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Hand Expression With Lactation Support: Effect on Self-Efficacy and Breastfeeding Duration

Florence Omekara
Walden University

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Walden University

College of Health Sciences

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Florence Uchenna Omekara

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2017

Abstract

Hand Expression With Lactation Support: Effect
on Self-Efficacy and Breastfeeding Duration

by

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MHPM, University of Benin, 1995

MSN, University of Ibadan, 1994

IBCLC International Lactation Consultant, 2011

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Nursing

Walden University

November 2017

Abstract

Breastfeeding is the best infant feeding method, and breastmilk has many immunological and anti-inflammatory properties that protect babies against illnesses and diseases. It protects the health of the mother and saves society substantial economic costs, as demonstrated in many studies. Studies show that if 90% of U.S mothers breastfed for 6 months, up to \$13 billion in healthcare costs could be saved. Despite the health and economic benefits of breastfeeding, most women stop breastfeeding before 6 months postpartum, which falls short of the recommendations of the World Health Organization, U.S. Surgeon General, and American Academy of Pediatrics. This study explored the effects of hand expression with lactation support on first-time mothers' self-efficacy for breastfeeding and breastfeeding duration among vaginal and Cesarean delivery mothers at a healthcare center in Oregon. The pretest posttest quasi-experimental design was used on 32 women with 4 repeated-measures ANOVA, and the women were followed up for 6 weeks postpartum. The women in the intervention group received the hand-expression intervention after the first breastfeeding until their white milk had been established. Results showed a large effect of the hand-expression intervention with lactation support on the dependent variable of self-efficacy, with an effect size of 0.888, and the dependent variable of breastfeeding duration, with an effect size of 0.801. Further, self-efficacy and breastfeeding duration increased over time. The results may inform policy development to increase women's self-efficacy and breastfeeding duration, which could help babies, mothers, and society to derive maximum benefits from breastfeeding.

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Dedication

I dedicate this dissertation to the memory of my beloved late father, Lawrence, and my late Uncle Bernard, who supported and valued women's education and provided me with educational opportunities to achieve this height in my educational career. It is sad that you two did not live to see me attain this level in my academic pursuit. This dissertation is also dedicated to my entire immediate family, who supported me throughout this dissertation process especially darling husband, love of my life, and friend, Dr. Otumdi Omekara, who supported me emotionally during difficult times, occasionally spell checked my work, and drove me to and from the research site for my data collection whenever he was available. To my daughter Dr. Ijay Omekara-Ndubuisi, for offering support and encouragement and making herself available to talk in stressful moments; my son-in-law, John Ndubuisi, for his support and encouragement; my daughter Chiammy Omekara, a Walden MBA student, for supporting me and helping me to run errands; my twin boys, David and Daniel Omekara, who always cleaned my messy study room; and my lovely grandkids, John Junior and Isabella Ndubuisi, for making me so happy when I spend time with them. Finally, I also dedicate this dissertation to my loving mother, Monica Udeaqgwu, who constantly prays for me and helped to cook for my family to free my time for my studies. I could not have completed this dissertation if not for the support of all of you.

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Table of Contents

List of Tables	vi
List of Figures.....	vii
Chapter 1: Introduction to the Study	1
Introduction	1
Background of the Study	2
Problem Statement.....	4
Purpose of the Study.....	6
Research Questions and Hypotheses	7
Theoretical Framework for the Study.....	7
Nature of the Study.....	10
Quantitative Methodology.....	10
Definitions of Variables.....	10
Assumptions	11
Scope and Delimitations.....	12
Limitations.....	13
Significance of the Study.....	13
Significance to Theory.....	13
Significance to Practice	14
Implications for Social Change	14
Summary and Transition	15
Chapter 2: Literature Review	16

Introduction	16
Literature Search Strategy	17
Theoretical Framework.....	18
Social Cognitive Theory (SCT).....	18
Self-Efficacy Theory (SET).....	20
Rationale for the Choice of Bandura’s Self-Efficacy Theory (SET).....	24
Relationship of Bandura’s Self-Efficacy Theory to Present Study	25
Literature Review Related to Key Variables.....	26
Breastfeeding Education and Duration.....	26
Breast Hand Expression.....	28
Lactation Support and Breastfeeding Duration	30
Latch Score and Breastfeeding Duration.....	34
Breastfeeding Self-Efficacy.....	37
Summary and Conclusions	46
Chapter 3: Research Method	48
Introduction	48
Research Design and Rationale	48
Time and Resource Constraints.....	50
Methodology.....	50
Population of Study and Sample Size.....	50
Sample and Sampling Procedures	51
Criteria for Inclusion and Exclusion.....	51

Procedures for Recruitment, Participation, and Data Collection.....	53
Instrumentation and Measures.....	59
Data Analysis Plan.....	60
Operational Definitions	61
Data Analysis.....	62
Threats to Validity	63
Internal Validity.....	63
Content Validity	64
Empirical Validity	64
Construct Validity.....	65
Effects of History.....	65
Maturation Effect.....	66
Ethical Procedures	66
Summary.....	67
Chapter 4: Results.....	69
Introduction	69
Data Collection.....	70
Participants	71
Data Analysis.....	71
Treatment/Intervention Fidelity.....	72
Study Results	73
Descriptive Statistics	73

Statistical Analysis of LATCH Score.....	75
Post-Hoc Analyses (LATCH Scores).....	78
Post-Hoc Analyses (Self-Efficacy).....	82
Summary.....	84
Chapter 5: Discussion, Conclusions, and Recommendations.....	86
Introduction	86
Breastfeeding Self-Efficacy.....	87
Breastfeeding Duration.....	88
Theoretical/Conceptual Findings.....	89
Limitations of the Study	89
Recommendations	90
Implications	90
Implications for Theory	90
Implications for Practice.....	91
Implications to Positive Social Change	91
Conclusion	92
References	94
Appendix A: Breastfeeding Self- Efficacy Scale—Short Form (Dennis, 1999).....	107
Appendix B: The LATCH Score Scale (Adams & Hewell, 1997).....	110
Appendix C: Demographic Data	111
Appendix D: Telephone Follow-Up Call	113
Appendix E: Research Flier.....	115

Appendix F: Benefits of Breastfeeding	116
Appendix G: Hand Expression Video (Witt & Bolman, 2013).....	117
Appendix H: Authorization to Use Breastfeeding Self-Efficacy Scale—Short Form.....	118
Appendix I: Information to Show Labor and Delivery Nurse While in Labor	119
Appendix J: Date and Time of Breastfeeding and Hand Expression	120

List of Tables

Table 1. Participants' Sociodemographic Characteristics (Categorical Variables).....	74
Table 2. Descriptive Statistics for Study Outcomes (Continuous Variables).....	75
Table 3. Estimated Marginal Means: Time, Transformed LATCH Scores.....	76
Table 4. Mauchly's Test of Sphericity ^b : LATCH Score Measures.....	76
Table 5. Test Within-Subject Effects: Measure of LATCH Scores	77
Table 6. Bonferroni Post Hoc Pairwise Comparisons: LATCH Score Measures	79
Table 7. Mauchly's Test of Sphericity ^b : Self-Efficacy Measures	81
Table 8. Tests of Within-Subjects Effects: Self-Efficacy Measures	82
Table 9. Bonferroni Post Hoc Pairwise Comparisons Estimates: Self-Efficacy Measures.....	83

List of Figures

Figure 1. Conceptual framework of self-efficacy.....	21
Figure 2. Estimated log-transformed LATCH score marginal means from baseline through third postintervention test.....	80
Figure 3. Estimated log-transformed breast self-efficacy marginal means from baseline through second postintervention test	84

Chapter 1: Introduction to the Study

Introduction

It is a national priority in the United States to increase breastfeeding duration to at least 6 months after delivery to enable infants and mothers to obtain the maximum benefits of breastfeeding. Several research studies have shown an association between breastfeeding and prevention of diseases for infants and mothers (Bartick & Reinhold, 2010). Breastfeeding confers nutritional and immunological benefits for infants, protecting them against several diseases; protects mothers against some cancers and osteoporosis; reduces infant morbidity and mortality; reduces illness in mothers; and has economic benefits (Bartick & Reinhold, 2010; LaLeche League International, 2016; Tuthill, McGrath, Graber, Cusson, & Young, 2015). Considering these benefits, the U.S. Surgeon General, World Health Organization (WHO), and Academy of Pediatrics have called for women to exclusively breastfeed their infants for at least 6 months (U.S. Department of Health and Human Services [USDHHS], 2011; WHO, 2015).

Despite the benefits of breastfeeding for infants, mothers, and society, many mothers stop breastfeeding their babies before 6 months postpartum. Several studies have shown that lactation support increases the duration of breastfeeding and that a woman's self-efficacy affects breastfeeding duration (Britton, McCormick, Renfrew, Wade, & King, 2007; Henshaw, Fried, Siskind, Newhouse, & Cooper, 2015; Hung & Berg, 2011). Currently, there is a lack of research concerning the effects of breast hand expression in combination with lactation support on mother's self-efficacy for breastfeeding and breastfeeding duration. Hence, this study was focused on evaluating the effect of breast

hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration.

In this chapter, I address the background, problem statement, purpose, research questions and related hypotheses, theoretical/conceptual framework, and nature of the study. I define the study variables and outline the study's assumptions, scope and delimitations, limitations, significance, and implications for social change. The chapter ends with a summary and an introduction to the next chapter.

Background of the Study

Breastfeeding is the best infant feeding method. Breast milk has many immunological and anti-inflammatory properties that protect babies against illnesses and diseases (Bartick & Reinhold, 2010; LaLeche League International, 2016). Breastfeeding protects mothers by minimizing the chances of breast, ovarian, and uterine cancer, and it minimizes the chances of postmenopausal osteoporosis (Bartick & Reinhold, 2010). Breast milk contains antibodies that protect a baby against infant diseases such as otitis media, upper and lower respiratory infections, pneumonia, intestinal disorders, staphylococcal aerus, streptococcus, allergies, diabetes, rheumatoid arthritis, many childhood cancers, and meningitis (LaLeche League International, 2016). Several studies have shown that lactation support and mothers' self-efficacy for breastfeeding can increase the duration of breastfeeding for up to 6 months (Britton et al., 2007; Hung & Berg, 2011; Meedya, Fahy & Kable, 2010).

Research has shown that if 90% of mothers in the United States breastfed their babies for 6 months, this action would result in savings of \$13 billion in healthcare costs

in addition to preventing 911 infant deaths per year (Bartick & Reinhold, 2010; Mass, 2011). The Healthy People 2020 breastfeeding objective is for 81.9% of mothers to initiate breastfeeding, 60.6% to continue to breastfeed at 6 months, and 34.1% to continue to breastfeed for 1 year (U.S. Breastfeeding Committee [USBC], 2015). The WHO (2015) recommends that women breastfeed exclusively for 6 months for their babies to achieve optimal growth, development and health and that they continue to breastfeed for up to 2 years.

