

THE ASSOCIATION BETWEEN WORKPLACE LACTATION
ACCOMMODATIONS AND CORPORATE LACTATION PROGRAMS AND
BREASTFEEDING DURATION IN WORKING WOMEN

A Dissertation
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

By

Elizabeth Dianne Hilliard

In Partial Fulfillment of the Requirements
for the Degree of
DOCTOR OF PHILOSOPHY

Major Department:
Health, Nutrition and Exercise Sciences

November 2017

Fargo, North Dakota

North Dakota State University
Graduate School

Title

The association between workplace lactation accommodations and corporate lactation programs and breastfeeding duration in working women

By

Elizabeth Dianne Hilliard, MS, RD

The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

DOCTOR OF PHILOSOPHY

SUPERVISORY COMMITTEE:

Ardith Brunt, PhD, RD

Chair

Sherri Stastny, PhD, RD, CSSD, LRD

Donna Terbizan, PhD

Elizabeth Blodgett Salafia, PhD

Approved:

November 17, 2017

Date

Yeong Rhee, PhD, RD

Department Chair

ABSTRACT

Breastfeeding support has increased over the past 2 decades, especially in the workplace. The Patient Protection and Affordable Care Act of 2010 provided several protections for working, breastfeeding women. Prior to the passage of this legislation, the North Dakota State Legislature amended SB 2344 to create an Infant Friendly business designation available to any business or organization in the state providing specified lactation accommodations for their employees. While this amendment has been in effect since 2009, and the first cohort of businesses was designated in 2011, there has been no evaluation of this designation to determine effectiveness. The purpose of this research is to examine the difference in breastfeeding continuation rates between women working for Infant Friendly and non-designated businesses, and to identify how intention, self-efficacy, and other worksite factors influence breastfeeding duration. An 85-item online questionnaire was developed and distributed using various sampling methods to working women across the state of North Dakota. T-tests, Analysis of Variance, and forward step-wise regression were used to analyze results. While there was no statistically significant difference in breastfeeding duration between designated and non - designated businesses, there was a 3-month difference in duration between continually designated businesses and those letting their designation lapse. Participants disagreed that breastfeeding education was available from their employers. With regard to intention, women who intended to exclusively breastfeed did so with a four month longer duration than those with other feeding intentions, although the results were not statistically significant. Women who perceived only minor challenges with combining breastfeeding and working, and those with greater self-efficacy for breastfeeding had longer breastfeeding durations as well. While the designation is a starting point for worksite breastfeeding support, it could be more comprehensive. Adding a policy

promotion and breastfeeding education component to the designation may improve awareness and use of accommodations, making the designation more impactful. These additions may also aid in increasing breastfeeding intention and self-efficacy among working women, and decrease the perception of barriers.

ACKNOWLEDGEMENTS

I would like to acknowledge several people for their contributions toward this work. First, I would like to thank the North Dakota Breastfeeding Coalition, specifically BriAnna Wanner, Mikaela Schlosser, Mandy Burbank, Kim Hinnenkamp, and Kim Vance for their efforts with evaluating the survey instrument, providing contacts for employers and suggestions for survey distribution. Their support and enthusiasm for the project was a major motivating force in completing the data collection and analysis.

I would also like to thank Shannon David Misialek, PhD, ATC, LAT for her guidance on the use of SPSS and advice on statistical analyses. She was always a sounding board and full of encouragement and suggestions.

Madison Millner, a fantastic data collection partner who kept me motivated to keep going. You were full of suggestions and incredibly driven to push forward until we got all of the numbers we needed. You were never intimidated to call or email anyone and made sure to follow-up until you got answers!

Finally, I would like to thank, my committee, Donna Terbizan, PhD, Sherri Stastny, PhD, CSSD, RD, LRD, Elizabeth Blodgett Salafia, PhD, and especially, my advisor, Ardith Brunt, PhD, RD. Dr. Brunt gave me the freedom to explore, and the boundaries to complete! I appreciate all of the encouragement, feedback, editing, and deadlines. You know how to adapt your style to fit the needs of your student, and it works!

DEDICATION

I would like to dedicate this work to my family, especially my husband, James, and my children, Abby and Charlie. They tolerated so much of my stress, limited time, and constant preoccupation with deadlines (and grades). Without their ability to accept and adapt, this project would not have been possible. All the late nights studying, night classes, complaints about homework, Saturday and Sunday mornings and afternoons at the coffee shop, and exhaustion must have been hard to deal with for five years. I am so grateful for your patience.

I would also like to dedicate this to the seventeen women who piloted the survey instrument. I never imaged how many of you would jump at the opportunity to participate in this project. You shared your personal experiences and challenges through that questionnaire, and I cannot express the fullest extent of my gratitude. Your stories were amazing and showed how resilient women can be in the face of adversity. Your dedication to your children and breastfeeding is incredible!

Finally, I would like to dedicate this work to all mothers, regardless of feeding or parenting choices, race, religion, marital status, working status or any other demographic that often divides us. In the end, we are all doing what we can to be superwomen and balance the many roles that we choose to accept in life. When we come together, we can be a powerful force for change.

This piece was written to illuminate the need for better family support in the workplace. One day, we will get the ultimate family support, which is paid family leave, but until then, maybe this work can help find ways to adjust.

TABLE OF CONTENTS

ABSTRACT	iii
ACKNOWLEDGEMENTS	v
DEDICATION	vi
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF ABBREVIATIONS.....	xiii
CHAPTER 1: INTRODUCTION	1
Statement of the Problem	4
Purpose of the Study	4
Focus	5
Objectives/Hypothesis/ Research Questions.....	5
Objectives	5
Limitations	6
Definition of Terms.....	7
CHAPTER 2: REVIEW OF LITERATURE.....	11
Purpose of the Study	11
Introduction.....	11
History of Women in the Workforce.....	12
Conflicting Roles for Working Women	14
Breastfeeding Rates in the United States	16
Benefits of Breastfeeding.....	20
Working Mothers and Breastfeeding	23
Theories Used in Workplace Breastfeeding Promotion.....	24
Legislation Promoting Breastfeeding.....	31

Supporting Breastfeeding Working Women	35
Length of Maternity Leave and Whether It Is Paid or Unpaid	36
Returning to Work Part-Time vs. Full-Time	40
On-Site Childcare	42
Lactation Breaks	44
Dedicated Lactation Space	46
Lactation Equipment Provided by Employer	50
Access to a Lactation Consultant.....	53
Breastfeeding Education Provided by the Employer.....	54
Workplace Lactation Policy	56
Support from Administrators, Supervisors, and Coworkers.....	58
Gaps in the Present Research	61
CHAPTER 3: METHODS	63
Purpose of the Study	63
Population Sample and Sampling Procedures	64
Data Collection.....	65
Instrument.....	65
Procedures/ Research Design	71
Analysis	72
CHAPTER 4: A REVIEW OF WORKSITE LACTATION ACCOMMODATIONS: OCCUPATIONAL HEALTH PROFESSIONALS CAN ASSURE SUCCESS.....	74
Abstract	74
Background	74
Methods.....	78
Results	79

Discussion	82
Summary	88
CHAPTER 5: AN EXAMINATION OF THE IMPACT OF AN INFANT FRIENDLY BUSINESS DESIGNATION ON EMPLOYEE BREASTFEEDING DURATION	89
Abstract	89
Background	89
Methods	91
Results	94
Discussion	105
Summary	108
CHAPTER 6: THE INFLUENCE OF SELF-EFFICACY, PERCEPTION OF SUPPORT FOR BREASTFEEDING, AND WORKPLACE CULTURE ON BREASTFEEDING DURATION IN A SAMPLE OF WORKING WOMEN	109
Abstract	109
Background	109
Methods	111
Results	114
Discussion	118
Summary	123
CHAPTER 7: CONCLUSION	124
REFERENCES	128
APPENDIX A: IRB APPROVAL	145
APPENDIX B: PARTICIPANT RECRUITMENT EMAIL	146
APPENDIX C: EMPLOYER RECRUITMENT SCRIPT	147
APPENDIX D: INFORMED CONSENT	148
APPENDIX E: INFANT – FRIENDLY WORKSITE SURVEY	150

APPENDIX F: RESULTS OF QUANTITATIVE STUDIES EXAMINING THE EFFECT OF WORKPLACE ACCOMMODATIONS ON BF DURATION 166

APPENDIX G: RESULTS OF INTERNATIONAL QUANTITATIVE STUDIES EXAMINING THE EFFECT OF WORKPLACE ACCOMMODATIONS ON BF DURATION..... 177

LIST OF TABLES

<u>Table</u>	<u>Page</u>
3.1. Cronbach’s Alpha for Scale Reliability of Likert Responses	68
3.2. Interclass Correlation Coefficient Between Pilot Test Participant Responses	70
5.1. Demographics of Survey Participants.....	96
5.2. Breastfeeding Duration in Months by Infant Friendly Designation Status.....	98
5.3. Employee’s Self – Reported Use of Lactation Accommodations in Worksites	98
5.4. Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status	100
6.1. Maternal Self-Efficacy and Breastfeeding Duration in Months	116
6.2. Perception of Breastfeeding Supports in the Workplace and Mean (SD) Breastfeeding Duration in Months.....	117
6.3. Univariate Forward Step-Wise Regression Model for Effects of Self-Efficacy, Social Support, Work Culture, and Demographics on Breastfeeding Duration in Working Women	119

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
2.1. Theory of Planned Behavior in Relation to Breastfeeding.	27
2.2. The Social - Ecological Model and Workplace Breastfeeding.....	30
2.3. Interaction of the Theory of Planned Behavior and the Social - Ecological Model.....	31
2.4. Source of Funding for Maternity Leave Cash Benefits, 2013..	37
2.5. Child Care Assistance Graphic from 2014 National Survey of Employers.....	43
2.6. Leading Occupations Graphic from the United States Department of Labor Women's Bureau.....	47
2.7. Electric Breast Pump and Accessories.....	51

LIST OF ABBREVIATIONS

BF.....	Breastfeeding
CLC.....	Certified Lactation Consultant
CLP.....	Corporate Lactation Program
FLSA.....	Fair Labor Standards Act
FMLA.....	Family and Medical Leave Act of 1993
LC.....	Lactation Consultant
LLLI.....	La Leche League International
MICH.....	Maternal, Infant, and Child Health objectives for Healthy People 2020
PPACA.....	Patient Protection and Affordable Care Act
WIC.....	Women, Infants and Children Program

CHAPTER 1: INTRODUCTION

Since the early 1900's, the number of women in the workforce has steadily increased. At the turn of the twentieth century, 5.3 million women, 18.1% of all workers and 20.4% of women of working age, had joined the workforce (Schwellenbach, 1948). While there have been peaks and valleys in the number of working women, by 2016 women comprised 46.8% of the labor force (United States Department of Labor Bureau of Labor Statistics, 2017), constituting about 57% of women in the United States (United States Department of Labor Bureau of Labor Statistics, 2017). Since women are traditionally charged with caring for the home and family members (Ross, Mirowsky, & Ulbrich, 1983), this role in workforce has created a conflicting demand for women's time and energy.

Coincidentally, breastfeeding rates began decreasing around the time more women were joining the workforce. Before the turn of the twentieth century, breastfeeding was an absolute. It was the only viable option for feeding infants and was considered the norm (Jana, 2014; Wright & Schanler, 2001). Women typically breastfed for the first year of the child's life (Wolf, 2003). The question is, how did breastfeeding transform from an absolute to obsolete? There may be several reasons including: the rise of human milk substitutes, a lack of support from the medical community, geographic spreading of families, and increasing participation of women in the workforce (Hirschman & Butler, 1981; Wolf, 2003; Wright & Schanler, 2001).

Declining breastfeeding rates have become a public health concern for several reasons. Early human milk substitutes were typically animal based milks (Wolf, 2003). As these substitutes were developed prior to pasteurization, many infants became sick or died because of milk spoilage (Wolf, 2003). Even with the advent of pasteurization, infants still did not thrive when fed human milk substitutes (Wolf, 2003). Many health care professionals at this time noted

that human milk offered protection from a variety of childhood conditions (Wolf, 2003).

However, there was little information available the protective and beneficial components of human milk.

Today there are many known benefits of breastfeeding. Mothers, infants, businesses, the economy, and society at large all benefit from breastfeeding. One of the best-known benefits of breastfeeding is the bonding that occurs between a mother and her infant. However, mothers also benefit from less bleeding after delivery, quicker uterine involution, delay of future pregnancies, protection from postmenopausal hip fracture and osteoporosis, and decreased rates of certain cancers (American Academy of Pediatrics, 2012, 2014a). Breastfeeding also offers many benefits for infants. These include decreased rates of: several types of infant illnesses, infant mortality, and sudden infant death syndrome (American Academy of Pediatrics, 2012, 2014b). As adults, breastfed children may experience reduced rates of type 1 and 2 diabetes, leukemia, Hodgkin's disease, overweight and obesity, hypercholesterolemia, eczema, allergies, and asthma (American Academy of Pediatrics, 2012, 2014b). Economic and societal benefits of breastfeeding are also well documented. With regard to businesses, employers that support breastfeeding may experience lower insurance costs, less employee absenteeism, increased employee loyalty and retention (United States Department of Health and Human Services, 2008; Welch, Wiehe, Palmer-Smith, & Dankoski, 2011). On a societal level, breastfeeding may decrease rates of chronic illness and place less burden on the health care system in general. Research suggests that if 90% of children in the United States were breastfed according to recommended guidelines it could save \$18.5 billion dollars per year in health care costs (Bartick et al., 2017). The savings would, in part, result from decreases in direct and indirect costs related

to treating various acute and chronic pediatric and maternal medical conditions, and from saving 3,340 preventable, premature deaths each year (Bartick et al., 2017).

The documented health and economic benefits of breastfeeding and inadequate breastfeeding rates have prompted many public health initiatives aimed at increasing breastfeeding rates. Some of these initiatives are aimed at increasing breastfeeding initiation rates, while others target duration. As initiation rates are now at a national average of 81.1% compared to the lowest point of 24% in 1971 (Centers for Disease Control and Prevention, 2016; Wolf, 2003), efforts are turning to promoting breastfeeding duration. As working outside the home has often been cited as barrier to continued breastfeeding (Chuang et al., 2010; Eldridge & Croker, 2005; Garvin et al., 2013; Kimbro, 2006), public health initiatives have been implemented to support employed, breastfeeding women. These mainly focus on creating breastfeeding supportive worksites. Healthy People 2020 includes an objective for increasing the percentage of employers offering worksite lactation support programs from 25% to 38% by 2020 (Department of Health and Human Services, 2016). In addition, federal legislation was passed in 2010 that mandates employers with 50 or more employees provide reasonable break time and a private space – other than a bathroom – for employees to express milk (United States Breastfeeding Committee, 2013). This landmark legislation, called the “Break Time for Nursing Mothers” law, is part of section 4207 of the Patient Protection and Affordable Care Act (PL 111-148) or PPACA, and is a first step in securing basic lactation accommodations for working women (United States Breastfeeding Committee, 2013). While lactation breaks and spaces are essential in promoting breastfeeding in the workplace, there are many other lactation accommodations that support breastfeeding mothers.

Statement of the Problem

The problem is suboptimal breastfeeding duration rates as evidenced by 6 month rates at 51.8%, and 12 month rates at 30.7% (Centers for Disease Control and Prevention, 2016). The American Academy of Pediatrics Policy Statement on Breastfeeding and the Use of Human Milk includes a recommendation for infants to be breastfed for the first 12 months of life. Working outside the home is one of the factors contributing to low breastfeeding duration rates. Since accommodating breastfeeding in the workplace is a public health initiative, assessing the effectiveness of these accommodations is warranted in order to maximize public health benefits.

Purpose of the Study

The purpose of this study is to examine whether worksite lactation accommodations are effective in increasing breastfeeding duration as they are currently implemented. While some research in the United States and internationally has examined the association of breastfeeding duration and various workplace breastfeeding accommodations and corporate lactation programs (CLP), what is unclear is whether breastfeeding initiation and duration has improved with implementation of accommodations. Very few studies have compared duration rates within a business prior to the implementation of lactation accommodations and after they were implemented. Additionally, there has been little comparison of breastfeeding duration between businesses who offer more comprehensive lactation accommodations and those with fewer or no lactation accommodations. In order to determine if lactation accommodation and Infant Friendly business designations are effective, assessing their implementation strategies and breastfeeding duration among employees is critical.

Focus

The focus of this study is to explore the differences in breastfeeding initiation and duration rates based on the perception of breastfeeding support in the workplace. This study will expand on the current literature by comparing the breastfeeding duration and work environments of North Dakota businesses that are Infant Friendly designated and those that are not. In North Dakota, businesses can apply to be designated as Infant Friendly through the North Dakota Department of Health (North Dakota Department of Health, 2011). In order to earn this designation, a business must have the following: a workplace lactation policy; flexible break time for milk expression; a private, comfortable space – other than a bathroom – for milk expression; a place to safely store human milk; and source of potable water close to the designated space for milk expression (North Dakota Department of Health, 2011). Since 2011, 98 employers in North Dakota have earned this designation (North Dakota Department of Health, 2011b). While this designation is important in facilitating breastfeeding in North Dakota worksites, there has been no research exploring whether the designation is promoting breastfeeding duration as intended.

Objectives/Hypothesis/ Research Questions

Objectives

1. What is the average employee breastfeeding duration in months for those employed by Infant Friendly designated businesses and those that are not designated?

Hypothesis: The average employee breastfeeding duration in months will be longer for those employed by Infant Friendly businesses.

2. What are the most commonly offered lactation accommodations by Infant Friendly designated and non- designated employers?

3. What is the perceived level of support for breastfeeding in Infant Friendly designated and non-designated businesses?

Hypothesis: Women employed by Infant Friendly designated businesses will report higher levels of support for breastfeeding in their workplace.

4. What improvements are needed to fully support breastfeeding in the worksite?
5. How do differences in maternal intention, self-efficacy, culture, and social support influence any associations seen between the workplace environment and breastfeeding duration in working mothers?

Limitations

There are several limitations to this study. First, while the non-Infant Friendly designated businesses will serve as a control group, determining the cause and effect relationship between the designation and breastfeeding duration is not possible. There was no measure of the breastfeeding duration in the Infant Friendly designated businesses before they obtained their certification. Therefore, this research is only able to show associations between the designation, breastfeeding duration, and perceived support.

Secondly, there was not an equal distribution of business sizes in the control and Infant Friendly group. There are relatively few businesses that are designated compared with those that are not designated. Additionally, while many Infant Friendly businesses were willing to distribute the questionnaire used in this study, many of the non-designated businesses were not. This made sampling matching difficult. Therefore, comparisons between the business types may not be equivalent.

While this study attempted to take some confounding variables into account such as intention, demographics, type of job, size of company, awareness of accommodations and

worksite lactation policy, and perception of support for breastfeeding, there are certainly many other confounders that could influence breastfeeding duration. Therefore, the workplace environment for breastfeeding may not be the only factor influencing breastfeeding duration.

Finally, while this study may be indicative of the association of the business designation on breastfeeding duration in North Dakota, it may not be indicative of this association in other parts of the United States. There are regional variations in breastfeeding initiation and duration rates (Centers for Disease Control and Prevention, 2016). Therefore, other regional, cultural, and environmental factors may influence breastfeeding in other parts of the U.S., which could not be predicted by this study.

Definition of Terms

Any Breastfeeding - Any amount of human milk offered. Indicates that an infant received some human milk, but may have also received another type of milk such as infant formula, or cow's milk (Bonet et al., 2013).

Breast milk – Milk produced by the mammary glands in a woman's breast (American Academy of Pediatrics, 2015). Also see **human milk**.

Breast pump – A device used to remove human milk from the breast. Varieties include: manual pumps, which are operated by hand; electric retail pumps, which are operated with an electric motor and designed for daily use by one mother; hospital grade pumps, which are designed for heavy use by multiple mothers are typically available for rental from durable medical suppliers (Medela, 2016b, n.d.-b)

Breastfeeding – Provision of human milk either directly from the breast or from a bottle if expressed (Balkam, Cadwell, & Fein, 2011).

Breastfeeding Initiation – Putting an infant to breast some time after birth (also known as Ever Breastfed) (Centers for Disease Control and Prevention, 2014b).

Certified Lactation Counselor or Consultant – A person who provides education and counseling on breastfeeding. This person is a credentialed professional who meets standards for work experience, completion of a training course, and passing a certification exam, and recertifying every 3 – 5 years. Organizations offering these certifications include the Academy of Lactation Policy and Practice and International Board of Lactation Consultant Examiners (Centers for Disease Control and Prevention, 2014b).

Corporate Lactation Program – A program intended to assist employees in maintaining breastfeeding once they return to work. This type of program consists of: a workplace lactation policy; a designated space (other than a bathroom) for milk expression or breastfeeding an infant; refrigerator for storing milk and access to a potable water supply for cleaning milk expression equipment; access to a lactation consultant from pregnancy through termination of breastfeeding; lactation breaks; availability of breast pumps; and, in some instances, on-site childcare for those wishing to nurse their infants during the work day (Bar-Yam, 1998b).

Exclusive Breastfeeding – Provision of human milk as the only source of milk. These infants may be taking complementary foods, water, or small quantities of juice if age appropriate (Bonet et al., 2013). In some sources it may also be listed as **Almost Exclusive Breastfeeding**.

Human milk – The preferred term for breast milk. Milk produced by the mammary glands in a woman's breast (American Academy of Pediatrics, 2012, 2015).

Infant Friendly – Adopting policies that support and promote breastfeeding (North Dakota Department of Health, 2011a).

Lactation Accommodation – A benefit provided by an employer that is intended to aid the employee in continuing to breastfeed upon return to work (California Breastfeeding Coalition, n.d.).

Lactation Breaks – A reasonable amount of time that allows for a mother to express human milk to feed her child. This break time does not have to be paid (National Conference of State Legislatures, 2015).

Lactation Space – A space in the workplace designated for employees to express human milk or breastfeed an infant (Bar-Yam, 1998a).

Lactation Support – The availability of some of the components of a corporate lactation program without the structure of a formal program. Typically this includes any combination of the presence of a workplace lactation policy, designated lactation space, lactation breaks, and/or breast pumping equipment (Bar-Yam, 1998b).

Milk Expression – The act of removing human milk from the breast (Geraghty & Rasmussen, 2010).

Occupational Health Nurse – A nurse whose role is to promote and maintain health in an organization (Rietz & McCullagh, 2010).

Partial Breastfeeding – Provision of a combination of human milk and infant formula (Dabritz, Hinton, & Babb, 2009).

Workplace Lactation Policy – A formal policy put forth by a company or organization for the purpose of supporting employees in providing their infants with human milk. At a minimum, this policy should address: flexible use of normal break time for expressing human milk; the provision of a clean, private, designated space – that is not a bathroom - for expressing human milk; a potable water source close to designated lactation space and a refrigerator for

storing human milk; and outline a pre-determined channel of communication for informing all employees of the policy (North Dakota Department of Health, 2011).

CHAPTER 2: REVIEW OF LITERATURE

Purpose of the Study

The purpose of this study is to examine whether worksite lactation accommodations are effective in extending breastfeeding duration as they are currently implemented. While some research in the United States and internationally has examined the association of breastfeeding duration and various workplace breastfeeding accommodations and corporate lactation programs (CLP), there is less research regarding whether breastfeeding duration has improved with implementation of accommodations. Very few studies have compared breastfeeding duration rates among working women within a business prior to the implementation of accommodations and after. Additionally, there has been little comparison of breastfeeding duration between businesses offering more comprehensive lactation accommodations and those with fewer or no lactation accommodations. Assessing accommodation implementation strategies and identifying accommodations that promote breastfeeding initiation and longer duration can maximize effectiveness of the accommodations and CLP's.

Introduction

In order to understand the need for worksite lactation accommodations, it is necessary to understand the evolution of women in the workforce. Women in the workforce face unique challenges once they bear children and return to work. Role conflict is one such challenge, and when combined with lack of extended family support and lack of support in the workplace, it may endanger breastfeeding initiation and duration. The following discussion is intended to explore the relationships between these challenges and the decline in breastfeeding initiation and duration. An in-depth discussion of workplace lactation accommodations and the domestic and international research currently available on these accommodations is also included. Together,

this information should paint a descriptive picture of the historic and current workplace lactation environment.

History of Women in the Workforce

In 1870 there were approximately 1.9 million women, age 10 years and older, in the U.S. workforce accounting for 14.8% of all workers and 13.3% of all women of working age (Schwellenbach, 1948). By the turn of the century, that number rose to 5.3 million accounting for 18.1% of all workers and 20.4% of women of working age (Schwellenbach, 1948). The number of women in the workforce continued to rise during the Depression Era, as many women had to secure employment in order to compensate for their husbands' lost wages (National Women's History Museum, 2007). Additionally, the positions affected most during the Great Depression were male dominated, whereas, teaching, nursing, and light manufacturing positions, dominated by women, did not experience the same level of decline (National Women's History Museum, 2007). Thus, job losses were more extensive for men than women. During this era, President Franklin Delano Roosevelt enacted the New Deal which increased wages for women, established a standard work week, gave women bargaining power, and created additional job opportunities for women (National Women's History Museum, 2007). The New Deal created a more favorable work environment for women, which furthered their interest in working.

By the end of the Great Depression, World War II was escalating in Europe, and the United States would inevitably join the battle. After the U.S. entered the war, women were once again summoned to work in heavy industries in positions such as, chemical, rubber and petroleum production, which had been vacated by men who were deployed (National Women's History Museum, 2007). According to Schwellenbach (1948), during the World War II years, 1941 – 1945 for the United States, the proportion of women workers in most sectors increased,

especially in clerical and operative jobs. Once World War II ended, the number of women in the workforce declined; however, these numbers remained higher than pre-War levels. By 1947, 16.3 million women were in the U.S. workforce, accounting for 27.6% of all workers and 29.8% of women of working age. However, the proportion of women in the workforce aged 20 – 34 had decreased. Many of the women in this demographic married after having to delay the event until after World War II ended, or they decided to devote themselves to home life upon the return of their husbands from the war. Many of the women who remained in the workforce after the war were single, widowed, or divorced. The smallest proportion of workers was among married women, who made up about one-fifth of women workers (Schwellenbach, 1948). Because the majority of women working during this time were single, they could work without any need of family accommodations.

Although the number of women in the workforce declined after World War II, by 1954, there were more women in the workforce than ever before (Public Broadcasting Service, 2001). Many women held service positions such as teachers, nurses, waitresses, secretaries, and some held light manufacturing jobs. Another turning point for working women came with the invention of oral contraceptives. Women could control the timing of pregnancy, allowing them to pursue their education or career goals. Women aspired to move from the lower paying service professions to professional positions (Public Broadcasting Service, 2001).

By 1970, the percentage of workforce jobs held by women had increased to just under 40% (United States Department of Labor Women's Bureau, n.d.). Each decade since 1970 has seen an increase in this percentage. By 2012, the percentage had again risen another 10%, to just under 50% (United States Department of Labor Women's Bureau, n.d.). From 1970 to 2012, the percentage of working women with a college degree had also risen from 11.2% to 38% (United

States Department of Labor Women's Bureau, n.d.). As of 2014, women comprise 46.8% of the labor force and this constitutes about 57% of women in the United States (United States Department of Labor Bureau of Labor Statistics, 2017; United States Department of Labor Bureau of Labor Statistics, 2017).

Women choose to work for a variety of reasons. Two of the most common reasons are the desire to pursue a career and supplementing their family's income or benefits. The Working Mother Research Institute and Ernst & Young (2011) conducted a survey of 3700 working and stay-at-home mothers regarding their choices to stay home or work. Of the women who were surveyed, 71% felt that earning a paycheck was the main reason to work (Working Mother Research Institute, 2011). The survey also identified that stay-at-home moms may have career aspirations, and 55% of these mothers would rather be working than staying at home (Working Mother Research Institute, 2011). Additionally, of the mothers staying home, only 20% did so because they had the aspiration to be a stay-at-home mom (Working Mother Research Institute, 2011). The reasons women gave for staying home with children included: cost of childcare; lack of affordable childcare; the needs of the children; lack of part-time and flexible work options; husband or other family members expected they would stay home; and lack of supportive management at work (Working Mother Research Institute, 2011). This may indicate that women may feel forced to choose between work and motherhood, or that if they choose to work, they will not have the resources or support to successfully combine work and motherhood.

Conflicting Roles for Working Women

Pursuing higher education and participating in the workforce created a new dilemma for women. Women were traditionally charged with home, child, and elder care (Ross et al., 1983). As women entered the workforce, it became more difficult to balance the role of home/family

caretaker with that workforce laborer. Survey research conducted by The Pew Research Center in 2013 indicated that 51% of working mothers with children under age 18 who participated in the survey reported they had difficulty advancing in their career because of the demands of family life (Parker, 2015). In contrast, only 16% of the working fathers who participated reported this difficulty (Parker, 2015). Additionally, 42% of the women surveyed reported losing ground on career advancement because of family obligations or the need to reduce the number of hours worked to allow more time to family (Parker, 2015). Finally 27% of women surveyed reported quitting their job to attend to family matters (Parker, 2015). Ten percent of the women who quit their job or decreased their work hours as a result of family obligations regretted doing so (Parker, 2015).

Results of the Pew Research Center (Parker, 2015) and Working Mother Research Institute (2011) surveys indicate that women in the United States perceive conflict between their roles in the workplace and in the home. Given that, historically, women have comprised a minority of the total workforce, it is understandable that their role may not be clear. British researchers have examined these unclear expectations in regard to what is considered the “norm” in a workplace. As stated in Gatrell (2007), Dr. Nirmal Puwar discusses in her book *Space Invaders: Race, Gender, and Bodies Out of Place*, that a woman’s mere physical shape confuses the workplace as it deviates from the “norm”, the male body. When this difference is accentuated by factors like pregnancy or lactation, the work environment becomes even more strained. Australian researchers have examined the concept of “misplaced” women in the workforce as well. Hausman (2004) stated that women are treated as female men in the workforce. The unique differences and needs of women in the workforce are therefore, treated as disabilities (Hausman, 2004). Pregnancy, for example, could be considered a unique illness or disability for a “female

male” (Hausman, 2004). Pregnancy also has a definite ending point, which can then return the “female male” to a normative state (Hausman, 2004). However, lactation is so removed from the realm of the normal male worker, that even considering it a disability cannot “normalize” the practice for the work environment (Gatrell, 2007; Hausman, 2004). If women were to conform to the male dominated workforce, it would leave them with the following options: hide or do not engage in any female behavior such as breastfeeding; engage in the behavior and accept criticism or risk termination; or do not work at all.

Breastfeeding Rates in the United States

Before the twentieth century, breastfeeding was considered the norm and also essential to infant survival (Jana, 2014; Wright & Schanler, 2001). Typically women breastfed their infants past 1 year of age (Wolf, 2003). In the late 1800’s, women began feeding their young infants, under 3 months of age, unpasteurized cow’s milk (Wolf, 2003). This had become so commonplace, that by the early 1900’s doctors wondered if a woman would even initiate breastfeeding (Wolf, 2003). Public health officials recognized that unpasteurized milk was not ideal for infants when they noticed that 53% of infant deaths resulted from diarrhea caused by unpasteurized milk (Wolf, 2003). Physicians during this time were acutely aware that breastfeeding carried great benefits that protected infants from illness and that “hand” or bottle feeding of cow’s milk did not provide this protection (Wolf, 2003).

Despite public health interventions and lobbying from physicians, use of human milk substitutes continued to increase. Many cities initiated nurse home visit programs to new mothers aimed at encouraging women to breastfeed and avoid human milk substitutes (Wolf, 2003). While these programs did promote breastfeeding, some cities, like Chicago, still struggled to increase breastfeeding rates. In 1912, the exclusive breastfeeding rate in Chicago was 39%

(Wolf, 2003). Unfortunately, the advent of pasteurization did not help the breastfeeding crusade. Many of the infant deaths from cow's milk occurred because the milk was "unclean" (Wolf, 2003). Once pasteurization became available, many practitioners began to consider cow's milk safe and ideal (Wolf, 2003). Breastfeeding rates declined further between 1930 and 1970 as physicians and health care providers continued to devalue human milk (Wolf, 2003). In 1971, the U.S. breastfeeding rate finally reached its lowest point with only 24% of mothers even initiating breastfeeding (Wolf, 2003).

The popularity of human milk substitutes may have increased for a variety of reasons. The most commonly cited reasons are increasing numbers of women entering the workforce during the early twentieth century and the spreading of extended families over large geographic areas (Hirschman & Butler, 1981; Wright & Schanler, 2001). As women began spending more time in the workforce and less time in the home, human milk substitutes became an efficient and appealing alternative to breastfeeding (Hirschman & Butler, 1981). Additionally, healthcare practitioners considered use of human milk to be outdated and actually encouraged early weaning and use of bottle feeding (Wolf, 2003). One of the reasons healthcare practitioners encouraged bottle feeding was aggressive marketing by the infant formula industry. Feeding animal milks to human babies is a centuries old practice: however, commercial infant foods were not readily available until the mid – 1800's after the invention of evaporated and condensed milks (Stevens, Patrick, & Pickler, 2009). By 1883, many alternate infant feeding options were available and by 1929, the first non-milk based formula made of soy was available. By the 1950's, the aggressive marketing from the infant formula industry had convinced parents and the healthcare community that artificial feeding was a safe and acceptable practice, again perpetuating the decreasing rates of breastfeeding (Stevens et al., 2009). During this time frame

families also began to spread geographically, which is another barrier to breastfeeding (Wright & Schanler, 2001). Older generations, which may have experience with breastfeeding, were now geographically separated from the younger childbearing generations. This isolated mothers from familial support, again making human milk substitutes an appealing option.

A resurgence in breastfeeding began in the 1970's. Several national organizations, such as the National Council of Churches' Interfaith Center on Corporate Responsibility and the Infant Formula Action Coalition, began breastfeeding promotion campaigns (Stevens et al., 2009). La Leche League International (LLLI), which began in the United States 1956, was also making progress in promoting breastfeeding during the 1970's (La Leche League International, 2014). In 1971 during the 4th International Conference in Chicago, IL, LLLI hosted Princess Grace of Monaco, which garnered a great deal of publicity for the group and breastfeeding (La Leche League International, 2014).

Through the efforts of these breastfeeding promotion organizations, breastfeeding rates begin to improve during the 1970's. In 1972, breastfeeding rates jumped 4% from 1970, and continued to increase by 3% per year for the remainder of the decade (La Leche League International, 2014). Breastfeeding rates continued to increase steadily, but much more slowly during the next 30 years (Stevens et al., 2009). While rates have been slowly increasing over the past 4 – 5 decades, they still had peaks and valleys. In the 1980's initiation rates fell between 1984 and 1989 from 60% to 52% (Wolf, 2003). Initiation rates struggled to rebound until 1995, when the initiation rate finally returned to 60% (Wolf, 2003). The rebound seen in the late 1980's into the 1990's has been partially attributed to the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). During this time frame, Congress enacted legislation requiring the United States Department of Agriculture (USDA) to promote

breastfeeding among the WIC population (United States Department of Agriculture, 2015), a population generally considered least likely to breastfeed (Wolf, 2003). The legislation was enacted in 1989 and further provisions were specified in 1992 (United States Department of Agriculture, 2015). Consequently, the gains seen in breastfeeding initiation rates were among the WIC eligible population (Wolf, 2003).

The increase in breastfeeding initiation rates also coincides with a rise in married women with a child less than 1 year old who work, indicating that many working women initiated breastfeeding (Wright & Schanler, 2001). Through the 1990's, part-time work was associated with higher initiation and duration rates than full-time (Wright & Schanler, 2001). Interestingly, women who worked full-time were as likely to initiate breastfeeding as those who were planning to stay home; however, they were more likely to terminate breastfeeding sooner (Wright & Schanler, 2001).