Research shows that hand expression increases breast milk production (Flaherman et al., 2013; Flaherman et al., 2011). This, in turn, increases the woman's self-efficacy for breastfeeding. Additionally, lactation support increases duration of breastfeeding (Ansari, Abedi, Hasanpoor, & Bani, 2014; Awano & Shimada, 2010; Britton et al., 2007). However, breastfeeding rates from the National Immunization Survey for 2012 show that 80% of babies were initiated to breastfeeding but only 21.9% of women who delivered vaginally were exclusively breastfeeding at 6 months (Centers for Disease Control and Prevention [CDC], 2012). When the mode of delivery was Cesarean section, only 13% of mothers continued to exclusively breastfeed their babies at 6 months postpartum (Bartick & Reinhold, 2010; Mass, 2011). These statistics fall short of Healthy People 2020 breastfeeding recommendations (Hung & Berg, 2011) and create a marked gap between Healthy People 2020 recommendations on breastfeeding and U.S. breastfeeding rates, with serious economic and health impacts on the lives of babies and mothers, as well as effects on the nation's economy (Bartick & Reinhold, 2010).

Problem Statement

Most women stop breastfeeding their babies before 6 months, despite the benefits of breastfeeding for a 6 month duration. Research has shown that women stop breastfeeding early in the postpartum period for several reasons, including lack of education about breastfeeding, lack of breastfeeding support during difficult breastfeeding challenges (Rosen, Krueger, Carney & Graham, 2008), insufficient milk production (Gatti, 2008), and lack of self-efficacy (Awano & Shimada, 2010; Wu, Hu, McCoy, & Efrid, 2014). *Lactation support*, which is defined as any breastfeeding assistance provided to a breastfeeding mother from either a layperson or a health professional, helps babies continue to breastfeed for a longer duration (Britton, et al., 2007; Hung & Berg, 2011). An intervention study where the participants were followed for 6 months used prenatal education and home based postpartum support as an intervention. The results showed that the intervention group was twice as likely to start and continue breastfeeding for 6 months postpartum than the control group (Gill, Reifsnider, & Lucke, 2007).

For breastfeeding to be successful, an ample supply of milk is necessary. Breast hand expression is one method that can stimulate a strong milk supply if performed within the first 1 to 3 hours after birth and at frequent intervals postpartum until mature breast milk is established. Breast hand expression is also recommended to mothers who have breastfeeding challenges (Flaherman et al., 2011; Ohyama, Watabe, & Hayasaka, 2010).

Self-efficacy, which is defined as an individual's belief about his or her capability to execute behavior necessary to produce specific performance attainments, also affects breastfeeding for the first 6 months (Meedya, et al., 2010). A woman's intention to breastfeed, social support, and self-efficacy are other factors that influence breastfeeding for the first 6 months (Meedya et al., 2010). Wilhelms, Rodehorst, Stepan, Hertzog, and Berens (2008), found that the combination of a positive intention to breastfeed and higher self-efficacy at 2 weeks postpartum increased the likelihood that breastfeeding women would continue to breastfeed for 6 months. Other researchers concluded that women who have high self-efficacy at 8 weeks, along with breastfeeding support, are more likely to breastfeed for 6 months (Meedya et al., 2010; Wilhelms et al., 2008).

Wu, et al., (2014) conducted a quasi-experimental pretest-posttest study on the effect of self-efficacy intervention on self-efficacy and breastfeeding duration at 4 and 8 weeks postpartum. The authors found that the mothers in the intervention group showed a significant effect on self-efficacy for breastfeeding and breastfeeding duration at 4 weeks and 8 weeks. The intervention group had significantly higher Breastfeeding Self-Efficacy Scale Short Form (BSES-SF) scores at 4 and 8 weeks than the control group; 87% of women in the intervention group were exclusively breastfeeding, and only 67% of mothers in the control group were breastfeeding at 8 weeks postpartum (Wu et al., 2014). The authors did not follow the participants for 6 months, but they stated that most women stop breastfeeding their babies in the early postpartum period before 8 weeks. Therefore, if a woman is exclusively breastfeeding at 8 weeks postpartum, she is more likely to breastfeed for 6 months (Wu et al., 2014).

The review of literature indicated that little or no research has been conducted on the effect of hand expression in combination with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration. This study focused on this important under researched area in order to add to the body of knowledge and effect positive social change. At the medical center in Oregon where this study was conducted, the practice of hand expression in combination with lactation support in the first hour after delivery was inconsistent or not practiced. This study could contribute to positive social change by informing policy to increase women's self-efficacy for breastfeeding and breastfeeding duration, in addition to improving health outcomes of infants to enable optimal growth and development (Laureate Education, 2015g; WHO, 2015).

Purpose of the Study

The purpose of this study was to determine the effects of hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration among mother-baby dyads after vaginal delivery and Cesarean section (CS). Ascertain the effect of hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration would provide a better understanding of this phenomenon and would be an important step for healthcare professionals and lactation consultants to develop appropriate interventions to increase self-efficacy and duration of breastfeeding after vaginal delivery and CS. In this quasi-experimental pretest-posttest study, the independent variables with two levels were breast hand expression and lactation support, and the dependent variables were mothers' self-efficacy for breastfeeding and breastfeeding duration.

Research Questions and Hypotheses

RQ1: What effect does breast hand expression teaching and lactation support have on the mother's self-efficacy for breastfeeding and breastfeeding duration among mother-baby dyads who receive hand expression teaching with lactation support, versus mother-baby dyads who receive the standard care lactation support and do not receive specific hand expression teaching?

H₀₁: There will be no difference in a mother's self-efficacy for breastfeeding and breastfeeding duration in mother-baby dyads who receive hand expression teaching with lactation support, versus mother-baby dyads who receive the standard care lactation support and do not receive specific hand expression teaching.

H_{A1}: There will be a significant difference in a mother's self-efficacy for breastfeeding and breastfeeding duration in mother-baby dyads who receive hand expression teaching and lactation support, versus mother- baby dyads who receive the sw3standard care lactation support and do not receive specific hand expression teaching.

Theoretical Framework for the Study

The theoretical framework that guided this study was based on Bandura's self-efficacy (BSE) theory, which originated from social cognitive theory (SCT). SCT emphasizes that learning occurs in social context and that what is learned is gained through observation. Self-efficacy is defined as believing in one's own possibility of

fulfilling a specific action and being confident about performing the task (Bandura, 1977). Self-efficacy is embedded in SCT, which includes environment, support from hospital staff, home, workplace, and society (Hector, King, Webb, & Heywood, 2005). BSE theory, which aligns with SCT, indicates that there are three factors that influence self-efficacy: (a) behaviors of the individual, (in this case, the woman after vaginal delivery or Cesarean delivery), (b) environment in which the mother and baby find themselves, and (c) personal/cognitive factors.

In the behavior stage, it is believed that after delivery, a mother is relieved that the delivery went well and that she delivered safely, which leads to increased self-efficacy (Awano & Shimada, 2010). However, a few hours to a few days after delivery, a mother's self-efficacy becomes unstable because of concerns about her ability to make enough breast milk for her baby, coupled with postpartum fatigue and feelings of uncertainty about whether breastfeeding will be established or not (Awano & Shimada, 2010). The environment in which mother and infant find themselves plays a big role in restoring the mother's self efficacy. If breastfeeding begins successfully after delivery, the woman may be confident that she can breastfeed and provide adequate nutrition for the baby, particularly when she has expressed enough breast milk with hand expression. These feelings will restore her self-efficacy.

Relevant aspects of the environment include the healthcare facility, where practices such as infants rooming-in with their mothers can promote breastfeeding on cue. Additionally, the healthcare facility may promote behaviors such as skin-to-skin contact and breast hand expression and may provide professional lactation support from

nurses and lactation consultants, which can help a mother learn how to perform hand expression as well as position and deep latch her baby for breastfeeding, thereby restoring and/or strengthening her self-efficacy. If a mother receives adequate support and is comfortable with breastfeeding, she will be likely to continue to breastfeed for a longer duration because of increased self-efficacy (Awano & Shimada, 2010; Hector et al., 2005). Self-efficacy is an important variable predicting actual actions when a “mother learns from repeated successful experience, the desired results of long-term continuation of breastfeeding can be achieved” (Awano & Shimada, 2010, p. 2). *Personal/cognitive factors* are what individuals believe that they can do, and their level of confidence about performing a task. *Confidence* refers to the ability of an individual to act on ambitions and desires without fear of failure (Bandura, 1977).

The concepts of breast hand expression and lactation support are well embedded in Bandura’s self-efficacy theory (BSET), making it an appropriate conceptual framework for this study. BSET may predict a relationship between people’s behavior, environment and personal/cognitive factors, which can be applied to the relationship of breast hand expression and lactation support to mothers’ self-efficacy for breastfeeding and breastfeeding duration. If a mother is in an environment that supports her with guidance on breast hand expression, deep latching, and proper positioning of her baby during breastfeeding, she will learn how to hand express breast milk for her baby, deep latch her baby, and properly position her baby. This will make the woman comfortable with the breastfeeding process, which will increase her self-efficacy. With enhanced self-efficacy and breastfeeding at 6 weeks postpartum, a woman is more likely to continue to

breastfeed her baby for a longer duration for up to 6 months (Wilhelms et al., 2008; Wu, et al., 2014).

BSET has been applied to studies of relationships between behavior, environment and personal/cognitive factors, especially in health and nursing research studies, and it has been employed in several breastfeeding research studies in the United States and worldwide (Awano & Shimada, 2010). Therefore, BSET derived from SCT, guided and directed this study on the effect of breast hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration among American women who have delivered vaginally and by CS at this medical center.

Nature of the Study

Quantitative Methodology

This study was quantitative quasi-experimental pretest-posttest design to determine the effect of breast hand expression in combination with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration. In this study, the two levels of independent variable were breast hand expression teaching and lactation support. The dependent variables were mothers' self- efficacy for breastfeeding and breastfeeding duration.

Definitions of Variables

In this study, the independent variable (IV) had two levels, breast hand expression and lactation support, and the dependent variables (DVs) were self-efficacy for breastfeeding and breastfeeding duration. The variables in this study, including the IV and DVs, were defined as follows:

Breastfeeding: The normal way to provide needed nutrition to infants for healthy growth and development (WHO, 2016).

Breastfeeding duration: The length of time that a woman breastfeeds her baby, beginning with the initial stage of exclusive breastfeeding, including any period of supplementary feeding, and concluding when the baby is completely weaned off the breast (Noel-Weiss, Boersma, & Kujawa-Myles, 2012).

Hand expression teaching: For the purpose of this study, teaching mothers how to perform breast massage and manual expression of breast milk (Witt & Bolman, 2013), with layperson or professional assistance or without assistance.

Lactation support: Any breastfeeding assistance to a breastfeeding mother, either from a layperson or from a professional (Britton et al., 2007; Hung & Berg, 2011), to help her latch and position her baby properly during breastfeeding.

Prenatal: Refers to the time period during pregnancy and before delivery of a baby (U.S. National Library of Medicine, 2013).

Self-efficacy: Believing in one's own possibility of fulfilling a specific action and being confident about performing the task (Bandura, 1977).

Vaginal or Cesarean mother-baby dyad: A mother-and-baby pair after a vaginal or Cesarean delivery.

Assumptions

This study involved an assumption that self-efficacy is a positive attribute for breastfeeding mothers. It was also assumed that mothers wanted to provide the best

nutrition for their babies, and that women would answer the research questionnaires truthfully.

Scope and Delimitations

The scope of this study encompassed women who delivered their babies by vaginal or Cesarean delivery, delivered single babies, delivered at term (i.e., at 38-42 weeks) at a medical center in Oregon, and intended to breastfeed their babies. Women pregnant with multiple babies and women who had previous breastfeeding experience were not chosen because these experiences would have affected their self-efficacy for breastfeeding. First-time pregnant women were chosen for this study so that participants would have the same level of breastfeeding experience.

A pretest-posttest study design without a control group was chosen because the research site did not allow control groups in research with their breastfeeding mothers. It was imperative to understand the effect of hand expression with lactation support on self-efficacy for breastfeeding and breastfeeding duration among first-time mothers who delivered at this medical center.

However, previous experiences of these first-time mothers, such as whether they witnessed their own mothers breastfeeding younger siblings, or witnessed family members or friends breastfeeding, might also have affected their self-efficacy for breastfeeding, thereby limiting the generalizability of the results of this study to other populations.

Limitations

There were potential limitations to this study. The study was conducted in only one medical center in Oregon, which makes generalizability of the results not possible. For the results to be applicable to other populations, the study would have to be conducted in several medical centers in Oregon to have vast representation of the population. Additionally, the study was limited to first time pregnant mothers, and the use of a convenience sampling strategy limited the generalizability of the results. The study was also limited to English-speaking mothers, and the participants were not followed for a period longer than 6 months.

The aforementioned limitations might have affected the study in terms of response bias, having an impact on the results and validity of the study due to confounding factors such as support at home and latch score (Frankfort-Nachmias & Nachmias, 2008). To address these limitations, I used a sample size of 150, which was determined through G* power analysis.

Significance of the Study

Significance to Theory

The significance of this study to theory resides in its use of BSET to test the hypothesis that breast hand expression teaching and lactation support have an effect on mothers' self-efficacy for breastfeeding and breastfeeding duration. In that breast hand expression with lactation support had a strong effect on the women's self-efficacy and breastfeeding duration, this study was reliable, as it was based on solid theory. In its use

of BSET, this study adds to other studies that have used BSE theory, positioning BSE theory as a more solid foundation for future similar studies.

Significance to Practice

The study provides data and perspectives on the effects of hand expression with lactation support on a mother's self-efficacy for breastfeeding and subsequent breastfeeding duration in mothers who delivered vaginally and by CS. It fills a gap in the literature concerning the effects of breast hand expression with lactation support on women's self-efficacy for breastfeeding and breastfeeding duration, which may help to inform policy around hand expression in combination with lactation support to increase women's self-efficacy for breastfeeding and subsequently increase breastfeeding duration.

Implications for Social Change

The results of this study, by filling gaps in the literature, may lead to positive social change. Upon dissemination of the results of this study, healthcare organizations and lactation consultants may use the data to formulate policies to increase women's self-efficacy and duration of breastfeeding in the larger community, which would protect the health of babies and mothers and save societal resources (Bartick & Reinhold, 2010; LaLeche League International, 2016; Tuthill et al., 2015). Further, this study may create awareness of how to increase women's self-efficacy for breastfeeding to consequently increase the duration of breastfeeding, allowing babies and mothers to get the maximum benefits of breastfeeding.

Summary and Transition

Breastfeeding duration in both vaginal and Cesarean delivery mother-baby dyads continues to be low nationwide (CDC, 2012). Several studies have been conducted to show that lactation support increases breastfeeding duration (Britton et al., 2007; Hung & Berg, 2011). Several studies have also shown that increased self-efficacy subsequently increases duration of breastfeeding (Awano & Shimada, 2010; Meedya et al., 2010). However, little or no research has been reported on the effects of breast hand expression in combination with lactation support on women's self-efficacy for breastfeeding and breastfeeding duration. Determining these effects is a necessary step toward formulating policy and interventions around hand expression in combination with lactation support to increase women's self-efficacy for breastfeeding and duration of breastfeeding.

Chapter 2 provides an in-depth review of relevant literature on key variables of the study. It includes the search strategy, the theoretical framework that guided the study, and a summary and conclusions.

Chapter 2: Literature Review

Introduction

Breastfeeding is the best infant feeding method because it provides immunological and anti-inflammatory protection (Bartick & Reinhold, 2010; LaLeche League International, 2016). To maximize the benefits of breastfeeding, the WHO (2015) advises women to breastfeed exclusively for 6 months. However, American women are not meeting these health recommendations to exclusively breastfeed their babies for 6 months (Bramson et., 2010), which could increase the risk for serious health issues for babies, mothers and society as a whole (Bramson et al., 2010). A short duration of breastfeeding can result in higher costs for employers and society, because it can result in mothers taking time off work to care for ill children. Research shows that \$13 billion would be saved in healthcare costs if 90% of mothers breastfed their babies for 6 months (Bartick & Shimada, 2010; Mass, 2011). Therefore, the purpose of this study was to determine the effects of hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration among mother-baby dyads after vaginal and CS delivery. In adopting this focus, I sought to reveal issues that earlier studies had ignored or did not approach to increase breastfeeding duration in the United States. This study may create awareness of how to improve women's self- efficacy for breastfeeding to consequently increase the duration of breastfeeding, thereby helping babies and mothers to obtain the maximum benefits of breastfeeding.

In the following chapter, I provide an overview of the search strategy used for the literature review. I briefly highlight the theoretical framework related to the variables of

interest in my study. I include an extensive and exhaustive literature review containing information on breastfeeding education, hand expression, lactation support, self-efficacy, breastfeeding duration, and other topics relevant to the study. I conclude the literature review chapter by highlighting the gaps in the literature that were relevant to my study, with an emphasis on the importance of the study in promoting women's self-efficacy for breastfeeding and longer breastfeeding duration.

Literature Search Strategy

For this literature review, I conducted a comprehensive search for relevant research studies. When using databases, I applied a filter to choose peer-reviewed journals. The key words I used in combination with Boolean search operations included the following: *breastfeeding*, *breastfeeding education*, *hand expression*, *lactation support*, *Latch score*, *self-efficacy*, *duration of breastfeeding*, *vaginal delivery*, and *Cesarean delivery*. The search was initially limited to articles written in English in peer-reviewed journals. Where little information was available on the variables in my study, as in the case of hand expression, I consulted books and case studies. Searches were conducted in the following databases through the Walden and Oregon Health and Science University (OHSU) libraries: Medline, ProQuest, EBSCO, PubMed, PsycINFO, CINAHL, Cochrane Database of Systematic Reviews (CDSR), OVID, MEDLINE, and Google Scholar. The literature search was limited to works published between 2006 and 2017, which provided an array of empirical evidence related to my area of interest while affording insight, breadth, and highlights on the methodology, sample size, effect size, type of analysis, and statistical power. A search for literature dating to the mid-20th

century was also employed to gain historical and theoretical insights related to the variables of interest in my study.

Theoretical Framework

Many theories have been proposed to explain what affects or drives human behavior. Human behavior theory is a vast area of the literature; this review focused only on the major themes that emerged in most of the literature reviewed. These themes included cognitive and emotional behavior, the influence of confidence and self-efficacy in relation to breastfeeding, the influence of self-efficacy on breastfeeding duration, and the importance of support in performing a task. Although these themes were presented in a variety of contexts in the literature, this paper only focused on the application of the themes to self-efficacy and breastfeeding duration. The theoretical framework that guided this study was based on the work of Bandura.

Social Cognitive Theory (SCT)

Miller and Dollard (1941) proposed a theory of social learning called social cognitive theory (SCT). SCT emphasizes that learning occurs in a social context and that what is learned is gained through observation (Bandura, 1977). SCT applies to cognitive and emotional behavior and explains how individuals acquire and maintain certain behavioral patterns. According to SCT, there are three factors that influence self-efficacy: (a) behavior, (b) environment, and (c) personal/cognitive factors. These factors interact with each other to predict an individual's self-efficacy (Bandura, 1977).

Behavior. Behavior is the way that an individual acts in a social setting; it is learned from the environment through a process of observation (Bandura, 1986). In the

context of this study, the behavior of the individual mother after delivery was that the mother was happy that the delivery went well, which increased her self-efficacy for breastfeeding. Current evidence shows that when self-efficacy for breastfeeding increases, breastfeeding duration increases as a result (Koskinen et al., 2014; Tuthill et al., 2015; Wu et al., 2014).

Environment. Bandura (1977) stated that in an environment, there is a mediating process that occurs between stimuli and response, and behavior is learned from the environment through observation. Bandura (1989) stipulated that the environment mediates an individual's performance of a task as the individual learns from the environment through observation. Bandura (1989) went further to postulate that behavior is “depicted as being shaped and controlled by environmental influence” (p. 2). Evidence has shown that the environment in which individuals find themselves affects their self-efficacy (Awano & Shimada, 2010; Hector et al., 2005). Research has indicated that environmental factors can support a woman in breastfeeding on cue, support her during difficult breastfeeding challenges, make her comfortable, and give her the confidence necessary to continue to breastfeed for a longer duration because of increased self-efficacy (Awano & Shimada, 2010; Hector et al., 2005).

Personal/cognitive factors. SCT indicates that “people act on their judgment of what they can do and belief about the effect of their actions and ability to perform a task” (Bandura, 1986, p. 231). Personal/cognitive factors involve what individuals believe that they can do and their level of confidence about performing a task. *Confidence* refers to the ability of an individual to act on ambitions and desires without fear of failure

(Bandura, 1977). Self-confidence is an influential motivator and regulator of individual behavior (Bandura, 1986). It is the belief in one's capabilities about accomplishing some goal and performing a task (Bandura, 1977). In this study, a woman's self-confidence that she could perform the task of breastfeeding was a positive factor promoting the continuation of breastfeeding for 6 months (Anasari, Abedi, Hasanpoor, Bani, 2014).