By 2001, breastfeeding initiation rates had increased to 69.5% (Wolf, 2003). By 2005, the breastfeeding initiation rate was at 74.1% and 76.7% by 2010 (Centers for Disease Control and Prevention, 2014a). The latest confirmed initiation rate was 81.1% in 2016 (Centers for Disease Control and Prevention, 2016). The initiation rate varies considerably by state with Alaska, California, Hawaii, Idaho, Minnesota, and Utah boasting initiation rates above 90% while Mississippi fell below 60% (Centers for Disease Control and Prevention, 2016). Additionally, the initiation rates are much higher than rates at 6 months. In 2016, the national rate for any breastfeeding at 6 months was 51.8%, and by 12 months this rate dropped to 30.7% (Centers for Disease Control and Prevention, 2016).

Healthy People 2020 goals are to increase the breastfeeding initiation rate to 81.1% and any breastfeeding at 6 and 12 month to 60.6% and 34.1% respectively (Department of Health

and Human Services, 2016). The recommendations for exclusive breastfeeding at 3 and 6 months are 46.2% and 25.5%, respectively (Department of Health and Human Services, 2016). Ideally, all women who have given birth would initiate breastfeeding and continue to provide human milk for 12 months. However there are a some instances when breastfeeding is not recommended, e.g. maternal HIV/AIDS or human T-cell lymphotropic virus type I or II, or infant has a metabolic disease requiring exclusion of one or more components of human milk (American Academy of Pediatrics, 2012). It should be noted that the contraindications to breastfeeding are all rare, so the proportion of individuals advised against breastfeeding is relatively small (American Academy of Pediatrics, 2012). Breastfeeding until 6 months and beyond is ideal as longer durations provide more benefits for mothers and infants. Infants exclusively breastfed at 6 months have lower rates of gastrointestinal illnesses, respiratory illnesses, and otitis media (ear infection) than those exclusively breastfed for 4 months or not at all (American Academy of Pediatrics, 2012). In short, the more human milk infants take over an extended period of time, the healthier they are.

Benefits of Breastfeeding

The American Academy of Pediatrics Policy Statement on Breastfeeding and the Use of Human Milk (2012) reinforces the recommendations for breastfeeding infants exclusively for the first 6 months of life, meaning no complementary foods or fluids should be given during this time (American Academy of Pediatrics, 2012). After 6 months, continued breastfeeding is recommended along with the addition of age appropriate complimentary foods until at least 12 months (American Academy of Pediatrics, 2012). Complementary infant foods are discouraged before 6 months of age and considered inappropriate before 4 months of age (American Academy of Pediatrics, 2012). The AAP recommendations are based on research indicating a

dose response between breastfeeding duration and infant health. Additionally, breastfeeding benefits maternal, corporate, and societal health (American Academy of Pediatrics, 2014a; Bartick & Reinhold, 2010; United States Department of Health and Human Services, 2008).

The benefits of breastfeeding for mother and child are well-documented. Benefits to infants include reduced rates of bacterial meningitis, bacteremia, diarrhea, respiratory tract infections, necrotizing enterocolitis, otitis media, urinary tract infection, sepsis in preterm infants, infant mortality, and sudden infant death syndrome (American Academy of Pediatrics, 2012, 2014b). Other benefits for infants and children include analgesia during painful procedures, and possible improved performance on cognitive tests (Agarwal, 2011; American Academy of Pediatrics, 2012). Once breastfed children become adults, they continue to benefit from early breastfeeding. Adults who were breastfed as infants experience reduced rates of type 1 and 2 diabetes, leukemia, Hodgkin's disease, overweight and obesity, hypercholesterolemia, eczema, allergies, and asthma (American Academy of Pediatrics, 2012, 2014b). Benefits for the mother include less bleeding after delivery, increased rate of uterine involution, increased spacing between children, earlier return to prepregnancy weight, reduced risk of breast and ovarian cancers, and possible decreased risk of postmenopausal hip fractures and osteoporosis (American Academy of Pediatrics, 2012, 2014a). Bonding between mother and baby is, however, one of the most recognized benefits of breastfeeding (American Academy of Pediatrics, 2012, 2014a).

Breastfeeding may provide significant benefits for employers by promoting the health of their employees and families. For each employee who breastfeeds a child, employers can save approximately \$400 in health care costs during the child's first year of life (United States Breastfeeding Committee, 2002). These savings are a direct result of lower rates of illness among

breastfed babies (United States Breastfeeding Committee, n.d.) leading to fewer work absences (United States Breastfeeding Committee, 2002). Mothers of formula fed infants miss more than twice as many days of work as mothers of breastfed infants (United States Department of Health and Human Services, 2008). Per 1,000 never-breastfed infants, parents of these infants may miss an extra 2,000 hours of work (2 hours per parent), equaling up to 1 year of missed work days (United States Breastfeeding Committee, n.d.). Additionally, for every \$1 employers invest in breastfeeding support, they save \$3 in costs related to absenteeism and healthcare (United States Breastfeeding Committee, 2002). When an employer provides breastfeeding support, employees have higher morale, are more loyal to the company, and are more productive (United States Department of Health and Human Services, 2008). Lactation support from the employer also helps to ease a new mother's transition back to work, meaning employees are more likely to return to work after the birth of a child (Galtry, 2003; United States Department of Health and Human Services, 2008). Companies providing lactation support programs have employee retention rates of 94.2% compared to the national average of 59% (United States Department of Health and Human Services, 2008). Retaining employees carries a significant financial benefit to businesses. Businesses incur fewer expenses for recruiting, hiring, and training new employees; or for securing temporary employees until a permanent replacement can be found (United States Department of Health and Human Services, 2008). Breastfeeding support may be an important recruitment strategy in attracting qualified employees striving to maintain balance between work and family (Welch et al., 2011).

The improved health of mothers and infants that results from breastfeeding can ultimately lead to improved societal health as well. In a 2017 update of their previous 2010 research, Bartick et al. estimated the United States would save \$18.5 billion per year in 2014 dollars if

90% of children were exclusively breastfed according to breastfeeding guidelines. The savings would result from decreases in direct and indirect medical costs related to treating various acute and chronic maternal and pediatric medical conditions, and from saving 3,340 lives (Bartick et al., 2017). Bartick examined cost savings in areas outside of health care in previous research from 2011. She estimated that if 90% of families complied with breastfeeding guidelines, \$3.9 billion per year in 2007 dollars could be saved on formula expenses (Bartick, 2011). Bartick (2011) also took into account the expenses that would be incurred as a result of increased breastfeeding rates. Breastfeeding mothers would likely eat more than non-breastfeeding mothers, so the increased cost of food for these mothers would be \$1.6 – 2.1 billion per year in 2007 dollars (Bartick, 2011). Hospitals would incur another \$0.145 billion dollars per year in 2007 dollars to support Baby-Friendly Hospital Initiatives to promote breastfeeding initiation (Bartick, 2011). Finally, the biggest cost to society would be implementing 12 weeks of partially paid (55%) maternity leave for working mothers which would cost \$6.2 billion per year in 2007 dollars (Bartick, 2011). Even with the added costs of supporting, promoting, and achieving 90% compliance rates with current breastfeeding recommendations, the financial benefits in health care and other savings (\$10 – 13 billion at that time) would have still outweighed the costs by an average of \$8.7 billion per year in 2007 dollars (Bartick, 2011). These findings indicate that breastfeeding has a positive impact on the economy of the United States and could promote not only better health of U.S. citizens but also bring money back into the economy.

Working Mothers and Breastfeeding

Approximately 40% of all women who give birth, whether employed prior to birth or not, are working within 3 months (Han, 2008). Another 20% are working within 9 months (Han, 2008). Of women who were employed prior to the birth of a child, approximately 70% return to

work within 3 months and almost 90% within 9 months (Han, 2008). When women return to work after having a child, they face significant time demands of combining work and family life, which can create a barrier to breastfeeding (Chuang et al., 2010; Eldridge & Croker, 2005; Garvin et al., 2013; Kimbro, 2006). While these women may devote the time to breastfeeding during maternity leave, after returning to work, they may encounter time and stamina barriers for combining both. This may create a need to choose one or the other, with breastfeeding being the easier of the two to discontinue.

Working has been continually cited as a risk factor for early breastfeeding cessation related to a real or perceived incompatibility of combining both. Studies have demonstrated that breastfeeding cessation is most likely the month before, during, and immediately after return to work (Kimbro, 2006). Given the large percentage of mothers who return to work, the challenges of combining breastfeeding and work, and the low rates of breastfeeding at 6 and 12 months, workplace breastfeeding supports may be crucial for working, breastfeeding mothers. In fact, some suggest that in order to further improve breastfeeding duration rates, more attention must be given to workplace breastfeeding promotion (Wright & Schanler, 2001).

Theories Used in Workplace Breastfeeding Promotion

Two theories commonly used with workplace breastfeeding promotion are the Theory of Planned Behavior (Stewart-Glenn, 2008) and the Social-Ecological model (Greene & Olson, 2008; Greene, Wolfe, & Olson, 2008; Hirani & Karmaliani, 2013a). Other models and theories used less frequently include: the ABC Model of Attitude Development (Chow, Wolfe, & Olson, 2012); Transtheoretical Model (Garvin et al., 2013); Foucault's Notions of Subjectivity, Technologies of Power, and the Self (Payne & Nicholls, 2010); Policy Theory (Abdulloeva & Eyler, 2013); and the Tailored Design Method (Hojnacki, Bolton, Fulmer, & Olson, 2012).

The Theory of Planned Behavior attempts to predict intention to engage in a behavior (Schifter & Ajzen, 1985). Intention is influenced by: attitudes toward the behavior; the perception that a given behavior will have a beneficial outcome; subjective norms regarding the behavior, which are perceptions about whether a behavior is socially acceptable; social norms for the behavior, which relate to whether others in the social group actually engage in the behavior; perceived behavioral control, a measure of whether a person believes he or she can successfully engage in the behavior; and perceived power, relating to whether the person believes supports are available to facilitate performing the behavior (Schifter & Ajzen, 1985).

With regard to breastfeeding research, applying the Theory of Planned Behavior may provide insight on why women do or do not breastfeed. First, a woman's intention to breastfeed during pregnancy may be a predictor of whether she breastfeeds once the baby is born (Duckett et al., 1998; Hirani & Karmaliani, 2013b). A woman may be more likely to initiate breastfeeding and breastfeed for longer if she intended to do it prior to giving birth (Duckett et al., 1998). With regards to whether a mother will continue to breastfeed after she returns to work, intention can again be a potential predictor (Hirani & Karmaliani, 2013b). A mother who has no intention of breastfeeding once she returns to work, may be more likely to wean before returning to work or shortly thereafter. Commitment to breastfeeding may also play a role in solidifying intention and prolonging breastfeeding duration. A stronger commitment to breastfeeding may prolong breastfeeding duration (Hirani & Karmaliani, 2013b; Stewart-Glenn, 2008).

Research using the Theory of Planned Behavior in breastfeeding promotion has shown three facilitators of intention are key in predicting whether a woman initiates and continues breastfeeding. These are subjective norms, attitude, and perceived control (Dick et al., 2002). Subjective norms may be influenced by the level of perceived social support available from

others, including spouse, family, friends, and coworkers (Stewart-Glenn, 2008). If a mother perceives she has support in her social circle for breastfeeding (indicating a social norm in favor of breastfeeding) she may develop breastfeeding intentions which could be predictive of longer duration (Stewart-Glenn, 2008). With regards to attitude, negative attitudes toward breastfeeding are associated with shorter breastfeeding duration, especially among first time mothers who experience a lack of perceived control for breastfeeding success (Dick et al., 2002). When combined, subjective norms that cause a mother to feel disapproval for breastfeeding, negative attitudes toward breastfeeding, and the mother believing she is not in control of breastfeeding success can shorten breastfeeding duration (Dick et al., 2002). Figure 1 shows the Theory of Planned Behavior model and demonstrates how breastfeeding behavior may be predicted through its constructs.

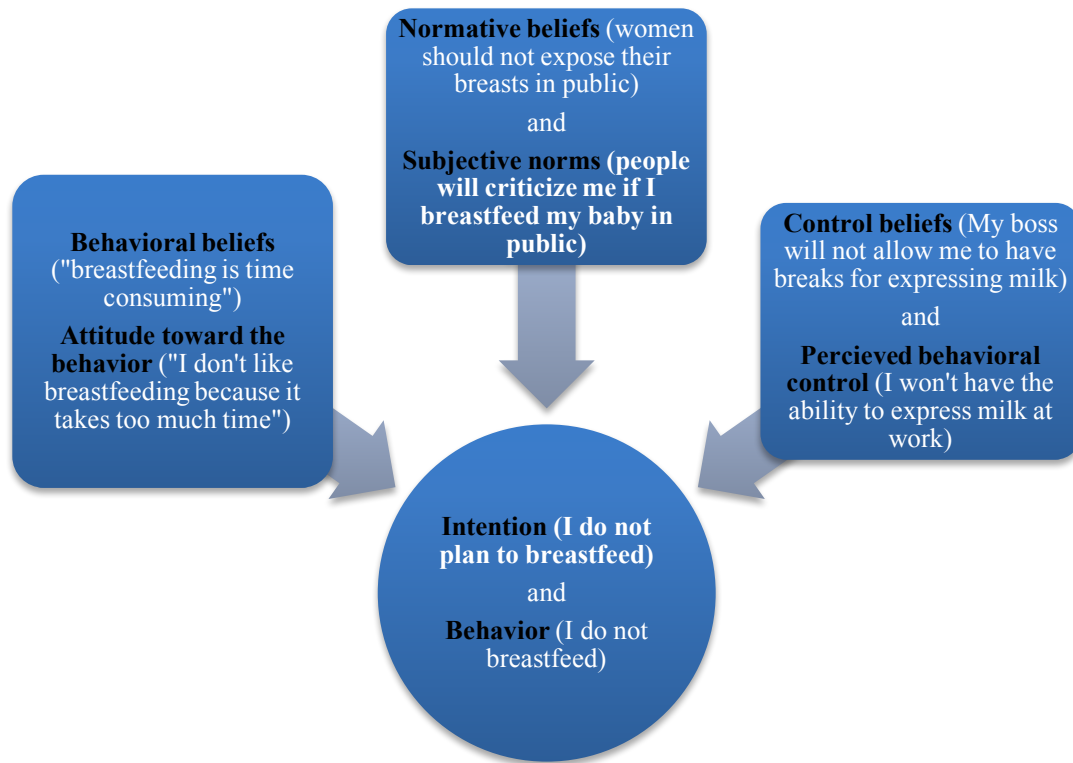


Figure 2.1. Theory of Planned Behavior in Relation to Breastfeeding (Boston University School of Public Health, 2013).

The Social-Ecological Model is also prevalent in breastfeeding research. This model proposes that an individual's behavior is determined by a combination of intrapersonal, interpersonal, and environmental factors (McLeroy, Bibeau, Steckler, & Glanz, 1988). These factors are categorized into five different levels: intrapersonal, a person's attitudes and beliefs about a behavior; interpersonal, the support a person receives from those in the immediate environment; institutional factors, the supports available in a work place; community, supports available within the larger social group or geographic region; and public policy, legislation that either promotes or inhibits participation in a behavior (McLeroy et al., 1988).

The Social-Ecological Model is utilized when examining the impact of returning to work on breastfeeding duration. Survey instruments measuring mothers' perceptions of workplace breastfeeding support often contain questions addressing many levels of the Social-Ecological

Model (Greene & Olson, 2008; Hirani, Karmaliani, Christie, Parpio, & Rafique, 2013). Since these surveys are measuring a variety of maternal, coworker, supervisor, facility, and policy characteristics, the Social-Ecological Model provides a comprehensive foundation for survey structure.

To measure intrapersonal factors, workplace breastfeeding questionnaires typically measure a woman's breastfeeding knowledge, her confidence in combining breastfeeding and work, her prenatal decision to breastfeed, attitude toward breastfeeding, ability and confidence to communicate her breastfeeding needs to the employer, and ability to plan for breastfeeding during work hours (Hirani & Karmaliani, 2013b; Hirani et al., 2013). With regards to assessing interpersonal factors related to breastfeeding, the survey instruments assess: the mother's family members support of breastfeeding after return to work (Hirani & Karmaliani, 2013b); the child care providers support with regards to arranging child feeding times around the mother's work schedule or how the childcare provider manages the use and storage of expressed milk (Hirani & Karmaliani, 2013b); and her supervisor's and coworkers' support of her breastfeeding needs while at work (Greene & Olson, 2008; Hirani et al., 2013). Institutional factors are measured by assessing whether the workplace: has a breastfeeding policy; provides maternity leave benefits; has a designated lactation space with storage for milk; provides breastfeeding education or access to a lactation consultant; allows flexible scheduling or time for lactation breaks during the day; offers part time work options; and provides milk expression equipment (Greene & Olson, 2008; Hirani & Karmaliani, 2013b; Hirani et al., 2013).

Community and public policy supports are not frequently assessed with workplace breastfeeding assessment tools since these are levels outside of the employer's direct control. However, these policy levels of support influence the work environment. The best example of a

larger ecological level influencing the work environment is federal legislation, specifically, section 4207 of the Patient Protection and Affordable Care Act (PPACA) of 2010. The section of this act titled “Break Time for Nursing Mothers” was written to promote workplace breastfeeding support. This law requires companies with 50 or more employees to provide reasonable time and a private, secure space - other than a bathroom - for expressing milk (Garvin et al., 2013; Marinelli, Moren, Taylor, & Ademy Of Breastfeeding Medicine, 2013; United States Breastfeeding Committee, 2013). Employees who are paid hourly and covered by the Fair Labor Standards Act (FLSA) are eligible for lactation breaks for up to one year after birth of a child (Garvin et al., 2013; Marinelli et al., 2013; United States Breastfeeding Committee, 2013). Those not covered under FLSA may eligible for lactation breaks under local and state laws (United States Breastfeeding Committee, 2013). Figure 2 shows the five levels of the Social-Ecological Model and how breastfeeding promotion in the workplace is influenced by each.

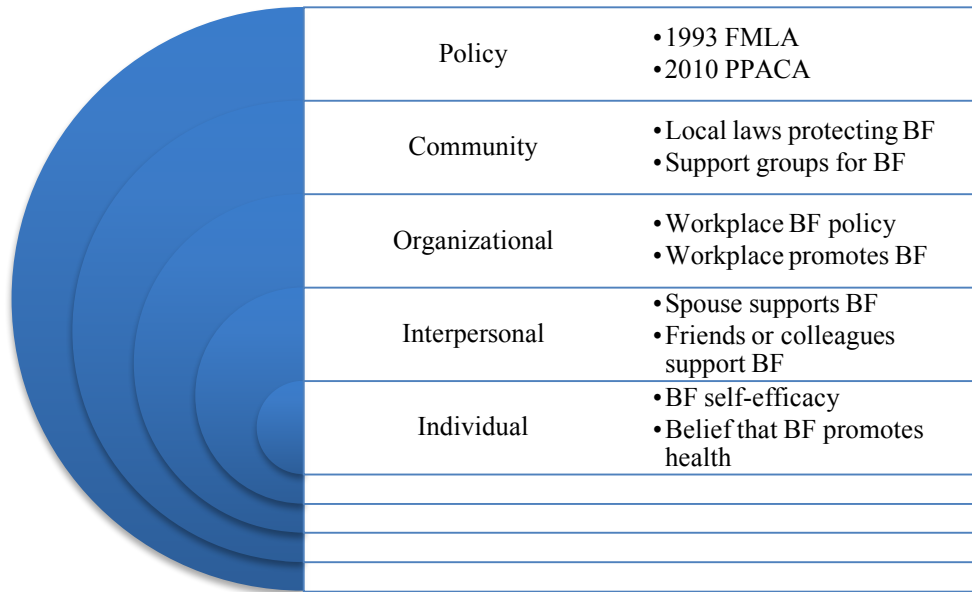


Figure 2.2. The Social - Ecological Model and Workplace Breastfeeding (Centers for Disease Control and Prevention, 2015).

Both the Social-Ecological Model and the Theory of Planned Behavior can be used in combination to measure breastfeeding duration. In fact, this combination may be the most effective method to predict breastfeeding duration and plan programs that promote breastfeeding in the workplace. While intention is critical for initiating breastfeeding and continuing to breastfeed after return to work, even a highly motivated and determined mother could be derailed by unsupportive family and friends and an unsupportive work environment. Therefore, combining the two models may be the most effective method for optimizing breastfeeding outcomes. Since the Social-Ecological Model address intrapersonal and interpersonal factors, the Theory of Planned Behavior components are easily included in these two levels. Maternal intention, perceptions, attitudes, perceived control, and subjective norms are intrapersonal factors included in the Social-Ecological Model. Social norms are part of the interpersonal factors in the

Social-Ecological Model, or could be included with the community or institutional levels. Figure 3 highlights how the two models interact in promoting breastfeeding in the workplace.

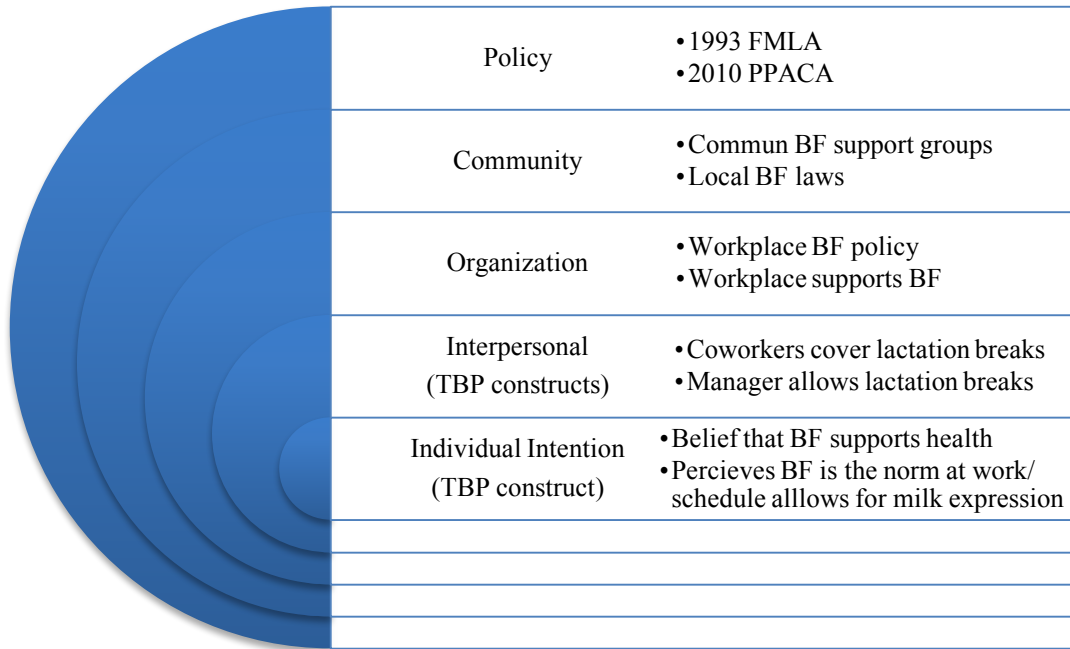


Figure 2.3. Interaction of the Theory of Planned Behavior and the Social - Ecological Model (Centers for Disease Control and Prevention, 2015).

Legislation Promoting Breastfeeding

Public policy is the most overarching level of the Social-Ecological Model. In the United States, the history of public policy supporting breastfeeding is relatively brief. Women have sought to find their legal rights to breastfeed at work supported under several pieces of federal legislation (Murtagh & Moulton, 2011). However, historically, these rights have not been upheld. It was not until 2010 that federal legislation was passed offering women the protection they were seeking.

Initially, women attempted to use Title VII of the Civil Rights Act of 1964, which prohibited discrimination based on gender. In 1978 the act was amended to include

discrimination against pregnancy through the Pregnancy Discrimination Act (Murtagh & Moulton, 2011). While breastfeeding is a purely female condition and very closely related to pregnancy, it has not been protected under the Civil Rights Act or the Pregnancy Discrimination Act (Murtagh & Moulton, 2011).

In 1981, a school employee attempting to breastfeed while at work sought to justify the act through the U.S. Constitution (Murtagh & Moulton, 2011). While the U.S. Court of Appeals Fifth Circuit ruled that a woman's decision to breastfeed is constitutional, rulings at later appeals of the case supported school board policies that made breastfeeding and working almost impossible (Murtagh & Moulton, 2011). Since this case, no other courts have been presented with this question and therefore, the ruling in this case is unique (Murtagh & Moulton, 2011).

The Americans with Disabilities Act was signed into effect on July 26, 1990 (Mayerson, 1992). Women have attempted to use Title I of the Americans with Disabilities Act to protect their rights to breastfeed while working. For this argument to be valid, breastfeeding would have to be considered a disability or a medical condition. Employers would not then be able to deny providing lactation accommodations to a mother who is still capable of doing her job (Mayerson, 1992). However, again, women could not find shelter under this legislation as breastfeeding is not a disability but a normal condition of women after giving birth (Murtagh & Moulton, 2011).

In 1993, yet another piece of enacted legislation held promise for breastfeeding women. The Family and Medical Leave Act, or FMLA, required employers to provide 12 work weeks of leave without pay for allowed circumstances, including birth of child, during a 12- month period. Employers were prohibited from terminating the employee during this time (United States Department of Labor Wage and Hour Division, 2015). Leave could be taken for the birth or adoption of a child within 12 months of the event; to care for a parent, spouse, or child with a

medical condition; or if the employee themselves had a medical condition preventing them from performing their regular job duties (United States Department of Labor Wage and Hour Division, 2015). Currently, FMLA allows women to be home with a newborn for 12 weeks after birth, which promotes breastfeeding initiation. However, it does not protect breastfeeding duration once the mother returns to work. Additionally, FMLA does not apply to all employees. Only employees who have been with their present employer for 12 months and only employers with 50 or more employees must comply (Murtagh & Moulton, 2011). This excludes a significant proportion of women from eligibility because approximately 43.7% of women in 2000 would have been ineligible for FMLA (Murtagh & Moulton, 2011). Additionally, many women who are eligible for FMLA do not take the full 12 weeks because the financial burden of unpaid leave is too great, especially when incurring medical bills and the added cost of another family member (Murtagh & Moulton, 2011).

While FMLA does not provide any protection for breastfeeding mothers in the workplace, some of these mothers are able to find support under state laws. As of 2011, 23 states had a state law addressing breastfeeding in the workplace (Murtagh & Moulton, 2011). Twenty – eight states, the District of Columbia, and Puerto Rico have legislation addressing breastfeeding in the workplace (National Conference of State Legislators, 2017). While these laws are a good starting point, and provide some support to working, breastfeeding mothers, they are not without limitations. Many of these statutes include an exemption clause for businesses that will incur a hardship for implementing them (Murtagh & Moulton, 2011). Additionally, some of the statutes only apply to public sector employees (Murtagh & Moulton, 2011). Legislation addressing break time does not mandate that the breaks be paid, or that a mother can take a break whenever she deems necessary to express milk (Murtagh & Moulton, 2011). Finally, not all states have this

legislation meaning women in 22 states have no state level support for breastfeeding in the workplace.

In 2010, legislation protecting working, breastfeeding mothers took a step forward. The “Break Time for Nursing Mothers” law in section 4207 of the Patient Protection and Affordable Care Act (PL 111-148) was signed into effect on March 23, 2010 (United States Breastfeeding Committee, 2013). This law requires companies with 50 or more employees to provide reasonable time and a private, secure space - other than a bathroom - for expressing milk (United States Breastfeeding Committee, 2013). Employees who are paid hourly and covered by the Fair Labor Standards Act (FLSA) are eligible for lactation breaks for up to one year after birth of a child (Garvin et al., 2013; United States Breastfeeding Committee, 2013). Additionally, if a woman works in a state that has state legislation protecting breastfeeding in the workplace, then she will benefit from the added protection of that state law (Murtagh & Moulton, 2011).

Employers with less than 50 employees can apply for exemption from the law if allowing milk expression breaks causes insurmountable disruptions to workflow (Garvin et al., 2013; United States Breastfeeding Committee, 2013). The “Break Time for Nursing Mothers” legislation is a huge victory for many working, breastfeeding mothers, but it does not provide protection for all. As previously stated, if the accommodations create a hardship on the employer, they do not have to comply. Lactation breaks do not have to be paid either (United States Breastfeeding Committee, 2013). The law only applies to those who are FLSA eligible, which is mostly non-exempt, hourly, paid employees, not those who are salaried, or exempt (United States Breastfeeding Committee, 2013). While hourly employees might be the most at risk population, those who are salaried may also face challenges with balancing work and breastfeeding.

United States public health initiatives have reinforced the need for lactation support in the workplace. Objective MICH – 22 for Healthy People 2020 is to increase the percentage of employers offering worksite lactation support programs (Department of Health and Human Services, 2016). While the target goal of this objective is to increase the availability of on-site lactation/mother’s rooms from 25% to 38%, there are many components of worksite lactation support programs (Department of Health and Human Services, 2016). These include, but are not limited to on-site childcare, job flexibility, physical facilities for expression and storage of human milk, mother friendly policies, and access to a lactation consultant (Bar-Yam, 1998b).

Supporting Breastfeeding Working Women

With the number of women in the workforce increasing and breastfeeding duration rates at suboptimal levels, various workplace lactation accommodations are critical. These accommodations include: maternity leave; part-time work options; on-site childcare or flexibility to work from home or bring baby to work; availability of breaks for milk expression; spaces for milk expression; equipment for milk expression; workplace policies to support breastfeeding; access to a lactation consultant; education provided to working women, supervisors, and coworkers on breastfeeding; and encouraging support from supervisors and coworkers for breastfeeding mothers. A business may decide to provide only one or two of these accommodations as needed, or they may bundle several of the accommodations as part of a corporate lactation program (CLP).

Some accommodations have been studied extensively in regards to their ability to promote breastfeeding duration in working women. Others have not. A summary of the most commonly studied accommodations and their relationship to breastfeeding duration follows. Additionally, summary tables of all of the articles, the accommodations assessed, and the

relationship to breastfeeding duration are listed in Appendix F (United States research) and Appendix G (international research). As the tables explicitly list many aspects of the studies, including quantitative results, not all studies will be discussed in detail within the following text.

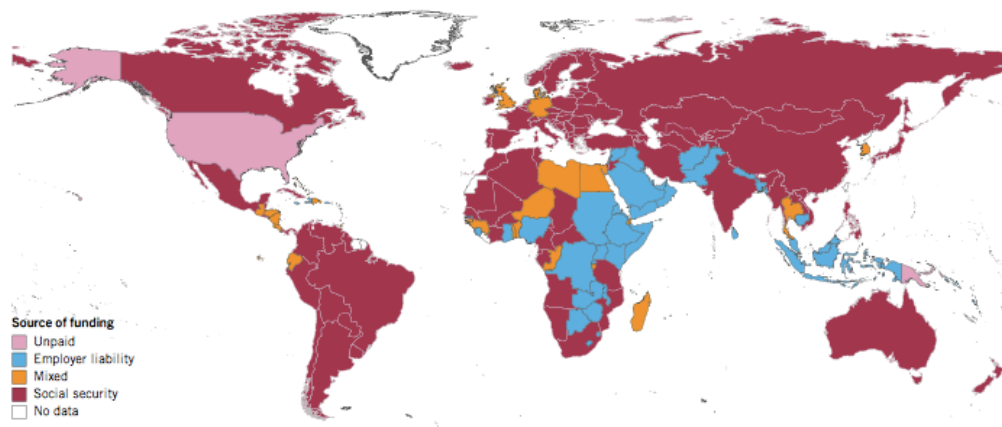
Length of Maternity Leave and Whether It Is Paid or Unpaid

Maternity leave is the “gold standard” in promoting breastfeeding duration in working women. If a woman does not have to return to work immediately following the birth of a child, then having to work will not be a barrier to breastfeeding. The effectiveness of maternity leave in promoting breastfeeding duration is determined by the length of the leave and the extent to which it is paid. A paid leave is of benefit but the benefit is minimized if it is only a few weeks in length. Likewise, a long leave that is not paid or only partially paid may not promote breastfeeding either as the family may not be able to tolerate the loss of income. Either of these options would force the mother back to work sooner and could undermine breastfeeding. Many studies, both U.S. and elsewhere, have examined the issue of maternity leave and the impact on breastfeeding duration. As such, this is probably the most studied accommodation in promoting breastfeeding among working women.

In the United States, many large, population based studies have examined the association between length of maternity leave and breastfeeding duration (Auerbach & Guss, 1984; Fein, Mandal, & Roe, 2008; Kimbro, 2006; Mandal, Roe, & Fein, 2010; Mirkovic, Perrine, Scanlon, & Grummer-Strawn, 2014a, 2014b; Roe, Whittington, Fein, & Teisl, 1999). Only a few small studies conducted in the United States have examined the relationship between maternity leave and breastfeeding duration (Bai & Wunderlich, 2013; McCarter-Spaulding, Lucas, & Gore, 2011; Sattari, Serwint, Neal, Chen, & Levine, 2013). Whether or not maternity leave was fully or partially paid was not specifically discussed in several of the articles (Auerbach & Guss, 1984;

Fein, Mandal, et al., 2008; Kimbro, 2006; McCarter-Spaulding et al., 2011; Mirkovic et al., 2014a, 2014b; Roe et al., 1999). In Mandal, Roe, and Fein (2010) the number of participants with fully paid leave was 27.2%, partially paid was 17.9%, and unpaid was 54.9%. However, the association between paid leave and breastfeeding duration was not considered (Mandal et al., 2010). Sattari, Serwint, Heal, Chen, and Levine (2013) noted that some women had paid leave and some had unpaid leave; however, these data were reported in aggregate. It is possible that many of the women took unpaid leave or only partially paid since many did not seem to have fully paid leave. The United States is one of only two countries worldwide (the other is Papua New Guinea) that does not mandate paid maternity leave, and the only industrialized country that does not mandate paid maternity leave (International Labour Organization, 2014).

Map 2.2 Source of funding of maternity leave cash benefits, 2013 (185 countries and territories)



Source: ILO Working Conditions Laws Database – Maternity Protection. Available at: <http://www.ilo.org/travdatabase> [26 Mar. 2014].

Figure 2.4. Source of Funding for Maternity Leave Cash Benefits, 2013. From http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_242615.pdf. Copyright 2014 by International Labour Organization. Reprinted with permission.

Of the studies examining the impact of maternity leave on breastfeeding duration, six of nine (Auerbach, 1984; McCarter-Spaulding et al., 2011; Mirkovic et al., 2014a, 2014b; Roe et

al., 1999; Sattari et al., 2013) found that longer leave times were associated with longer breastfeeding duration and/or intention to breastfeed for longer. One study examined the odds of discontinuing breastfeeding in the months before and after returning to work, and found that breastfeeding cessation was most likely to occur the month immediately before, the month of, or the month immediately after returning to work (Kimbrow, 2006). Bai & Wunderlich (2013) found no significant association between maternity leave and breastfeeding duration. The authors noted this was in contradiction to many other studies. They concluded this might have resulted from other factors in the home; variation in the sample's characteristics from samples of other studies; or that the study focused on workplace support and not maternity leave. Finally, one study found a negative association between the number of months the mother continued to breastfeed after returning to work and the age of the infant when the mother returned to work, however, the effect was minimal (Fein, Labiner-Wolfe, et al., 2008). This finding seems contradictory to other findings, however, if a woman delays her return to work, then theoretically, she may not need to breastfeed as long after she returns. Taking the Fein et al. (2008a) results into account, it appears that, overall, length of maternity leave is positively associated with breastfeeding duration in the U.S. See Appendix A for comprehensive listing of all U.S. studies.