Self- Efficacy Theory (SET)

Self-efficacy is the extent to which an individual believes that he or she has mastered a particular skill (Bandura, 1997). In establishing self-efficacy theory, Bandura advanced the early work of Miller and Dollard (1941) while examining the factors that mediate an individual's self-efficacy and performance of a task (Bandura, 1977). Self-efficacy theory indicates that several factors influence an individual's decisions and pursuit of a goal. The factors that affect self-efficacy, according to Bandura (1997), include (a) performance outcome, (b) vicarious experiences, (c) verbal or social persuasion, and (d) physiological feedback.

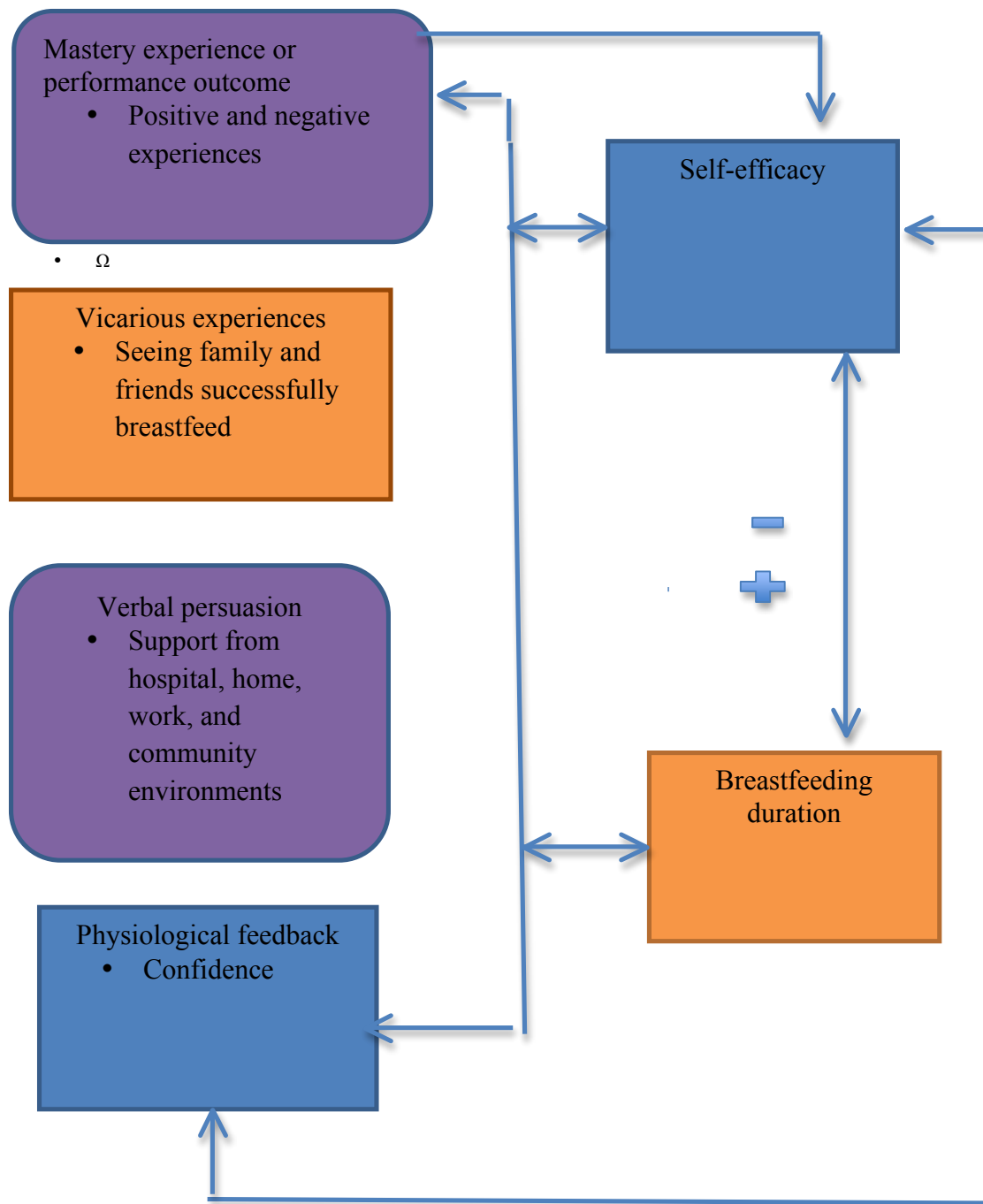


Figure 1. Conceptual framework of self-efficacy. Developed by Florence Omekara
Adopted from “Self-Efficacy: Toward a Unifying Theory of Behavioral Change,” by A. Bandura, (1977)

Positive or negative experience can affect the ability of an individual to perform a task. In this study, if a mother had a positive or negative experience in the environment in which she found herself, this experience might have a positive or negative impact on her self-efficacy to perform the task of breastfeeding her baby. The implication in Bandura's study was that some individuals are more apt to adapt to a specific behavior and perform a task than others (Bandura, 1977). For breastfeeding mothers, current evidence shows that self-efficacy to significantly mediate by intention to perform the act (Jager, Broadbent, Fuller-Tyszkiewicz, & Skouteris, 2014). The SET postulates that if an individual believes in his or her ability to fulfill a specific action and is confident about performing the task, this will lead to the actual performance of the task because what people believe they can do depends on their self-efficacy to perform the particular task (Bandura, 1997).

In reference to *vicarious experiences*, Bandura (1977) posited that individuals can develop high or low self-efficacy through other people's performance. Bandura (1977) contended that human beings learn new behavior through observations, which mediate confidence and increase self-efficacy in order to approach and master the specific task. Recent studies have shown self-efficacy to be mediated by previous experience (Awano & Shimada, 2010), prenatal education influence (Otsuka et al., 2014), and breastfeeding support (Britton et al., 2007; McQueen, Montelpare, Dennis, 2013). Evidence shows that women who witness their mother, family members, or friends breastfeed are more likely to have higher self-efficacy for breastfeeding and to breastfeed for a longer duration (Awano & Shimada, 2010).

Verbal or social persuasion consists of support from other people that encourages an individual to believe that he or she can perform a task. Evidence shows that if an individual receives adequate support for performing a specific task and is comfortable with performing the task, the individual will be likely to initiate the task and continue to perform the task if needed for a longer duration because of increased self-efficacy (Awano & Shimada, 2010; Hector et al., 2005). In this study, as shown in the conceptual framework above, support from the hospital environment, home environment, work environment, and community environment can increase a woman's self-efficacy to continue to breastfeed her baby for a longer duration. If a woman is in a hospital environment where rooming-in is supported, where the woman breastfeeds her baby on cue, where skin-to-skin contact is encouraged between baby and mother, and where lactation support/education is offered, the woman will be comfortable breastfeeding her baby because of increased self-efficacy (Awano & Shimada, 2010; Hector et al., 2005).

In the home environment, if the woman receives family and peer support, this support will increase her self-efficacy to continue to breastfeed her baby (Awano & Shimada, 2010; Hector et al., 2005). In the work and community environment, if there are policies that support breastfeeding, such as pumping stations and pumping breaks, and if breastfeeding is an acceptable norm within the community, these factors will increase the woman's self-efficacy to continue to breastfeed for a longer duration (Awano & Shimada, 2010; Hector et al., 2005). If there is no support from the aforementioned environments, the woman's self-efficacy will be low, which may lead to early termination of breastfeeding because of lack of confidence and self-efficacy (Awano &

Shimada, 2010, 2010; Bandura, 1997). Self-efficacy is an important concept in the prediction of actual actions, especially when a “mother learns from repeated successful experience [that] the desired results of the long-term continuation of breastfeeding can be achieved” (Awano & Shimada, 2010, p. 2).

Physiological feedback occurs when individuals are at ease with the task at hand. When this occurs, people feel more capable and confident, with increased self-efficacy. Self-efficacy is a mechanism that enhances the development of skill competencies. Bandura (1997) stated that lack of confidence and self-efficacy leads to avoidance of a task.

In the above conceptual model, all four factors affect self-efficacy either positively or negatively. Self-efficacy affects the duration of breastfeeding either positively or negatively. If a woman has increased self-efficacy for breastfeeding, she will be more likely to continue to breastfeed for a longer duration (Awano & Shimada, 2010). If a woman has low self-efficacy, she will be more likely to quit breastfeeding early.

Rationale for the Choice of Bandura’s Self-Efficacy Theory (SET)

Bandura’s self-efficacy theory (SET) was chosen because it was an appropriate theoretical framework for the current study. Bandura (1977) stated that people undertake situations that they can handle but avoid situations that they believe they cannot handle. Bandura’s SET may predict a relationship between people’s behavior, environment, and personal/cognitive factors, which can be applied to the relationship that breast hand expression and lactation support have with mothers’ self-efficacy in relation to

breastfeeding and breastfeeding duration. Bandura's SET has also been applied to studies of relationships between behavior, environment and personal/cognitive factors, especially in health and nursing research studies, and it has also been employed in several breastfeeding research studies in the United States and worldwide (Awano & Shimada, 2010). Therefore, Bandura's self-efficacy theory guided and directed this study on the effect of breast hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration among American women who delivered vaginally and by CS at a health center in Oregon.

Relationship of Bandura's Self-Efficacy Theory to Present Study

Research shows that if a woman is in an environment that supports her in performing breast hand expression, deep latching, and proper positioning of her baby during breastfeeding, the woman will be comfortable with the breastfeeding process, which will increase her self-efficacy (Wilhelms et al., 2008). If a woman's self-efficacy is enhanced and she is breastfeeding at 6 weeks postpartum, she is most likely to continue to breastfeed her baby for a longer duration for up to 6 months (Wilhelms et al., 2008). Bandura's self-efficacy theory provides theoretical insight and clarity in relation to the relationship between self-efficacy, breastfeeding duration, support, and confidence in relation to breastfeeding and breastfeeding duration. This new knowledge was incorporated into this study's design and philosophical inquiry.

The theoretical framework from Bandura Self Efficacy Theory by Dennis, (1997), guided the research of hand- expression with lactation support its effect on self- efficacy for breastfeeding and breastfeeding duration. In this study I hypothesized that hand-

expression with lactation support would lead to increased self- efficacy for breastfeeding and breastfeeding duration. This analysis was used in this study to clarify concepts, and enabled me to distinguish concepts of interest from all other concepts noting the attributes and characteristics that differentiate them from all other concepts. (Mulder, 2006)

Literature Review Related to Key Variables

Breastfeeding Education and Duration

Research has consistently shown that lactation education has a positive effect on breastfeeding duration. This is supported by current evidence that elucidated the effect of antenatal breastfeeding education on breastfeeding duration (Lumiganon et al., 2012). The authors reported in their Cochrane reviews of 16 randomized controlled studies from four developed countries including United States that antenatal breastfeeding education significantly increased breastfeeding duration (Lumiganon et al., 2012). In corroboration with (Aksu, Kucuk & Duzgun, 2011) that showed breastfeeding education/support rendered during the home visit at three days postpartum significantly increased the percentage of exclusive breastfeeding duration at two weeks, six weeks and six months and the total breastfeeding duration. While some studies report that prenatal education reduced nipple pain and trauma, which has been linked to early discontinuation of breastfeeding (Brand, Kothari & Stark, 2011). Prenatal education is well documented to increase breastfeeding duration to 6 months among the women in the intervention group that received breastfeeding education and lactation consultation (Aksu, Kucuk & Duzgun

(2011). These results are also supported by current study by (Ansari, Abedi, Hasanpoor and Bani, 2014).

Aksu, Kucuk and Duzgun (2011) surveyed the effect of education and support offered at home visit at day three postpartum among 60 women that delivered in a Baby Friendly maternity hospital in Aydin Turkey. The women in the intervention group received breastfeeding education, plus the standard breastfeeding education in the Baby Friendly Hospital where they delivered. The women in the intervention group received an addition in home visit and education/support, the intervention group showed a significant increase in the percentage of exclusive breastfeeding at two weeks, 6 weeks and six months. The authors concluded breastfeeding education at three-day postpartum increased breastfeeding duration and breastfeeding knowledge (Aksu et al., 2011).

Pisacane, Continisio, Filosa, Tagliamonte and Continisio, 2012 conducted a prospective cohort study on two hundred mothers with healthy newborns, that were assigned to either intervention or control group. The intervention group received baby carriers and some accurate information and training on how to use the carrier and about education on breastfeeding. The results showed no difference between intervention and control groups on breastfeeding at hospital discharge. However, mothers in intervention group showed significantly higher rate on breastfeeding than control group at two months (72% versus 51%) and at five month (48% versus 24%) between intervention and control group respectively (Piscane et al., 2012)

Earlier study by Chezem, Friesen and Boettcher (2003), a prospective descriptive study on seventy-three first time mothers with prenatal intention to breastfeed, were

interviewed via telephone prenatally, and at six weeks, three months and six months postpartum. The researchers interviewed the participants on breastfeeding knowledge, breastfeeding confidence and infant feeding plans. Chezem et al., (2003) found breastfeeding Knowledge to be strongly correlated with breastfeeding confidence ($r = .262, p = .025$) and breastfeeding duration.

Breast Hand Expression

Breast hand expression is defined as massaging the mother's breast and manually expressing breast milk (Witt & Bolman, 2013), with layperson or health professional assistance or mother expressing breast milk without assistance. Research has shown that breast hand expression removes colostrum more effectively than electric pump in early postpartum period (Morton, 2009). Flasherman et al., (2011), in their randomized trial study with 68 mother -baby dyads at 12- 36 hours postpartum found that mothers assigned to the hand expression group at 12- 36 hours postpartum were more likely to be breastfeeding at two months than mothers assigned to the breast pumping group (Flasherman et al., 2011). The researchers also found mothers in the hand expression group at two months were 96.1% more likely to be breastfeeding than the mothers on pumping group. The researchers recommended that since this was the first study that compared breast hand expression and breast pumping, there is a need for further studies in this area to confirm their result (Flasherman et al., 2011). There is a very limited published study on hand expression; therefore, this study focused on this under-researched area to ascertain if hand expression with lactation support has an effect on self efficacy for breastfeeding and breastfeeding duration, to add to the body of knowledge.

Similarly, Morton et al., (2009) conducted a study that explored the effect of hand expression of colostrum and hands on pumping of mature milk in mothers of preterm infants, on 67 mothers of infants less than 31 weeks gestation. The researchers reported that mothers of preterm infants could reach and maintain high milk production level by combining electric pumping with a manual expression such as hand expression. The researchers reported mean daily volumes expressed breast milk increased to 820 ml per day by week 8, and 955 ml per day in mothers who hand expressed (Morton et al., 2009). The researchers suggested that studies that measure the effectiveness of pumps in a removal of breast milk should be factored in the use of hand expression technique (Morton et al., 2009), since there is a limited study on hand expression.

In corroboration with earlier studies, Morton et al., (2012) compared milk composition between mothers stratified by early hand expression frequency. The researchers reported that mothers who initiated expression by using hand expression were more than five times per day produced the higher milk volumes and more fat in breast milk. The researchers concluded that early hand expression removed colostrum more than pump suction alone and increased the percentage of alveoli for subsequent milk production (Morten et al., 2012). Hand expression has been shown to increase milk production and expressed more fat milk content (Morten et al., 2012).

Lussier et al., (2015) conducted a repeated measures randomized trial of breast hand expression versus electric breast pump expression to compare early exclusive hand expression with early exclusive electric pump expression for milk in mother of very low birth weight infants. The participants were assigned to either the hand expression or

electric expression group for the first seven days postpartum. The researchers compared the daily volume of expressed milk between the groups in the first 28 days. The researcher found the electric pump group to have higher volume of expressed milk 623 ml than the hand expression group 105 ml in the first 28 days. The researchers concluded that hand expression group had significantly less cumulative daily milk production during the first seven days postpartum than the pump expression group. The result of this study did not support previous study by Morten et al., (2009), that found hand expression group to express more colostrum than the electric pump group. This probably may be due to thick and small amount of colostrum at the early stage postpartum. The researchers suggested that further research is needed to confirm and expand their findings (Lussier., et al (2015).

Lactation Support and Breastfeeding Duration

Research shows that lactation support correlates with longer duration of breastfeeding, and also has a significant positive effect on breastfeeding mothers to continue to breastfeed their infants. Lactation support is defined as any breastfeeding assistance to the breastfeeding mother either from a layperson or a health professional (Britton et al., 2007; Hung & Berg, 2011), to latch and position her baby properly during breastfeeding. Breastfeeding duration is the length of time a woman is breastfeeding her baby from the initial stage of exclusive breastfeeding, which includes any period of supplementary feeding to the time the baby is completely weaned off the breast (Noel-Weiss, Boersma, & Kujawa- Myles, 2012).

Britton et al. (2007) conducted a meta-analysis of 34 randomized controlled trials of 29,385 mother-baby dyads from 14 countries, and found that professional support in any form, either a layman or professional lactation support increased duration of breastfeeding up to 6 months post delivery. The studies in this meta-analysis showed that social support has positive influence on breastfeeding initiation and duration (Britton et al., 2007). In contrast, Pound et al., (2015) found no significant difference between the intervention and control groups of women who exclusively breastfed until three months postpartum regardless of the level of breastfeeding support. The study was a randomized controlled trial with 99 mothers of hospitalized infants with jaundice comparing lactation support and breastfeeding. The difference in the two studies were that in meta-analysis study, conducted by Britton et al., (2007) the infants did not have jaundice, and the participants were followed for up to six months postpartum. While in Pound et al., (2015) study, the infants have jaundice and the participants were only followed for three months. Grassley and Sauls (2011) conducted a quasi-experimental posttest design study on 106 adolescent new mothers during childbirth intra-partum nursing in a tertiary hospital. These researchers evaluated intrapartum supportive needs during childbirth on their childbirth satisfaction and breastfeeding rates. Grassley and Sauls, (2011) found a contrasting evidence to Britton et al., (2007) findings. The researchers reported that the intervention group was more likely to initiate breastfeeding in the first hour of life, which has been shown to increase breastfeeding duration (Girolamo et al., 2008; Murray et al., 2007). However, Grassley and Sauls (2011) did not find any significant results in breastfeeding duration, which implies their intervention did not increase breastfeeding

duration. Grassley and Sauls, (2011) gave a different view from Brtton et al., (2007), that intra and postpartum support made no difference in breastfeeding at three months between the intervention and control groups, which supports Moreau et al., (2015) and Pound et al., (2015) studies. A call to replicate the study was made by the authors to explore if the intervention affects breastfeeding duration (Grassley & Sauls, 2011).

Spencer, (2013) conducted an interpretive phenomenology study that interviewed 22 women aimed to capture the women's experiences of breastfeeding. In-depth interview was used to collect data on the women's experience of breastfeeding. The results showed the women were not prepared for the reality of breastfeeding. They were shocked and over-whelmed with breastfeeding (Spencer, 2013). The women also did not report their lack of coping with breastfeeding, as they did not want to show their vulnerability, which could possibly be due to the challenges of breastfeeding. These findings support the importance of breastfeeding education before delivery and breastfeeding support post delivery period.

In another phenomenological study conducted by Leuer and Misskey, (2015) in which the researchers distributed a survey to 551 mothers that their infants were six months and one day less than twelve months of age and explored the infant's feeding practices and experience during the first six months. 191 mothers completed and returned the survey. The researchers analyzed the open ended questions using qualitative description and found that breastfeeding support that gave consistent breastfeeding information on feeding frequency/duration, proper latch and position were key components that led to increased breastfeeding duration among the participants. Lack of

adequate instructions on these key areas may result in the mothers being at risk to discontinue breastfeeding (Dietrich & Misskey, 2015).

Thussanasupap, Lapvongwatana, Kalampakorn and Spatz, (2016) conducted a quasi-experimental study on working mothers (n=52) living in Chonburi Province, Thailand to examine the effectiveness of a Community Breastfeeding Promotion Program (CBPP) in a community unit of the hospital. The CBPP was aimed at increasing the breastfeeding self- efficacy of working mothers. The women in the control group received the usual activities of a single home visit from community health nurses within 1- 2 weeks after delivery without the intervention of specific breastfeeding knowledge and support for working mothers. Another 26 mother baby dyads that were assigned into an intervention group seven months later to avoid contamination. The CBPP was a community-based program developed to increase breastfeeding duration. The CBPP includes: 1) enactive mastery experiences to enhance breastfeeding self- efficacy; 2) live modeling demonstration of breastfeeding skills; 3) verbal persuasion, to motivate the mothers to achieve breastfeeding success; and 4). Physiological and effective mother's state to increase self- efficacy (Thussanasupap et al., 2016). The breastfeeding support team visited the working mothers at home at 8 to 14 days, 4 to 6 weeks and at 6 to 8 weeks after delivery to strengthen their self-efficacy for breastfeeding. The results showed that the breastfeeding behavior of the working mothers in the intervention group was significantly higher than the control group; 69.23% of women in the intervention group were exclusively breastfeeding at 6 months and 53. 85% continue to breastfeed at 1 year. While none of the mothers in the control group exclusively breastfed for 6 months.

The authors concluded that the CBPP had positive effect on breastfeeding duration of working mothers (Thussanasupa et al., 2016)

In a study conducted in one medical center in Thailand, Niela- Vilen, Axelin, Melender, Loyttyniemi, and Salantera, (2015), used randomized control trial with a one year follow up on 124 mothers of preterm infants to examine whether internet based peer- support intervention has effect on breastfeeding duration. Participants were randomly assigned, 60 participants into intervention groups and 64 participants were assigned to control group. The data were collected from the participants at a five-point measure. The researchers found that breastfeeding peer support in the media had no effect on the duration of breastfeeding or breast milk expression for preterm infants. The authors found maternal attitude to be the strongest predictor of breastfeeding (Niela- Vilen et al., (2016).