International researchers have explored the relationship between maternity leave and breastfeeding duration. Four large, national level, prospective cohort studies (Bai, Fong, & Tarrant, 2015; Bonet et al., 2013; Chuang et al., 2010; Skafida, 2012), and one compilation of national cross-sectional surveys (Rivera-Pasquel, Escobar-Zaragoza, & González de Cosío, 2015) presented data on maternity leave and breastfeeding duration. Paid parental leave was mentioned in a few of the international studies. Bonet, et al. (2013) stated that in France women are eligible to receive up to 2773 euros for up to 16 weeks for the first and second child and this

level of pay for a maximum of 26 weeks for subsequent children. Rivera-Pasquel et al. (2014) stated that while Mexico has legislation supporting maternity leave and breastfeeding in the workplace, these mandates are not enforced. This could indicate that women do not take a paid maternity leave. Skafida (2012) mentioned that in the United Kingdom (UK), women receive 90% pay for the first 6 weeks followed by a £124.88/ week stipend for the next 33 weeks. However, two studies did not mention whether leave was paid (Bai et al., 2015; Chuang et al., 2010). It could, therefore, be assumed that of the international studies examined, two of them likely included women who received pay for leave time, while the other three did not. See Appendix B for comprehensive listing of all international studies.

In the five international studies examining length of maternity leave and breastfeeding duration, each found that shorter leave times were associated with shorter breastfeeding duration. However, the exact outcome varied by study. Bonet, et al. (2012) found that longer maternity leaves, likely paid as this study was conducted in France, were significantly associated with any and exclusive breastfeeding at 4 months. Bai, Fong, & Tarrant (2015) found that in Hong Kong women were more likely to combine work and breastfeeding if they had a longer maternity leave, however, there was no association with total leave time on duration of exclusive breastfeeding. This would indicate that any mother who returned to work was likely to add infant formula into the feeding mix. Chuang et al. (2010) found that Taiwanese mothers were more likely to initiate breastfeeding and less likely to wean if they did not have to return to work. In Mexico, Rivera-Pasqual et al. (2014) noted that women were more likely to breastfeed if they were unemployed or informally employed, indicating they had more control over their daily work schedule. Finally, Skafida (2012) found that women in Scotland were more likely to wean an infant if they returned to work in less than 6 months.

From the U.S. and international data, it appears that shorter maternity leaves are a risk factor for weaning an infant before 12 months of age. Two (Bonet et al., 2013; Skafida, 2012) of the studies were conducted in countries offering a partial or mostly paid leave. These studies still noted negative impacts of shorter leave times on breastfeeding duration. In the U.S., public health mandates encourage at least 12 months of breastfeeding with the first 6 months as exclusive breastfeeding as research supports a dose response between breastfeeding duration and decreasing risks of acute and chronic diseases (American Academy of Pediatrics, 2012). Therefore, a mandate for longer, paid, maternity leave time for all postpartum women may be an effective method for promoting breastfeeding duration.

Returning to Work Part-Time vs. Full-Time

The number of hours worked once the mother resumes working, is another aspect of employment that has been heavily examined in regards to breastfeeding duration. While longer leave time is considered ideal for promoting extended breastfeeding, many women do not have the option to take a long leave. If a mother has to return to work when her infant is younger, she may be able to breastfeed longer if she can work fewer hours per week. Literature from the U.S. and international community has examined this accommodation.

As with maternity leave, many large population based studies in the U.S. have examined the impact of full-time and part-time work on breastfeeding duration (Attanasio, Kozhimannil, McGovern, Gjerdingen, & Johnson, 2013; Fein, Mandal, et al., 2008; Mandal et al., 2010; Mirkovic et al., 2014a, 2014b; Ogbuanu, Glover, Probst, Hussey, & Liu, 2011; Roe et al., 1999). Additionally, smaller studies have also considered the impact of part-time and full-time employment (Auerbach, 1984; Ortiz, McGilligan, & Kelly, 2004). Among these nine studies, six found that the number of hours worked upon return to paid employment was negatively

associated with breastfeeding intention (Attanasio et al., 2013; Mirkovic et al., 2014a) and/or duration (Auerbach, 1984; Mandal et al., 2010; Mirkovic et al., 2014b; Ogbuanu, Glover, Probst, Hussey, et al., 2011). Fein, Mandal, & Roe (2008b) found no significant association ($p = 0.29$) between the number of hours worked and breastfeeding duration. Of note in this study, is that mothers reporting more working hours in the study did cease breastfeeding earlier than those that did not. Additionally, Ortiz, McGilligan, & Kelly (2004) found that full-time working mothers participating in a full time CLP expressed milk an average 6.2 months after returning to work whereas part – time mothers only expressed milk for 5.1 months. This difference was not significant and seems to contradict other studies. However, the part-time working mothers in the CLP may not have worked enough hours to necessitate milk expression at work (Ortiz et al., 2004). Roe, Whittington, Fein, & Teisl (1999) examined self-employed mothers, who arguably have more control over their work schedule and can determine how many hours to work on a weekly basis. They noticed that self-employed mothers had significantly longer breastfeeding duration than those in formal employment ($p \leq 0.01$).

Large, national level international studies have examined the effect of full-time and part-time work on breastfeeding duration (Bai et al., 2015; Bonet et al., 2013; Skafida, 2012) as well as smaller scale studies of individual worksites (Tsai, 2013). Among the four international studies identified, two found a negative association between hours worked and breastfeeding duration (Bai et al., 2015; Tsai, 2013). However, two studies found no association between number of hours worked and breastfeeding duration (Bonet et al., 2013; Skafida, 2012). The countries represented in these studies include France (Bonet et al., 2013), Hong Kong (Bai et al., 2015), Scotland (Skafida, 2012), and Taiwan (Tsai, 2013). Interestingly the studies that found significant negative associations between work hours and breastfeeding duration were in Asian

countries, while the Western European studies showed no association. This may indicate a cultural workplace difference between these regions of the world. Bonet et al. (2013) noted that women in France may not be comfortable combining work and employment regardless of the number of hours worked. Therefore, working fewer hours, does not promote breastfeeding. In contrast, the study conducted in Taiwan which found a negative association between hours worked and breastfeeding duration was comparing women who worked less than 8 hours per day to those working 9-14 hours per day (Tsai, 2013). A woman who works 6-8 hours a day may have a much easier time combining work and breastfeeding than one who works 12–14 hours per day.

Out of 13 national and international studies examining the number of hours worked and breastfeeding duration, eight found a negative association. This could indicate that working full-time does act as a barrier to breastfeeding continuation. While a few studies did not find an impact of working hours on breastfeeding duration, this may have been due to other workplace environmental factors, cultural differences, or study methodologies. Therefore, fewer hours worked may not, by itself, guarantee an increase in breastfeeding duration.

On-Site Childcare

As previously mentioned, keeping mother and child together by offering extended maternity leave is considered the ideal in facilitating breastfeeding duration among working women. However, if this option is not available, then providing on-site childcare may be the next best option. However, very few employers provide on-site childcare. According to the 2014 National Survey of Employers, only 7% of employers offer on-site or near – site childcare (Matos & Galinsky, 2014). This 7% is an average of 4% of small employers (50 – 99 employees) and 20% of larger employers (1,000 or more employees)(Matos & Galinsky, 2014).

Does your organization provide any employees ...	Total Sample "Yes" ²⁰	"Yes" by Employer Size		
		Small (50 to 99 employees)	Sig.	Large (1,000 or more employees)
Access to information to help locate child care in the community (Child Care Resource and Referral)	37%	30%	***	61%
Child care at or near the worksite	7%	4%	***	20%
Payment for child care with vouchers or other subsidies that have direct costs to the company	2%	1%	**	5%
Dependent Care Assistance Plans (DCAPs) that help employees pay for child care with pre-tax dollars	61%	56%	***	77%
Child care for school-age children on vacation	3%	3%	NS	7%
Back-up or emergency care for employees when their regular child care arrangements fall apart	4%	4%	NS	8%
Sick care for the children of employees	3%	3%	NS	6%

Source: Families and Work Institute, 2014 National Study of Employers. Sample sizes for employers overall ranged between 1,046-1,049. Sample sizes for comparisons of small and large employers ranged from 555-557 for small employers and 91-92 for large employers. Only the percent responding "Yes" is reported for each option. Statistical significance: *** = $p < .001$; ** = $p < .01$; ns = not significant.

Figure 2.5. Child Care Assistance Graphic from 2014 National Survey of Employers (Matos & Galinsky, 2014).

As on-site childcare is infrequently offered in the U.S., there are not many studies examining its association with breastfeeding duration. Only two U.S. studies examined the impact of on-site childcare or the perception of available on-site childcare on breastfeeding duration (Bai & Wunderlich, 2013; Jacknowitz, 2008). In Bai & Wunderlich (2013) on-site childcare was examined as part of a technical support dimension provided to breastfeeding mothers in the workplace. The other components of this dimension included availability of milk expression equipment, such as pumps, and a refrigerator for milk storage (Bai & Wunderlich, 2013). The technical support dimension was significantly correlated ($r = 0.71$; $p = 0.01$) with exclusive breastfeeding at 6 months. Jacknowitz (2008) examined the perception of available on-site childcare and found that it was associated with a 47% increase in the likelihood of

breastfeeding at 6 months ($p = 0.01$). While these are only two results, they both indicate a positive impact of on-site childcare on breastfeeding, especially up to the age of 6 months. None of the international studies identified examined the association of on-site childcare with breastfeeding duration.

Lactation Breaks

To date, the most significant piece of legislation protecting the breastfeeding rights of working mothers in the U.S. is section 4207 of the Patient Protection and Affordable Care Act of 2010. This legislation mandates that employers with 50 or more employees allow break time and space for milk expression to all FLSA eligible employees (United States Breastfeeding Committee, 2013). While this legislation was not signed into effect until 2010, several studies examining the impact of lactation breaks on breastfeeding duration prior to and subsequent to this legislation were identified. Lactation or milk expression breaks are critical to working breastfeeding mothers. Human milk must be removed from the breast multiple times during the day in order to stimulate additional milk production (Edgar, 2006). Without expression breaks, mothers would not be able to remove milk during the day which would result in pain from breast engorgement, milk leakage and embarrassment, and a decrease in their milk supply. A decrease in supply will ultimately lead to weaning.

In the United States, at least seven studies have examined the association between lactation breaks and breastfeeding duration (Alvarez, Serwint, Levine, Bertram, & Sattari, 2015; Bai & Wunderlich, 2013; Cohen & Mrtek, 1994; Dabritz et al., 2009; Hills-Bonczyk, Avery, Savik, Potter, & Duckett, 1993; Sattari et al., 2013; Waite & Christakis, 2015). Of these seven studies, three found positive associations between lactation breaks and breastfeeding duration (Alvarez et al., 2015; Hills-Bonczyk et al., 1993; Sattari et al., 2013). However, an equal number

found no association with breastfeeding duration (Bai & Wunderlich, 2013; Dabritz et al., 2009; Waite & Christakis, 2015). One study examined lactation breaks as part of corporate lactation program (CLP) and did not study the accommodation individually (Cohen & Mrtek, 1994). This study by Cohen & Mrtek (1994) only provided descriptive statistics; however, it was noted that the average breastfeeding duration among the employees in the CLP was 8.1 months and 74.3% were still breastfeeding at six months (Cohen & Mrtek, 1994).

In international literature two studies examined lactation breaks and breastfeeding duration (Tsai, 2013; Yimyam & Hanpa, 2014). One study noted that awareness and use of lactation breaks was associated with breastfeeding for six months or longer ($p < 0.05$) (Tsai, 2013). In the second study, lactation breaks were considered as part of a CLP and not as an individual accommodation (Yimyam & Hanpa, 2014). The overall results of the study indicated that those who participated in the CLP were more likely to exclusively breastfeed ($p < 0.05$) or engage in any breastfeeding ($p = 0.03$) at 6 months (Yimyam & Hanpa, 2014).

Given the importance of expressing milk to maintain milk supply, it is puzzling that lactation breaks are not universally associated with longer breastfeeding duration. There may be several reasons for the lack of association. First, some of the studies consisted of older, white, more highly educated women who tend to breastfeed longer than other groups (Bai & Wunderlich, 2013; Waite & Christakis, 2015). In other studies, mothers were working at companies offering longer, paid maternity leaves, meaning mothers had to combine breastfeeding and working for less time (Waite & Christakis, 2015). It should be noted however, that authors cited “lengthy” maternity leaves as greater than 6 weeks (Waite & Christakis, 2015). Additionally, some women held positions where they had more control over their schedule and were able to prioritize lactation (Waite & Christakis, 2015). International studies also illuminate

why lactation breaks may not impact breastfeeding duration. In one study of an electronics manufacturer in Taiwan, some participants indicated concern about receiving a poor performance rating from their supervisor if they took lactation breaks (Tsai, 2014). Another study in Iran found that many women were not permitted to leave their work station, even though lactation breaks were supposed to be permitted (Ahmadi & Moosavi, 2013).

U.S. and international literature do not seem to present a consistent picture of the association between lactation breaks and breastfeeding duration. Impact of lactation breaks on breastfeeding duration can be confounded by multiple factors such as maternal education, socioeconomic factors, and other worksite variables (Dabritz et al., 2009).

Dedicated Lactation Space

If women are going to express milk during the day, they not only need a break to do so, they also need a space. However, even though there are many different spaces in a work environment, not all of them are conducive to milk expression. Many employed women work in a private office, which may be suitable for expressing milk. Others may share a common area and lack access to a private space. Based on 2013 data, the Bureau of Labor Statistics reports that, at most, 41.6% of women hold managerial positions, and this varies based on demographic category (United States Department of Labor Women's Bureau, 2013). As seen in Figure 6, White and Asian women tend to hold more of these positions than Hispanic or African American groups (Bureau of Labor Statistics & United States Department of Labor, 2011). The women in managerial positions may be the most likely to have a private office conducive for milk expression. The remaining women workers are employed in sales or hold office assistant positions; natural resources or construction; production or transportation; or service fields

(United States Department of Labor Women's Bureau, 2013). Women in these professions may be much less likely to find a private, suitable space for milk expression during the workday.

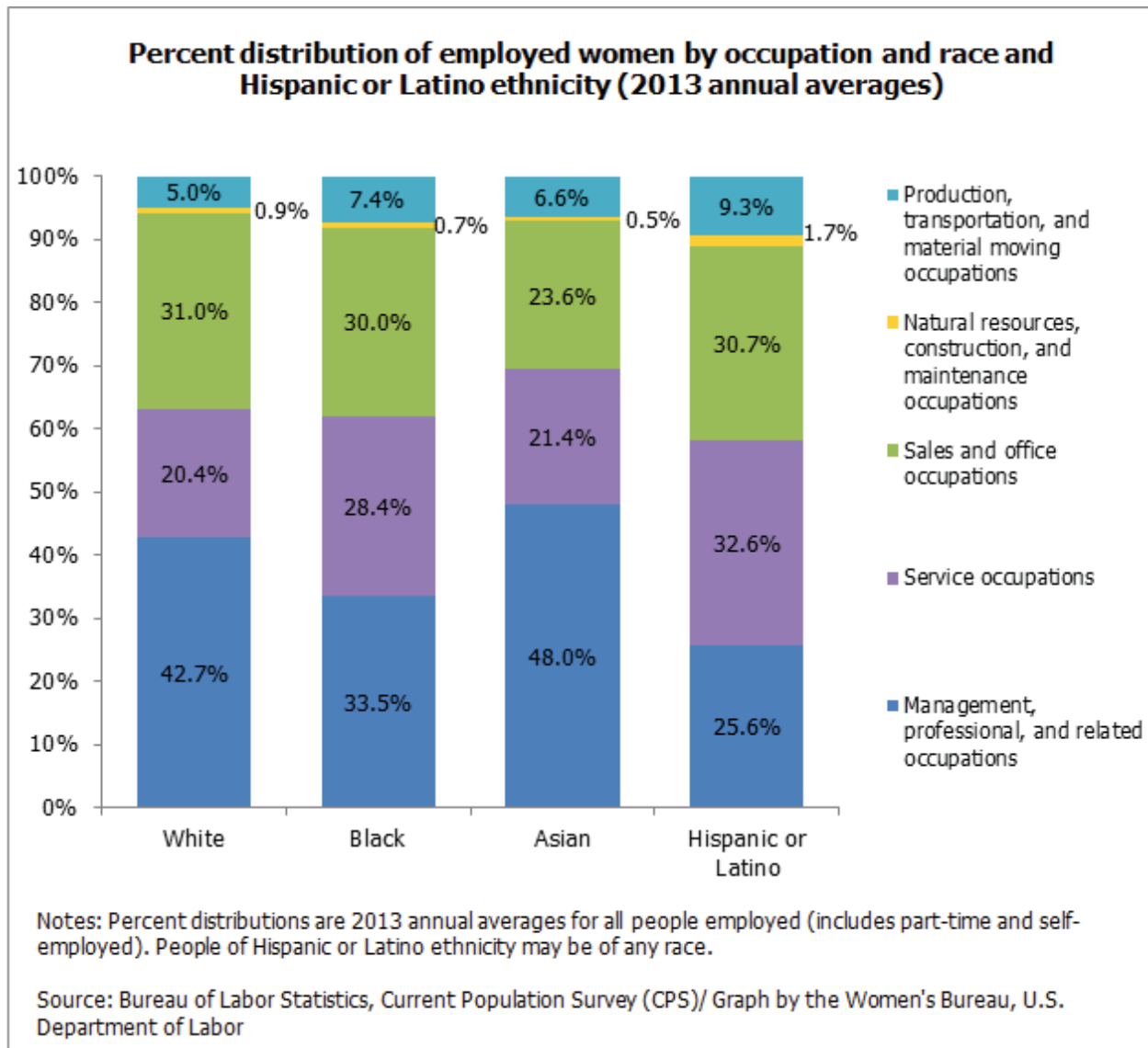


Figure 2.6. Leading Occupations Graphic from the United States Department of Labor Women's Bureau. <https://www.dol.gov/wb/stats/leadoccupations.htm>.

Since many women do not have an appropriate, private space to express milk, employers are now required to provide a space as part of the PPACA of 2010. The legislation mandates that employers must provide a private space -other than a bathroom - for milk expression if they have 50 or more employees (United States Breastfeeding Committee, 2013).

While this is the minimum set forth in the federal law, best practice for a lactation space involves several other provisions. Ideally, a space for milk expression should be dedicated solely for that purpose and have a locking door; be clean, private, and convenient to the worksite; be equipped with a power outlet, comfortable chair, sink, and refrigerator; and be available for use when mothers are ready to express (Bar-Yam, 1998a; Eldridge & Croker, 2005; Marinelli et al., 2013). Restrooms are not appropriate for milk expression as they are unsanitary (Bar-Yam, 1998a) and do not promote a sense of respect for the mother's choice to breastfeed her infant.

While a space for milk expression will help facilitate milk expression during work hours, research examining the association between these spaces and breastfeeding duration does not show consistent results. Ten studies in the United States were identified that include an examination of the association between breastfeeding duration and lactation spaces (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Cohen & Mrtek, 1994; Dabritz et al., 2009; Hills-Bonczyk et al., 1993; Katcher & Lanese, 1985; Ortiz et al., 2004; Sattari et al., 2013; Waite & Christakis, 2015). Of these 10, only two showed positive associations with breastfeeding duration (Alvarez et al., 2015; Bai & Wunderlich, 2013). Five of the 10 showed no association between lactation spaces and breastfeeding duration (Balkam et al., 2011; Dabritz et al., 2009; Hills-Bonczyk et al., 1993; Sattari et al., 2013; Waite & Christakis, 2015). Three studies considered lactation spaces as part of an entire CLP and did not investigate the accommodation as an individual entity (Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et al., 2004). All three of these studies found that women in the CLP had an average breastfeeding duration rate greater than 6 months (8.1, 11.7, and 9.1 months respectively for each study).

The lack of associations seen between lactation spaces and breastfeeding duration are concerning given the necessity of these spaces for many mothers, and that they are mandated by

federal legislation. It seems ironic that something considered a best practice is not performing well in its intended purpose. The seemingly poor performance of lactation spaces in the U.S may be related to several factors. First, in one of the studies, the mother's surveyed were physicians who had access to empty exam rooms or private office spaces where they could express milk thereby negating the need for another "dedicated" space (Sattari et al., 2013). Another study found that women felt the spaces available were not well – kept (Bai & Wunderlich, 2013). In one study, the authors noted that the participants may have had higher intrinsic motivation for breastfeeding and would be likely to find a way to express even in the absence of well-suited lactation spaces (Balkam et al., 2011). Available spaces may not have been convenient to the worksite, making them too difficult to access. Another point to consider is that spaces, by themselves, are not effective but become effective when combined with breaks, support from coworkers or colleagues, and education on combining work and breastfeeding. Evidence supporting an inclusive model can be seen in the CLP studies examining all components together. The CLP's appear to be effective in promoting breastfeeding duration (Cohen & Mrtek, 1994; Ortiz et al., 2004; Yimyam & Hanpa, 2014). Future research should explore the interaction of other accommodations on the effectiveness of lactation spaces in order to better promote their use and breastfeeding duration.

International studies have also found lack of associations between breastfeeding duration and lactation spaces. Only two studies were identified that specifically discussed lactation spaces in regards to breastfeeding duration (Tsai, 2013; Yimyam & Hanpa, 2014). One did not find any association ($p = 0.30$) between spaces and breastfeeding duration (Tsai, 2013). The other examined lactation spaces as part of CLP and found that any ($p = 0.03$) and exclusive ($p < 0.05$) breastfeeding at 6 months was more likely after the inception of the CLP (Yimyam & Hanpa,

2014). In the first study, researchers noted that only 30% of the participants in the survey found the lactation rooms to be satisfactory (Tsai, 2013). Additionally, some of the rooms available to these women were not solely dedicated to milk expression, which created reluctance to use the rooms (Tsai, 2013). Finally, Tsai (2013) noted that while the rooms were available, the breastfeeding employee might have perceived a negative attitude from their supervisor or coworkers toward breastfeeding, which discouraged the mother from using the rooms and lactation breaks.

Lactation Equipment Provided by Employer

Another component of expressing human milk at work is having the proper equipment to do so. At a minimum, the equipment needed includes: a breast pump (preferably electric); tubing and breast shields with valve and seal; bottles for collecting pumped milk; bottles with caps or another sealed container for storing expressed milk; refrigerator or cooler for storing expressed milk; and a source of potable water for hand and bottle washing. Human milk expression is most efficient when the mother has an electric, daily use, double pump or hospital grade pump, and a hands free kit (Medela, n.d.-a). The hands-free kit allows a mother to attach the breast shields to her bra, or the mother can wear a special bra that is designed to hold the breast shield of a pump. The mother can then pump but keep her hands free for other tasks, like typing or writing. The double electric pump increases efficiency as it promotes more prolactin production during milk expression, thereby causing the breast to produce more milk in less time (Medela, n.d.-a).

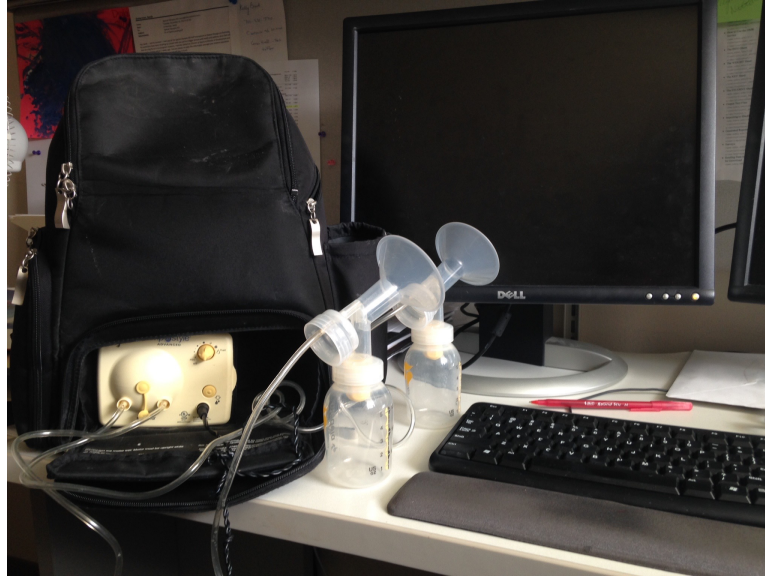


Figure 2.7. Electric Breast Pump and Accessories. Photo by Elizabeth Hilliard.

Quality electric breast pumps can be costly depending on the needs of the mother. The main supplier of breast pumps to healthcare facilities in the United States is Medela (Medela, 2016a). Medela produces breast pumps for all expression needs from hand pumps for those who express only occasionally to hospital grade pumps that are designed to be used by multiple women multiple times per day over a period of years (Medela, 2016a). The cost of electric pumps as listed on the retail portion of the Medela website is between \$170 and \$500 with most ranging from \$300 to \$450 (Medela, 2016b). Of note, is that many of these pumps come as kits which include all the needed tubing, breast shields, valves, bottles, and a small cooler bag and ice pack (Medela, 2016b).

In order to facilitate milk expression at work, the PPACA also includes provisions stating that insurance companies must cover the cost of human milk expression equipment (Healthcare.gov, n.d.). This requirement applies to Health Care Marketplace plans and all other insurance plans, unless they are grandfathered (Healthcare.gov, n.d.). However, the type of milk expression equipment varies from plan to plan. Some plans may cover the cost of a daily use,

electric pump while some will cover only manual pumps, and others require rental of a hospital grade pump (Healthcare.gov, n.d.). For some plans, a letter of authorization or medical necessity is required from the woman's physician in order to obtain coverage for the cost of the equipment (Healthcare.gov, n.d.).

Given that insurance plans are now required to cover the cost of human milk expression equipment, it seems unnecessary for employers to provide it as well. However, as noted in the legislation, grandfathered plans are not required to comply. Likewise, some plans will only cover a manual pump, which is not efficient for milk expression multiple times per day over a period of months. Therefore, there is population of women who will have to finance this costly part of breastfeeding. Additionally, some hospital grade rental pumps are very large and can be difficult to carry. When combined with other items a woman may need to take to work including: a young infant in a carrier; a diaper bag that may have to be packed each morning; a purse; a briefcase or other bag; and possibly a meal, an on-site breast pump might offer greater convenience and financial benefit for a working mother.

Provision of milk expression equipment is not a widely used accommodation in the U.S. This is another added cost for the employer and requires someone, typically a wellness nurse or on-site lactation consultant (Ortiz et al., 2004), to be responsible for distribution and maintenance of the equipment. There were six studies identified which examined employer provided equipment and breastfeeding duration (Bai & Wunderlich, 2013; Cohen & Mrtek, 1994; Hills-Bonczyk et al., 1993; Katcher & Lanese, 1985; Ortiz et al., 2004; Whaley, Meehan, Lange, Slusser, & Jenks, 2002). Four of these studies considered the equipment as part of a CLP or a bundle of lactation accommodations, and did not examine the impact of the accommodation individually (Bai & Wunderlich, 2013; Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et

al., 2004). Two of the studies (Bai & Wunderlich, 2013; Katcher & Lanese, 1985) found statistically significant positive associations with breastfeeding duration, while the other two studies (Cohen & Mrtek, 1994; Ortiz et al., 2004) utilized descriptive statistics without p-values to demonstrate breastfeeding duration beyond 6 months in the CLP group. One study (Hills-Bonczyk et al., 1993) found no association between equipment and breastfeeding duration; however, the equipment examined was storage for milk, not breast pumps.

None of the international studies explored the association between employer provided equipment and breastfeeding duration. Based on the U.S. data, there may be some promise with this accommodation. Further research examining the association of employer provided equipment and breastfeeding duration is warranted in this area and may help to identify best practices for equipment provisions.

Access to a Lactation Consultant

Some CLP's provide access to a lactation consultant (LC) for breastfeeding employees. The LC can either be a full time lactation professional employed by the company, a contracted part-time lactation consultant (Bar-Yam, 1998b), or an on-site occupational health nurse with lactation training (Rietz & McCullagh, 2010). Lactation consultants serve pregnant, postpartum, or returning to work mothers in planning how to incorporate breastfeeding into their lifestyle (Bar-Yam, 1998b). The consultant can also help a new mom adjust to schedule changes with work and breastfeeding and problem solve breastfeeding barriers (Bar-Yam, 1998b). Lactation consultants are also able to provide breastfeeding education to male employees new to fatherhood, or other employees, supervisors, and administrators (Bar-Yam, 1998b). In order to justify the benefits of a CLP, a lactation consultant can be charged with tracking breastfeeding duration among employees enrolled in the program, maintaining records on program

participants, developing resources for participants, and maintaining lactation spaces and equipment (Rietz & McCullagh, 2010).

In the United States, four studies examined the association between lactation consultants (LC) in the workplace and breastfeeding duration (Balkam et al., 2011; Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et al., 2004). One specifically examined the impact of employer paid LC's on breastfeeding duration, and found that both telephone consults and return to work consults provided by those LC's were associated with exclusive breastfeeding at 6 months (Balkam et al., 2011). However, only the return to work consultation was associated with any breastfeeding at 6 months (Balkam et al., 2011). The other three studies looked at lactation consultants as part of an entire CLP and found that those participating in the CLP were able to combine work and breastfeeding beyond 6 months (8.1, 11.7, and 9.1 months respectively) (Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et al., 2004).

Only one international study included LC's (Yimyam & Hanpa, 2014). As with many of the studies in the United States, this study examined LC's as part of an entire CLP. The study results indicated that the CLP was able promote significantly higher rates of any and exclusive breastfeeding at 6 months ($p = 0.03$ and $p < 0.05$, respectively).

The impact of LC's is another area in need of further research. While several studies did include a mention of LC's, the studies did not examine the specific associations between breastfeeding duration and LC's, or other factors that may influence the association.

Breastfeeding Education Provided by the Employer

Breastfeeding education provided by the employer can take several forms. It includes education provided to pregnant and postpartum employees and/or their spouses/partners, and education aimed at increasing breastfeeding knowledge of other coworkers, supervisors, and

administrators (Yimyam & Hanpa, 2014). Pregnant and postpartum women need education on all of the lactation support services available in the work environment (Cohen & Mrtek, 1994). Additionally, prenatal education could include general information about the benefits of, tips for, common problems associated with, and how to best combine work and breastfeeding (Cohen & Mrtek, 1994; Ortiz et al., 2004). A few weeks prior to the mother's return to work, education can include use of an electric breast pump, orientation to the lactation services and spaces available in the work place, and a review of the workplace policies and expectations for use of any available accommodations (Cohen & Mrtek, 1994). Education provided to spouses/partners and close relatives can reinforce education received by the mother which would aid in promoting support in the home (Cohen & Mrtek, 1994). Additionally, education for coworkers, supervisors, and administrators can increase: acceptance of breastfeeding in the workplace; understanding of the unique needs of a breastfeeding mother; and acceptance that breastfeeding will not negatively impact productivity or the general work environment (Ortiz et al., 2004).

Four studies in the United States examined breastfeeding education provided by the employer either directly to the pregnant employee, her close family, or coworkers/ supervisors/ administrators (Balkam et al., 2011; Cohen & Mrtek, 1994; Ortiz et al., 2004; Whaley et al., 2002). Of these four studies, two examined the association between education provided to mothers and breastfeeding duration. Neither study found a significant association between duration and education (Balkam et al., 2011; Whaley et al., 2002). The other two studies examined maternal and employer education as part of a CLP and both found that women participating in the CLP breastfed past 6 months (8.1 and 9.1 months respectively); however, only descriptive statistics were used in these studies (Cohen & Mrtek, 1994; Ortiz et al., 2004).

In international studies only one examined the association between breastfeeding duration and breastfeeding education provided by the employer (Yimyam & Hanpa, 2014). Again, this study examined education as part of an entire CLP and not individually. The results showed that women who participated in the CLP were significantly more likely to be exclusively breastfeeding or breastfeeding at all at 6 months ($p < 0.05$ for both).

To date, the results of providing breastfeeding education in the workplace are not convincing. When included as part of a CLP, most CLP's do increase breastfeeding duration. However, given that studies examining the specific association of education and breastfeeding duration do not show any significant results, it may be unlikely that the CLP studies find success because of the breastfeeding education alone. Some reasons that education may not be associated with breastfeeding duration include: content of the education materials did not meet the mothers' needs; the format and/or timing of the sessions was not conducive to learning; lack of awareness on the availability of the education sessions making them underutilized; limiting education to only mothers and not including their support network; education provided information the mother already knew and therefore promoted no change in knowledge; or other components of the CLP were more effective in promoting breastfeeding duration. Additionally, future research should closely examine these relationships and best practices for education.

Workplace Lactation Policy

Workplace lactation policies are often a first step in creating lactation accommodations for breastfeeding employees. A formal workplace lactation policy establishes the accommodations to be offered and who is eligible to assure equitable administration of the benefits (Centers for Disease Control and Prevention, 2010). A worksite lactation policy should include: rationale for the program or the reasons the employer is implementing these benefits; the

accommodations provided such as breaks, education, lactation spaces, equipment, etc.; the standards for eligibility and the parameters for participation; and the responsibilities for administrators, supervisors, and employees utilizing the policy (Centers for Disease Control and Prevention, 2010).

Four studies conducted in the U.S. examined the association between worksite lactation policies and breastfeeding duration (Bai & Wunderlich, 2013; Dabritz et al., 2009; Katcher & Lanese, 1985; Ortiz et al., 2004). Of these 4 studies, one study examined policies as a component of one of the four dimensions of a CLP, and found that workplace policies were not significantly associated with breastfeeding duration (Bai & Wunderlich, 2013). One study which examined awareness of worksite breastfeeding policies found that among women who were aware of such policies, the policies were significantly associated with any and almost exclusive breastfeeding at 6 months ($p = .036$) (Dabritz et al., 2009). Two studies examined worksite breastfeeding policies as part of a CLP and found that these CLP's were associated with breastfeeding rates greater than 6 months (11.7 and 9.1 months respectively) (Katcher & Lanese, 1985; Ortiz et al., 2004). Unfortunately, none of the international studies identified examined the workplace policies and association with breastfeeding duration.

If the total CLP studies are removed from consideration, then worksite lactation policies only seem to be associated with breastfeeding duration sporadically. There may be several reasons for this. One reason for the inconsistency may be a lack of communication regarding the policy. Research indicates that communication in the workplace about breastfeeding may be absent (Anderson et al., 2015; Stewart-Glenn, 2008). The articles which found no association between breastfeeding duration and worksite policies did not discuss how the policy was communicated to women in need of it (Bai & Wunderlich, 2013; Dabritz et al., 2009). The two

articles covering CLP's discussed that lactation benefits were discussed during pregnancy or while the mother was on maternity leave (Katcher & Lanese, 1985; Ortiz et al., 2004). One article examining awareness of the policy found awareness was associated with breastfeeding at 6 months (Dabritz et al., 2009). This would indicate that when women are aware of the policy and the parameters of it, they utilize the benefits it provides.