Latch Score and Breastfeeding Duration

Kumar, Mooney, Wieser and Havstad, (2006), conducted a prospective study on 248 postpartum women, and examined whether LATCH scores assessed during mothers in- hospital stays are predictive of breastfeeding duration at 6 weeks postpartum. The researchers found that the mothers with higher LATCH scores at 16 to 24 hours after delivery were still breastfeeding at six weeks while mothers with lower LATCH score weaned their baby before six weeks. The researchers made the conclusion that the LATCH assessment tool is a predictor of breastfeeding duration (Kumar et al., 2006). This study is in corroboration with earlier study that higher latch score would predict longer duration of breastfeeding (Riordan, Bibb, Miller & Rawlins, 2001).

Riordan, Bibb, Miller and Rawlins, (2001) tested the validity of LATCH breastfeeding assessment tool in 133 mother- baby dyads in two Midwestern United States community hospitals. The researchers evaluated feeding using LATCH score tool 24 to 72 hours postpartum. The lactation consultants observed the mother baby dyads as they breastfed their babies, and each mother was asked to rate how she thought the breastfeeding went. The participants were followed for 8 weeks postpartum. The researcher called the participants at 8 weeks postpartum to find out the mode of their infant feeding, and found that the women who were still breastfeeding at 6 weeks (71%) had higher total LATCH scores (9.3 +/- 0.9) than those women who had weaned their babies (8.7 +/- 1.0). At 8 week, 50% of the mothers reported they have given their babies formula one or more times. The researchers reported they chose 6 weeks as the outcome variable because it is a “vulnerable time when the mothers milk supply is being established and both mother and baby are learning the skill of breastfeeding” (Riordan, 2001).

Cakmak and Kuguoglu, (2007) conducted an observational and comparative study to assess and compare the breastfeeding process on 118 mothers who had Cesarean Section (CS) and 82 mothers who delivered vaginally in a private hospital in Istanbul. Data was collected using introductory information form and LATCH breastfeeding charting system. The researchers reported the average first breastfeeding LATCH score for CS mother baby dyads was 6.27 and 8.81 for the third breastfeeding in this group. For vaginal delivery mother baby dyads, the first feeding using the LATCH score system was 7.46 and third breastfeeding scoring was 9.70. The researchers concluded in their study

that method of delivery affects breastfeeding, and CS mother baby dyads need more help with positioning for breastfeeding (Cakmak and Kuguoglu, 2007).

Gercek, Karabudak, Celik and Saruhan, (2016) conducted a cross- sectional descriptive study on 303 postpartum women in Turkey. The data was obtained using Personal identification Form, Breastfeeding Self- Efficacy Scale- Short Form (BSES- SF) and Latch Breastfeeding Assessment Tool. The researchers collected data using mean, standard deviation, frequency, percentage, correlation analysis, Kruskal Wallis Variance analysis (Gercek et al., 2016). The researchers found a weak positive correlation between average LATCH score and average BSES- SF of the participants in postpartum period, while participants who has been pregnant four times or more has significant higher BSES- SF and average LATCH scores, and the women that started breastfeeding 30 minutes after their delivery had higher average LATCH scores (Gercek, 2016).

Lau, Htun, Lim, Lim, and Yobas, (2016) conducted a cross- sectional study that used a secondary data from their large breastfeeding survey from 2013 to 2014 in Singapore. The researchers excluded all preterm deliveries, and included only full term deliveries. The researchers evaluated the internal consistency, structural validity, sensitivity and specificity of the 5 and 4-item version of the LATCH assessment tool among the participants. Lau et l., (2016) found that the 4-item version demonstrated sound psychometric properties compared to the 5- item version with Cronbach Alpha of .70 for 5 item LATCH assessment tool and 0.74 for 4- item LATCH assessment tool. Furthermore, the two Confirmatory Factor Analysis (CFA) of the 4- item LATCH demonstrated better-fit indices of the models compared to the CFA of the 5- item

LATCH assessment tool (Lau et al., 2016). This current study used 5- item LATCH Assessment Tool, which is the LATCH tool used at the medical center where this study was conducted. The Cronbach alpha of 0.70 falls under an acceptable level according to Frankfort- Nachmias and Nachmias, (2008).

Breastfeeding Self-Efficacy

Self-efficacy has a psychological impact on how a woman performs the act of breastfeeding. Self- efficacy is defined as believing in one's own possibility of fulfilling a specific action and being confident about performing the task (Bandura, 1977). Several studies have shown that the level of self- efficacy affects breastfeeding duration negatively or positively; current evidence reveals positive association between a higher breastfeeding self-efficacy and longer breastfeeding duration. Ansari, Abedi, Hasanpoor and Bani, 2014). Anasari et al. (2014) conducted a randomized control trial on 120 nulliparous pregnant women in Ahvz Iran that planned to breastfeed. The women were randomly assigned to either intervention or control group from 11 public health centers. The intervention group received both standard prenatal care, and education to be successful with breastfeeding. The intervention group were called in and trained as a group for two sessions lasting two hours each. The education included benefits of breastfeeding for the baby, mother and the community, how to properly position to breastfeed successfully, and methods that increase mother's success in breastfeeding (Ansari et al., 2014). The researchers chose a mother who was successful in previous breastfeeding, so the pregnant mothers had a role model and could benefit from peer education. The intervention group was also allowed to contact the researchers if they experienced

problem with breastfeeding and to come in for help to resolve the breastfeeding problem (Ansari et al., 2014). The control group received the standard prenatal care of education of breast-feeding and breast examination (Ansari et al., 2014). The results showed significant increase in breastfeeding self efficacy and increase in exclusive breastfeeding in intervention group at six months after delivery, with 73.3% of women in this group exclusively breastfeeding compared to control group, where only 26.6% were exclusively breastfeeding at six months after delivery. The results also showed there was a significant relationship between mother's self-efficacy for breastfeeding and duration of exclusive breastfeeding at 6 months postpartum (Ansari et al., 2014).

Such finding as Anasari et al. (2014) were corroborated by a quasi-experimental pretest-post test design study by Awano and Shimada (2010), on 117 participants in Japan to develop the Breast Self- Efficacy – Short Form (BSES- SF) program for breastfeeding to increase mothers' breastfeeding confidence; and to evaluate the effectiveness of the program. The participants were randomly assigned to an intervention or control group. The intervention group received the BSES program and the standard education, while the control group received only the standard education. The results showed a significant increase in breastfeeding in the BSES score among the intervention group from 34.8 at early post- delivery to 49.9 at one-month post delivery (Awano & Shimada, 2010). A longitudinal control study by Chan, Ip, and Choi (2016), on the effect of a self- efficacy- based educational program on maternal breastfeeding self- efficacy, breastfeeding duration and exclusive breastfeeding rates among mothers in Hong Kong revealed the exclusive breastfeeding rate was linked to increased self- efficacy, with

11.4% for the intervention group, while 5.6% for the control group at six months after delivery (Chan et al., 2016).

Glassman, McKeamey, Saslaw and Sirota, (2014), found breastfeeding self-efficacy as a major factor associated with exclusive breastfeeding at six months in their interview with 209 participants. The researchers examined the effect of breast- self-efficacy and sociocultural factors in early breastfeeding. Also, a prospective study conducted by Blyth et al., (2002) revealed a significant relationship between breastfeeding self -efficacy and predicted breastfeeding duration. The researchers reported that mothers with high breastfeeding self-efficacy were significantly more likely to be exclusively breastfeeding at one week and 4 months than mothers with low breastfeeding self- efficacy (Blyth et al., 2002). In a meta – analysis on conducting interventions to improve breastfeeding outcomes, Sinha et al., (2015) maintained that while breastfeeding self efficacy increased the duration of breastfeeding, that intervention delivery in a combination of settings have higher improvement on breastfeeding rates. The authors concluded that to promote breastfeeding, the intervention should be delivered in combination of settings by involving the health systems, home, family and community environment (Sinha et al., 2015).

Henic, (2016) conducted a descriptive correlational study that revealed a positive correlation between breastfeeding self- efficacy, birth satisfaction, number of children, partner support of breastfeeding, intention to breastfeed, intention to breastfeed exclusively for 6 months and feeling prepared for birth (Hinic, 2016). The researcher used the Perceived Stress Scale- 10; Birth Satisfaction Scale- Revised, Breast Feeding

Self- Efficacy Scale- Short Form (BSES- SF) and a demographic questionnaire to identify the factors related to breastfeeding self- efficacy, as an important factor affecting sustained breastfeeding in the postpartum period (Henic, 2016). The researcher concluded that promoting birth satisfaction and involving partners in breastfeeding education would increase the woman's breastfeeding self- efficacy for breastfeeding (Hinic, 2016).

Similarly, Henshaw, Fried, Siskind, Newhouse and Cooper, (2015), conducted a study on breastfeeding self- efficacy, mood, and breastfeeding outcomes among primiparous women in a Midwest level 3 tertiary care center. The results showed that high Breastfeeding Self Efficacy (BSE) at 2 days post delivery predicted a positive emotional adjustment and exclusive breastfeeding at 6 months post delivery (Henshaw et al., 2015).

Jager, Broadbent, Fuller- Tyszkiewicz and Skouteris, (2014), conducted a retrospective study on 174 women, and found higher intention to exclusively breastfeed, higher breastfeeding self-efficacy and comfort level breastfeeding in public to positively affect breastfeeding at 6 months postpartum. Similarly, Josh, Amadi, Meza, Aguirre and Wihelm, (2015), conducted a two group repeated measures quasi- experimental study on 46 rural Hispanic women from Regional West Medical center and examined the effect of a computer- based breastfeeding educational program to promote breastfeeding among rural Hispanic women. The intervention group received a computer- based breastfeeding educational support program, and the control group received the bilingual breastfeeding educational material during their prenatal visit (Josh et al., 2015). The Breastfeeding Attrition Prediction Tool is a 35-item Likert scale questionnaire used to indicate the factors that affect the likelihood to discontinue breastfeeding. The Breastfeeding Self-

Efficacy- Short Form, a 14-item Likert scale questionnaire, was used to measure breastfeeding self- efficacy (Josh et al., 2015). The results showed a significant positive association between self- efficacy and intent to breastfeed (Josh et al., 2015), which was in agreement with Jager et al., (2014)

In a two group, repeated measure quasi-experimental study conducted by Joshi, Amadi, Meza, Aguirre and Wihelm, (2015) the effect of using a computer based breastfeeding education program to promote breastfeeding practices among rural Hispanic women was examined. The results revealed significant positive association between self- efficacy and intent to breastfeed. In contrast, Harley, Stamm and Eskenazi, (2007) examined association between socio-demographic characteristics and breastfeeding knowledge, and self-efficacy and prediction of breastfeeding attrition among rural Hispanic women. The authors reported a breast-feeding rate of 26.9% at 4 months, 55% at 6 months and 31 % at 12 months among Hispanic women (Harley, Stamm & Eskenazi, 2007), which was not in agreement with Joshi et al., (2015) study.