Support from Administrators, Supervisors, and Coworkers

Support from others in the work environment is essential for the success of a breastfeeding employee. Bar-Yam (1998) identifies the key roles of everyone in the workplace. Human resource professionals implement company benefits and programs that: support employees, lead to productivity, and ensure a safe work environment. However, human resource personnel do not achieve this without the help of others. They rely on input and communication with supervisors, managers and administration in order to implement and administer programs (Bar-Yam, 1998b). Supervisors and managers direct employees to complete the work of the institution, but also assist employees in balancing their personal lives and work (Bar-Yam, 1998b). In this role, supervisors and managers must continually reassess the current workload and workplace policies to facilitate a balanced environment (Bar-Yam, 1998b). The role of the working mother is to carry out the assigned tasks of her position. However, this may be in conflict with her role as a mother (Bar-Yam, 1998b). Mothers often need to be creative in meshing these two roles, and also need to communicate their needs to employers (Bar-Yam, 1998b). Additionally, they may to advocate for the accommodations they need in the workplace (Bar-Yam, 1998b).

Among the studies conducted in the United States, five examined the association between supervisor and coworker support and breastfeeding duration (Alvarez et al., 2015; Bai &

Wunderlich, 2013; Dabritz et al., 2009; Sattari et al., 2013; Waite & Christakis, 2015). Of these, two found a positive association between supervisor and coworker support and exclusive breastfeeding at 6 months (Alvarez et al., 2015; Dabritz et al., 2009) and one found a positive association with supervisor but not coworker support and exclusive breastfeeding at 6 months (Bai & Wunderlich, 2013). Additionally, in two of the studies researchers found that supervisor and coworker support was positively associated with any breastfeeding at 6 months (Alvarez et al., 2015; Dabritz et al., 2009), while one did not consider associations with any breastfeeding at 6 months (Bai & Wunderlich, 2013). One study among physician mothers which measured the degree of support women perceived from supervisors and coworkers found that for each unit increase in perceived coworker support, breastfeeding duration increased by 1.3 months (Sattari et al., 2013). Additionally, each unit increase in perceived support from the division chief increased breastfeeding duration by 1.1 months (Sattari et al., 2013). Only one study found no association between supervisor and coworker support and breastfeeding duration (Waite & Christakis, 2015).

In the international studies, only one addressed supervisor and coworker support (Yimyam & Hanpa, 2014). This study examined effectiveness only of lactation accommodations as part of the entire CLP, and found that significantly more women were exclusively breastfeeding or breastfeeding at all at 6 months after implementation of the program ($p < 0.004$ and $.033$, respectively) (Yimyam & Hanpa, 2014). This CLP was designed with increasing support from management as a goal and did so by including management in the planning process for the CLP (Yimyam & Hanpa, 2014). Another component of the program was including marketing campaigns aimed at normalizing breastfeeding in the workplace to increase coworker support (Yimyam & Hanpa, 2014).

The results from both U.S. and international studies appear to indicate an important connection in that supervisor and coworker support is critical in supporting the breastfeeding, working mother. Supervisors are key in arranging and implementing needed lactation accommodations for mothers (Bar-Yam, 1998b). Coworkers are key in helping the mother find the time for lactation breaks and covering the mother's work during these breaks (Bar-Yam, 1998b). For this, reason marketing campaigns should not only target working mothers, but also their supervisors and coworkers. Not only has research shown that support promotes breastfeeding duration, but also that lack of support has an even stronger negative impact on breastfeeding duration. The study by Sattari, et al. (2013) also examined the impact of perceived lack of breastfeeding support, and found that each unit decrease in perceived support resulted in a 3.5 month decrease in breastfeeding duration ($p < 0.04$) (Sattari et al., 2013). International studies show some similar results. A study of employees at a large manufacturing plant in Taiwan found that almost half of the women not utilizing lactation breaks provided by the employer cited a perception that their supervisor would give an unfavorable evaluation as the reason (Tsai, 2014). Additionally, among the women utilizing the breaks, supervisor and coworker encouragement to do so was cited as a reason among many (Tsai, 2014). Another study in Iran involving 212 mothers found that 50.0% were not permitted to leave their worksite to express milk, and 55.6% of these women used formula to feed their infants (Ahmadi & Moosavi, 2013). However, this was not significantly different than the proportion of the 50% of mothers who were permitted to take breaks and chose to formula feed ($p = 0.57$) (Ahmadi & Moosavi, 2013).

Gaps in the Present Research

There is wide variation in how breastfeeding duration is assessed between studies. While several studies identify either any or exclusive breastfeeding, or both, at 6 months, other studies report actual durations and still others report on duration rates such as 4 months or 2 weeks after returning to work. Standardization in assessing breastfeeding duration rates may help in identify trends and associations with more accuracy. Additionally, knowing the actual mean breastfeeding duration as opposed to the percent of employees who are breastfeeding at a certain time after return to work may also be beneficial as international and U.S. public health officials recommend breastfeeding until infants are at least 12 months of age.

Very few of the studies identified compared pre – accommodation breastfeeding duration with post – accommodation breastfeeding duration. Therefore, it is difficult to determine if the breastfeeding duration associations seen with these accommodations are different from the associations before the accommodations were implemented. One exception to this is the study by Yimyam & Hanpa (2014) that examined the impact of a CLP on breastfeeding duration in a company in Thailand. In this study, the authors measured the breastfeeding rate at 6 months before and after the CLP was initiated. They found that the rates of any and exclusive breastfeeding at 6 months increased significantly for the women participating in the program ($p = 0.033$ and 0.004 , respectively) (Yimyam & Hanpa, 2014). With the small sample size of 57 participants (24 participants before the CLP and 33 after the CLP), additional studies utilizing a larger sample size may help to illuminate the pre-and post – CLP associations with breastfeeding.

Another limitation of this research is that many of the articles do not discuss how the lactation accommodations are implemented. Identifying the channels through which employees

will be made aware of and be able to access policies and accommodations is critical in promoting their use. Additionally, establishing who is responsible for assuring compliance with the policy is also an essential component of implementation. Most articles did not mention the channels through which employees were made aware of such policies and accommodations. Another component of implementation relates to interpretation of policies. None of the articles mentioned how managers and supervisors were trained on interpreting and implementing the policies in their work units. Thus, policies may be implemented differently among departments resulting in unequal receipt of benefits among women.

Many of the research articles did not detail the condition of equipment or lactation spaces provided, or whether the location of these accommodations was convenient to the mother's worksite. This may influence use of these benefits since women might avoid expressing milk in an inconvenient or unclean space (Tsai, 2013). Additionally, when lactation spaces are not centrally located or convenient to the worksite, women may not use them as it takes too much time from their break. An examination of whether the facilities and equipment provided are adequate and in good working condition will aid in determining how the accommodations promote breastfeeding. Additionally, it would be necessary to determine how the accommodations were communicated to employees. Lack of association between the accommodations and breastfeeding duration could be related to lack of awareness among the employees.

CHAPTER 3: METHODS

Purpose of the Study

The purpose of this study was to examine whether workplace lactation accommodations, as they were currently implemented, were impacting breastfeeding duration. While some research in the United States and internationally has examined the association of breastfeeding duration and various workplace breastfeeding accommodations and corporate lactation programs (CLP), what is not certain is whether breastfeeding duration has increased with implementation of accommodations. Very few studies have compared rates within a business prior to and after implementation of accommodations. Additionally, there has been little comparison of breastfeeding duration rates between businesses who offer more comprehensive lactation accommodations and those with fewer or no lactation accommodations. Assessing lactation accommodation implementation strategies, and examining if work place lactation accommodations are promoting longer breastfeeding can maximize effectiveness of accommodations.

Women face unique challenges once they bear children and return to work. Role conflict and lack of support from extended family and the workplace may endanger breastfeeding duration. However, a thorough examination of the interactions between role conflict, self-efficacy, and breastfeeding intention is needed to determine whether lactation accommodations in the workplace are as effective as they could be. Therefore, the design of this study included an examination of several variables related to breastfeeding duration including: norms for breastfeeding in the workplace; supervisor and coworker support for combining work and breastfeeding; support from childcare providers and partners; job type and pay level; and various demographic variables.

The State of North Dakota initiated an Infant Friendly business designation in 2009. To become designated, employers must: establish a worksite breastfeeding policy, provide a clean private space – other than a bathroom - for milk expression, allow flexible break times for milk expression, have a source of potable water for hand and bottle washing and place to store expressed milk (North Dakota Department of Health, 2011a). While breastfeeding initiation and duration rates in ND had increased since 2011 when the first businesses earned the designation (71.4 % initiation and 46.1% at 6 months in 2011 vs. 82.3% initiation and 51.5% at 6 months in 2016), it was still not known how much the Infant Friendly designation contributed to these improvements (Centers for Disease Control and Prevention, 2011, 2016; North Dakota Department of Health, 2011b). As a Baby Friendly Hospital initiative was also launched during this time, it was beneficial to know the contributions of the worksite designation. Therefore, this study examined breastfeeding duration in worksites with and without the designation.

Population Sample and Sampling Procedures

The population for this study was working mothers in North Dakota who experienced at least one live birth between 2014 and 2016. The target sample was mothers working for businesses that became Infant Friendly during 2011 and 2012, as those had been designated for the longest duration, and an equivalent number of mothers working for non-designated businesses. There were approximately 37 businesses that became designated in 2011 and 2012 (North Dakota Department of Health, 2011b).

Estimating by equation, the desired sample size was 384 participants. Per Smith (2013) the following equation was used to estimate the necessary sample size:

$$\text{Necessary Sample Size} = (Z\text{-score})^2 * \text{Standard Deviation}^2 / (\text{margin of error})^2$$

By using a Z-score of 1.96, estimating standard deviation at 0.5, and using a margin of error at 0.05, the equation yielded a result of 384 participants (Smith, 2013).

$$384 = (1.96)^2 * (.5)(.5) / (.05)^2$$

Given the relatively small population of North Dakota, 757,952 total population (United States Census Bureau, 2016), multiple sampling methods were needed in order to yield the required sample size. Initially, businesses were contacted directly and asked to send the link for the questionnaire via their company email system. The first businesses contacted were those designated during 2011 and 2012. Additionally, other large employers that were not designated as Infant Friendly were also contacted. While several employers, most of which were designated, agreed to send the surveys via their company email system, many declined stating it was not an appropriate use of their professional email. Therefore, sampling methods were expanded to include email listservs of state professional organizations such as the nurses association, dietetics association, long-term care association and several others. Many of the professional organizations also stated they would not be able to distribute the survey via their email listeservs. Finally, snowball sampling was utilized. Several participants contacted the researcher requesting to send the survey to other friends in the state. Other participants and some professional organizations offered to post the survey to social media groups in order to distribute. In the end, not only were businesses designated during 2011 and 2012 included, but those designated during other years were also included, as well as businesses that were not designated.

Data Collection

Instrument

The instrument used in this study was a questionnaire developed specifically for the purposes of this study. Many questionnaire items were based on questions in or taken from other

breastfeeding questionnaires. These questionnaires include the Listening to Mothers II and III surveys (Declercq, 2006, 2013), the Fragile Families and Child Well-Being Study, and the Perceived Breastfeeding Support Assessment Tool (PBSAT) (Hirani et al., 2013), the Employee Perception of Breastfeeding Support Questionnaire (EPBS – Q) (Greene & Olson, 2008; Greene et al., 2008), and the Workplace Breastfeeding Support Scale (WBSS) (Bai, Peng, & Fly, 2008; Bai & Wunderlich, 2013). These surveys were chosen because they were tested and validated, and designed to measure workplace characteristics and breastfeeding behaviors. The final questionnaire included 85 items, 47 of which were from these other instruments. These 85 questions were divided into 15 sub-sections based on topic. The 15 sub-section titles included: recent birth (6 questions), prenatal work history (2 questions), infant feeding intentions and practices (10 questions), maternity leave (7 questions), full or part – time work (7 questions), education on combining work and breastfeeding (8 questions), support from family (7 questions), childcare (2 questions), workplace support for breastfeeding (5 questions), coworker support for breastfeeding (5 questions), manager support for breastfeeding (6 questions), physical environment for breastfeeding (9 questions), breaks (6 questions), and demographics (5 questions). The survey was imported into Qualtrics software, Copyright © 2015 Qualtrics (Qualtrics, 2005). Participants were sent a questionnaire link or were able to access the link through social media.

Reliability

There were some inherent measures of reliability in the questionnaire. Many of the questions were developed, piloted, tested for reliability and validity, and then used for research in other studies (Bai & Wunderlich, 2013; Declercq, 2006, 2013; Greene et al., 2008; Hirani et al., 2013). However, since the questionnaires were tested as written and not in combination with

other instruments or items, additional reliability testing was conducted. Seventeen women who attempted to breastfeed at least one child after returning to work and who were employed outside the state of North Dakota pilot tested the questionnaire. The data collected during pilot testing was assessed using Cronbach's coefficient to determine scale reliability. Additionally, Interclass Correlation Coefficient was used to assess reliability of responses between participants. All statistics were calculated using Statistical Package for the Social Sciences (IBM SPSS Statistics for Macintosh, Version 24.0. Armonk, NY: IBM Corp).

Table 3.1

Cronbach's Alpha for Scale Reliability of Likert Responses

Cronbach's Alpha 0.91	Cronbach's Alpha based on Standardized Items 0.90	N 39
--------------------------	--	---------

Cronbach's Alpha if Item Deleted

Question number	Question Stem	Cronbach's alpha if item deleted
21_1	I believe breastfeeding is a healthy way to feed babies.	0.91
21_2	I was confident that I would be able to successfully breastfeed my child.	0.91
21_3	I was confident in my ability to combine breastfeeding and working.	0.91
27	I had enough leave (paid and/or unpaid) to get breastfeeding started before going back to work.	0.91
39_1	During my pregnancy, my health care provider discussed breastfeeding with me and/or provided educational materials on breastfeeding.	0.91
39_2	During my pregnancy, my employer provided educational materials about breastfeeding and working.	0.91
39_3	When my child was born, I received breastfeeding education or support from the nursing staff at the hospital.	0.91
39_4	Before I returned to work, my employer provided educational materials about breastfeeding and working.	0.91
39_5	My employer provided a lactation consultant.	0.91
39_6	My employer provided me with information on breastfeeding resources available in our community (such as local lactation consultants or support groups).	0.91
43	My partner supported breastfeeding.	0.91
44	My family supported breastfeeding.	0.91
47	My family encouraged me to continue breastfeeding when I returned to work.	0.91
48	My partner encouraged me to continue breastfeeding when I returned to work.	0.91
54_1	My employer had written policies for employees that are breastfeeding or pumping breast milk.	0.91

Table 3.1. *Cronbach's Alpha for Scale Reliability of Likert Responses (continued)*

Question number	Question stem	Cronbach's alpha if item deleted
54_2	Breastfeeding was common in my workplace.	0.91
54_3	My job was at risk (e.g., job loss, loss of scheduled hours, loss of opportunities for advancement) if I chose to breastfeed or pump breast milk at work. ^a	0.91
54_4	I was comfortable asking for accommodations to help me breastfeed or pump breast milk at work.	0.91
57_1	My coworkers willingly cover for me when I need to pump breast milk.	0.91
57_2	My coworkers would help me find a place to breastfeed or pump breast milk if I needed it.	0.91
57_3	My coworkers said things that made me think they supported my breastfeeding efforts.	0.91
57_4	My coworkers listen to me talk about my breastfeeding experience.	0.91
60_1	My manager helped me adjust my workload so I could breastfeed or pump breast milk at work.	0.91
60_2	My manager considered it part of his/her job to help me combine breastfeeding and work.	0.91
60_3	My manager supported my breastfeeding or pumping breast milk at work.	0.91
60_4	My manager said things that make me think he/she supported my breastfeeding efforts.	0.91
60_5	I talked with my manager about my breastfeeding needs while at work.	0.91
63_1	While at work, I could easily find a quiet place, other than the bathroom, to breastfeed or pump breast milk.	0.91
63_2	My workplace provided a designated place for breastfeeding or pumping breast milk.	0.91
63_3	The designated place for breastfeeding or pumping breast milk was available when I needed it.	0.91
63_4	The designated place for breastfeeding or pumping breast milk was satisfactory.	0.91
65_1	My workplace had a refrigerator that I could use to store my milk.	0.91
65_2	My workplace had a breast pump available for breastfeeding mothers to use.	0.91

Table 3.1. *Cronbach's Alpha for Scale Reliability of Likert Responses (continued)*

Question number	Question stem	Cronbach's alpha if item deleted
65_3	I was made aware of the expectations for using and maintaining the designated space for breastfeeding or pumping breast milk.	0.91
67_1	My breaks were frequent enough for breastfeeding or pumping breast milk.	0.90
67_2	My breaks were long enough for breastfeeding or pumping breast milk.	0.91
67_3	Some days I would need to skip a breastfeeding or pumping session because my work schedule was too hectic. ^a	0.91
67_4	I could adjust my break schedule in order to breastfeed or pump breast milk.	0.91
67_5	I feel comfortable taking the breaks during work hours to pump breast milk.	0.91

Note: All Likert Scale responses were converted to numeric values for analysis (“strongly disagree” = 1; “disagree” = 2; “somewhat agree” = 3; “agree” = 4; “strongly agree” = 5)

^a Numeric values for Likert responses were reversed for analysis since question was framed in the negative.

Table 3.2

Interclass Correlation Coefficient Between Pilot Test Participant Responses

	Interclass Correlation	95% Confidence Interval		F –Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	P
Single Measures	0.206	0.181	0.235	11.126	353	13414	0.00
Average Measures	0.910	0.896	0.923	11.126	353	13414	0.00

As noted in Tables 3.1 and 3.2, the survey was generally reliable. Overall, Cronbach's Coefficient was 0.91. As values above 0.70 – 0.80 are considered acceptable for reliability, 0.91 was well above that threshold (Field, 2013). Additionally, Cronbach's Alpha when each question

was deleted did not indicate that any of the individual items were lowering the reliability of the overall instrument (Field, 2013). Additionally, the Interclass Correlation Coefficient for average measures was also within an acceptable range as values greater than 0.90 are considered excellent (Koo & Li, 2016).

Validity

Four lactation professionals currently working in North Dakota addressed face validity by reviewing the questionnaire and providing feedback on question wording and whether the instrument could accurately measure the variables of interest. Additionally, the working mother pilot group also addressed construct (theory) and criterion (predictive ability) validity.

Procedures/ Research Design

Once the instrument was finalized, the study was presented to the Institutional Review Board at North Dakota State University for approval. The IRB approval letter (HE 17090) is listed in Appendix A. After IRB approval, businesses earning the North Dakota Infant Friendly Worksite designation in 2011 and 2012 were approached to secure commitment for participation in the research. An equal number of non-designated worksites in North Dakota were also approached for participation. The online questionnaire link was emailed to a representative at the worksite to distribute to all employees. Email reminders to complete the survey were sent 2 weeks after the initial email invitation.

Since many employers declined sending the questionnaire, sampling methods were expanded two additional times. The first sample expansion efforts included contacting state professional organizations including the state dietetic association, nurses' association, and long-term care association. The associations also declined stating they also did not feel it was an appropriate use of their email listserves. The state dietetic association was agreeable to posting

the questionnaire link on their social media page. Finally, sampling methods were expanded to include snowball sampling techniques. This method was used since several participants had contacted the researchers asking if they could post the survey to social media or email it to other friends and family members. Therefore, this seemed like the most effective avenue to obtain the needed 384 participants. All changes in sampling techniques were submitted to the IRB for approval prior to instituting.

Analysis

All statistical analyses were conducted using Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY). As one of the main purposes of this study was to determine what differences exist between businesses designated as Infant Friendly and those that were not, many of the analyses used were comparisons of means. These included t-tests and ANOVA for mean differences in breastfeeding duration between groups (such as variations in support from supervisors and coworkers, breastfeeding duration differences, breastfeeding intention, etc.). All ANOVA measures included an assessment of homogeneity of variance, which was reported in the results.

Some variables were transformed into numerical scales and used in regression models to predict breastfeeding duration. These variables include level of supervisor, coworker, and family support; presence of various lactation accommodations in the workplace; number of births, etc. Forward, step-wise regression was chosen as it was seen as an efficient method for identifying the most impactful of the 20 independent variables. All regression models included assessments of collinearity (including Variance Inflation Factor or VIF, tolerance, Durbin – Watson, and eigenvalues). Models met the following criteria: VIF values below 10, tolerance values above

0.2, Durbin–Watson values around 2, and eigenvalues above 0. A histogram regression standardized residual plot was used to assess normality of data. The plot was considered normal.

CHAPTER 4: A REVIEW OF WORKSITE LACTATION ACCOMMODATIONS: OCCUPATIONAL HEALTH PROFESSIONALS CAN ASSURE SUCCESS¹

Abstract

The objective of this review is to examine workplace lactation accommodations, determine their association with breastfeeding duration, and identify areas for occupational health professionals to promote improvements. This study involved a review of literature from 1985 through 2015 using PubMed and CINAHL. Using PRISMA Analysis, 11 articles were identified for review. A corporate lactation program, on-site childcare, and return to work/telephone lactation consultation were consistently associated with breastfeeding at 6 months. Other breastfeeding accommodations (including lactation spaces, lactation breaks, worksite lactation policy, and supervisor/coworker support) were not consistently associated with breastfeeding duration. Occupational health professionals may play a key role in improving the effectiveness of accommodations. Assuring adequate implementation of accommodations, increasing communication and marketing of accommodations, and promoting supervisor and coworker support are areas that occupational health professionals should explore for improving effectiveness.

Background

In the United States, the breastfeeding initiation rate is considerably higher than the rate at 6 months. Based on the 2014 United States Breastfeeding Report Card, the national breastfeeding initiation rate (percentage of infants ever fed breast milk) was 79.2%; however,

¹ This material was originally published in *Workplace Health & Safety*. Hilliard, E. (2017). A review of worksite lactation accommodations: occupational health professionals can assure success. *Workplace Health & Safety*, 65 (1), 33 – 44. <https://doi.org/10.1177/2165079916666547>. Copyright © 2016 (Workplace Health & Safety). Reprinted by permission of SAGE Publications.

only 49.4% of infants were still breastfeeding at 6 months of age (Centers for Disease Control, 2014). One explanation for breastfeeding attrition is maternal employment. Data suggest that many women are employed outside the home shortly after giving birth (Han, 2008). In 2001, among women who were employed prior to the birth of a child, the proportion who returned to work by 1, 2, 3, and 9 months postpartum were 10%, 40%, 70% and 90% respectively (Han, 2008).

In the literature, there are many variables associated with failure to initiate and continue breastfeeding. Some of the most influential variables include: race, marital status, extended separation from the infant, age, income, and education level (Ogbuanu, Glover, Probst, Hussey, et al., 2011). However, return to full time employment after the birth of a child has also been consistently associated with failure to initiate and continue breastfeeding (Attanasio et al., 2013; Mandal et al., 2010; Mirkovic et al., 2014b; Ogbuanu, Glover, Probst, Liu, & Hussey, 2011). Among working women, analyses of national level data sets have supported positive associations between prolonged maternity leave (Mandal et al., 2010; Mirkovic et al., 2014a, 2014b) and part time employment (Mandal et al., 2010; Ogbuanu, Glover, Probst, Hussey, et al., 2011) and extended breastfeeding duration (number of weeks or months an infant receives breast milk). The Fragile Families and Child Wellbeing Study¹, a United States (U.S.) longitudinal study of first - time and unwed parents and their children, demonstrated that mothers working outside the home were most likely to discontinue breastfeeding the month immediately before, during, or immediately after returning to work (Kimbrow, 2006).

Longer breastfeeding duration is associated with health benefits for infants, including fewer acute illnesses (American Academy of Pediatrics, 2012). The health of an infant may seem unrelated to the interests of an employer; however, infant health impacts corporate expenses and

work productivity. Parents of breastfed infants have half as many one-day absences as parents of formula fed infants, producing up to \$60,000 in cost saving related to absenteeism for some employers (United States Department of Health and Human Services, 2008). Corporate lactation programs (CLP), which promote and facilitate breastfeeding in the workplace, have aided some employers in decreasing their health care costs by \$240,000 as employees typically need to utilize fewer insurance benefits for their infants (United States Department of Health and Human Services, 2008). Employee retention is also higher among companies with CLP's (94.2% retention rate compared to the national average of 59%) (United States Department of Health and Human Services, 2008). Retention may result from employees feeling supported in their roles as parents, creating positive perceptions of the employer and increasing loyalty (United States Department of Health and Human Services, 2008).

In response to poor breastfeeding duration rates, the U.S. Congress enacted section 4207 of the Patient Protection and Affordable Care Act (PPACA), which included the "Break Time for Nursing Mothers" law of 2010 (Garvin et al., 2013; United States Breastfeeding Committee, 2013). This law requires companies with 50 or more employees to provide reasonable time and a private secure space - other than a bathroom - for expressing milk. Employees who are paid hourly and covered by the Fair Labor Standards Act (FLSA) are eligible for lactation breaks for up to one year after the birth of a child (Garvin et al., 2013; United States Breastfeeding Committee, 2013). Employers with less than 50 employees can apply for exemption from the law if allowing milk expression breaks causes insurmountable disruptions to workflow (Garvin et al., 2013; United States Breastfeeding Committee, 2013). National public health initiatives also reinforce the need for workplace lactation support. Healthy People 2020 Objective MICH – 22

focuses on increasing the percentage of employers offering CLP's from 25% to 38% (United States Department of Health and Human Services, 2016).

Research has supported the role of health professionals, such as Occupational Health Nurses or Certified Lactation Consultants, in promoting, facilitating, and administering worksite lactation benefits or CLP's (Rietz & McCullagh, 2010). The occupational healthcare professional can perform the following tasks critical for a CLP: develop the workplace lactation policy; facilitate conversations between employee and employer regarding needed lactation accommodation; care and maintenance of lactation equipment and spaces; research liability insurance requirements and providers; promote the program and educate all employees; evaluate the program; maintain program records and conduct benefit analyses for justification of the program; and act as a support person for the breastfeeding mother (Mills, 2009; Ortiz et al., 2004; Rietz & McCullagh, 2010).

A gap in the available literature is a summary of the association of various workplace lactation accommodations and breastfeeding duration in working mothers utilizing the accommodations. The purpose of this review is to examine data regarding the impact of workplace lactation accommodations on breastfeeding duration. Another purpose is to identify which accommodations are consistently associated with increased breastfeeding duration, and identify areas for improvement. The answers to these questions are of benefit to various occupational health professionals as they may help optimize the effectiveness of current programs and facilitate development of comprehensive new programs. As the relationship between breastfeeding duration and maternity leave and employment status are well documented in the literature, those factors will not be addressed in this review.

Methods

This study involved a literature review using PubMed and CINAHL databases. Search terms included *workplace lactation support*, *workplace breastfeeding duration*, *breastfeeding and employment*, and *workplace breastfeeding*. Inclusion criteria for this review were: 1) article written in English; 2) data collected in the U.S.; 3) examination of individual worksite lactation accommodations or a CLP; 4) availability of descriptive and/or inferential statistics on breastfeeding duration in women utilizing the accommodations or a CLP; and 5) dated from 1985 to 2015. Studies conducted outside the United States were excluded to assure that findings would reflect the unique cultural and workplace environment and breastfeeding practices in the U.S. Studies conducted more than 5 years ago were included to provide historical context to the current research. These studies also form the foundation for current knowledge about best practices for supporting breastfeeding in the workplace.

Articles were excluded if: they were not based on U.S. data; did not relate to workplace lactation accommodations; did not relate to breastfeeding; were commentaries, editorials, reviews, news briefs, or training modules; were focused on the employer's response to breastfeeding, the development of workplace breastfeeding assessment tools, or discussions of theory; and did not compare breastfeeding duration with use of lactation accommodations or a CLP. Articles that focused on the association between maternity leave and full or part – time work status and breastfeeding duration were also not included in this analysis as the focus of this research is the on the impact of the work environment on breastfeeding duration. In order to gain understanding on the topic of barriers to workplace breastfeeding, qualitative studies focusing on women's experiences with combining breastfeeding and working were also reviewed. However,

they were not included in the analyses, as they did not provide numerical data on the association between breastfeeding duration and lactation accommodations.

One author searched the databases and reviewed abstracts and full texts for literature meeting the inclusion criteria during June and July of 2015. Through PRISMA Analysis, quantitative analyses of workplace lactation accommodations and their association with breastfeeding duration were reviewed and associations were noted in tabular format. Correlations and p-values were included in the tables and are representative of their presentation in the original study.

Results

The search terms identified 1030 references in Pubmed and 481 references in CINAHL (Figure 1). After duplicates were removed, 981 references remained. From these, 910 were excluded based on the title or brief abstract because they were not based on U.S. data, did not relate to workplace accommodations, or did not relate to breastfeeding. Full – text articles for the remaining 71 references were closely reviewed for eligibility. Upon review of the abstracts, an additional 60 articles were excluded because they were: commentaries/editorials; practice papers, reviews, or conference proceedings; discussed only theory; were international; presented only qualitative data; did not compare breastfeeding duration to lactation accommodations; were focused on the development of assessment tools; or reviewed only maternity leave. Eleven articles (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Cohen & Mrtek, 1994; Dabritz et al., 2009; Hills-Bonczyk et al., 1993; Jacknowitz, 2008; Katcher & Lanese, 1985; Ortiz et al., 2004; Sattari et al., 2013; Waite & Christakis, 2015) met study inclusion criteria.

The 11 studies are summarized in Table 1. Five were cross sectional surveys (Alvarez et al., 2015; Bai & Wunderlich, 2013; Dabritz et al., 2009; Sattari et al., 2013; Waite & Christakis, 2015). One was a prospective cohort study of various employers regarding the availability and use of lactation accommodations as compared to breastfeeding duration among female employees (Hills-Bonczyk et al., 1993). Two were cross-sectional surveys of participants in a corporate lactation program (CLP) (Balkam et al., 2011; Katcher & Lanese, 1985). One was a prospective cohort study of participants in a CLP (Cohen & Mrtek, 1994) and one was a retrospective record review of participants in a CLP (Ortiz et al., 2004). Finally, one was an analysis of national data which contained questions about workplace lactation accommodations (Jacknowitz, 2008). There were no clinical trials or experimental studies identified.

A summary of the accommodations studied and their associations with breastfeeding duration are listed in Table 2. Accommodations are grouped into 6 categories in order to simplify presentation of data. Groups include: support, education, access to infant, milk expression, policy, and availability of a (CLP). As noted in Table 2, the methods used to measure breastfeeding duration vary between studies. Several studies measure any or exclusive breastfeeding at 6 months, while some studies examine total duration.

In general, the presence of a CLP seemed to promote breastfeeding at 6 months (Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et al., 2004), as did on-site childcare (Bai & Wunderlich, 2013; Haider, Jacknowitz, & Schoeni, 2003). Of the three studies examining CLP's, the average breastfeeding duration for employees utilizing the program was 8.1 months (Cohen & Mrtek, 1994), 11.7 months (Katcher & Lanese, 1985), and 9.1 months (Ortiz et al., 2004). Only Katcher & Lanese (1985) included a comparison group to identify differences in breastfeeding duration between employees enrolled in the CLP and those that were not (11.7 mo

for the CLP vs. 6 months for non-CL, $p < .003$). This study was conducted before U.S. workplace lactation laws went into effect. With regards to on-site childcare, one study found that the perception of available on-site childcare significantly increased the likelihood of breastfeeding at 6 months by 47% ($p < 0.01$) (Jackowitz, 2008). In the second study, factor analysis was used to develop four dimensions of breastfeeding accommodations. The dimension of technical support, which included on-site childcare, was significantly positively associated with breastfeeding duration ($r = 0.71$, $p = .01$) (Bai & Wunderlich, 2013). Telephone and return to work consultations with a lactation consultant were examined in only one article and were significantly positively associated with any and exclusive breastfeeding at 6 months ($p < .05$) (Balkam et al., 2011). Other accommodations that were examined in the literature had inconsistent associations with breastfeeding duration.

In four studies (Alvarez et al., 2015; Bai & Wunderlich, 2013; Dabritz et al., 2009; Sattari et al., 2013), coworker and supervisor support for breastfeeding was significantly positively associated with overall breastfeeding duration and exclusive breastfeeding at 6 months ($p = .032$, $.01$, $.018$, $.011$, respectively), while one study (Waite & Christakis, 2015) did not find any significant association with duration at either of two study sites ($p = .73$ and $.75$). Additionally, one study found that the perception of unsupportive colleagues was significantly associated with a 3.5 month decrease in breastfeeding duration (no r -value reported, $p = .037$) (Sattari et al., 2013).

Lactation spaces for milk expression and lactation breaks were not consistently associated with breastfeeding duration. Two studies (Alvarez et al., 2015; Bai & Wunderlich, 2013) examining availability of a lactation space found a significant positive association with breastfeeding duration ($r = .504$ and $.26$, $p = .039$ and $.01$, respectively), while the other four

(Balkam et al., 2011; Dabritz et al., 2009; Hills-Bonczyk et al., 1993; Sattari et al., 2013) found no significant association with breastfeeding duration ($p = \text{NS}$, .094, two not reported, respectively). Lactation breaks were not consistently associated with breastfeeding duration either. Two studies (Alvarez et al., 2015; Sattari et al., 2013) found a significant positive association with total breastfeeding duration ($r = .493$, .29, and $p = .044$ and $< .001$, respectively), while one study (Bai & Wunderlich, 2013) found no significant association ($r = .05$, $p = .52$). Additionally, one study found that women encountering major problems finding time to express milk had significantly shorter breastfeeding duration than those reporting no problems at all (13 weeks versus 22 weeks total duration, $p = .01$) (Hills-Bonczyk et al., 1993).

Worksite policy was examined in two of the studies (Bai & Wunderlich, 2013; Dabritz et al., 2009) with differing results. One (Dabritz et al., 2009) found that a worksite policy was significantly associated with any breastfeeding at 6 months ($p = .036$) while the other (Bai & Wunderlich, 2013) found no significant association between worksite policy and exclusive breastfeeding at 6 months ($r = .13$, $p = .24$). One study conducted prior to enactment of the 2010 PPACA, reported a significant positive association between the presence of a state law regarding breastfeeding at work and any breastfeeding at 6 months ($p < .01$) (Jackowitz, 2008).

Discussion

This review identified several workplace breastfeeding accommodations that occupational health professionals can implement to promote breastfeeding among working mothers. Promising interventions include the presence of a CLP, on-site childcare, and telephone and back - to - work consultations with a lactation consultant. CLP's and on-site childcare were shown to be consistently significantly associated with breastfeeding at 6 months in multiple studies, while the consults with lactation consultants were only examined in one study. However,

with three or fewer studies examining these three accommodations, generalizability of these findings may be limited.

Many of the other accommodations were not consistently significantly associated with breastfeeding duration, and occupational health professionals may have a critical role in improving effectiveness. While some of the inconsistent associations may have resulted from confounding variables such as lack of support from family and friends, low maternal self-efficacy for breastfeeding, personal or cultural beliefs about breastfeeding, and research design, worksite factors may contribute as well. Implementation of the accommodations may be a confounder, especially regarding adequacy of the accommodations; communication about and marketing of the accommodations; and supervisors and coworker encouragement for use of the accommodations.

Occupational health professionals can assure adequacy of accommodations by promoting current best practices, gathering feedback on accommodations, and monitoring the condition of physical facilities. In one study, participants expressed that the designated lactation spaces were not adequately equipped to promote milk expression (Bai & Wunderlich, 2013). Interestingly, this study found a significant positive association between spaces and breastfeeding duration. A space for milk expression should be dedicated solely to lactation and have a locking door; be clean, private, and convenient to the worksite; be equipped with a power outlet, comfortable chair, sink, and refrigerator; and be available for use when mothers are ready to express (Eldridge & Croker, 2005; Marinelli et al., 2013; Uriell, Perry, Kee, & Burrell, 2009). An occupational health professional can assure spaces meet the recommended criteria, and needs of mothers, by providing feedback cards in the rooms, conducting follow-up surveys, and examining the rooms for disrepair.

Breastfeeding employees may be hesitant to use accommodations without the support supervisors and coworkers. Occupational health professionals can assist with facilitating support for breastfeeding employees. Support from coworkers and supervisors is critical in promoting breastfeeding among working mothers (Bar-Yam, 1998a). The studies in this review found that support was significantly positively associated with longer breastfeeding duration (Alvarez et al., 2015; Bai & Wunderlich, 2013; Dabritz et al., 2009; Sattari et al., 2013), while lack of support significantly shortened breastfeeding duration (Sattari et al., 2013). Qualitative studies and position papers have cited the importance of manager, coworker, and organizational support in promoting breastfeeding in the workplace as well (Bar-Yam, 1998b; O'Keefe & Henly, 1998). Encouragement from managers, coworkers, and the organization promotes the use lactation breaks, assists with scheduling the workday around breastfeeding, and helps the mother feel accepted for her choice to work and breastfeed (Bar-Yam, 1998b). Occupational health professionals can improve supervisor and coworker support for breastfeeding by writing a comprehensive workplace lactation policy; promoting breastfeeding throughout the worksite; providing education to all employees on the benefits of breastfeeding; and acting as a liaison between employee and supervisor in obtaining needed accommodations (Cohen & Mrtek, 1994; Mills, 2009; Ortiz et al., 2004; Rietz & McCullagh, 2010).

It was unclear in the many of the studies what information was provided to supervisors and coworkers to increase their support for breastfeeding. One study reported that managers were educated by corporate lactation consultants on the needs of working, breastfeeding women (Ortiz et al., 2004). The purpose of this was to assure managers that a woman's participation in the program would not interfere with her productivity and would only utilize her regular break schedule (Ortiz et al., 2004). This study was conducted prior to the implementation of the

PPACA in 2010. Education for employers would need to include this important piece of legislation as well as any state or organizational policies mandating greater benefits. Managers and coworkers also need to be aware of the benefits of breastfeeding, the company lactation policy and available accommodations, and a breastfeeding mother's need for support. Occupational health professionals can be instrumental in assuring effective breastfeeding education is provided to all employees.

Occupational health professionals can also facilitate communication in the workplace. Research shows that workplace communication about breastfeeding is lacking (Anderson et al., 2015). Inadequate communication about the workplace policy and availability of lactation breaks and spaces may limit use of the accommodations. Three of the studies examining the impact of a CLP on breastfeeding duration mention program promotion; however, they do not specifically describe the process of communicating about available accommodations and expectations for their use to breastfeeding employees. One study mentioned that the CLP was offered to all full-time, female employees (Ortiz et al., 2004) and another stated that women were informed about the CLP when they requested maternity leave (Katcher & Lanese, 1985). The third simply mentioned that CLP promotion was more effective at one site than another (Cohen & Mrtek, 1994). Only one study of a CLP mentioned that employees were given a return to work consultation with a lactation consultant including a meeting with the employee's supervisor (Cohen & Mrtek, 1994). The supervisor meeting was included in order "to clarify any remaining issues regarding the maintenance phase of the lactation program" (Cohen & Mrtek, 1994), possibly meaning a discussion of the expectations for using breaks and accommodations. The interaction of employee - employer communication and breastfeeding duration was not considered in any of the studies. The occupational health professional is uniquely positioned to

address this challenge, as they are a knowledgeable mediator able to speak on behalf of both parties.

As mentioned previously, occupational health professionals are well-positioned for establishing an employer sponsored lactation program (Rietz & McCullagh, 2010). If an employer has multiple barriers preventing implementation of a CLP, occupational health professionals could also assist in developing a work from home or flex work program. Some research has shown that women who are able to work more hours from home, or are self- or non-formally employed, breastfeed longer than those in formal employment (Rivera-Pasquel et al., 2015) (Roe et al., 1999). This could be a less burdensome option for some employers, as it would only require that a mother have the resources needed to do her job from home instead of altering the work environment.

Future research for occupational health professionals should focus on the interactions between the amenities included in lactation rooms, the rooms' proximity to the mother's workplace (Hojnacki et al., 2012), whether rooms are designated for lactation, and supervisor/coworker promotion of and support for use of the spaces, and breastfeeding duration. Additionally, more insight into the breastfeeding education provided to employers and employees, the educational methods used, and the impact on breastfeeding duration may also be beneficial. Communication between employee and employer regarding needed lactation accommodations and recommendations for best practice may also be a critical area for the future. Evaluative research should focus on absenteeism in breastfeeding employees, use of medical benefits for infants, total length of breastfeeding duration, and changes in normative perceptions of breastfeeding in the workplace in order to demonstrate benefits of the program to the employer. Finally, if an occupational health professional has the opportunity to build a CLP, data

on breastfeeding prevalence and duration should be collected before and after the CLP is implemented for comparison.

There are several limitations to this review. First, none of the identified studies were experimental. Many had small, homogeneous sample sizes. Several of the studies included mostly of white (Bai & Wunderlich, 2013; Balkam et al., 2011; Jacknowitz, 2008; Ortiz et al., 2004; Waite & Christakis, 2015), at least partially college educated women (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Dabritz et al., 2009; Hills-Bonczyk et al., 1993; Jacknowitz, 2008; Sattari et al., 2013; Waite & Christakis, 2015) who were over age 30 years (Alvarez et al., 2015; Balkam et al., 2011; Jacknowitz, 2008; Ortiz et al., 2004; Sattari et al., 2013), and married (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Hills-Bonczyk et al., 1993; Jacknowitz, 2008; Sattari et al., 2013; Waite & Christakis, 2015). Research suggests that breastfeeding duration is longer in women who fit these demographic characteristics (Chin, Myers, & Magnus, 2008; Persad & Mensinger, 2008; Ryan & Martinez, 1989). Additionally, this group of women may be more motivated to participate in research studies and be over-represented. Recall bias could have also been an issue with several studies (Bai & Wunderlich, 2013; Balkam et al., 2011; Dabritz et al., 2009; Katcher & Lanese, 1985; Sattari et al., 2013; Waite & Christakis, 2015). Breastfeeding duration was defined in different ways between studies. Additionally, there is a lack of research conducted in the U.S. examining the associations or effect of lactation accommodations on breastfeeding duration, so this review is based on very limited data. Finally, some studies included in the review were more than 5 years old, so they may not reflect current workplace breastfeeding practices.

Summary

Workplace breastfeeding accommodations may have the potential to extend breastfeeding duration for the working mother. Occupational health professionals are ideal for promoting breastfeeding by assuring that a well-written lactation policy is in place and fully implemented, and maintaining equipped lactation facilities. Increasing communication about and marketing of breastfeeding, and supporting the working breastfeeding mother are other critical duties.

Future research areas should include: type and impact of breastfeeding education provided to all employees; best practices for breastfeeding communication and how to facilitate it between employer and employee; the impact that education and communication have on breastfeeding duration; and a comparison of breastfeeding duration in employees before and after implementation of a CLP.

CHAPTER 5: AN EXAMINATION OF THE IMPACT OF AN INFANT FRIENDLY BUSINESS DESIGNATION ON EMPLOYEE BREASTFEEDING DURATION

Abstract

In response to suboptimal breastfeeding initiation and continuation rates, one Midwestern state amended SB 2344 to create an Infant Friendly business designation available to any business or organization in the state providing specified lactation accommodations for their employees. However, there has been no evaluation of this designation to determine effectiveness since its inception. The purpose of this article is to examine the difference in breastfeeding continuation rates between women working for Infant Friendly and non-designated businesses. An 85-item online questionnaire was developed and distributed to working women across the state using various sampling methods. t-tests, and Analysis of Variance were used to analyze results. While there was no statistically significant difference in breastfeeding duration between designated and undesignated businesses, there was an average 3-month difference in duration between continually designated businesses and those letting their designation lapse. Most participants did not have access to paid maternity leave or on-site childcare, nor did they receive breastfeeding education from their employers. Most women felt supported by coworkers, had access to a designated lactation area and refrigeration for expressed milk. While the designation is a starting point for worksite breastfeeding support, it could be more comprehensive. Adding a policy promotion and breastfeeding education component to the designation may improve awareness and use of accommodations, making the designation more impactful.

Background

By 2008, breastfeeding rates had fallen below the national average in several Midwestern states including, Ohio, Indiana, Illinois, Michigan, Missouri, North Dakota, South Dakota, and

Wisconsin. Per the 2008 Breastfeeding Report Card, Ohio had the lowest “ever breastfeeding”, 6 and 12 month rates at 65, 31.5 and 14%, respectively (national average was 74.2, 43.1 and 21.4%, respectively); while Illinois had the highest “ever breastfeeding” rate at 71.1%, and Wisconsin and Michigan had the highest 6 and 12 month rates at 39.2 and 19.6%, respectively (Centers for Disease Control and Prevention, 2008).

In 2009, North Dakota amended SB 2344 with a provision to protect a woman’s right to discretely breastfeed her child in public (North Dakota Department of Health, 2011c). The amendment also included a provision to create an Infant Friendly business designation available to businesses and organizations in the state providing specified lactation accommodations for employees. To be eligible, a worksite must have a lactation policy, allow flexible break times, provide a private space – other than a bathroom – for women to express milk and a source of potable water for hand washing, and provide a refrigerator for milk storage (North Dakota Department of Health, 2011c). Any business or organization meeting the criteria can submit an application, at no cost, to the North Dakota Department of Health.

The first cohort of businesses became designated in 2011 with a second cohort in 2012. To date, there are 98 businesses designated as Infant Friendly in North Dakota. Of these, 22 were certified with the first 2 cohorts and then recertified 5 years later. There are 10 businesses that certified initially but, for unknown reasons, failed to complete the 5-year recertification. The types of businesses certified include state colleges and universities, smaller hospitals, local public health units and clinics (including the Special Supplemental Nutrition Program for Women, Infants, and Children or WIC program), city, county, and state governments, independent medical practitioner offices, malls, grocery retailers, banks and credit unions, and other private businesses. Of note, is the lack of hospitals, major retailers, food service venues,

armed services, utility companies, or postal/ package delivery services with the Infant Friendly designation.

Since the inception of the business designation, breastfeeding rates are on the rise. As of 2016, breastfeeding rates have improved in North Dakota. The 2016 rates for “ever breastfeeding” and breastfeeding at 6 and 12 months are now 82.3, 51.5, and 27.9%, respectively, while the national averages are 81.1, 51.8, and 30.7% for the same time frame (Centers for Disease Control and Prevention, 2016). While the Infant Friendly designation has gained momentum and the number of designated businesses is expanding, there has been no examination of the designation’s impact on breastfeeding duration among working women in that state. As the designation has been available since 2009 and breastfeeding continuation rates still fall behind the national average, assessing the impact of the Infant Friendly designation is timely.

The purpose of this article is to examine the difference in breastfeeding continuation rates between women working for Infant Friendly, and non-designated businesses. Additionally, an examination of the lactation accommodations most commonly offered by businesses and explore areas for improvement to increase the designation’s impact.

Methods

This study was designed as a cross-sectional online survey. The online format was chosen in order to reach a critical mass of participants with relatively easy distribution. Additionally, there was no incentive offered for participation, therefore the researchers felt a method with low participant burden was ideal. The study was approved by the Institutional Review Board at North Dakota State University (HE17090). The approval letter is listed in Appendix A. Participants did not provide their name or any identifying information, other than the name and county of their

employer, which the researchers kept confidential. The survey was administered between November 2016 and March 2017. The survey was administered via email and social media to women working in North Dakota, a state that is still not meeting the Healthy People 2020 goals for breastfeeding duration at 6 months.

The target population for this study was working women who attempted to continue breastfeeding after returning to work following the birth of a child. The sample included women who had given birth between 2014 and 2016 and were employed in North Dakota. This group was targeted as they would have experienced the current working environment with regards to breastfeeding support. Power analysis indicated that 384 participants were needed to provide statistical power at $\alpha = .05$. Power analysis was conducted using the following equation (Smith, 2013):

Necessary Sample Size =

$$(Z\text{-score})^2 * \text{Standard Deviation} * (1 - \text{Standard Deviation}) / (\text{margin of error})^2$$

By using a Z-score of 1.96, estimating standard deviation at 0.5, and using a margin of error at 0.05, the equation yields a result of 384 participants.

$$384 = (1.96)^2 * (.5)(.5) / (.05)^2$$

Multiple sampling methods were needed in order to yield the required sample size. Businesses were contacted directly and asked to disseminate the survey link via their company email. Many declined stating it that would be a violation of corporate policy. Methods were then expanded to include state professional organizations. Many of the professional organizations also declined citing similar concerns. Finally, snowball sampling was utilized. Many participants volunteered to send the survey to friends or post the survey to social media groups.

The questionnaire was developed using questions from previously tested instruments, and some original items. Previously developed items included questions from the Perceived Breastfeeding Support Assessment Tool (PBSAT) (Hirani et al., 2013), Employee Perceptions of Breastfeeding Support Questionnaire (Greene & Olson, 2008; Greene et al., 2008), Listening to Mothers II and III (Declercq, 2006, 2013), Fragile Families and Child Well-Being Study (FFCWS)², and the Workplace Breastfeeding Support Assessment Scale (Bai et al., 2008; Bai & Wunderlich, 2013). All items were used with permission from the original authors.

The questionnaire contained 85 items in total, 38 original items, and 47 taken from previous questionnaires. Questions were multiple choice and short answer. Most multiple choice questions were based on a 5 point Likert scale. The questionnaire was reviewed by a panel of four experts within the field of breastfeeding to improve face and content validity. Minor wording and syntax changes were made based on their input. The questionnaire was then pilot tested with 17 women who were not part of the intended sample. Cronbach's alpha was used to assess scale reliability, and interclass correlation coefficient was used to assess between participant reliability. Cronbach's alpha for the 39 Likert scale items was 0.91. Cronbach's alpha ranged from 0.90 – 0.91 when one of each of the items was omitted. Interclass correlation coefficient for the average of all measures was 0.910 [0.896, 0.923], $F(353, 13414) = 11.126, p = 0.00$.

² Fragile Families and Child Wellbeing Study research was supported by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) of the National Institutes of Health under award numbers R01HD36961, R01HD39135, and R01HD40421, as well as a consortium of private foundations. The content of this publication is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

The final questionnaire link was disseminated via email. The email text explained participation eligibility and the purpose of the study. Eligible participants who clicked on the questionnaire link were taken to the informed consent, and upon giving consent, were able to complete the questionnaire.

Descriptive statistics were used for demographic data. Demographic data were grouped into three age categories that were relatively equivalent in participant size. This was done to highlight any differences in demographic composition by age. One-Way Analysis of Variance (ANOVA) was used to explore the differences in mean breastfeeding duration by designation status, perception of employer breastfeeding support, and perception of accommodations available in the workplace. This was done to determine if any of these variables were associated with significant differences in breastfeeding duration. When using ANOVA for analyzing Likert scale responses, each response options was assigned a numeric value, 1 for “strongly disagree”, 2 for “disagree”, 3 for “somewhat agree”, 4 for “agree”, 5 for “strongly agree”. For questions phrased in the negative, this point scale was reversed. Some Likert scale questions also included an option “not sure.” This response option was grouped with the “somewhat agree” option as they were both considered a neutral.

Results

A total of 502 women participated in the survey from 29 businesses. Of those, 392 met the study inclusion criteria for giving birth between 2014 and 2016 and working in the state. Demographic data are included in Table 5.1. Participants’ average age was 30.8 (4.1) years with ages ranging from 20 – 45 years. Most participants were white (97%) with fewer identifying as American Indian/ Alaska Native (1%) and other groups (each at less than 1%). Most participants were married women who held a bachelor’s degree or higher and professional or administrative

positions, and had household incomes greater than \$75,000 per year. For a majority of the sample, the most recent pregnancy resulted in the birth of a full-term infant. Many participants had given birth one or two times, and breastfed one or two children.

Breastfeeding duration is listed in Table 5.2. Only 55% of participants provided information about breastfeeding duration for their most recent birth. The average breastfeeding duration for all participants was 9.02 (5.87) months. For those employed by businesses designated as Infant Friendly, the average breastfeeding duration was 8.93 (6.51) months, which was not statistically different, $F(3, 211) = 0.84, p > 0.05$, from the duration for those employed by non-designated businesses.

Use of employer provided maternity leave and on-site childcare is listed in Table 5.3. The average length of leave taken after birth was 10.57 (3.75) weeks with a minimum length of 0 weeks and a maximum of 52 weeks. Most participants reported using sick and vacation leave, paid time off (PTO), and short-term disability to cover their leave. Only 3.6% of women reported access to paid maternity leave. Few women reported using employer provided on-site childcare (4.4%) and even fewer took their infant to work (3.3%).

Table 5.1

Demographics of Survey Participants

Demographic	N	Mean (SD)		
Age (years)	360	30. 8 (4.1)		
Demographic	Total n (%)	20 – 28 years ^{a,b} n (%)	29 – 31 years ^{a,b} n (%)	32 – 45 years ^{a,b} n (%)
Race	367	120 ^c	133 ^c	114 ^c
White	356 (97.0)	112 (93.3)	131 (98.4)	111 (97.3)
Black	2 (0.6)	0	1 (0.8)	1 (0.9)
Asian/Pac. Is.	1 (0.2)	1 (0.8)	0	0
Am. In./Al. Nat	4 (1)	4 (3.4)	0	0
Mixed race	2 (0.6)	1 (0.8)	1 (0.8)	1 (0.9)
Decline	2 (0.6)	2 (1.7)	0	1 (0.9)
Marital Status	391	116	132	112
Married	367 (94.0)	107 (92.2)	129 (97.7)	102 (91.1)
Cohabiting	17 (4.3)	7 (6.0)	3 (2.3)	7 (6.3)
Single	4 (1.0)	1 (0.9)	0	2 (1.8)
Other	3 (0.7)	1 (0.9)	0	1 (0.8)
Household Income	355	115	128	110
<\$15K	1 (.3)	1 (0.7)	0	0
\$15 – 24.9K	4 (1.1)	2 (1.7)	0	2 (1.8)
\$25 – 34.9K	11 (3.1)	4 (3.5)	2 (1.5)	5 (4.5)
\$35 – 49.9K	24 (6.8)	13 (11.3)	8 (6.3)	3 (2.7)
\$50 – 74.9K	64 (18.0)	28 (24.3)	19 (14.8)	17 (15.4)
\$75 – 99.9K	106 (29.9)	29 (25.5)	45 (35.2)	32 (29.1)
>\$100K	145 (40.8)	38 (33.0)	54 (42.2)	51 (46.3)
Education	362	116	132	112
H.S./ GED	6 (1.6)	4 (3.5)	2 (1.5)	0
Some College	33 (9.1)	13 (11.2)	11 (8.3)	9 (8.0)
Assoc. Degree	44 (12.2)	21 (18.1)	10 (7.6)	13 (11.6)
Bachelor's	152 (42.0)	47 (40.5)	64 (48.5)	41 (36.6)
Some Grad	22 (6.1)	10 (8.6)	5 (3.8)	7 (6.3)
Grad. Degree	105 (29.0)	21 (18.1)	40 (30.3)	42 (37.5)
Weeks gestation	391	116	132	112
<28 wk	3 (0.7)	1 (0.9)	0	1 (0.9)
28 – 32 wk	5 (1.3)	1 (0.9)	2 (1.5)	1 (0.9)
32 – 37 wk	21 (5.4)	10 (8.6)	5 (3.8)	3 (2.7)
37 – 40 wk	236 (60.4)	70 (60.3)	77 (58.3)	71 (63.4)
> 40 wk	126 (32.2)	34 (29.3)	48 (36.4)	36 (32.1)

Table 5.1. *Demographics of Survey Participants (continued)*

Demographic	Total n (%)	20 – 28 years ^{a,b} n (%)	29 – 31 years ^{a,b} n (%)	32 – 45 years ^{a,b} n (%)
Number of births	391	116	132	112
1	186 (47.6)	79 (68.1)	64 (48.5)	26 (23.2)
2	133 (34.0)	33 (28.5)	45 (34.1)	47 (42.0)
3	55 (14.1)	4 (3.4)	19 (14.4)	27 (24.1)
4	12 (3.1)	0	2 (1.5)	9 (8.0)
>4	5 (1.3)	0	2 (1.5)	3 (2.7)
Number of children breastfed	388	115	131	111
1	194 (50)	80 (69.0)	70 (53.5)	27 (24.4)
2	126 (32.5)	32 (27.6)	39 (29.8)	48 (43.2)
3	53 (13.7)	3 (2.4)	18 (13.7)	26 (23.4)
4	11 (2.8)	0	2 (1.5)	8 (7.2)
>4	4 (1)	0	2 (1.5)	2 (1.8)
Type of work	389	115	132	111
Professional/tech	200 (51.0)	58 (50.5)	67 (50.8)	57 (51.4)
Exec/admin/man	52 (13.3)	10 (8.7)	20 (15.2)	19 (17.1)
Sales	16 (4.1)	5 (4.3)	6 (4.5)	4 (3.6)
Admin support	34 (8.7)	9 (7.8)	11 (8.3)	10 (9.0)
Handler/laborer	1 (0.3)	0	1 (0.7)	0
Service	13 (3.3)	4 (3.5)	3 (2.3)	5 (4.5)
Other	73 (18.6)	29 (25.2)	24 (18.2)	16 (14.4)

^a Age was bracketed to form three equally sized groups.

^b “n” for individual age brackets may not equal N for the entire sample as some women did not include their age, but provided other demographic.

^c Some women indicated more than 1 racial category, therefore number of responses for race is larger than “n”.

Table 5.2

Breastfeeding Duration in Months by Infant Friendly Designation Status

	Des & Rec ^a n = 45	Late Des ^b n = 14	No Rec ^c n = 7	No Des ^d n = 149	Total ^e n = 215	<i>p</i>
BF in mo ^f mean (sd)	8.93 (6.51)	7.96 (4.98)	6.07(4.32)	9.28 (5.80)	9.02 (5.87)	0.47 ^g

^a Des & Rec = Designated in 2011 or 2012 and recently recertified

^b Late Des = Designated later than 2012

^c No Rec = Designated in 2011 or 2012 and did not recertify

^d No Des = Not currently Designated

^e Participants were not forced to answer questions. They have still been breastfeeding and therefore, left the question blank, or they chose not to respond.

^f BF in mo = breastfeeding duration in months

^g Equal variances assumed

Table 5.3

Employee's Self-Reported Use of Lactation Accommodations in Worksites

Question stem	Response option	Total N	Yes n (%)	No n (%)
After giving birth, which of the following types of leave did you use to stay home with your baby?	Paid maternity leave	392	14 (3.6%)	378 (96.4%)
	Unpaid maternity leave ^a	392	36 (9.2%)	356 (90.8%)
	Sick leave	392	182 (46.4%)	210 (53.6%)
	Vacation leave	392	140 (35.7%)	252 (64.3%)
	PTO	392	180 (45.9%)	212 (54.1%)
	Short term disability	392	162 (41.3%)	230 (58.7%)
	Unspecified FMLA ^b	392	6 (1.5%)	386 (98.5%)
While you are working, who takes care of this child?	On-site care	392	17 (4.3%)	375 (95.7%)
	Bring baby to work	392	13 (3.3%)	379 (96.7%)

^a Frequency tabulated from write in responses specifically including the words “no pay” or “unpaid”.

^b Frequency tabulated from write in responses specifying FMLA but did not include those that stated the FMLA was unpaid.

Participants rated their agreement on the availability of other lactation accommodations in their workplace, as listed in Table 5.4. Likert scores were converted to the numeric rating previously described. Analysis of variance (ANOVA) was used to determine differences in mean Likert scores based on Infant Friendly designation status. Several accommodation categories had mean scores below 2.30, indicating women did not feel they had access to those accommodations. Mean Likert scores were significantly different between designation categories for employers providing antenatal education about working and breastfeeding, $F(3, 379) = 2.54$, $p < 0.05$. There were also significant differences in scores between designation categories for employers providing postpartum education materials on breastfeeding and working and breastfeeding resources in the community, and employers providing lactation consultants and breast pumps. However, Levine's Test for homogeneity of variance was significant ($p < 0.05$) for these categories.

Accommodation categories receiving moderate scores, 2.49 to 3.96, included lactation policies, breastfeeding acceptance, manager support, communication, lactation spaces and lactation breaks. Categories with statistically significant differences in scores based on designation status included breastfeeding acceptance, $F(3, 376) = 2.53$, $p < 0.05$, lactation policies, $F(3, 377) = 17.98$, $p < 0.05$, lactation spaces, $F(3, 360) = 3.69$, $p < 0.05$, and lactation breaks, $F(3, 353) = 3.33$, $p < 0.05$. Levine's Test for homogeneity was significant ($p < 0.05$) for lactation spaces and lactation breaks.

Accommodations with higher scores, ranging from 3.72 to 4.28 and meaning women felt they had access to the accommodations, included coworker worker support and refrigeration. Neither of these accommodation categories showed significant differences in mean score based on designation status.

Table 5.4

Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status

Accommodation	Question Stem (n)	Response Category ^h N (%)	Total Sample mean (sd)	Des & Rec ^a Mean (sd)	Late Des ^b Mean (sd)	No Rec ^c Mean (sd)	No Des ^d Mean (sd)	<i>p</i>	
Employer provided lactation education materials	During my pregnancy, my employer provided education materials about breastfeeding and working. ^e (383)	Total	1.67 (1.00)	1.71 (1.03)	2.00 (0.92)	2.30 (1.34)	1.60 (0.98)	0.06	
		SD	383	84	20	10	269		
		D	227 (59.3)	48 (57.1)	7 (35.0)	3 (30.0)	169 (62.8)		
		SWA	99 (25.8)	22 (26.2)	7 (35.0)	4 (40.0)	66 (24.6)		
		A	23 (6.0)	5 (6.0)	5 (25.0)	1 (10.0)	12 (4.5)		
	SA	26 (6.8)	8 (9.5)	1 (5.0)	1 (10.0)	16 (5.9)			
	Before I returned to work, my employer provided education materials about breastfeeding and working. ^e (383)	Total	1.43 (0.72)	1.55 (0.84)	1.70 (0.73)	2.00 (0.94)	1.35 (0.66)		0.00 ^g
		SD	383	84	20	10	269		
		D	257 (67.1)	53 (63.1)	9 (45)	3 (30)	192 (71.4)		
		SWA	99 (25.8)	20 (23.8)	8 (40)	5 (50)	66 (24.5)		
A		17 (4.4)	7 (8.3)	3 (15)	1 (10)	6 (2.2)			
SA	8 (2.2)	4 (4.8)	0 (0)	1 (10)	3 (1.1)				
		SA	2 (0.5)	0 (0)	0 (0)	0 (0)	2 (0.8)		

Table 5.4. *Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status (continued)*

Accommodation	Question Stem (n)	Response Category ^h N (%)	Total Sample mean (sd)	Des & Rec ^a Mean (sd)	Late Des ^b Mean (sd)	No Rec ^c Mean (sd)	No Des ^d Mean (sd)	<i>p</i>
Employer provided lactation education materials	My employer provided me with information on breastfeeding resources available in the community. ^e (383)	Total	1.39 (0.76) 383	1.61 (0.99) 84	1.75 (0.91) 20	1.60 (0.97) 10	1.29 (0.63) 269	0.00 ^g
		SD	275 (71.8)	54 (64.3)	9 (45.0)	6 (60.0)	206 (76.6)	
		D	84 (21.9)	18 (21.4)	9 (45.0)	3 (30.0)	54 (20.1)	
		SWA	8 (2.1)	4 (4.8)	0 (0.0)	0 (0.0)	4 (1.5)	
		A	13 (3.4)	7 (8.3)	2 (10.0)	1 (10.0)	3 (1.1)	
		SA	3 (0.8)	1 (1.2)	0 (0.0)	0 (0.0)	2 (0.7)	
Lactation consultant	My employer provided a lactation consultant. ^e (382)	Total	1.35 (0.74) 382	1.54 (0.99) 84	1.55 (0.83) 20	1.30 (0.48) 10	1.28 (0.64) 268	0.03 ^g
		SD	287 (75.1)	58 (69.0)	12 (60.0)	7 (70.0)	210 (78.4)	
		D	75 (19.6)	16 (19.0)	6 (30.0)	3 (30.0)	50 (18.6)	
		SWA	5 (1.3)	3 (3.6)	1 (5.0)	0 (0.0)	1 (0.4)	
		A	11 (3.0)	5 (6.0)	1 (5.0)	0 (0.0)	5 (1.9)	
		SA	4 (1.0)	2 (2.4)	0 (0.0)	0 (0.0)	2 (0.7)	
Lactation policies	My employer had written policies for employees that are breastfeeding or pumping breastmilk. ^f (381)	Total	2.86 (1.22) 381	3.46 (1.12) 83	3.62 (0.97) 21	3.70 (1.16) 10	2.58 (1.16) 267	0.00
		SD	73 (19.2)	6 (7.2)	1 (4.8)	0 (0.0)	66 (24.7)	
		D	49 (12.9)	5 (6.0)	0 (0.0)	2 (20.0)	42 (15.7)	
		SWA/NS	163 (42.8)	35 (42.2)	9 (42.9)	2 (20.0)	117 (43.8)	
		A	52 (13.6)	19 (22.9)	7 (33.3)	3 (30.0)	23 (8.6)	
		SA	44 (11.5)	18 (21.7)	4 (19.0)	3 (30.0)	29 (7.2)	

Table 5.4. *Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status (continued)*

Accommodation	Question Stem (n)	Response Category ^h N (%)	Total Sample mean (sd)	Des & Rec ^a Mean (sd)	Late Des ^b Mean (sd)	No Rec ^c Mean (sd)	No Des ^d Mean (sd)	<i>p</i>
Breastfeeding acceptance	Breastfeeding was common in my work place. ^f (380)	Total	2.84 (1.34) 380	2.82 (1.35) 83	3.10 (1.17) 20	3.90 (0.88) 10	2.78 (1.35) 267	0.06
		SD	88 (23.2)	19 (22.8)	2 (10.0)	0 (0.0)	67 (25.1)	
		D	66 (17.4)	16 (19.3)	4 (20.0)	0 (0.0)	46 (17.2)	
		SWA/NS	93 (24.5)	20 (24.1)	6 (30.0)	4 (40.0)	63 (23.6)	
		A	86 (22.5)	17 (20.5)	6 (30.0)	3 (30.0)	60 (22.5)	
Social support	My coworkers willingly cover for me when I need to pump milk. ^f (376)	Total	3.72 (1.08) 391	3.80 (0.99) 86	3.76 (1.04) 21	4.20 (0.63) 10	3.69 (1.12) 274	0.43
		SD	15 (3.8)	2 (2.3)	0 (0.0)	0 (0.0)	13 (4.7)	
		D	32 (8.2)	5 (5.8)	3 (14.3)	0 (0.0)	24 (8.8)	
		SWA/NS	109 (27.9)	25 (29.1)	5 (23.8)	1 (10.0)	78 (28.5)	
		A	123 (31.5)	30 (34.9)	7 (33.3)	6 (60.0)	80 (29.2)	
Social support	My manager considered it part of his/her to help me combine breastfeeding and working. ^f (369)	Total	2.58 (1.29) 369	2.66 (1.17) 80	2.74 (1.48) 19	2.60 (0.70) 10	2.55 (1.34) 260	0.87
		SD	92 (24.9)	15 (18.7)	5 (26.3)	0 (0.0)	72 (27.7)	
		D	100 (27.2)	21 (26.3)	5 (26.3)	5 (50.0)	69 (26.5)	
		SWA/NS	86 (23.3)	26 (32.5)	2 (10.5)	4 (40.0)	54 (20.8)	
		A	51 (13.8)	12 (15.0)	4 (21.1)	1 (10.0)	34 (13.1)	
Lactation space	My workplace provided a designated place for breastfeeding or pumping. ^f (364)	Total	3.38 (1.49) 364	3.74 (1.34) 80	3.94 (1.16) 18	3.70 (1.25) 10	3.21 (1.53) 256	0.01 ^g
		SD	64 (17.6)	7 (8.7)	1 (5.6)	0 (0.0)	56 (21.9)	
		D	45 (12.4)	10 (12.5)	1 (5.6)	3 (30.0)	31 (12.1)	
		SWA/NS	66 (18.1)	12 (15.0)	3 (16.7)	0 (0.0)	51 (19.9)	
		A	67 (18.4)	19 (23.8)	6 (33.3)	4 (40.0)	38 (14.8)	
		SA	122 (33.5)	32 (40.0)	7 (38.8)	3 (30.0)	80 (31.3)	

Table 5.4. *Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status (continued)*

Accommodation	Question Stem (n)	Response Category ^h N (%)	Total Sample mean (sd)	Des & Rec ^a Mean (sd)	Late Des ^b Mean (sd)	No Rec ^c Mean (sd)	No Des ^d Mean (sd)	<i>p</i>
Breastpump	My workplace had a breast pump available for breastfeeding mothers to use. ^e (363)	Total	1.40 (0.81) 363	1.51 (0.80) 80	1.39 (0.98) 18	2.11 (1.45) 9	1.35 (0.77) 256	0.02 ^g
		SD	258 (71.1)	47 (58.7)	14 (77.7)	4 (44.5)	193 (75.3)	
		D	88 (24.2)	30 (37.5)	3 (16.7)	3 (33.3)	52 (20.3)	
		SWA	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.4)	
		A	7 (1.9)	1 (1.3)	0 (0.0)	1 (11.1)	5 (2.0)	
		SA	9 (2.5)	2 (2.5)	1 (5.6)	1 (11.1)	5 (2.0)	
Refrigeration	My work place had a refrigerator that I could use to store my milk. ^e (366)	Total	4.13 (1.14) 366	4.28 (1.13) 80	4.16 (0.96) 19	4.00 (1.16) 10	4.09 (1.16) 257	0.64 ^g
		SD	18 (4.9)	3 (3.8)	0 (0.0)	0 (0.0)	15 (5.8)	
		D	23 (6.3)	6 (7.5)	2 (10.5)	2 (20.0)	13 (5.1)	
		SWA	39 (10.7)	6 (7.5)	1 (5.3)	0 (0.0)	32 (12.5)	
		A	98 (26.8)	16 (20.0)	8 (42.1)	4 (40.0)	70 (27.2)	
		SA	188 (51.3)	49 (61.2)	8 (42.1)	4 (40.0)	127 (49.4)	
Communication	I was made aware of the expectations for using and maintaining the designated space for breastfeeding or pumping breast milk. ^e (363)	Total	2.53 (1.42) 363	2.51 (1.36) 79	3.17 (1.43) 18	2.80 (1.32) 10	2.49 (1.43) 256	0.24
		SD	122 (33.6)	23 (29.1)	3 (16.7)	2 (20.0)	94 (36.7)	
		D	79 (21.8)	23 (29.1)	3 (16.7)	2 (20.0)	51 (19.9)	
		SWA	50 (13.7)	12 (15.2)	4 (22.2)	3 (30.0)	31 (12.1)	
		A	70 (19.3)	12 (15.2)	4 (22.2)	2 (20.0)	52 (20.3)	
		SA	42 (11.6)	9 (11.4)	4 (22.2)	1 (10.0)	28 (10.9)	

Table 5.4. *Rated Adequacy of Lactation Accommodations in All Worksites and by Designation Status (continued)*

Accommodation	Question Stem (n)	Response Category ^h N (%)	Total Sample mean (sd)	Des & Rec ^a Mean (sd)	Late Des ^b Mean (sd)	No Rec ^c Mean (sd)	No Des ^d Mean (sd)	<i>p</i>
Lactation breaks	I could adjust my break schedule in order to breastfeed or pump breast milk. ^e (357)	Total SD D SWA A SA	3.52 (1.20) 357 30 (8.3) 41 (11.5) 81 (22.7) 123 (34.5) 82 (23.0)	3.86 (1.04) 78 2 (2.6) 7 (9.0) 15 (19.2) 30 (38.4) 24 (30.8)	3.61 (1.24) 18 1 (5.6) 3 (16.7) 3 (16.7) 6 (33.3) 5 (27.7)	3.89 (0.93) 9 0 (0.0) 1 (11.1) 1 (11.1) 5 (55.6) 2 (22.2)	3.40 (1.24) 252 27 (10.7) 30 (11.9) 62 (24.6) 82 (32.5) 51 (20.3)	0.02 ^g

^a Des & Rec = Designated in 2011 or 2012 and recently recertified

^b Late Des = Designated later than 2012

^c No Rec = Designated in 2011 or 2012 and did not recertify

^d No Des = Not currently Designated

^e Frequency counts based on tabulation from 5 point Likert scale.