Koskinen, Aho, Hannula, and Kaunonen, (2014), conducted a cross sectional survey on 573 primiparous and multiparous women in three urban maternity hospital in Finland, that explored the relationship between maternity hospital practices and breastfeeding self- efficacy. The researchers found that early breastfeeding initiation, rooming in and exclusive breastfeeding during the hospital stay were associated with higher maternal breastfeeding self- efficacy in both primiparous and multiparous women (Koskinen et al., 2014). Similarly, Karall et al., (2015) conducted a prospective study on a 555 mother baby dyads and found that the women did not attain the recommended

breastfeeding duration of 6 months. The researchers suggested that to understand the risk factors of not exclusively breastfeeding for 6 months would provide insight to give better support to mothers and prevent short and long term morbidity as a result of early weaning (Karall et al., 2015).

McQueen, Montelpare, and Dennis (2013) conducted a prospective cohort study on 130 breastfeeding Aboriginal women to test the reliability and validity of the Breastfeeding Self- Efficacy Scale- Short Form (BSES- SF). Baseline data was collected on 130 participants while the women were in the hospital, followed by telephone at four weeks, only 105 participants completed the telephone survey and at eight weeks postpartum 102 participants responded for assessment on method of their infant feeding (McQueen et al., 2013). The searchers found that BSES- SF was a valid and reliable tool for assessing breastfeeding self- efficacy among Aboriginal women. Internal consistency for response in the hospital was Cronbach's alpha 0.95, and correlation between the individual items and the total survey ranged from 0.65 to 0.81 for in hospital data collection. The researchers concluded that the participants with low BSES-SF in the early postpartum period might be at risk for early weaning of their babies from the breast, and this group needs additional breastfeeding support (McQueen et el., 2013).

Otsuka et al., (2013) conducted an experimental study on 781 pregnant women and evaluated the effects of self- efficacy intervention on breastfeeding self- efficacy and exclusive breastfeeding among women that delivered in two Baby Friendly Hospital and Two Non Baby Friendly Hospitals in Japan; and later assessed the difference the type of hospital. Participants in the intervention group were provided with a breastfeeding self-

efficacy workbook in their third trimester of their pregnancy (Otsuka et al., 2013). The authors found that the intervention improved breastfeeding self- efficacy and exclusive breastfeeding at 4 weeks postpartum only in the Baby Friendly Hospitals but not in the Non Baby Friendly Hospital (Otsuka et al., 2013). However, the authors reported that the infant feeding status was not improved at 12 weeks in either Baby Friendly Hospitals or the Non Baby Friendly Hospitals (Otsuka et al., 2013). Baby Friendly Hospital is a hospital recognized by the World Health organization (WHO) and United Nations Children's Fund UNICEF) that offer optimal level of care for infant feeding and mother-baby bonding, who have demonstrated through an on- site assessment that they have met the criteria (Baby – Friendly USA, n.d).

The role of self- efficacy in promoting breastfeeding duration is well documented in the literature. Pollard and Guill, (2009), conducted a descriptive correlational study among 70 mothers who delivered at a regional hospital in Southern North Carolina, to examine relationship between socio- demographic variables, maternal self- efficacy for breastfeeding and breastfeeding duration using BSES- SF as a measurement instrument. The authors found breastfeeding initiation rate of 69.5 % and breastfeeding duration of 36.7% at 6 months. However, the variables that correlated to breastfeeding duration in the study include marital status, WIC enrollment and in-hospital supplementation of formula. BSES – SF was statistically significant predictor of breastfeeding duration. The authors concluded BSES- SF could be used after delivery as an assessment tool in the hospital to identify mother baby dyads at risk for early weaning (Pollard & Guill, 2009).

Tuthill et al. (2015) compared and critically reviewed six available breastfeeding self- efficacy instruments that applied a number of theoretical and conceptual frameworks in their development. Before the selection of the six instruments, the authors excluded 64 instruments that included other constructs like knowledge, attitudes and social support plus two more instruments that did not measure breastfeeding self- efficacy, thereby leaving only the six instruments. The authors found Bandura's Social Cognitive Theory to be the most common. The authors also noted that content, construct and predictive validity were strong for most scales and some has been successfully adapted to research settings (Tuthill et al., 2015). They found that a higher score on the instrument indicated greater breastfeeding self-efficacy and that mothers felt more positive towards breastfeeding (Tuthill et al., 2015).

Souza and Fernandes (2014), conducted a cohort study on the breastfeeding self- efficacy on 100 postpartum mothers and evaluated the clinical use of Breastfeeding Self- Efficacy Scale as a predictive of early weaning, and verified if women with high self- efficacy breastfed for a longer duration. The women were contacted over the phone on day 7th, 15th, 30th, 45th and 60th day after delivery to monitor breastfeeding continuity (Souza & Fernandes, 2014). The authors found that most women had 82.3% scores, which were comparable with high self- efficacy for breastfeeding, and none of the participant had low self- efficacy. However, the authors did not find any relationship between higher scores of high self- efficacy and longer periods of exclusive breastfeeding (Souza & Fernandes, 2014), which was a contradicted result to the other studies (Koskinen et al., 2014; Tuthill et al., 2015).

Wu et al. (2014), conducted an experimental pre-test-posttest design on 74 participants from tertiary hospital that examined the effect of Self-Efficacy Theory on breast feeding self efficacy, breastfeeding duration and exclusivity at 4 and 8 weeks postpartum. The intervention group received three individualized self- efficacy-enhancing sessions and the control group received only standard care. The researchers reported the women in the intervention group showed greater increase in breastfeeding self efficacy, breastfeeding duration and exclusivity than the women in control group, with 87.9% of women in the intervention group breastfeeding at 8 weeks versus 67.6% breastfeeding in the control group breastfeeding at 8 weeks. The result showed increased self-efficacy had a significant effect on mothers' self efficacy for breastfeeding and breastfeeding outcomes (Wu et al., 2014). These results supported findings of other studies (Koskinen et al., 2014; Tuthill et al., 2015).

Zhu, Sally, Zhou, Ye and He (2014) conducted a cross sectional study among 201 expectant women from antenatal clinics of three university hospitals in China and examined breastfeeding self- efficacy and identified its predictors. The converted Chinese Breastfeeding Self- Efficacy Scale, 32-item self- report instrument with Crobach's coefficient of 0.93 was used to collect data on mothers' self -efficacy. The Perceived Social Support Scale (PSSS) a 12 item self-report was used to measure mothers' perceived adequacy of social support. The researchers found that the participants reported moderate levels of breast feeding on the self- efficacy scale and the women that had previous experience with breastfeeding either watched others breastfeed their infants, or who had made decision to breastfeed earlier reported higher breastfeeding self- efficacy.

The authors concluded that to identify women at risk of low breastfeeding self- efficacy, healthcare workers should assess expectant women for previous experience with breastfeeding, previous experience watching other women breastfeed, timing of their decision to breastfeed, social support and their husband's attitude towards breastfeeding (Zhu et al., 2014).

Summary and Conclusions

Chapter 2 discussed the literature related to effect of breast hand expression with lactation support on self-efficacy and breastfeeding duration. This helped to determine if this topic of research was worth studying (Laureate Education, 2015h). It also helped in narrowing down to the needed area of inquiry (Creswell, 2009). The literature review was a very important part of this research study because it explained the theoretical framework and provided the context for the study. The literature review prevented the repetition of previous studies in this area, thereby not contributing anything to the body of scientific knowledge, which would have been a waste of time and resources (Laureate Education, 2015h). This chapter 2 enabled the unique positioning of this research study and differentiating it from previous studies of self-efficacy and breastfeeding duration (Laureate Education 2015h).

In the review of this literature, several studies reported low power in their studies. The authors call for an urgent need to conduct Randomized Control Trials with adequate power to evaluate the effectiveness of antenatal breastfeeding education on breastfeeding duration. In the same manner, some authors recommend that more research is needed to explore the effect of hand expression and electric pumping on breastfeeding duration.

Furthermore, studies that measure effectiveness of pumps in removal of breast milk should factor in the use of hand expression technique. Thus, hand expression with lactation support represents what has been missing in the literature to respond to previous researchers calls to do intervention study with adequate power to increase the woman's self- efficacy for breastfeeding and dramatically increase breastfeeding duration in United States

Chapter 3 proceeded to cover the design, research methodology and its rationale for the current study. It discussed the population of the study, independent and dependent variables, inclusion and exclusion criteria for the study and method of the data analysis. For the purpose of clarity, the operational definitions of the variables of interest in this study were defined. The potential threats to content validity, empirical validity, construct validity, internal validity, effects of history and maturation effects were also discussed. Finally, the chapter concluded with a discussion of the ethical procedures/implications and measures taken to prevent ethical conflict in this study.

Chapter 3: Research Method

Introduction

The Healthy People 2020 breastfeeding objective is for 81.9% of mothers to initiate breastfeeding of their infants in the immediate postpartum period and for 60.6% to continue to breastfeed for at 6 months, with 34.1% continuing to breastfeed for 1 year (U.S. Breastfeeding Committee [USBC], 2015). However, a breastfeeding duration of 6 months is below the Healthy People 2020 targets for breastfeeding in the United States (CDC, 2012). The purpose of this study was to determine the effect of breast hand expression with lactation support on a woman's self-efficacy for breastfeeding and breastfeeding duration. Given a lack of studies in the literature on this important phenomenon, this study was designed to provide valuable information on the effect of a woman's self-efficacy on breastfeeding duration.

In the first section of this chapter, I describe the research design and rationale, the research question and related hypotheses, and the population used in this study. This precedes descriptions of the independent and dependent variables, the inclusion and exclusion criteria for the study, and data analysis techniques.