^f Frequency counts based on tabulation from 5 point Likert scale which included an additional response for “not sure” which was counted with the “somewhat agree” response.

^g Levine’s test for homogeneity significant ($p < 0.05$)

^h SD = strongly disagree = 1; D = disagree = 2; SWA = somewhat agree = 3; A = agree = 4; SA = strongly agree = 5; NS = Not sure

Discussion

The purpose of this study was to examine breastfeeding duration between businesses designated as Infant Friendly, and those that were not designated. To date, the researchers know of no other studies that have examined the impact of a state-level business designation on breastfeeding duration of employees.

While there were no statistically significant differences in breastfeeding duration between businesses that were designated and those that were not designated, there was an interesting trend noted. As seen in Table 5.1, breastfeeding duration between women who worked for business that were designated and recertified within 5 years was almost 3 months longer than those who worked for businesses that were designated but chose not to recertify, 8.93(6.51) years vs. 6.07(4.32) years, respectively. It could be that extended employer commitment to supporting employee breastfeeding does facilitate longer breastfeeding duration. Additionally, those working for businesses certified in 2011 or 2012 breastfed almost a month longer than those working for businesses certified after 2013, 8.93(6.51) years vs. 7.96 (4.98), respectively. However, the duration of breastfeeding among employees of businesses that were never certified was the longest at 9.28 (5.80). These results may be due to differences in the number of participants in each category, as most participants (69%) did not work for an Infant Friendly designated employer.

The average breastfeeding duration for all the participants was 9 months. Other research examining breastfeeding duration of employees in businesses with corporate lactation programs has found duration rates between 8.1 and 11.7 months (Cohen & Mrtek, 1994; Katcher & Lanese, 1985; Ortiz et al., 2004). The results of this research appear to be consistent.

With regard to lactation accommodations in the workplace, it appears there are some commonalities across employers. Many women were able to utilize sick or vacation leave, PTO, or short-term disability to cover their leave after birth. Additionally, many women agreed their coworkers were willing to cover their work during lactation breaks and they had access to refrigeration for expressed milk as evidenced by Likert scores over 3.69 and 4.0, respectively.

Unfortunately, only 3.6% of women had access to paid maternity leave outside of using their sick or vacation leave, or PTO. Research in the United States and internationally has shown that extended paid maternity leave is associated with extended breastfeeding duration (Bai et al., 2015; Chuang et al., 2010; Cooklin, Rowe, & Fisher, 2012; Mandal et al., 2010; Mirkovic et al., 2014a, 2014b; Skafida, 2012). Additionally, very few women reported using on-site childcare or taking their infant to work. While on-site childcare has been shown to promote extended breastfeeding duration (Bai & Wunderlich, 2013; Balkam et al., 2011), it is relatively uncommon in the United States with only 7% of employers providing childcare at or near the worksite (Matos & Galinsky, 2014). A concern across most worksites is that few women reported receiving education from their employer about breastfeeding and working or breastfeeding resources in the community. Research examining the impact of lactation consultants providing telephone consultations to employees prior to the return to work has found that this communication and education was associated with exclusive breastfeeding at 6 months (Balkam et al., 2011). Most employers also did not provide access to a lactation consultant, either contracted or employed by the business. Corporate lactation programs (CLP's) providing education and support through a lactation consultant or other healthcare professional are associated with breastfeeding at 6 months (Balkam et al., 2011) or more (Cohen & Mrtek, 1994; Ortiz et al., 2004). Most women indicated they did not use a breast pump provided on-site by the

employer. While this has not been studied as extensively, one study found a positive association between an employer provided breast pump and exclusive breastfeeding at 6 months (Bai & Wunderlich, 2013). Finally, communication about expectations for using lactation accommodations and perception of manager support for breastfeeding were also lacking. Communication about breastfeeding has been shown to be a critical component in promoting breastfeeding (Anderson et al., 2015) as has managerial support for breastfeeding (Alvarez et al., 2015; Bai & Wunderlich, 2013; Sattari et al., 2013).

Given that the women employed by non-designated businesses had the longest breastfeeding duration in the sample, it appears that the business designation alone did not impact breastfeeding. However, it could provide more benefit with some adjustments. Including an education component to the designation requirement may encourage businesses to communicate their lactation accommodations to employees and the public as well as provide information on strategies for combining breastfeeding and working. Requiring more education for management about supporting women who are breastfeeding may improve communication throughout the workplace. A lactation consultant could assist employers with providing education to their employees and managerial staff. As with most of the United States, encouraging employers to adopt paid leave policies that support women in initiating and continuing breastfeeding is also an area for improvement.

This study has several limitations. First, the sample was relatively homogeneous and included older, white, married, more educated mothers who research has shown typically breastfeed longer (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Jackowitz, 2008; Waite & Christakis, 2015). Since the survey was electronic, those without email access, which are likely those with more difficult experiences combining breastfeeding and

work, were underrepresented. There was not an equal distribution of businesses in each designation category as the number of designated businesses is much smaller than the number of undesignated businesses. The sample was not a random sample due to the nature of the snowball sampling effect. Additionally, the study was limited to one state, meaning results may not be generalizable to the entire United States.

Summary

Breastfeeding provides important health and financial benefits infants, families, worksites, and the community at large. The sample of women represented in this study had a relatively long breastfeeding duration. While not statistically significant, those working for businesses making longer commitments to the Infant Friendly designation had longer breastfeeding durations than those working for businesses designated more recently. Additional efforts should be made to increase breastfeeding education and support in the workplace, and to promote workplace breastfeeding communication. Also providing education to all employees about supporting breastfeeding may increase awareness and the perception of breastfeeding acceptance. Future research should continue to explore these issues.

**CHAPTER 6: THE INFLUENCE OF SELF-EFFICACY, PERCEPTION OF SUPPORT
FOR BREASTFEEDING, AND WORKPLACE CULTURE ON BREASTFEEDING
DURATION IN A SAMPLE OF WORKING WOMEN**

Abstract

Breastfeeding support has increased over the past 2 decades, especially in the workplace. The Patient Protection and Affordable Care Act of 2010 provided several protections for working, breastfeeding women. However, most states are still not meeting the Healthy People 2020 goals for breastfeeding duration and exclusivity. The purpose of this study is to determine how maternal intention and self-efficacy for breastfeeding influence breastfeeding duration among working women. An 85-item online questionnaire was developed and distributed to working women using various sampling methods in a Midwestern state. Results were analyzed using t-tests, Analysis of Variance, and forward stepwise regression. While not statistically significant, women who intended to exclusively breastfeed did so with a four month longer duration than those with other feeding intentions. Women who perceived only minor challenges with combining breastfeeding and working, and those with greater self-efficacy for breastfeeding had a longer breastfeeding duration as well. Intention, self-efficacy, and perception of barriers to breastfeeding appear to influence duration in working women. Further research should investigate the exact relationship between these factors and breastfeeding duration and explore how to increase intention and self-efficacy for breastfeeding among working women.

Background

The Break Time for Nursing Mothers law included in the Patient Protection and Affordable Care Act (PPACA) of 2010 was the first piece of legislation in the United States to protect an employee's right to breastfeed or express breast milk during the workday. The law

states that employers with 50 or more employees must provide a private space – other than a bathroom – for a mother to breastfeed or express breast milk, and allow sufficient break time to do so (United States Breastfeeding Committee, 2013). Although Break Time for Nursing Mothers is relatively recent legislation, employers and researchers have been exploring workplace breastfeeding support for several decades.

The interest in workplace breastfeeding support stems partially from plummeting breastfeeding initiation rates during the Twentieth Century (Wright & Schanler, 2001). United States breastfeeding initiation rates have improved over the last 40 years (Centers for Disease Control and Prevention, 2016), and the rise in initiation rates is promising. However, continuation rates, especially for breastfeeding exclusivity, are lagging. The rates for exclusivity at 3 and 6 months are 44.4 and 22.3% respectively (Centers for Disease Control and Prevention, 2016), while Healthy People 2020 Objectives have a target goal of 46.2% and 25.5% for exclusivity at these periods (United States Department of Health and Human Services, 2014). A possible explanation for poor continuation rates is a woman's return to work, which typically occurs by her child's third month of life. Forty percent of women employed prior to giving birth return to work by 3 months after delivery and 90% return by 9 months after delivery (Han, 2008).

Research dating back to Kutcher and Lanes (1985) has shown that supporting breastfeeding employees in the workplace increases breastfeeding duration. Researchers have examined lactation accommodations, social support, and workplace communication with regard to the impact on breastfeeding duration (Alvarez et al., 2015; Anderson et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Dabritz et al., 2009; Jackowitz, 2008; Sattari et al., 2013; Waite & Christakis, 2015). Despite research indicating that worksite breastfeeding support

increases duration, most states are still not meeting Healthy People 2020 goals for breastfeeding duration and exclusivity (Centers for Disease Control and Prevention, 2016).

Theory of Planned Behavior is often used to predict whether individuals will engage in a particular behavior (Schifter & Ajzen, 1985). This theory uses several constructs including perceived self-efficacy, social and behavioral norms to predict behavior (Schifter & Ajzen, 1985). The purpose of this study is use the constructs of maternal self-efficacy for breastfeeding, perception of breastfeeding barriers, and social support for breastfeeding to determine breastfeeding duration once the mother returns to work.

Methods

This study was designed as a cross-sectional online survey. The online format was chosen in order to reach a critical mass of participants with relatively easy distribution. Additionally, there was no incentive offered for participation; therefore, the researchers felt a method with low participant burden was ideal. The study was approved by the Institutional Review Board at North Dakota State University (HE17090). Participants did not provide their name or any identifying information, other than the name and county of their employer, which the researchers kept confidential.

The survey was administered between November 2016 and March 2017. The survey was administered via email and social media to women working in North Dakota, a state that is still not currently meeting the Healthy People 2020 goals for breastfeeding duration at 6 months. The target population for this study was working women who attempted to continue breastfeeding after returning to work following the birth of a child. The sample included women who had given birth between 2014 and 2016 and were employed in North Dakota. This group was

targeted as they would have experienced the current working environment with regards to breastfeeding support.

Power analysis indicated that 384 participants were needed to provide statistical power at $\alpha = .05$. Power analysis was conducted using the following equation (Smith, 2013):

$$\text{Necessary Sample Size} = (\text{Z-score})^2 * \text{Standard Deviation} * (1 - \text{Standard Deviation}) / (\text{margin of error})^2$$

By using a Z-score of 1.96, estimating standard deviation at 0.5, and using a margin of error at 0.05, the equation yields a result of 384 participants.

$$384 = (1.96)^2 * (.5) (.5) / (.05)^2$$

Multiple sampling methods were needed to yield the required sample size. Businesses were contacted directly and asked to disseminate the survey link via their company email. Many declined stating it that would be a violation of corporate policy. Methods were then expanded to include state professional organizations. Many of the professional organizations also declined citing similar concerns. Finally, snowball sampling was utilized. Many participants volunteered to send the survey to friends or post the survey to social media groups.

The questionnaire was developed using questions from previously tested instruments, and some original items. Previously developed items included questions from the Perceived Breastfeeding Support Assessment Tool (PBSAT) (Hirani et al., 2013), Employee Perceptions of Breastfeeding Support Questionnaire (Greene & Olson, 2008; Greene et al., 2008), Listening to Mothers II and III (Declercq, 2006, 2013), Fragile Families and Child Well-Being Study

(FFCWS)³, and the Workplace Breastfeeding Support Assessment Scale (Bai et al., 2008; Bai & Wunderlich, 2013). All items were used with permission from the original authors.

The questionnaire contained 85 items in total, 38 original items, and 47 taken from previous questionnaires. Questions were multiple choice and short answer. Most multiple choice questions were based on a 5 point Likert scale. The questionnaire was reviewed by a panel of four experts within the field of breastfeeding to improve face and content validity. Minor wording and syntax changes were made based on their input. The questionnaire was then pilot tested with 17 women who were not part of the intended sample. Cronbach's alpha was used to assess scale reliability, and interclass correlation coefficient was used to assess between participant reliability. Cronbach's alpha for the 39 Likert scale items was 0.910. Cronbach's alpha ranged from 0.904 – 0.913 when each one of the items was omitted. Interclass correlation coefficient for the average of all measures was 0.910 [0.896, 0.923], $F(353, 13414) = 11.126, p = 0.00$.

The final questionnaire link was disseminated via email. The email text explained participation eligibility and the purpose of the study. Eligible participants who clicked on the questionnaire link were taken to the informed consent, and upon giving consent, were able to complete the questionnaire.

Descriptive statistics were used for demographic data. One-Way Analysis of Variance (ANOVA) was used to explore whether there were significant differences in mean breastfeeding duration by maternal self-efficacy for breastfeeding. Additionally, ANOVA was used to

³ Fragile Families and Child Wellbeing Study research was supported by the Eunice Kennedy Shriver National Institutes of Child Health and Human Development (NICHD) of the National Institutes of Health under award numbers R01HD36961, R01HD39135, and R01HD40421, and a consortium of private foundations. The content of this publication is solely the responsibility of the authors and does not necessarily represent the official view of the National Institutes of Health.

determine if there were any significant differences in mean breastfeeding duration by the perception of lactation accommodations available in the workplace. This was done to determine which, if any, of these constructs were associated with extended breastfeeding duration. When using ANOVA for analyzing Likert scale responses, each response options was assigned a numeric value, 1 for “strongly disagree”, 2 for “disagree”, 3 for “somewhat agree”, 4 for “agree”, 5 for “strongly agree”. For questions phrased in the negative, this point scale was reversed. Some Likert scale questions also included an option “not sure.” This response option was grouped with the “somewhat agree” option as they were both considered a neutral response.

Univariate forward step-wise regression was used to develop a predictive model for workplace breastfeeding duration. Multiple factors were examined in the model to determine which would be most predictive of duration. These factors included various social supports (partner, family, coworker, manager), breastfeeding beliefs, breastfeeding self-efficacy, perceived workplace breastfeeding norms, breastfeeding education, weeks of maternity leave, whether the workplace was designated as Infant Friendly, and demographic variables (age, education level, income, weeks of gestation for most recent pregnancy, number of births and children breastfed).

Results

Initially, 502 women participated in the study with 392 meeting the study inclusion criteria for giving birth between 2014 and 2016, and working inside the state. Most participants were white (97%), with 1% or less identifying with American Indian/ Alaska Native and other groups. Ninety-four percent were married and 77% held a bachelor’s degree or higher. Sixty – four percent were employed in professional or administrative positions, and 70% had household incomes greater than \$75,000 per year. Ninety-three percent indicated their most recent

pregnancy resulted in the birth of a full-term infant, and 82 and 83%, respectively stated they had given birth one or two times and breastfed one or two children.

Women with antenatal feeding intentions for exclusive breastfeeding had the longest duration at 9.88 (5.93) months, while those with other antenatal feeding intentions breastfed for 4.90 (2.93), $t(98)$, $p < 0.05$. However, the majority of women indicated exclusive breastfeeding, leaving unequal cell counts and unequal variances.

Women reporting minor challenges with combining breastfeeding and working had a significantly longer breastfeeding duration, 11.22(5.80) months, than those who indicated major challenges, 8.13(4.97) months, or those who did not breastfeed, 2.74(3.12) months, $F(3, 211) = 19.48$, $p < 0.05$. Of note, is that those indicating major challenges with combining breastfeeding and working were still able to breastfeed for 8.13 (4.97) months.

As noted in Table 6.1, there were significant differences detected in breastfeeding duration between those indicating differing levels of confidence in their ability to breastfeed, $F(4, 210) = 3.74$, $p < 0.05$. However, the results for confidence in the ability to combine breastfeeding and working were confounded by unequal variances.

Table 6.2 lists results for breastfeeding duration by perception of breastfeeding support in the workplace. Significant differences in breastfeeding duration were noted for women perceiving that: the number of hours worked made it difficult to combine breastfeeding and working, $F(3, 209) = 4.29$, $p < 0.05$; their job was at risk because of breastfeeding, $F(4, 205) = 2.64$, $p < 0.05$; they could ask for lactation accommodations while at work, $F(4, 205) = 5.08$, $p < 0.00$; their coworkers were supportive of breastfeeding, $F(4, 210) = 4.46$, $p < 0.05$; they were comfortable using breaks to express milk or breastfeed, $F(4, 192) = 5.43$, $p < 0.05$; and breaks

could be adjusted as needed for milk expression or breastfeeding, $F(4, 192) = 2.86, p < 0.05$.

Only one of these results, adjustable breaks, was confounded by a lack of equal variances. Table

Multiple measures of self-efficacy, social support, work culture, and demographic variables were included in regression models to determine which were the most predictive of breastfeeding duration. Four models are listed in the Table 6.3. The variables that were excluded are listed under the table. Ultimately, the most predictive variables were the number of infants born during the most recent pregnancy, the mother's confidence in her ability to combine breastfeeding and working, and whether the employer provided breastfeeding education materials to the mother prior to her return to work. All three models were shown to be significant predictors ($p = 0.00$), and showed moderate positive correlations with breastfeeding (R values ranging from 0.40 – 0.50). Predictive value of the regression models was relatively low with R^2 values of 0.16 – 0.25.

Table 6.1

Maternal Self-Efficacy and Breastfeeding Duration in Months

Efficacy Construct	SD ^a mean (SD)	D ^b mean (SD)	SWA ^c mean (SD)	A ^d mean (SD)	SA ^e mean (SD)	Total mean (SD)	<i>p</i>
Conf BF ^f	20.00 n = 1	4.57 (4.29) n = 14	8.60 (5.18) n = 52	9.13 (4.81) n = 76	10.06 (7.01) n = 72	9.06 (5.85) n = 215	0.01
BF	2.71 (2.21)	4.55 (2.81)	8.24 (5.23)	10.13 (4.65)	10.92 (7.27)	9.02 (5.87) n = 215	0.00 ^h
Work ^g	n = 7	n = 20	n = 65	n = 64	n=59		

^a SD = Strongly Disagree = 1

^b D = Disagree = 2

^c SWA = Somewhat Agree = 3

^d A = Agree = 4

^e SA = Strongly Agree = 5

^f Conf BF = Maternal self – efficacy for breastfeeding

^g BF Work = Maternal self-efficacy for combining work and breastfeeding

^h Levine's test for homogeneity of variance significant ($p < 0.05$)

Table 6.2

Perception of Breastfeeding Supports in the Workplace and Mean (SD) Breastfeeding Duration in Months

Support Category	SD ^a	D ^b	SWA ^c	A ^d	SA ^e	Total	<i>p</i>
Leave ^f	9.58 (9.70) n = 24	8.48 (4.88) n = 25	8.13 (5.00) n = 47	9.39 (6.03) n = 67	9.28 (4.48) n = 51	9.00 (1.22) n = 214	0.76 ^p
Hours ^g	12.06 (4.86) n = 9	10.41 (5.61) n = 54	9.66 (5.16) n = 49	9.15 (7.29) n = 48	6.47 (4.69) n = 54	9.03 (5.88) n = 214	0.00 ^{q,r}
Common ⁱ	7.63 (5.39) n = 46	9.03 (5.29) n = 35	9.30 (7.20) n = 58	9.45 (5.26) n = 44	10.11 (5.29) n = 27	9.03 (5.90) n = 210	0.43
Job Risk ^j	9.53 (5.34) n = 102	9.69 (7.00) n = 68	7.30 (4.60) n = 28	5.78 (4.32) n = 9	2.67 (3.06) n = 3	9.03 (5.90) n = 210	0.04 ^q
Ask Acc ^k	5.88 (4.12) n = 29	6.59 (4.31) n = 29	9.74 (5.89) n = 43	10.55 (6.97) n = 63	9.79 (5.05) n = 46	9.03 (5.90) n = 210	0.00 ^{q,s,t}
Cowork ^l	7.54 (4.01) n = 8	8.03 (4.28) n = 16	7.31 (5.49) n = 59	11.22 (7.04) n = 70	8.70 (4.27) n = 56	9.07 (5.85) n = 209	0.00 ^{q,v}
Manager ^m	8.67 (5.54) n = 19	9.30 (7.08) n = 15	8.77 (5.58) n = 65	10.35 (5.81) n = 51	9.52 (4.47) n = 54	9.20 (5.87) n = 204	0.75
Breaks ⁿ	5.67 (4.07) n = 27	7.93 (3.80) n = 44	10.14 (7.50) n = 40	11.27 (5.72) n = 42	10.43 (4.77) n = 40	9.46 (5.81) n = 197	0.00 ^{q,t}
Adj Break ^o	5.76 (3.08) n = 19	10.04 (4.12) n = 25	9.17(8.03)) n = 47	10.69 (5.48) n = 64	9.21 (4.45) n = 42	9.46 (5.81) n = 197	0.03 ^{p,q,u}

^a SD = Strongly Disagree

^b D = Disagree

^c SWA = Somewhat Agree

^d A = Agree

^e SA = Strongly Agree

^f Leave = Length of leave was sufficient to support breastfeeding

^g Hours = Number of hours worked made it difficult to breastfeed

^h Difficulty = Maternal perception the difficulty of combining work and breastfeeding

ⁱ Common = Maternal perception that breastfeeding was common in the workplace (option for not sure included in analysis for strongly disagree)

^j Job Risk = Maternal perception that her job was at risk because of breastfeeding (option for not sure included in analysis for somewhat agree)

^kAsk Acc = Mother was comfortable asking for lactation accommodations (sixth option for not sure included in analysis for somewhat agree)

^lCowork = Maternal perception that coworkers said thing supportive of breastfeeding (option for not sure included in analysis for somewhat agree)

^mManger = Maternal perception that manager supported breastfeeding (option for not sure included in analysis for somewhat agree)

ⁿBreaks = Maternal comfort level with taking breaks to pump milk

^oAdj Break = Maternal comfort level with adjusting her break schedule to meet her pumping needs

^pLevine's test for homogeneity of variance was significant ($p < 0.05$)

^qsignificant at $\alpha = 0.05$

^rpost hoc tests indicate significant differences between "disagree" and "strongly agree", "somewhat agree" and "agree"

^spost hoc tests indicate significant differences between "agree" and "disagree"

^tpost hoc tests indicate significant differences between "strongly disagree" and "somewhat agree", "agree", and "strongly agree"

^upost hoc tests indicate significant differences between "strongly disagree" and "agree"

^vpost hoc tests indicate significant differences between "agree" and "somewhat agree"

Discussion

This study is unique in its examination of working women's breastfeeding intentions, beliefs about breastfeeding, self-efficacy for breastfeeding, and social support system in the workplace. The results indicate that there are combinations of factors critical in promoting breastfeeding for the working mother.

With regard to intention, the study's results were confounded by unequal variances, likely due to large differences in group sizes between the exclusive breastfeeding ($n=180$) and the other group ($n=35$). However, there was a five-month difference between those with antenatal exclusive breastfeeding intention, 9.82 (5.96) months, and those without, 4.90 (2.93) months. This is consistent with other research suggesting that women with antenatal intentions to breastfeed are more likely to be exclusively breastfeeding at 4 months (de Jersey, Mallan, Forster, & Daniels, 2017)

Table 6.3

Univariate Forward Step-Wise Regression Model for Effects of Self-Efficacy, Social Support, Work Culture, and Demographics on Breastfeeding Duration in Working Women

	Component	β	SE	R	R^2	$Adj R^2$	F	p
Model 1	Constant	-6.96	3.46	0.40	0.16	0.16	23.79	0.00
	How many infants were born during this pregnancy?	16.31	3.35					
Model 2	Constant	-11.30	3.63	0.47	0.22	0.21	17.49	0.00
	How many infants were born during this pregnancy?	14.88	3.27					
	I was confident in my ability to combine breastfeeding and working.	1.55	0.50					
Model 3	Constant	-9.57	3.69	0.50	0.25	0.23	13.34	0.00
	How many infants were born during this pregnancy?	14.51	3.23					
	I was confident in my ability to combine breastfeeding and working.	1.71	0.50					
	Before I returned to work, my employer provided educational materials on breastfeeding and working.	-1.32	0.65					

Variables excluded from models: weeks of gestation at birth of the child, number of total births, number of children breastfed, belief that breastfeeding is healthy way to feed infants, weeks of leave after giving birth, whether mother works for an infant friendly employer, breastfeeding education from health care provider during pregnancy, breastfeeding education from employer during pregnancy, partner supported breastfeeding and breastfeeding and working, family supported breastfeeding and breastfeeding and working, breastfeeding as common in the workplace, coworkers cover work duties during milk expression breaks, ability to speak with manager about lactation needs, age of the mother, highest degree completed, household income.

There was a significant 3-month difference in breastfeeding duration between those perceiving minor challenges and those perceiving major challenges with combining breastfeeding and working. Previous researchers have also found that women perceive tremendous barriers to breastfeeding after return to work or school, especially among lower income mothers (Rojjanasrirat & Sousa, 2010). Eliminating or changing the perception of barriers is crucial in promoting longer breastfeeding duration.

This study showed an interesting result with regard to self-efficacy. One participant indicated a lack of self-efficacy for breastfeeding, but still breastfed for 20 months. The data were checked for accuracy; therefore, this could have been an unusual outlier or a participant reporting error. Those that agreed or strongly agreed they were confident in their breastfeeding ability breastfed for 5 months longer than those who disagreed ($p = .01$). A similar trend was seen with those who agreed or strongly agreed that they were confident in their ability to continue breastfeeding once returning to work. A 2017 meta-analysis of breastfeeding research found that women with higher breast-feeding self-efficacy were 56 and 66% more likely to be breastfeeding at 1 and 2 months, respectively (Brockway, Benzies, & Hayden, 2017). Additionally, for every 1 point increase in self-efficacy, the odds of breastfeeding increased by 10% (Brockway et al., 2017). Increasing self-efficacy may be a key area to explore further in workplace breastfeeding promotion.

Breastfeeding duration was significantly shorter for women perceiving their working hours were prohibitive to breastfeeding, as well as for women not comfortable taking breaks for milk expression. It is well-documented that women who work fewer hours or part-time have longer breastfeeding durations (Mandal et al., 2010; Ogbuanu, Glover, Probst, Liu, et al., 2011). Women who are unable to take breaks for milk expression or who have to make-up missed

work time because of taking breaks may not be able to continue breastfeeding, especially if they work longer hours or full time (Sattari et al., 2013).

The results of this research are congruent with other research indicating support from coworkers promotes breastfeeding (Alvarez et al., 2015; Bai & Wunderlich, 2013; Dabritz et al., 2009; Sattari et al., 2013). Communication is critical in building social support in the workplace, which could be a reason those who felt comfortable asking for accommodations had longer breastfeeding durations. Communication about breastfeeding is lacking in the workplace and could be critical in improving social support (Anderson et al., 2015).

While this study did not find significant differences in breastfeeding duration based on manager support, several other studies have shown that managerial support is positively associated with breastfeeding duration (Alvarez et al., 2015; Bai & Wunderlich, 2013; Sattari et al., 2013). The question used to assess this construct in our research was taken from Green & Olson, 2008, not from any of the studies finding positive associations between managerial support and breastfeeding duration. This may help explain the difference in results. Additionally, many of the women in our study worked in professional and administrative jobs that provide more autonomy. Additionally, if coworker support is sufficient, it may negate the need for more managerial support, especially if coworkers are willingly covering missed work time for the breastfeeding mother.

Breastfeeding duration did not differ significantly based on how common breastfeeding was in the workplace, possibly because most women disagreed or only somewhat agreed that breastfeeding was common in the workplace (139 of 210 women or 66%). Women who perceived their job would be at risk if they continued breastfeeding after returning to work had significantly shorter breastfeeding duration (by 7 months) than those who did not. This may

indicate that women will shorten their breastfeeding duration if they perceive job loss will result from continuing.

Univariate regression analysis identified the most significant predictive factor for breastfeeding duration was the mother's total number of births. The next most predictive was the mother's self-efficacy for combining breastfeeding and working. Self-efficacy is a predictor of engaging in a particular behavior in the Theory of Planned Behavior model (Schifter & Ajzen, 1985). In this study, self – efficacy was measured by two questions asking about the mother's confidence in her ability to breastfeed and breastfeed upon returning to work. The third, but negative, predictor was whether the employer provided breastfeeding education to their employee prior to their return to work. Other research has shown that return to work consultations have been beneficial in extending breastfeeding duration after mothers return (Balkam et al., 2011). The result seen in this research is unusual. It is possible that the education provided to mothers was not helpful or insufficient, or not provided in a timely fashion. Additionally, only 10 participants agreed or strongly agreed that they were given education, which is not sufficient to determine the actual impact.

This study has several limitations. First, the sample was relatively homogeneous and included primarily white, married, more educated, women who typically breastfeed longer (Alvarez et al., 2015; Bai & Wunderlich, 2013; Balkam et al., 2011; Jackowitz, 2008; Waite & Christakis, 2015) and may be more likely to complete the questionnaire. The questionnaire was emailed and could not reach those without email access, which may be a population with more difficult experiences combining breastfeeding and work. The sample was not a random sample, as large numbers were needed for statistical power. Additionally, the study was limited to one state, and may not be generalizable to the United States.

Summary

The results of this research indicate that personal experience with childbirth and self-efficacy for breastfeeding are predictors of breastfeeding duration once a woman returns to work. Intending to breastfeed may also be an important predictor. Job security, manageable work and break hours, and social support from coworkers were also associated with longer duration. Future research should examine interventions to increase breastfeeding communication and education in the workplace. Additionally, interventions aimed at increasing confidence, promoting breastfeeding intention, and changing workplace perceptions about breastfeeding may strengthen motivation for mothers to breastfeed longer.

CHAPTER 7: CONCLUSION

The purpose of this cross-sectional research was to assess whether women working in North Dakota Infant Friendly designated businesses were able to breastfeed for a longer duration after returning to work than those who did not work for designated businesses. The impact of other factors, such as intention and self-efficacy, on breastfeeding duration was also assessed. The questionnaire developed for this research was pilot tested on women working outside of North Dakota and then distributed to women throughout North Dakota. The final sample size of 392 women was sufficient to meet statistical power analysis requirements, although the sample was fairly homogeneous.

Results showed that women working for North Dakota businesses maintaining continuous designation for the past five to six years do not breastfeed for a statistically significant longer duration than those working for businesses that have never been designated. However, of clinical significance, is that women working for continuously designated business breastfed almost three months longer than those working for businesses that let their designation lapse. While this may have happened by chance, it may also be related to an environmental change in the workplace, one changing from a focus of support to non-support. Given that breastfeeding has a dose dependent effect on infant health, even a few weeks longer duration could mean additional health benefits for a child.

With regard to availability of lactation accommodations across worksites, very few women reported utilizing paid or unpaid maternity leave after giving birth. This is consistent with national data as well. Most women used paid time off or short-term disability to cover their maternity leaves. Additionally, very few women reported using and employer's on-site childcare for their infant care after returning to work. This is also consistent with national data. Once

women returned to work, they generally felt supported by their coworkers when taking breaks to express milk. Many women also reported have a designated place to express breast milk and a refrigerator for storing it during the day. This would indicate that not only are the Infant Friendly businesses meeting this requirement of their designation, but businesses that are not designated are providing it as well.

There are several areas that could be improved in order to make the Infant Friendly designation more impactful for working, breastfeeding women. Very few women reported receiving any type of education from their employer with regards to combining breastfeeding and work, breastfeeding accommodations in the workplace, or breastfeeding resources in the community. Few women also reported having access to a lactation consultant through their employer, and few had access to an employer provided breast pump. There is little research available exploring the impact of employers providing education on combining breastfeeding and working. However, among the few studies available, those providing education, especially using a lactation consultant, have more employees breastfeeding at 6 months.

In considering the impact of intention on breastfeeding duration, the results were statistically significant; however, the results were invalidated due to unequal variances. Nevertheless, women who expressed intention to exclusively breastfeed were able to breastfeed for an average of 9 months, while those expressing intention for other feeding methods, only breast fed for an average of 5 months. This may, again be of enormous clinical importance since any increase in breastfeeding duration is beneficial for the child.

Breastfeeding self-efficacy was another area examined in this study. The results were somewhat cofounded by an outlier and problems with homogeneity of variance. In general, those who were more confident in their ability to breastfeed did, in fact, breastfeed long than those

who were not confident. However, one woman reported breastfeeding for 20 months even though she strongly disagreed that she was confident in her ability to do so. Those indicating they were confident in their ability to combine breastfeeding and working also breastfed longer than those who were not confident, however, the samples did not have homogenous variances.

Women stating they perceived only minor challenges with regard to breastfeeding and working, were able to breastfeed longer than those perceiving major challenges combining the two. This may be an area where additional education on breastfeeding and working would promote extended breastfeeding. If women were aware of which accommodations were available from their employer and the breastfeeding resources in the community, and had a lactation consultant available in the workplace, they may perceive fewer barriers to breastfeeding and choose to continue longer.

Through regression modeling the two most critical factors associated with breastfeeding duration in working mothers was the number of infants born during the pregnancy and the mother's confidence in her ability combine breastfeeding and working. Ironically, education provided to the mother from her employer was negatively associated with breastfeeding, however, such a small number of women received education, it is difficult to assess what was provided and if it was useful. Three regression models were developed using these factors, and while they were all statistically significant predictors of duration, the models had relatively small coefficients of determination (all < 0.25).

The results of this research highlight several important points. First is the need to build self-efficacy for women choosing to combine breastfeeding and working. One way to build confidence may be to build breastfeeding infrastructure into the workplace, which some of the current accommodations such as designated lactation spaces and flexible break times provide.

However, a missing component of this may be education and access to a lactation consultant.

Education should begin in the prenatal period and continue past the mother's return to work. The education should include the accommodations available at the worksite, how to access them, and the expectations for use. Additionally, promoting education throughout the worksite to managers and coworkers may also increase the perception of "infant" or "breastfeeding friendliness" which may, in turn, decrease the number of perceived barriers to breastfeeding and working.

Secondly, the Infant Friendly designation in North Dakota is a start to promote breastfeeding in worksites. However, it could be strengthened. While the designation mandates that worksites provide a designated place for expressing milk, flexible breaks, access to refrigeration for breast milk, a hand washing station, and a worksite lactation policy, the designation should also include a plan for dissemination of the policy to all employees to increase awareness. Additionally, the designation should also include some requirement for providing education to pregnant and postpartum employees and their managers about what the worksite has available with regard to lactation support, and open a discussion on the expectations of using those accommodations. This would provide an opportunity for education for the mother and manager as well as begin a dialog for the mother's needs.

Thirdly, research should continue to explore breastfeeding education and communication in the workplace. While accommodations such as maternity leave, part-time work, lactation breaks and spaces, and corporate lactation programs have been researched frequently, there is little information about the role of breastfeeding education and communication in the workplace. These may be keys to promoting breastfeeding among working women and be integral in increasing the impact of corporate lactation programs and lactation accommodations.

REFERENCES

- Abdulloeva, S., & Eyler, A. A. (2013). Policies on worksite lactation support within states and organizations. *Journal of Women's Health, 22*(9), 769-774. doi:10.1089/jwh.2012.4186
- Agarwal, R. (2011). Breastfeeding or breast milk for procedural pain in neonates : RHL commentary. Retrieved from http://apps.who.int/rhl/newborn/cd004950_agarwalr_com/en/
- Ahmadi, M., & Moosavi, S. M. (2013). Evaluation of occupational factors on continuation of breastfeeding and formula initiation in employed mothers. *Global Journal of Health Science, 5*(6), 166-171.
- Alvarez, R., Serwint, J. R., Levine, D. M., Bertram, A., & Sattari, M. (2015). Lawyer mothers: infant-feeding intentions and behavior. *Southern Medical Journal, 108*(5), 262-267. doi:10.14423/SMJ.0000000000000277
- American Academy of Pediatrics. (2012). Breastfeeding and the use of human milk. *Pediatrics, 129*(3), 598-601. doi:10.1542/peds.2011-3552
- American Academy of Pediatrics. (2014a). Benefits of breastfeeding for mom. Retrieved from <http://www.healthychildren.org/English/ages-stages/baby/breastfeeding/Pages/Benefits-of-Breastfeeding-for-Mom.aspx>
- American Academy of Pediatrics. (2014b). Breastfeeding benefits your baby's immune system. Retrieved from <http://www.healthychildren.org/English/ages-stages/baby/breastfeeding/Pages/Breastfeeding-Benefits-Your-Baby's-Immune-System.aspx>

- American Academy of Pediatrics. (2015). Breastmilk and your diet. Retrieved from <https://www.healthychildren.org/English/ages-stages/baby/breastfeeding/Pages/Breastmilk-And-Your-Diet.aspx>
- Anderson, J., Kuehl, R. A., Drury, S. A., Tschetter, L., Schwaegerl, M., Hildreth, M., . . . Lamp, J. (2015). Policies aren't enough: the importance of interpersonal communication about workplace breastfeeding support. *Journal of Human Lactation, 31*(2), 260-266.
doi:10.1177/0890334415570059
- Attanasio, L., Kozhimannil, K. B., McGovern, P., Gjerdingen, D., & Johnson, P. J. (2013). The impact of prenatal employment on breastfeeding intentions and breastfeeding status at 1 week postpartum. *Journal Human Lactation, 29*(4), 620-628.
doi:10.1177/0890334413504149
- Auerbach, K. G. (1984). Employed breastfeeding mothers: problems they encounter. *Birth, 11*(1), 17-20.
- Auerbach, K. G., & Guss, E. (1984). Maternal employment and breastfeeding. A study of 567 women's experiences. *American Journal of Diseases of Children, 138*(10), 958-960.
- Bai, D. L., Fong, D. Y., & Tarrant, M. (2015). Factors associated with breastfeeding duration and exclusivity in mothers returning to paid employment postpartum. *Maternal and Child Health Journal, 19*(5), 990-999. doi:10.1007/s10995-014-1596-7
- Bai, Y., Peng, C. J., & Fly, A. D. (2008). Validation of a short questionnaire to assess mothers' perception of workplace breastfeeding support. *Journal of the American Dietetic Association, 108*(7), 1221-1225.

- Bai, Y., & Wunderlich, S. M. (2013). Lactation accommodation in the workplace and duration of exclusive breastfeeding. *Journal of Midwifery & Women's Health*, 58(6), 690-696.
doi:10.1111/jmwh.12072
- Balkam, J. A., Cadwell, K., & Fein, S. B. (2011). Effect of components of a workplace lactation program on breastfeeding duration among employees of a public-sector employer. *Maternal & Child Health Journal*, 15(5), 677-683. doi:10.1007/s10995-010-0620-9
- Bar-Yam, N. B. (1998a). Insights in practice. Workplace lactation support, part I: a return-to-work breastfeeding assessment tool. *Journal of Human Lactation*, 14(3), 249-254.
- Bar-Yam, N. B. (1998b). Insights in practice. Workplace lactation support, part II: working with the workplace. *Journal of Human Lactation*, 14(4), 321-325.
- Bartick, M. (2011). Breastfeeding and the U.S. economy. *Breastfeeding Medicine*, 6, 313-318.
doi:10.1089/bfm.2011.0057
- Bartick, M. C., Schwarz, E. B., Green, B. D., Jegier, B. J., Reinhold, A. G., Colaizy, T. T., . . . Stuebe, A. M. (2017). Suboptimal breastfeeding in the United States: maternal and pediatric health outcomes and costs. *Maternal & Child Nutrition*, 13(1).
doi:10.1111/mcn.12366
- Bartick, M., & Reinhold, A. (2010). The burden of suboptimal breastfeeding in the United States: a pediatric cost analysis. *Pediatrics*, 125(5), e1048-1056. doi:10.1542/peds.2009-1616
- Bonet, M., Marchand, L., Kaminski, M., Fohran, A., Betoko, A., Charles, M. A., . . . Group", "EDEN Mother–Child Cohort Study. (2013). Breastfeeding duration, social and occupational characteristics of mothers in the French 'EDEN mother-child' cohort. *Maternal and Child Health Journal*, 17(4), 714-722. doi:10.1007/s10995-012-1053-4

- Boston University School of Public Health. (2013). Theory of planned behavior. Retrieved from <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/SB721-Models/SB721-Models3.html>
- Brockway, M., Benzies, K., & Hayden, K. A. (2017). Interventions to improve breastfeeding self-efficacy and resultant breastfeeding rates: a systematic review and meta-analysis. *Journal of Human Lactation*, 33(3), 486-499. doi:10.1177/0890334417707957
- Bureau of Labor Statistics, & United States Department of Labor. (2011). The economics daily, earnings and employment by occupation, race, ethnicity, and sex, 2010. Retrieved from http://www.bls.gov/opub/ted/2011/ted_20110914.htm
- California Breastfeeding Coalition. (n.d.). Workplace and school: laws that protect women in the workplace and lactating teens at school. Retrieved from <http://californiabreastfeeding.org/breastfeedingrights/breastfeeding-at-work/>
- Centers for Disease Control. (2014). *Breastfeeding report card 2014*. Atlanta, GA: Centers for Disease Control Retrieved from <http://www.cdc.gov/breastfeeding/pdf/2014breastfeedingreportcard.pdf>.
- Centers for Disease Control and Prevention. (2010). Healthier worksite initiative: planning. Retrieved from <http://www.cdc.gov/nccdphp/dnpao/hwi/toolkits/lactation/planning.htm>
- Centers for Disease Control and Prevention. (2011). Breastfeeding report card 2011. Retrieved from <http://www.cdc.gov/breastfeeding/pdf/2011breastfeedingreportcard.pdf>
- Centers for Disease Control and Prevention. (2014a). Breastfeeding rates among U.S. children born 2001-2011, CDC national immunization survey. Retrieved from http://www.cdc.gov/breastfeeding/data/nis_data/

- Centers for Disease Control and Prevention. (2014b). *Breastfeeding report card 2014*. Atlanta, GA: Centers for Disease Control. Retrieved from <http://www.cdc.gov/breastfeeding/pdf/2014breastfeedingreportcard.pdf>.
- Centers for Disease Control and Prevention. (2015). Colorectal cancer control program (CRCCP). Atlanta, GA: United States Department of Health and Human Services.
- Centers for Disease Control and Prevention. (2016). Breastfeeding Report Card, 2016. Retrieved from <https://www.cdc.gov/breastfeeding/pdf/2016breastfeedingreportcard.pdf>
- Chin, A. C., Myers, L., & Magnus, J. H. (2008). Race, education, and breastfeeding initiation in Louisiana, 2000-2004. *Journal of Human Lactation, 24*(2), 175-185.
doi:10.1177/0890334408316074
- Chow, T., Wolfe, E. W., & Olson, B. H. (2012). Development, content validity, and piloting of an instrument designed to measure managers' attitude toward workplace breastfeeding support. *Journal of the Academy of Nutrition & Dietetics, 112*(7), 1042-1047.
doi:10.1016/j.jand.2012.01.013
- Chuang, C. H., Chang, P. J., Chen, Y. C., Hsieh, W. S., Hung, B. S., Lin, S. J., & Chen, P. C. (2010). Maternal return to work and breastfeeding: a population-based cohort study. *International Journal of Nursing Studies, 47*(4), 461-474.
doi:10.1016/j.ijnurstu.2009.09.003
- Cohen, R., & Mrtek, M. B. (1994). The impact of two corporate lactation programs on the incidence and duration of breast-feeding by employed mothers. *American Journal of Health Promotion, 8*(6), 436-441.
- Cooklin, A. R., Rowe, H. J., & Fisher, J. R. (2012). Paid parental leave supports breastfeeding and mother-infant relationship: a prospective investigation of maternal postpartum

- employment. *Australian and New Zealand Journal of Public Health*, 36(3), 249-256.
doi:10.1111/j.1753-6405.2012.00846.x
- Dabritz, H. A., Hinton, B. G., & Babb, J. (2009). Evaluation of lactation support in the workplace or school environment on 6-month breastfeeding outcomes in Yolo County, California. *Journal of Human Lactation*, 25(2), 182-193.
doi:10.1177/0890334408328222
- de Jersey, S. J., Mallan, K., Forster, J., & Daniels, L. A. (2017). A prospective study of breastfeeding intentions of healthy weight and overweight women as predictors of breastfeeding outcomes. *Midwifery*, 53, 20-27. doi:10.1016/j.midw.2017.07.002
- Declercq, ER, Sakala, C, Corry, MP, Applebaum, S. (2006). Listening to Mothers II: birth by the numbers. New York: Childbirth Connection.
- DeClercq, ER, Sakala, Corry, MP, Applebaum, S. (2013). Listening to Mothers SM III: New Mothers Speak Out. New York: Childbirth Connection.
- Department of Health and Human Services. (2016). Healthy People 2020 Maternal, Infant, and Child Health Objectives. Retrieved from
<http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>
- Dick, M. J., Evans, M. L., Arthurs, J. B., Barnes, J. K., Caldwell, R. S., Hutchins, S. S., & Johnson, L. K. (2002). Predicting early breastfeeding attrition. *Journal of Human Lactation*, 18(1), 21-28.
- Duckett, L., Henly, S., Avery, M., Potter, S., Hills-Bonczyk, S., Hulden, R., & Savik, K. (1998). A theory of planned behavior-based structural model for breast-feeding. *Nursing Research*, 47(6), 325-336.

- Edgar, Anna. (2006). Anatomy of a working breast. Retrieved from <http://www.lalecheleague.org/nb/nbmarapr05p44.html>
- Eldridge, S., & Croker, A. (2005). Breastfeeding friendly workplace accreditation: creating supportive workplaces for breastfeeding women. *Breastfeeding Review*, 13(2), 17-22.
- Fein, S. B., Labiner-Wolfe, J., Shealy, K. R., Li, R., Chen, J., & Grummer-Strawn, L. M. (2008). Infant Feeding Practices Study II: study methods. *Pediatrics*, 122 Suppl 2, S28-35. doi:10.1542/peds.2008-1315c
- Fein, S. B., Mandal, B., & Roe, B. E. (2008). Success of strategies for combining employment and breastfeeding. *Pediatrics*, 122 Suppl 2, S56-62. doi:10.1542/peds.2008-1315g
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (M. Carmichael Ed.). Los Angeles, California: Sage.
- Galtry, J. (2003). The impact on breastfeeding of labour market policy and practice in Ireland, Sweden, and the USA. *Social Science & Medicine*, 57(1), 167-177.
- Garvin, C. C., Sriraman, N. K., Paulson, A., Wallace, E., Martin, C. E., & Marshall, L. (2013). The business case for breastfeeding: a successful regional implementation, evaluation, and follow-up. *Breastfeeding Medicine*, 8(4), 413-417. doi:10.1089/bfm.2012.0104
- Gatrell, C. J. (2007). Secrets and lies: breastfeeding and professional paid work. *Social Science & Medicine*, 65(2), 393-404. doi:10.1016/j.socscimed.2007.03.017
- Geraghty, S. R., & Rasmussen, K. M. (2010). Redefining “breastfeeding” initiation and duration in the age of breastmilk pumping. *Breastfeeding Medicine*, 5(3), 135 - 137. doi:10.1089/bfm.2009.0094

- Greene, S. W., & Olson, B. H. (2008). Development of an instrument designed to measure employees' perceptions of workplace breastfeeding support. *Breastfeeding Medicine*, 3(3), 151-157. doi:10.1089/bfm.2008.0103
- Greene, S. W., Wolfe, E. W., & Olson, B. H. (2008). Assessing the validity of measures of an instrument designed to measure employees' perceptions of workplace breastfeeding support. *Breastfeeding Medicine*, 3(3), 159-163. doi:10.1089/bfm.2007.0029
- Haider, S. J., Jacknowitz, A., & Schoeni, R. F. (2003). Welfare work requirements and child well-being: evidence from the effects on breast-feeding. *Demography*, 40(3), 479-497.
- Han, W., Ruhm, C., Waldfogel, J., & Washbrook, E. (2008). The timing of mother's employment after childbirth. *Monthly Labor Review*, June, 15 - 27.
- Hausman, B. L. (2004). The feminist politics of breastfeeding. *Australian Feminist Studies*, 19(45), 273-285. doi:10.1080/0816464042000278963
- Healthcare.gov. (n.d.). Health benefits and coverage: breastfeeding benefits. Retrieved from <https://www.healthcare.gov/coverage/breast-feeding-benefits/>
- Hills-Bonczyk, S. G., Avery, M. D., Savik, K., Potter, S., & Duckett, L. J. (1993). Women's experiences with combining breast-feeding and employment. *Journal of Nurse - Midwifery*, 38(5), 257-266.
- Hirani, S. A., & Karmaliani, R. (2013a). Evidence based workplace interventions to promote breastfeeding practices among Pakistani working mothers. *Women & Birth*, 26(1), 10-16. doi:10.1016/j.wombi.2011.12.005
- Hirani, S. A., & Karmaliani, R. (2013b). The experiences of urban, professional women when combining breastfeeding with paid employment in Karachi, Pakistan: a qualitative study. *Women & Birth*, 26(2), 147-151. doi:10.1016/j.wombi.2012.10.007

- Hirani, S. A., Karmaliani, R., Christie, T., Parpio, Y., & Rafique, G. (2013). Perceived Breastfeeding Support Assessment Tool (PBSAT): development and testing of psychometric properties with Pakistani urban working mothers. *Midwifery*, *29*(6), 599-607. doi:10.1016/j.midw.2012.05.003
- Hirschman, C., & Butler, M. (1981). Trends and differentials in breast feeding: an update. *Demography*, *18*(1), 39-54.
- Hojnacki, S. E., Bolton, T., Fulmer, I. S., & Olson, B. H. (2012). Development and piloting of an instrument that measures company support for breastfeeding. *Journal of Human Lactation*, *28*(1), 20-27. doi:10.1177/0890334411430666
- International Labour Organization. (2014). Maternity and paternity at work: law and practice across the world. Geneva, Switzerland: International Labour Office.
- Jacknowitz, A. (2008). The role of workplace characteristics in breastfeeding practices. *Women & Health*, *47*(2), 87-111.
- Jana, L. A. (2014). A very brief history of formula as we know it. Retrieved from <https://www.healthychildren.org/English/ages-stages/baby/feeding-nutrition/Pages/Brief-History-of-Formula.aspx>
- Katcher, A. L., & Lanese, M. G. (1985). Breast-feeding by employed mothers: a reasonable accommodation in the work place. *Pediatrics*, *75*(4), 644-647.
- Kimbrow, R. T. (2006). On-the-job moms: work and breastfeeding initiation and duration for a sample of low-income women. *Maternal & Child Health Journal*, *10*(1), 19-26.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, *15*(2), 155-163. doi:10.1016/j.jcm.2016.02.012

- La Leche League International. (2014). A brief history of La Leche League International. Retrieved from <http://www.llli.org/lliihistory.html>
- Mandal, B., Roe, B. E., & Fein, S. B. (2010). The differential effects of full-time and part-time work status on breastfeeding. *Health Policy, 97*(1), 79-86. doi:10.1016/j.healthpol.2010.03.006
- Marinelli, K. A., Moren, K., Taylor, J. S., & Academy Of Breastfeeding Medicine. (2013). Breastfeeding support for mothers in workplace employment or educational settings: summary statement. *Breastfeeding Medicine, 8*(1), 137-142. doi:10.1089/bfm.2013.9999
- Matos, K., & Galinsky, E. (2014). 2014 National Study of Employers. Retrieved from <http://familiesandwork.org/downloads/2014NationalStudyOfEmployers.pdf>
- Mayerson, A. (1992). The history of Americans with Disability Act. Retrieved from <http://dredf.org/news/publications/the-history-of-the-ada/>
- McCarter-Spaulding, D., Lucas, J., & Gore, R. (2011). Employment and breastfeeding outcomes in a sample of black women in the United States. *Journal of National Black Nurses Association, 22*(2), 38-45.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly, 15*(4), 351-377.
- Medela. (2016a). About Medela. Retrieved from <https://www.medelabreastfeedingus.com/about-medela>
- Medela. (2016b). Breastpumps. Retrieved from <https://www.medelabreastfeedingus.com/products/category/breast-pumps?categories=retail-pumps>

- Medela. (n.d.-a). Breast pumping tips: usage of breast pumps. Retrieved from <https://www.medela.com/breastfeeding/advice/pumping/useful-tips>
- Medela. (n.d.-b). How to choose a pump & accessories. Retrieved from <https://www.medelabreastfeedingus.com/why-medela-product-selector>
- Mills, S. P. (2009). Workplace lactation programs: a critical element for breastfeeding mothers' success. *American Association of Occupational Health Nurses Journal*, 57(6), 227-231.
- Mirkovic, K. R., Perrine, C. G., Scanlon, K. S., & Grummer-Strawn, L. M. (2014a). In the United States, a mother's plans for infant feeding are associated with her plans for employment. *Journal of Human Lactation*, 30(3), 292-297.
doi:10.1177/0890334414535665
- Mirkovic, K. R., Perrine, C. G., Scanlon, K. S., & Grummer-Strawn, L. M. (2014b). Maternity leave duration and full-time/part-time work status are associated with U.S. mothers' ability to meet breastfeeding intentions. *Journal of Human Lactation*, 30(4), 416-419.
doi:10.1177/0890334414543522
- Murtagh, L., & Moulton, A. D. (2011). Working mothers, breastfeeding, and the law. *American Journal of Public Health*, 101(2), 217-223. doi:10.2105/AJPH.2009.185280
- National Conference of State Legislators. (2017). Breastfeeding state laws. Retrieved from <http://www.ncsl.org/research/health/breastfeeding-state-laws.aspx>
- National Conference of State Legislatures. (2015). Breastfeeding state laws. Retrieved from <http://www.ncsl.org/research/health/breastfeeding-state-laws.aspx>
- National Women's History Museum. (2007). NWHM exhibit: a history of women in industry. Retrieved from <https://www.nwhm.org/online-exhibits/industry/12.htm>

- North Dakota Department of Health. (2011). Infant friendly worksite application. Retrieved from <http://www.ndhealth.gov/breastfeeding/?id=68>
- North Dakota Department of Health. (2011a). North Dakota breastfeeding: state breastfeeding laws. Retrieved from <http://www.ndhealth.gov/breastfeeding/?id=64>
- North Dakota Department of Health. (2011b). North Dakota designated businesses. Retrieved from <http://www.ndhealth.gov/breastfeeding/?id=77&page=ND+Designated+Businesses>
- North Dakota Department of Health. (2011c). State laws. Retrieved from <http://www.ndhealth.gov/breastfeeding/?id=64>
- O'Keefe, T. D., & Henly, S. J. (1998). Breast feeding on campus: personal experiences, beliefs, and attitudes of the university community. *Journal of American College Health, 47*(3), 129.
- Ogbuanu, C., Glover, S., Probst, J., Hussey, J., & Liu, J. (2011). Balancing work and family: effect of employment characteristics on breastfeeding. *Journal of Human Lactation, 27*(3), 225-238. doi:10.1177/0890334410394860
- Ogbuanu, C., Glover, S., Probst, J., Liu, J., & Hussey, J. (2011). The effect of maternity leave length and time of return to work on breastfeeding. *Pediatrics, 127*(6), e1414-1427. doi:10.1542/peds.2010-0459
- Ortiz, J., McGilligan, K., & Kelly, P. (2004). Duration of breast milk expression among working mothers enrolled in an employer-sponsored lactation program. *Pediatric Nursing, 30*(2), 111-119.
- Parker, K. (2015). Despite progress, women still bear heavier load than men in balancing work and family. Retrieved from <http://www.pewresearch.org/fact-tank/2015/03/10/women-still-bear-heavier-load-than-men-balancing-work-family/>

- Payne, D., & Nicholls, D. A. (2010). Managing breastfeeding and work: a Foucauldian secondary analysis. *Journal of Advanced Nursing*, 66(8), 1810-1818. doi:10.1111/j.1365-2648.2009.05156.x
- Persad, M. D., & Mensinger, J. L. (2008). Maternal breastfeeding attitudes: association with breastfeeding intent and socio-demographics among urban primiparas. *Journal of Community Health*, 33(2), 53-60. doi:10.1007/s10900-007-9068-2
- Public Broadcasting Service. (2001). American experience: the pill and the women's liberation movement. Retrieved from http://www.pbs.org/wgbh/amex/pill/peoplevents/e_lib.html
- Qualtrics. (2005) (Version May 2016). Provo, UT, USA. Retrieved from <http://www.qualtrics.com>
- Rietz, M. F., & McCullagh, M. C. (2010). Why breastfeeding matters to occupational health nurses and employers. *American Association of Occupational Health Nurses Journal*, 58(11), 458-461. doi:10.3928/08910162-20101027-04
- Rivera-Pasquel, M., Escobar-Zaragoza, L., & González de Cosío, T. (2015). Breastfeeding and maternal employment: results from three national nutritional surveys in Mexico. *Maternal & Child Health Journal*, 19(5), 1162-1172. doi:10.1007/s10995-014-1622-9
- Roe, B., Whittington, L. A., Fein, S. B., & Teisl, M. F. (1999). Is there competition between breast-feeding and maternal employment? *Demography*, 36(2), 157-171.
- Rojjanasrirat, W., & Sousa, V. D. (2010). Perceptions of breastfeeding and planned return to work or school among low-income pregnant women in the USA. *Journal of Clinical Nursing*, 19(13/14), 2014-2022. doi:10.1111/j.1365-2702.2009.03152.x
- Ross, C. E., Mirowsky, J., & Ulbrich, P. (1983). Distress and the traditional female role: a comparison of Mexicans and Anglos. *American Journal of Sociology*, 89(3), 670-682.

- Ryan, A. S., & Martinez, G. A. (1989). Breast-feeding and the working mother: a profile. *Pediatrics*, 83(4), 524-531.
- Sattari, M., Serwint, J. R., Neal, D., Chen, S., & Levine, D. M. (2013). Work-place predictors of duration of breastfeeding among female physicians. *The Journal of Pediatrics*, 163(6), 1612-1617. doi:10.1016/j.jpeds.2013.07.026
- Schifter, D. E., & Ajzen, I. (1985). Intention, perceived control, and weight loss: an application of the theory of planned behavior. *Journal of Personality and Social Psychology*, 49(3), 843-851. doi:10.1037/0022-3514.49.3.843
- Schwellenbach, L.B., Miller, F.S. (1948). *Handbook of facts on women workers*. Washington D.C.: United States Government Printing Office Retrieved from https://fraser.stlouisfed.org/docs/publications/women/b0225_dolwb_1948.pdf.
- Skafida, V. (2012). Juggling work and motherhood: the impact of employment and maternity leave on breastfeeding duration: a survival analysis on growing up in Scotland data. *Maternal & Child Health Journal*, 16(2), 519-527. doi:10.1007/s10995-011-0743-7
- Smith, S. (2013). Determining sample size: how to ensure you get the correct sample size. Retrieved from <http://www.myendnoteweb.com/EndNoteWeb.html?func=new&>
- Stevens, E. E., Patrick, T. E., & Pickler, R. (2009). A history of infant feeding. *The Journal of Perinatal Education*, 18(2), 32-39.
- Stewart-Glenn, J. (2008). Knowledge, perceptions, and attitudes of managers, coworkers, and employed breastfeeding mothers. *American Association of Occupational Health Nurses Journal*, 56(10), 423-429.

- Tsai, S. Y. (2013). Impact of a breastfeeding-friendly workplace on an employed mother's intention to continue breastfeeding after returning to work. *Breastfeeding Medicine*, 8, 210-216. doi:10.1089/bfm.2012.0119
- Tsai, S. Y. (2014). Employee perception of breastfeeding-friendly support and benefits of breastfeeding as a predictor of intention to use breast-pumping breaks after returning to work among employed mothers. *Breastfeeding Medicine*, 9(1), 16-23. doi:10.1089/bfm.2013.0082
- United States Department of Labor Bureau of Labor Statistics. (2017). Labor force statistics from the current population survey: employed persons by detailed occupation, sex, and Hispanic or Latino ethnicity. Retrieved from <https://www.bls.gov/cps/cpsaat11.htm>
- United States Breastfeeding Committee. (2002). Workplace breastfeeding support. Retrieved from <http://www.usbreastfeeding.org/Portals/0/Publications/Workplace-2002-USBC.pdf>
- United States Breastfeeding Committee. (2013). Workplace support in federal law. Retrieved from <http://www.usbreastfeeding.org/workplace-law>
- United States Breastfeeding Committee. (n.d.). Economic benefits of breastfeeding. Retrieved from <http://www.usbreastfeeding.org/LinkClick.aspx?link=Publications/Economic-Benefits-2002-USBC.pdf>
- United States Census Bureau. (2016). State and County QuickFacts: Fargo, North Dakota. Retrieved from <https://www.census.gov/quickfacts/fact/table/ND/PST045216>
- United States Department of Agriculture. (2015). Legislative history of breastfeeding promotion requirements in WIC. Retrieved from <http://www.fns.usda.gov/wic/legislative-history-breastfeeding-promotion-requirements-wic>

- United States Department of Health and Human Services. (2008). The business case for breastfeeding: steps for creating a breastfeeding friendly worksite. Retrieved from <http://www.womenshealth.gov/breastfeeding/government-in-action/business-case-for-breastfeeding/easy-steps-to-supporting-breastfeeding-employees.pdf>
- United States Department of Health and Human Services. (2014). Healthy People 2020: nutrition and weight status objectives. Retrieved from <http://www.healthypeople.gov/2020/topics-objectives/topic/nutrition-and-weight-status/objectives>
- United States Department of Health and Human Services. (2016). Healthy People 2020 Maternal, Infant, and Child Health Objectives. Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=26>
- United States Department of Labor Bureau of Labor Statistics. (2017). Labor force statistics from the current population survey: employment status of the civilian non institutionalized population 16 years and over by sex, 1976 to date. Retrieved from <https://www.bls.gov/cps/cpsaat02.htm>
- United States Department of Labor Wage and Hour Division. (2015). Family and medical leave act. Retrieved from <http://www.dol.gov/whd/fmla/>
- United States Department of Labor Women's Bureau. (2013). Leading occupations. Retrieved from <https://www.dol.gov/wb/stats/leadoccupations.htm>
- United States Department of Labor Women's Bureau. (n.d.). Facts over time: women in the labor force. Retrieved from http://www.dol.gov/wb/stats/facts_over_time.htm
- Uriell, Z., Perry, A., Kee, A., & Burrell, L. (2009). Breastfeeding in the navy: estimates of rate, duration, and perceived support. *Military Medicine*, 174(3), 290-296.

- Waite, W. M., & Christakis, D. (2015). Relationship of maternal perceptions of workplace breastfeeding support and job satisfaction. *Breastfeeding Medicine, 10*, 222-227. doi:10.1089/bfm.2014.0151
- Welch, J. L., Wiehe, S. E., Palmer-Smith, V., & Dankoski, M. E. (2011). Flexibility in faculty work-life policies at medical schools in the Big Ten conference. *Journal of Women's Health, 20*(5), 725-732. doi:10.1089/jwh.2010.2553
- Whaley, S. E., Meehan, K., Lange, L., Slusser, W., & Jenks, E. (2002). Predictors of breastfeeding duration for employees of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). *Journal of the American Dietetic Association, 102*(9), 1290-1293.
- Wolf, J. H. (2003). Low breastfeeding rates and public health in the united states. *American Journal of Public Health, 93*(12), 2000-2010. doi:10.2105/AJPH.93.12.2000
- Working Mother Research Institute. (2011). What moms choose. In Ernst & Young (Ed.). New York, NY: Working Mother Media/ Bonnier Corporation.
- Wright, A., & Schanler, R. (2001). The resurgence of breastfeeding at the end of the second millennium. *Journal of Nutrition, 131*(2), 421S-425S.
- Yimyam, S., & Hanpa, W. (2014). Developing a workplace breast feeding support model for employed lactating mothers. *Midwifery*. doi:10.1016/j.midw.2014.01.007

APPENDIX A: IRB APPROVAL



November 9, 2016

Dr. Ardith Brunt
Health, Nutrition & Exercise Science

Re: IRB Certification of Exempt Human Subjects Research:
Protocol #HE17090, "Differences in Breastfeeding Duration Between Infant-Friendly Designated and Non-Designated Worksites"

Co-investigator(s) and research team: Elizabeth Hilliard, Madison Millner

Certification Date: 11/9/2016 Expiration Date: 11/8/2019
Study site(s): varied (TBD)
Sponsor: n/a

The above referenced human subjects research project has been certified as exempt (category # 2b) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol submission with revised consent (received 11/9/2016).

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.
Sincerely,



Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU,
ou=Institutional Review Board,
email=kristy.shirley@ndsu.edu, c=US
Date: 2016.11.09 14:56:47 -0500

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult http://www.ndsu.edu/research/integrity_compliance/irb/. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb

Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

NDSU is an EQAA university

APPENDIX B: PARTICIPANT RECRUITMENT EMAIL

Greetings,

My name is Elizabeth Hilliard and I am a PhD student at North Dakota State University. I am conducting a research study to learn more about mothers' experiences with working and breastfeeding. The purpose of this study is to identify ways to better support mothers who choose to continue breastfeeding once they return to work. If you have had a baby between 2014 and 2016, please click on the link below to take the survey. The survey contains 85 questions, which are broken into small sections that will only take few minutes to complete. You do not need to complete the survey all at once. It should not take more than 30 minutes to finish the survey. More information on this study will be available when you click the survey link.

(Insert survey link here)

Thank you for your participation and valuable input. Your responses are greatly appreciated and will be helpful in supporting working mothers.

Sincerely,

Elizabeth Hilliard, MS, RD, LRD
PhD Candidate
North Dakota State University

APPENDIX C: EMPLOYER RECRUITMENT SCRIPT

Hello,

My name is Elizabeth Hilliard and I am a PhD student at North Dakota State University. I am conducting a research study to learn more about the experiences of mothers who choose to continue breastfeeding their infant after returning to work. I am hoping to email a survey to women at various worksites in North Dakota, and was calling to ask if your business would be willing to participate. The survey responses are confidential, so no individual woman will be identifiable. Women are asked to provide the name and county of their employer so the researchers can determine if the employer is designated as Infant Friendly in the State of North Dakota. Otherwise, the employer information will not be released or used in any other way. Once all surveys have been completed, a summary of the survey results from all employees will be compiled and distributed to employers. Again, this will not identify the employer or individual respondent. This research study has been approved by the Institutional Review Board at North Dakota State University (HE17090). Would your business be willing to distribute this online survey through email to employees?

Sincerely,

Elizabeth Hilliard, MS, RD, LRD
PhD Candidate
North Dakota State University

APPENDIX D: INFORMED CONSENT

NDSU **North Dakota State University**
Department of Health, Nutrition and Exercise Sciences
1310 Centennial Blvd., EML Hall 316
NDSU Dept. 2620
PO Box 6050
Fargo, ND 58108-6050
701.231.7474

Differences in Breastfeeding Duration Between Infant-Friendly Designated and Non-Designated Worksites

Dear Working Mother:

My name is Elizabeth Hilliard. I am a graduate student in the Department of Health, Nutrition and Exercise Sciences at North Dakota State University, and I am conducting a research project to determine the impact of the North Dakota Infant-Friendly business designation on breastfeeding duration in working women. It is our hope, that with this research, we will learn more about how to support women who choose to breastfeed their infants upon return to paid employment.

Because you are a working mother who has given birth in the last 2 years, you are invited to take part in this research project. Whether you breastfed upon return to work or not, we encourage you to complete the survey. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in research procedures, but we have taken reasonable safeguards to minimize any known risks. These known risks include: emotional discomfort while responding to questions, or potential loss of confidentiality for your responses. You do not need to provide your name for this survey; however, we do ask that you identify the name and county of your employer. Individual survey responses will not be released to employers. Only data that has been compiled will be released so that no individual respondent can be identified.

It is unlikely that you will personally benefit by taking part in this survey. However, benefits to others and society are likely to include advancement of knowledge on supporting breastfeeding, working mothers, and identification of areas of improvement for the Infant-Friendly business designation.

It should take about 30 minutes to complete the entire survey. The survey is divided into 14 sections with 1 – 7 questions each. Each section should take no more than 5 minutes to complete. The survey does not have to be completed in one sitting as long as you use the same computer or mobile device each time you open it. Questions will cover a variety of topics from basic demographic data, personal experience with breastfeeding, your worksites breastfeeding support policies and accommodations, and family support for breastfeeding. There is no compensation

available for completing the survey. However, the data that you provide will be critical in furthering the support for breastfeeding, working mothers in North Dakota.

We will keep private all research records that identify you. The identifying information will be the name and county of your employer. Your name will not be collected. Your information will be combined with information from other people taking part in the study, and we will write about the combined information that we have gathered. You will not be identified in these written materials. We may publish the results of the study; however, we will keep your name and other identifying information private. Additionally, we will not provide employers with individual response data, so they will not be able to identify you. By completing and submitting the survey, you are providing consent for us to use your data for analysis and publication.

If you have any questions about this project, please contact me at 701-231-7480 or Elizabeth.hilliard@ndsu.edu, or contact my advisor Dr. Ardith Brunt at 701-231-7475 or aridth.brunt@ndsu.edu.

You have rights as a research participant. If you have questions about your rights or complaints about this research, you may talk to the researcher or contact the NDSU Human Research Protection Program at 701.231.8995, toll-free at 1-855-800-6717, by email at ndsu.irb@ndsu.edu, or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

Thank you for your taking part in this research. If you wish to receive a copy of the results, please contact Elizabeth Hilliard at 701-231-7480 or Elizabeth.hilliard@ndsu.edu.

APPENDIX E: INFANT – FRIENDLY WORKSITE SURVEY

I am conducting a survey about mothers' experiences with working outside the home and breastfeeding. The results of this survey will be used to help support women who wish to breastfeed after they return to work. The goal is to find what employers are currently doing to support breastfeeding and if additional support would help breastfeeding mothers who work. This survey is confidential. Individual responses will be combined, unidentifiable, and will not be shared with your employer.

This survey is 84 questions and is divided into several small sections. Each section will only take a few minutes to answer. You can start and stop the survey if you are unable to complete all questions in one sitting. Please be sure to save the answers you have already completed before closing the survey.

Thank you for taking the time to give your valuable input.

Section A: Recent birth (7 questions)

1a. Did you give birth between 2014 and 2016?

- a. Yes
- b. No

If yes, continue taking the rest of the survey. If no, do not continue.

1b. What was the date you gave birth between 2014 and 2016?

Write in the Date: ___/___/_____

2. How many weeks pregnant were you when you gave birth to the child born between 2014 - 2016?

- a. Less than 28 weeks
- b. More than 28 weeks but less than 32 weeks
- c. More than 32 weeks but less than 37 weeks
- d. More than 37 but less than 40 weeks
- e. More than 40 weeks

3. How many infants were born during this pregnancy?

- a. 1
- b. 2
- c. 3
- d. More than 3

4. What is your relationship with the child's father?

- a. We are married
- b. We are not married but living together
- c. We are married but live apart
- d. We are not married and live apart
- e. We are separated but have contact with each other
- f. We have no contact at all
- g. Other _____

5. How many times have you given birth?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. More than 4
6. How many children have you breastfed?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. More than 4

Section B: Prenatal work history (2 questions)

The next section includes questions about your place of employment during your pregnancy with the child born between 2014 and 2016.

1. Were you employed during this pregnancy?
 - a. Yes, part - time for someone else (less than 30 hours per week)
 - b. Yes, full – time for someone else (more than 30 hours per week)
 - f. Yes – part - time, self employed
 - g. Yes – full – time, self employed
 - h. No
 - i. Not sure
 - j. Decline to answer
2. Were you employed with your current employer during this pregnancy?
 - a. Yes
 - b. No, employed with a different employer
 - c. No, not employed during this pregnancy
 - d. Not sure
 - e. Decline to answer

Section C: Infant feeding intentions and practices (10 questions)

The next section asks questions about how you fed the child born between 2014 and 2016.

1. During your most recent pregnancy, how had you hoped to feed your baby?
 - a. Breast milk only
 - b. Formula only
 - c. A combination of breast milk and formula
 - d. Not sure
 - e. Decline to answer

2. How are you currently feeding your child?
 - a. Breast milk only
 - b. Formula only
 - c. Both breast milk and formula
 - d. Both breast milk and solid food
 - e. Both formula and solid food
 - f. All three: breast milk, formula and solid food
 - g. Solid food, and whole or low-fat cow's milk
 - h. Other _____
 - i. Not sure
 - j. Decline to answer
3. If you are currently feeding your child breast milk, how does your child receive it?
 - a. From my breast
 - b. From a bottle (pumped milk)
 - c. From my breast and a bottle
 - d. From a cup
 - e. From my breast and a cup
 - f. Other _____
 - g. Decline to answer
 - h. I am not feeding my child any breast milk at this time
4. How long did you continue to feed your baby with breast milk only (meaning no formula, juice, water, or cow's milk)? If you are not sure, then give your best estimate. If you did not breastfeed or breastfed only for less than 1 week, select 0 months.
 - a. 0 months
 - b. 1 week
 - c. 2 weeks
 - d. 3 weeks
 - e. 1 month
 - f. 2 months
 - g. 3 months
 - h. 4 months
 - i. 5 months
 - j. 6 months
 - k. 7 months
 - l. 8 months
 - m. I am still providing breast milk only
 - n. Not sure
 - o. Decline to answer
5. How old was your baby when you stopped feeding him/her breast milk – that is when was your baby was completely weaned? If less than one month, enter 0.
 - a. _____ months
 - b. Not yet weaned

6. Did you meet your breastfeeding goal?
 - a. Yes
 - b. No
 - c. Decline to answer
 - d. I did not intend to breastfeed
7. Please explain your response to question 6. (Write in response here)

Please indicate how much you agree with the following questions.

8. I believe breastfeeding is a healthy way to feed babies.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
9. I was confident that I would be able to successfully breastfeed my child.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
10. I was confident in my ability to combine breastfeeding and working.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree

Section D: Maternity leave (7 questions)

This section includes questions about the maternity leave benefits available to you for the child born between 2014 and 2016.

1. After giving birth, which of the following types of leave did you use to stay home with your baby? Please mark all that apply.
 - a. Sick leave
 - b. Vacation leave
 - c. Paid time off (PTO)
 - d. Short term disability
 - e. None of above, my employer offered paid maternity leave
 - f. Other _____
 - g. Decline to answer
2. While you were on leave, for how many weeks did you receive pay? If you are not sure, give your best estimate.
 - a. Write in the number of weeks: _____

3. What percentage of your regular pay did you receive? If you are not sure, give your best estimate.
 - a. Write in the percentage of pay you received: _____
4. How many weeks after giving birth did you return to work? If you are not sure, give your best estimate. If you are still on leave write “still on leave.”
 - a. Write in number of weeks: _____
5. How much do you agree with this statement? I had enough leave (paid and/or unpaid) to get breastfeeding started before going back to work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
6. In many countries, new mothers have fully paid maternity leave, health insurance, and job protection. If you had this type of support, what would be the ideal amount of time off to be with your baby?
 - a. _____ months
7. Please explain your answer to question 6. (Write in response here).

Section E: Full-time or part- time work (7 questions)

This section asks questions about whether you worked full-time or part-time after your birth between 2014 and 2016.

1. Where were you employed after the birth of your child born between 2014 and 2016? This information will not be shared with your employer, but is very important to the purpose of this research study.
 - a. Write in the name of the employer:

 - b. County of employer: _____
2. Was your employer designated as “Infant Friendly” by the State of North Dakota Department of Health?
 - a. Yes
 - b. No
 - c. Not sure
 - d. Decline to answer

3. How would you categorize the type of work you did when you returned to work after your 2014 to 2016 birth?
 - a. Professional/technical
 - b. Executive/administration/ managerial
 - c. Sales
 - d. Administrative support
 - e. Precision production/ craft/repair
 - f. Machine operator/ assembly/inspection
 - g. Transportation/ material moving
 - h. Handler/ equipment cleaner/laborer
 - i. Service (not private household)
 - j. Military farming/agriculture
 - k. Other _____
4. When you did return to work, was it...?
 - a. Part - time for the same pre-birth employer (on average, less than 30 hours a week)
 - b. Full - time for the same pre-birth employer (on average, 30 or more hours a week)
 - c. Part - time for a different employer (on average, less than 30 hours a week)
 - d. Full - time for a different employer (on average, 30 or more hours a week)
 - e. Part - time (self-employed)
 - f. Full - time (self-employed)
 - g. Not sure
 - h. Decline to answer
5. How much do you agree with the following statement? The number of hours I worked made it difficult to continue breastfeeding as long as I wanted to.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
6. Upon returning to work after this birth, how challenging was breastfeeding?
 - a. Not a challenge
 - b. A minor challenge
 - c. A major challenge
 - d. I did not breastfeed upon returning to work
7. Please explain your answer for question 5. (Write in answer here)

Section F: Education on combining work and breastfeeding (8 questions)

This section asks questions about whether you received any information on how to combine breastfeeding and working for the child born between 2014 and 2016.

Please indicate how much you agree with questions 1 - 6.

1. During my pregnancy, my health care provider discussed breastfeeding with me and/or provided educational materials on breastfeeding.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
2. During my pregnancy, my employer provided educational materials about breastfeeding and working.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
3. When my child was born, I received breastfeeding education or support from the nursing staff at the hospital.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
4. Before I returned to work, my employer provided educational materials about breastfeeding and working.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
5. My employer provided a lactation consultant.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
6. My employer provided me with information on breastfeeding resources available in our community (such as local lactation consultants or support groups).
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree

7. Which of the following community breastfeeding resources are you aware of? Please mark all that apply.
 - a. Visiting nurses
 - b. Parenting classes
 - c. WIC (Women, Infants, and Children)
 - d. Local lactation support group
 - e. Local lactation consultant clinic
 - f. La Leche League
 - g. Well baby clinics or check-ups
 - h. Other _____
8. Since your most recent birth, have you received help from any of the following agencies or programs? Please mark all that apply.
 - a. Visiting nurse
 - b. Parenting classes
 - c. Head Start or Early Head Start
 - d. WIC (Women, Infants, and Children)
 - e. Local lactation support group
 - f. Local lactation consultant clinic
 - g. La Leche League
 - h. Other _____

Section G: Support from family (7 questions)

This section asks questions about how your family supported your breastfeeding efforts for the child born between 2014 and 2016.

Please indicate how much you agree with each of the following statements.

1. My partner supported breastfeeding.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not applicable
2. My family supported breastfeeding.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree

3. Which family members were most influential in your breastfeeding decisions?
 - a. Partner
 - b. Mother
 - c. Grandmother
 - d. Sister
 - e. Aunt
 - f. Cousin
 - g. Other

 - h. None of my family was influential
 - i. Don't know
4. Please explain how your family influenced your breastfeeding decisions. (Write in answer here).
5. My family encouraged me to continue breastfeeding when I returned to work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
6. My partner encouraged me to continue breastfeeding when I returned to work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not applicable
7. Please explain how your partner influenced your breastfeeding decisions. (Write in answer here).

Section H: Childcare (2 questions)

This section asks questions about the childcare options you had for the child born between 2014 and 2016.

1. While you are working, who takes care of this child? Please select all that apply.
 - a. Family member or friend
 - b. A nanny or sitter at my home
 - c. A home daycare provider
 - d. Staff at a child care center away from my worksite
 - e. Staff at a child care center at my worksite
 - f. I keep my baby at work with me
 - g. Other

2. How much do you agree with the following statement? My baby's caregivers are supportive of breastfeeding.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not Applicable
 - g.

Section I: Workplace support for breastfeeding (5 questions)

This section asks questions about how your worksite supported breastfeeding the child born between 2014 and 2016.

Please indicate how much you agree with the following statements

1. My employer had written policies for employees that are breastfeeding or pumping breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
2. Breastfeeding was common in my workplace.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
3. My job was at risk (e.g., job loss, loss of scheduled hours, loss of opportunities for advancement) if I chose to breastfeed or pump breast milk at work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
4. I was comfortable asking for accommodations to help me breastfeed or pump breast milk at work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure

5. Please explain how your employer supported or didn't support your breastfeeding efforts. Write your answers below.

Section J: Coworker support for breastfeeding (5 questions)

This section asks about the support you received from coworkers while breastfeeding the child born between 2014 and 2016.

Please indicate how much you agree with the following statements.

1. My coworkers willingly cover for me when I need to pump breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
2. My coworkers would help me find a place to breastfeed or pump breast milk if I needed it.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
3. My coworkers said things that made me think they supported my breastfeeding efforts.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
4. My coworkers listen to me talk about my breastfeeding experience.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
5. Please explain how your coworkers supported or didn't support your breastfeeding efforts. (Write answer here).

Section K: Manager support for breastfeeding (6 questions)

This section asks questions about the support you received from your manager while breastfeeding the child born between 2014 and 2016.

Please indicate how much you agree with the following statements.

1. My manager helped me adjust my workload so I could breastfeed or pump breast milk at work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
2. My manager considered it part of his/her job to help me combine breastfeeding and work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
3. My manager supported my breastfeeding or pumping breast milk at work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
4. My manager said things that make me think he/she supported my breastfeeding efforts.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
5. I talked with my manager about my breastfeeding needs while at work.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
6. Please explain how your manager supported or didn't support your breastfeeding efforts.
(Write answer here).

Section L: Physical environment for breastfeeding (8 questions)

This section asks questions about where you were able to express milk and what equipment was available to you at work to breastfeed the child born between 2014 and 2016.

Please indicate how much you agree with the following statements.

1. While at work, I could easily find a quiet place, other than the bathroom, to breastfeed or pump breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
2. My workplace provided a designated place for breastfeeding or pumping breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
3. The designated place for breastfeeding or pumping breast milk was available when I needed it.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
 - f. Not sure
4. The designated place for breastfeeding or pumping breast milk was satisfactory.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
5. The designated place for breastfeeding or pumping included the following (mark all that apply):
 - a. A comfortable chair
 - b. A working electrical outlet
 - c. A table
 - d. A sink for hand washing (or a sink near the room)
 - e. An electric breast pump
 - f. A telephone
 - g. A computer
 - h. Adequate lighting
 - i. A diaper changing area
 - j. A locking door
 - k. Privacy

6. My workplace had a refrigerator that I could use to store my milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
7. My workplace had a breast pump available for breastfeeding mothers to use.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
8. I was made aware of the expectations for using and maintaining the designated space for breastfeeding or pumping breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree

Section M: Breaks (6 questions)

This section asks questions about your break schedule at work while you were breastfeeding the child born between 2014 and 2016.

Please indicate how much you agree with the following statements.

1. My breaks were frequent enough for breastfeeding or pumping breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
2. My breaks were long enough for breastfeeding or pumping breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
3. Some days I would need to skip a breastfeeding or pumping session because my work schedule was too hectic.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree

4. I could adjust my break schedule in order to breastfeed or pump breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
5. I feel comfortable taking the breaks during work hours to pump breast milk.
 - a. Strongly Agree
 - b. Agree
 - c. Somewhat Agree
 - d. Disagree
 - e. Strongly Disagree
6. Are there any other accommodations that would have been beneficial in helping you continue to breastfeed after returning to work?

Section N: Demographic data (4 questions)

This section asks questions about other things that have been shown to affect how long women breastfeed. Please respond to as many questions as you feel comfortable answering.

1. What is your current age? (Write in answer)
2. What is the highest level of education you have completed or the highest degree you have received?
 - g. Less than high school
 - h. Some high school
 - i. High school or equivalent (e.g., GED)
 - j. Some college, but no degree
 - k. Associate's degree
 - l. College (Bachelor's degree)
 - m. Some graduate school, but no degree
 - n. Graduate school (e.g., Master's degree or Doctor of Philosophy)
 - o. Not sure
 - p. Decline to answer
3. Which of the following best describes your family/household income before taxes?
 - a. Less than \$15,000
 - b. \$15,000 to \$24,999
 - c. \$25,000 to \$34,999
 - d. \$35,000 to \$49,999
 - e. \$50,000 to \$74,999
 - f. \$75,000 to \$99,999
 - g. Above \$100,000
 - h. Not sure
 - i. Decline to answer

4. Do you consider yourself...? (Mark all that apply)
- a. White
 - b. Black
 - c. African American
 - d. Asian or Pacific Islander
 - e. Native American or Alaskan Native
 - f. Mixed racial background
 - g. Other race
 - h. Not sure
 - i. Decline to answer

Thank you for taking the time to complete this important survey. Your willingness to participate will benefit many mothers returning to work.

**APPENDIX F: RESULTS OF QUANTITATIVE STUDIES EXAMINING THE EFFECT
OF WORKPLACE ACCOMMODATIONS ON BF DURATION**

Author	Year	N	Employer	Study Design	Results	Limitations
Alvarez, Serwint, Levine, Bertram, Sattari	2015	29	Law students and lawyers educated at the University of Florida	Cross-sectional survey design. Adaptation of the physician survey used by Sattari, Serwint, Neal, Chen, & Levine (2013). Survey assessed duration of any and exclusive BF and presence of several potential workplace barriers and facilitators of BF. Responses from women with more than 1 child were not included in analysis. Accommodations Assessed: Support Space LB	Average BF duration for all mothers in mo (SD): 9.71 (9.10) Exclusive BF duration for all mothers in mo (SD): 3.53 (2.59) Associated with exclusive BF: Support (r = 0.40, p = .03) LB (r = 0.46, p = 0.03) Associated with any BF: Support (r = 0.45, p = 0.03) LB (r = 0.49, p = 0.04) Space (r = 0.50, p = 0.04)	Selection bias Not representative of general population Recall bias Participants of different ages – older participants may not have had access to the same work environment as younger participants.

Author	Year	N	Employer	Study Design	Results	Limitations
Bai, Wunderlich	2013	113	Higher education Health care Government Media Corporate Retail	Cross-sectional survey design using the Workplace Breastfeeding Support Scale and the Employee Perceptions of Breastfeeding Support Questionnaire. Surveys were emailed to all female faculty and staff of childbearing age in the spring and fall of 2010. Percent of women giving any and exclusive breastmilk at 6 mo was assessed for 4 dimensions of workplace lactation support, identified using the principle component method factor analysis (workplace environment, technical support, break time, and workplace policy.) Accommodations Assessed: LB, Support, Space, CC, Equip, WP	Average duration of exclusive breastfeeding in mo (SD): Entire sample: 5.3 (1.5) Full-time: 5.11 (1.72) Part-time: 5.69 (1.08) Private office: 5.12 (1.69) No private office: 5.41 (1.43) Significant associations with exclusive BF at 6 mo: Workplace Environment: frequency of BF in the work environment, support, and space ($r = 0.26$, $p = 0.01$). Technical Support: availability of Equip and CC ($r = 0.71$, $p = 0.01$). Not significantly associated with exclusive BF at 6 mo: Break time: frequency and duration of LB, flexibility, and coworker support not significant for exclusive ($r = 0.05$, $p = 0.52$) Workplace policies: length of Mat Leave, and a WP addressing BF ($r = 0.13$, $p = 0.24$)	Homogeneous sample Accommodations were grouped into categories and not considered individually Participants were self-selected.

Author	Year	N	Employer	Study Design	Results	Limitations
Balkam, Caldwell	2011	128	Public – sector	<p>Survey of participants in an established CLP. In 2005 any female employee who used at least 1 component of the CLP were mailed a questionnaire based on questions from the Infant Feeding Practices II Survey and the 2000 Census. Data was analyzed as % of women doing any or exclusive breastfeeding at 6 mo.</p> <p>Accommodations Assess: Prenatal and return to work BF classes, telephone lactation consults with LC, return to work consultation with LC, and Space</p>	<p>Association with any BF at 6 mo: PT (<35 hr/wk): p<.05 96.8% PT vs. 82.5% FT Mat Ed: NS 81.5% with ed vs. 90.4% no ed LC telephone support: NS 83.7% support vs. 90.5% no support LC return to work consultation: p < 0.05 92.0% consult vs. 77.4% no consult Space: NS 88.7% space vs. 77.4% no space Number of services utilized: NS 1 (83.9%); 2 (85.3%); 3 (84.6%); 4 (91.7%)</p> <p>Association with AEBF BF at 6 mo: PT (<35 hr/wk): NS 61.3% PT vs. 55.7% FT Mat Ed: NS LC telephone support: p < 0.05 62.8% support vs. 45.2% no support LC return to work consultation: p < 0.05 68% support vs. 41.5% no support Space: NS 59.8% space vs. 48.4% no space Number of services utilized: p < 0.05 1 (41.9%); 2 (47.1%); 3 (66.6%); 4 (75.0%)</p>	<p>Homogeneous sample</p> <p>No comparison group</p> <p>May not be a representative sample</p> <p>Recall bias</p>

Author	Year	N	Employer	Study Design	Results	Limitations
Cohen, Mrtek	1994	187	Utilities company Space corporation	Prospective cohort survey of women enrolled in a CLP from 1989 – 1993. Accommodations Assessed: Mat Ed (employee and family); LC; Equip; Space; LB; Emp Ed	Average duration of breast milk feeding was 8.1 months. 139/187 (74.3%) were still BF at 6 months.	Homogenous, self – selected sample No comparison to women not in the CLP, and no significance level identified
Dabritz, Hinton, Babb	2009	201	Various employers in Yolo County, CA	Cross-sectional interviews conducted with mothers between May 2006 and June 2007 when their infant was 6 months of age. Mothers reported on various determinants of BF and BF behaviors at 2 days, 2 weeks, 2 months, and 6 mo. Outcomes were based on % of women doing any, exclusive or no BF at 6 mo Accommodations Assessed: Space; LB; Knowledge of WP; Support; PT/FT	Percent at 6 mo: AEBF: PT(62%) FT(38%) PBF: PT (43%) FT (57%) No BF: PT (41%) FT (60%) p = 0.03 (S) AEBF: aware WP (79%) unaware WP (21%) PBF: aware WP (61%) unaware WP (39%) No BF: aware WP (61%) unaware WP (39%) p = 0.04 (S) AEBF: support (94%) no support (2%) PBF: support (65%) no support (11%) No BF: support (68%) no support (11%) p = 0.02 (S) LB: p = 0.22 (NS) Space: p = 0.09 (NS)	Participants recruited or self referred Recall bias Inaccuracy and categorizing BF duration as it was reported by participants in various units Homogeneous sample

Author	Year	N	Employer	Study Design	Results	Limitations
Hills-Bonczyk, Avery, Savik, Potter, Duckett	1993	619	Various Midwestern employers	Prospective cohort study utilizing the Combining Breast-Feeding and Working Survey from 1989 to 1991. Subjects were women delivering at large Midwestern hospital. Women were screened and interviewed by phone at 1, 3, 6, 9, and 12 months. They were contacted every 3 months by phone after 12 months if they continued to breastfeed. ANOVA was used to assess difference in weeks of exclusive BF between working and stay at home moms, and within groups of working women.	<p>Difference in average weeks of exclusive BF in mo (SD): At home moms: 14.2 (8.9) Weaned before returning to work: 4.5 (4.5) Working and breastfeeding: 11.9 (7.9) (differences among the three $p < 0.01$)</p> <p>Women experiencing major problems finding time to express milk at work combined BF and employment an average of 13 weeks while those that had no problems combining both continued for an average of 22 weeks ($p = 0.01$)</p> <p>There was no significant difference in mean duration of combining BF and work for those with major versus no problem finding a Space (15 vs. 18 weeks) or a place (19 vs. 17 weeks) to store milk.</p> <p>Accommodations Assessed: LB; Space; Equip</p>	Homogeneous sample Did not explore other workplace accommodations for BF.

Author	Year	N	Employer	Study Design	Results	Limitations
Jackowitz	2008	1506	National sample – including over samples of Black, Hispanic, and low-income White.	Analysis of the data collected as part of National Longitudinal Survey of Youth 1979 and the Children of the National Longitudinal Survey of Youth 1979. Accommodations Assessed: Perception of CC and flexible work schedule; presence of state employment BF law; hours worked at home	Each additional 8 hours worked at home increased likelihood of BF initiation by 8% and duration to 6 mo by 16.8% ($p < 0.05$); Perception of CC increased likelihood of BF until 6 mo by 47% ($p < 0.01$) Presence of an employment BF law was positively associated with BF initiation ($p < 0.01$) effect was large	Results reflect perception, not what is actually available No measures of exclusivity or intensity Not representative of all births nationally
172 Katcher, Lanese	1985	41	Hunterdon Medical Center in New Jersey	Cross-sectional survey of mothers taking maternity leave before CLP was in place (9/12/79 – 5/27/81) and those taking leave after CLP inception (7/2/81 – 1/7/83) Accommodation Assessed: Equip, Space, WP, and an LC (employee health nurse)	100% (22/22) women in the CLP and 16/19 (84.2%) of those not in the CLP initiated BF. 22/22 in the CLP and 9/19 not in the CLP continued BF upon return to work ($p < 0.01$). Average BF duration for CLP was 11.7 months and 6 months for non-CLP ($p < 0.01$) (SD not given)	Only examined CLP as a whole Not a clinical trial Sample motivated for BF Research conducted prior to PPACA

Author	Year	N	Employer	Study Design	Results	Limitations
Ortiz, McGilligan, Kelly	2004	462	2 accounting firms 1 entertainment industry company 1 incorporated city government 1 service corporation	Retrospective review of LC records of women enrolled in a CLP. Accommodations Assessed: WP, equip, space, LC, mat ed	336/435 who returned to work were successful with expressing milk for 2 weeks after returning to work. Women expressed milk an average of 6.3 (3.87) mo after returning to work with full time average of 6.2 (4.03) mo and part time average of 5.1 (2.82) mo Average age of the baby when mom stopped expressing milk was 9.1 (4.11) mo with average of 9.0 (4.26) mo for full time and 8.6 (2.95) mo for part time.	No control group Measured success by being able to express milk for 2 weeks at work Did not examine usefulness of individual accommodations Women in the CLP may have been more motivated to BF Self selected sample

Author	Year	N	Employer	Study Design	Results	Limitations
Sattari, Serwint, Neal, Chen, Levine	2013	130	Physicians from John's Hopkins University School of Medicine and the University of Florida College of Medicine	<p>Cross-sectional survey design. Survey developed to assess work environment variables that may be predictors of physician BF behaviors.</p> <p>Regression analysis was used to identify predictive value of variables.</p> <p>Accommodations Assessed: Support; LB (meaning no make-up of missed call for time needed to express milk); Space; Mat Leave</p>	<p>Mean BF duration in mo (SD) for all participants: 9.91 (6.34)</p> <p>BF duration longer for those with LB than those without (10.1 mo vs. 8 mo, $p = 0.04$)</p> <p>Each 1 week increase in maternity leave (paid or unpaid) increased BF duration by 0.14 [0.64 - 1.08] mo increase ($r = 0.16$, $p < 0.01$)</p> <p>Each 1 unit increase in collegial support increased BF duration by 1.3 [0.37 - 2.25] mo ($r = 0.19$, $p = 0.01$)</p> <p>Each 1 unit increase in support from division chief increased BF duration by 1.1 [0.26-1.90] mo ($p = 0.01$)</p> <p>Those that perceived lack of support for BF at work had 3.5 mo [-6.77 to -0.15] decrease in duration ($p = 0.04$)</p> <p>Each increase in availability of time for LB associated with a 1.1 mo increase in BF duration ($r = 0.29$, $p < .01$)</p> <p>No significant association between Space and BF duration (p-values and duration not reported).</p>	<p>Recall bias</p> <p>Limited sample pool</p> <p>Not an experimental study</p>

Author	Year	N	Employer	Study Design	Results	Limitations
Waite, Christakis	2015	551	Seattle Children's Hospital (SCH) Large corporation in the Southeast United States	Cross sectional emailed survey on workplace lactation support for women who had a child within past 5 years. Survey consisted of questions inquiring about various levels of support from the organization, manager, and coworkers as well as the physical environment. These results were calculated into an overall workplace support score. Support scores were then regressed to predict job satisfaction and breastfeeding duration at both facilities. Accommodations Assessed: Support; LB (noted as time support); Space (noted as physical environment)	No association between BF duration and support score. Total support score was associated with job satisfaction ($p < 0.01$) Children's Hospital: $\beta = 0.41$ [0.30, 0.51] Large Corporation: $\beta = 0.27$ [0.14, 0.40] Univariate analysis association between job satisfaction and BF support Children's Hospital Organization: $\beta = 0.40$ [0.31, 0.50] ($p <$ 0.01) Manager: $\beta = 0.42$ [0.33, 0.51] ($p <$ 0.01) Coworker: $\beta = 0.33$ [0.24, 0.43] ($p <$ 0.01) Time: $\beta = 0.34$ [0.25, 0.44] ($p < 0.01$) Space: $\beta = 0.17$ [0.06, 0.29] ($p < 0.01$) Large Corporation Organization: $\beta = 0.42$ [0.28, 0.55] ($p <$ 0.01) Manager: $\beta = 0.35$ [0.22, 0.48] ($p <$ 0.01) Coworker: $\beta = 0.40$ [0.27, 0.53] ($p <$ 0.01) Time: $\beta = 0.35$ [0.21, 0.49] ($p < 0.01$) Space: $\beta = 0.28$ [0.14, 0.41] ($p < 0.01$)	Homogenous sample

Mat Leave – Maternity Leave; FT/PT – full-time/ part-time work; LB – lactation breaks; Space – facilities for milk expression; Equip – employer provided pump, supplies, and/or refrigerator; CC – on-site childcare; Emp Ed – employer breastfeeding education; Mat Ed

– maternal breastfeeding education; WP – workplace policies; LC – access to a lactation consultant; Support – supervisor/coworker support; CLP – corporate lactation program; BF– breastfeeding; mo – month; PPACA – Patient Protection and Affordable Care Act; AEBF – almost exclusively breastfeeding; PBF – partial breastfeeding; No BF – no breastfeeding

**APPENDIX G: RESULTS OF INTERNATIONAL QUANTITATIVE STUDIES
EXAMINING THE EFFECT OF WORKPLACE ACCOMMODATIONS ON BF
DURATION**

Author/ year	Country	N	Employer	Study Design	Results	Limitations
178 Bonet, Marchand, Kaminski, Fohran, Betoko, Charles, Blondel, The “Eden Mother- Child Cohort Study Group” (2012)	France	1339	Various	Prospective mother-child cohort study of women and infants seeking care at 2 university hospitals in France. Women were interviewed prenatally and then completed questionnaires at 4, 8, and 12 months Accommodations Assessed: Mat Leave FT/PT	Odds ratio of any BF at 6 mo: Mat leave < 4 mo PT: 1.5 [0.9, 2.5] Mat leave < 4 mo FT: 1 Mat leave > 4 mo PT: 3.4 [2.0, 5.8] Mat leave > 4 mo FT: 3.5 [2.1, 5.8] No return to work: 4.7 [3.0, 7.6] (p < 0.01) FT/PT (NS) Odds ratio of almost exclusive BF at 4 mo: Mat leave < 4 mo PT: 1.3 [0.5, 3.1] Mat leave < 4 mo FT: 1 Mat leave > 4 mo PT: 4.4 [2.1, 9.3] Mat leave > 4 mo FT: 4.2 [2.0, 8.6] No return to work: 10.6 [5.4, 20.7] (p < 0.01) FT/PT (NS)	Homogeneous sample Participants were self-selected.

Author/ year	Country	N	Employer	Study Design	Results	Limitations
Bai, Fong, Tarrant (2014)	Hong Kong	1738	Various	Prospective longitudinal cohort study of women who recently delivered a baby. Women were followed for 12 mo or until they weaned their infant. Women were surveyed after delivery in the hospital and again at 1, 2, 3, 6, 9, and 12 months (if not already weaned). Odds Ratios for breastfeeding 2 weeks after return to work and Hazard Ratios for ceasing breastfeeding 2 weeks after return were calculated. Accommodations Assessed: FT/PT Mat leave	Adj OR/HR for continuing BF for 2 weeks after return to work: Mat leave < 6 weeks = 1/1 Mat leave 6-8 weeks = 1.42 (0.98–2.08) /0.95 (0.80–1.13) Mat leave 8-10 weeks = 1.64 (1.11–2.42) /0.79 (0.66–0.95) Mat leave >10 wks = 1.28 (0.83–1.97) /0.70 (0.57–0.85) Part-time = 1/1 Full-time = 0.76 (0.45–1.28) /1.25 (0.96–1.64)	Not representative of entire population Self-reported data (recall bias)

Author/ year	Country	N	Employer	Study Design	Results	Limitations
Chuang, Chuang, Chen, Hsieh, Hurng, Lin, Chen (2010)	Taiwan	21,248 (6 mo) 20,172 (18 mo)	Various	Prospective longitudinal cohort study of women and infants from the Taiwan Birth Cohort. Women were interviewed in the home at 6 and 18 mo. Results reflect OR for the behavior upon return to work. Accommodations Assess: Mat Leave	Likelihood of initiating BF No return; Adj OR = 1.00 ≤ 1mo: Adj OR = 0.71 (0.62, 0.80) (p < 0.01) ≤ 2 mo: Adj. OR 0.96 (0.87, 1.06) (p = 0.42) ≤ 3 mo: Adj. OR 1.12 (0.89, 1.43) (p = 0.34) ≤ 6 mo: Adj. OR 1.04 (0.86, 1.28) (p = 0.67) ≤ 12 mo: Adj. OR 1.07 (0.87, 1.30) (p = 0.53) > 12 mo: Adj. OR 0.98 (0.78, 1.23) (p = 0.85) Overall model: p < .01 Likelihood of weaning No return; Adj HR = 1.00 ≤ 1mo: Adj HR = 1.49 (1.14, 1.57) (p < 0.01) ≤ 2 mo: Adj. HR 1.41 (1.35, 1.50) (p < 0.01) ≤ 3 mo: Adj. HR 1.18 (1.08, 1.29) (p < 0.01) ≤ 6 mo: Adj. HR 1.26 (1.17, 1.36) (p < 0.01) ≤ 12 mo: Adj. HR 1.10 (1.02, 1.19) (p < 0.01) > 12 mo: Adj. HR 1.03 (0.94, 1.13) (p = 0.56) Overall model: p < 0.01	No analysis of work environments No differentiation of exclusive vs. any breastfeeding

Author/ year	Country	N	Employer	Study Design	Results	Limitations
Rivera-Pasquel, Escobar-Zaragoza, González de Cosío (2014)	Mexico	5,385	Various	Data was collected from the 1999 National Nutrition Survey and the 2006 and 2012 National Nutrition and Health Surveys. Regression analysis was used to assess maternal employment and association with total breastfeeding duration in children < 1 year of age. Accommodations Assessed: Mat Leave (as employment status after delivery)	OR (CI) for BF and employment Formally employed = 1 Non-formally employed = 1.25 (0.88, 1.79) (p = 0.21) Unemployed = 1.37 (1.09, 1.72) (p < 0.01) Median duration of BF in mo [CI]: Formally employed: 4.3 [2.8, 5.9] Unemployed: 11 [7.3, >11]	Cross-sectional data Lack of information on the work environment and maternity leave No data on exclusive BF

Author/ year	Country	N	Employer	Study Design	Results	Limitations
Skafida (2012)	Scotland	5,217	Various	<p>Growing Up longitudinal cohort data was used to obtain a cross-sectional data pool. Multivariate proportional hazards regression was used to determine the association of maternal employment status on BF duration using Hazard Ratios for breastfeeding cessation within the first 10 months.</p> <p>Accommodations Assessed: Mat Leave FT/PT</p>	<p>Hazard ratio for BF cessation at 10 mo</p> <p>Maternity leave 0-1 mo = 1.41 [0.95, 2.10] 1-2 mo = 1.64 [1.06, 2.53] (p < 0.05) 2-3 mo = 1.51 [1.05, 2.16] (p < 0.05) 3-4 mo = 1.69 [1.12, 2.53] (p < 0.05) 4-5 mo = 1.50 [1.15, 1.97] (p < 0.01) 5-6 mo = 1.31 [0.10, 1.71] 6-10 mo = 1.00 [0.76, 1.32]</p> <p>Work Status FT self-employed = 0.86 [0.55, 1.35] PT employee = 0.88 [0.77, 0.10] (p < 0.05) PT self-employed = 0.72 [0.50, 1.03]</p>	<p>Study did not account for any work environment factors</p> <p>Education level was strong confounder in that mothers with more education were more likely to breastfeed</p>

Author/ year	Country	N	Employer	Study Design	Results	Limitations
Tsai (2013)	Taiwan	715	Electronic manufacturing company	Cross-sectional survey of women employed by a company offering a breastfeeding friendly workplace. The types of employees surveyed were either office workers or working in a clean room. Accommodations available were compared with breastfeeding rates at 6 months. Assessed: FT/PT Space Awareness and use of LB	BF > 6mo Work 8 hr/day – 27.7% Work 9 -14/day – 23.3% p < 0.01 Designated Space – 25% Non-designated space – 25% p = 0.30 Awareness of LB – 27% No awareness of LB – 15.4% p < 0.01 Used LB – 49.5% LB not used – 9.6% p < 0.01	Self-selected participation
Yimyam, Hanpa (2014)	Thailand	55	Electronic Industrial Company	Participatory Action Research project on the impact of BF friendly workplace intervention on duration rates among female employees. Data was collected before and after the intervention. Assessed: LC, Mat Ed, Space LB, Support	Exclusive BF at 6 mo more likely in intervention group: % Before: 4.2 % After: 36.4 (p < 0.01) Any BF at 6 mo more likely in intervention group % Before: 29.2 % After: 57.6 (p = 0.03)	Small Sample size Did not consider effectiveness of individual accommodations

LB – lactation breaks; Space – facilities for milk expression; Equip – employer provided pump, supplies, and/or refrigerator; CC – on-site childcare; Emp Ed – employer breastfeeding education; Mat Ed – maternal breastfeeding education; WP – workplace policies; LC – access to a lactation consultant; Support – supervisor/coworker support; CLP – corporate lactation program; BF– breastfeeding; mo – month; Mat Leave – maternity leave; FT/PT – full-time vs. part-time status