Research Design and Rationale

Based on the quantitative research tradition, this research study had a quasi-experimental pretest-posttest design that used a paper-and-pencil method to collect data from participants to examine whether mean differences in Breastfeeding Self-Efficacy and LATCH score existed between preintervention and post intervention groups. Data were collected at four-point intervals. The purpose of this study was to determine whether

breast hand expression with lactation support had an effect on a woman's self-efficacy for breastfeeding and breastfeeding duration at 6 weeks among first-time mother-baby dyads after vaginal delivery and CS. Quantitative research was an appropriate methodology because the study was designed to test a hypothesis using quantitative data. This quasi-experimental pretest-posttest design had one independent variable with two levels (i.e., breast hand expression and lactation support) and two dependent variables (i.e., self-efficacy for breastfeeding and breastfeeding duration). The covariate in this study was pretest (self-efficacy) to control for the level of self-efficacy that mothers had before the introduction of the intervention (i.e., hand expression teaching). The mediator variable was support for breastfeeding, which mediated between the intervention variable (hand expression with lactation support) and the dependent variables (self-efficacy and breastfeeding duration). The main purpose of the study was to investigate how these levels of independent variable (i.e., hand expression and lactation support) affected the dependent variables (i.e., self-efficacy and breastfeeding duration; Rudestam & Newton, 2015). This study used primary data and a nonprobability (convenience) sampling method, which was designed to randomly assign participants from 36 weeks of pregnancy into an intervention or control group as they attended a perinatal education class or hospital tour until a sample of 150 participants was on record.

Therefore, a quasi-experimental pretest-posttest design was deemed ideal for this study because the baseline data were compared to the post intervention hand expression with lactation support data on the new mothers. Random assignment using computer-

generated code was planned to assign the participants into the intervention or control group.

Time and Resource Constraints

There were certain time and resource constraints in conducting this study. Conducting this study at multiple sites and following participants for up to 6 months post-delivery was not feasible within the available time frame and available resources. It would have been time consuming, unaffordable and impossible for me to conduct this study using multiple sites; I could not have been in multiple sites to administer the intervention within the first 1 to 3 hours after delivery.

Methodology

Population of Study and Sample Size

This quantitative, quasi-experimental pretest-posttest study included all populations of American pregnant women who received their prenatal care and delivered their babies at a medical center in Oregon. The sample size, as determined by G*Power, was 132, with ANOVA to give the study 80% power, Cohen's d of 0.8 (Cohen, 1988), and a significance level of 5% (Polit & Beck, 2008). Eligible participants had delivered either vaginally or by CS and had not experienced any other health problems, as indicated by their statements and medical reports included in the study. The participants included primigravidas that were at least 18 years but not more than 38 years of age. The participants had delivered either vaginally or by CS. If the inclusion criteria were not met after delivery, a participant was dropped from the study, and the participants were given this information about the inclusion criteria at the time of recruitment.

Sample and Sampling Procedures

It is imperative for a researcher to determine which sampling method will adequately support a particular research inquiry, given that the recruitment method can affect sample variability (Winhusen, Winstanley, Somaza, & Brigham, 2012). The sampling strategy for this study was non random (convenience) sampling (Frankfort-Nachmias & Nachmias, 2008) because random sampling was not feasible. A flier was distributed to the participants to introduce the study as they attended a perinatal education class and hospital tour. I met with interested prospects after their perinatal class or hospital tour and explained the study, answered any questions they had, and asked them to sign the informed consent. Participants attending a prenatal education class from 36 weeks of pregnancy were assigned sequentially to the intervention group using computer-generated random codes. Recruitment continued until 35 participants were on record and their identifiers had been collected in a sealed envelope that only me had access to in a locked cupboard. Written permission was also obtained from the selected participants to follow them at delivery, during their hospitalization and up to 6 weeks after delivery.

Criteria for Inclusion and Exclusion

It was important to set clear inclusion and exclusion criteria for this study before assigning participants. The inclusion criteria were those essential attributes that research prospects needed to possess before they could qualify to participate in the study. It was important to establish clear inclusion and exclusion criteria to reduce bias and remove the influence of specific confounding variables (McDonagh, Peterson, Raina, Chang, & Shekelle, 2013).

Inclusion criteria. The inclusion criteria for this study indicated that the participants needed to be first-time pregnant women between 18 and 38 years of age who delivered a single baby vaginally or by Cesarean delivery at full term and had the intention to breastfeed. *Full term* was defined as a pregnancy that lasted 38 to 42 weeks. Deliveries occurred at a research site in Oregon. Eligible participants had no major health problems; both mother and baby were stable in each participating dyad. Further, they had not experienced any complications, such as postpartum hemorrhage (PPH) following delivery. The baby had not needed extensive resuscitation that resulted in separating the baby from the mother for admission to the neonatal intensive care unit (NICU), and the baby did not have any anatomical malformation that would have hindered breastfeeding, such as cleft palate. The baby did not have low birth weight (< 2500 g); or overweight (> 4500 g). The participants had a support person and had normal breast anatomy. The participants were able to understand and speak English. Race or ethnicity was not a factor as long as participants met all inclusion criteria.

Exclusion criteria. Exclusion criteria applied to first-time pregnant women under the age of 18 years or over the age of 38 years, women who delivered more than a single baby, and pregnant women who were unable to understand and speak English. A checklist was included in the subject's study packet to establish eligibility. The labor and delivery nurse evaluated whether any of the birth-related exclusion criteria were present on a checklist; if any of the exclusion criteria applied, the patient was disenrolled in the study.

Procedures for Recruitment, Participation, and Data Collection

Recruitment procedure. The first stage of participant recruitment involved posting flyers at the Perinatal Education Center to inform the potential participants about the study. In the second stage, I recruited interested prospects who were 36 weeks or more into a pregnancy with their first baby after explaining the study to them, answering their questions, and receiving their signature on the informed consent.

When a pregnant woman showed interest in becoming a participant, the perinatal education instructor asked her to meet me in the lobby after the class for recruitment. I then approached the potential participant to explain the study to her and answer any questions she had about the study. Afterward, I asked the interested participant to sign the informed consent.

Baseline data from the Breastfeeding Self-Efficacy Scale—Short Form (BSES-SF; see Appendix A) developed by Dennis (1999) were collected after the consent form. The signed consent document also gave me permission to be notified when the participant had delivered her baby so that I could collect the baseline data on the LATCH score from 1 to 3 hours after delivery (if the participant was eligible for the study).

Participants who experienced any of the following complications during labor and delivery were disenrolled from the study:

- Postpartum hemorrhage (PPH)
- Maternal or fetal exhaustion that led to crash Cesarean delivery
- Baby needing extensive resuscitation that resulted in separation of mother and baby due to the baby's admission to NICU

- Cleft palate or any other anatomical abnormality

Provision of informed consent. A thorough overview of the study was presented to the potential participants before informed consent and recruitment. The purpose of the study, benefits of participation, and any risk factors were fully explained. Potential participants were informed that they had the right to decline or withdraw from the study at any time. They were assured of the confidentiality of their information. Finally, I gave participants a contact phone number to reach me if they had any questions.

Recruitment and data collection procedure. This study involved the collection of primary data using a non probability (convenience) sampling method. Each participant was randomly assigned using a computer-generated code into the intervention or control group. Recruitment continued until the calculated number of participants confirmed their consent.

Demographic information collected included the participant's name, date of birth, expected date of delivery, mailing address, current phone number (both landline and cell phones), work status, income, and smoking/alcohol status, as well as the name of a support person (i.e., spouse, partner, family member, or friend). The demographic information was coded with a number to maintain anonymity. Only I had the names and codes of the participants, which I kept in a locked cupboard. The demographic data collection form was completed (Appendix C).

Intervention group. All of the women in the intervention group and their support persons were invited to watch a 5-minute video (available from <http://www.bfmedneo.com>) describing breast hand expression, demonstrating how to

perform breast hand expression after delivery, and showing how to position and latch on a baby properly (Witt & Bolman, 2013). Participants received information on how to access the website housing the video so that they could watch it at home to become more comfortable with hand expression, latch, and proper positioning of their baby prior to delivery. Because the hand expression video was on the web, it was accessible to anyone who had access to the Internet. Permission to use the video for this study was not required, according to its authors, Witt and Bolman, who indicated this during a lactation conference in Chicago in 2016.

I trained all of the women in the intervention group and their support persons on how to perform breast hand expression and proper latching on and positioning of their babies by using a doll and demo breast.

I also provided the members of the intervention group with education on the benefits of breastfeeding for the baby, the mother, and society. The intervention group received information during the education session indicating that lactation assistance would be available to them if they had any problems breastfeeding their baby while at the hospital and at home. They also received the standard care and education on breastfeeding.

Control group. The control group would have received the standard care of prenatal care and education on breastfeeding

Special training. The nurses and lactation consultants who recorded the latch score while the participants were in the hospital received education on how to properly record the latch score to ensure interrater reliability. They rated five different mothers

admitted in mother-baby unit (MBU) on their LATCH score during breastfeeding and compared their ratings. Anyone whose rating was off by 2 points was retrained until that person maintained consistent ratings with the others.

Mode of data collection. Immediately after delivery, all participants (mothers and babies) who met the inclusion criteria continued with the study. The standard care was provided to both the intervention and control group within the first hour of delivery if mother and baby were stable. The standard care included the following:

- Skin-to-skin contact (placing the baby on the mother's bare chest)
- Lactation support to assist the mother with baby latch and positioning if baby and mother were stable

Data collection procedure. Data were collected for both the intervention and the control group on four different points.

First data collection point. Baseline data from the BSES-SF developed by Dennis (1999; see Appendix A) was collected at a perinatal education center before delivery for both the intervention and the control group after participants signed the consent form. One to 3 hours after delivery, both the intervention and control groups filled out the baseline questionnaires on the LATCH Score Scale developed by Adams and Hewell (1997; see Appendix B), which was included in their admission package.

Immediately after LATCH scores were collected, the treatment (i.e., hand expression) was administered to the intervention group. Either I or the participant and her support person performed hand expression. Breast milk expressed into a spoon or baby's

mouth as the participants leaned from the breastfeeding video, or they let their baby leak the colostrum, if there was not enough to collect in a spoon.

Each mother documented the time of initiation of breast hand expression and subsequent times that she performed hand expression after breastfeeding the baby. The mothers in the intervention group and their support persons continued with breast hand expression and breastfeeding their baby on cue 8 to 12 times or more in 24 hours, not going more than 3 hours without feeding the baby. The intervention group continued the standard care of skin-to-skin contact with their baby and lactation support as needed.

The participants in the intervention group and their support persons were trained at a perinatal education center, and they continued watching the video on how to properly perform breast hand expression without supervision.

The mothers in the control group would have continued with the standard care of skin-to-skin contact, breastfeeding their babies on cue 8 to 12 times or more in 24 hours, without going more than 3 hours not feeding their babies, with lactation support as needed without specific hand expression.

Second data collection point. At hospital discharge or 2 days postpartum (post intervention), data were collected on BSES-SF and LATCH Score Scale questionnaires on intervention and would have been collected on control groups to ascertain whether there were any differences on their ratings on the BSES-SF and LATCH Score.

Third data collection point. Data were collected at 2 weeks postpartum on the intervention group and would have been collected on the control group via stamped self-addressed mail on the BSES-SF and LATCH Score questionnaires.

Fourth data collection point. Data were collected at 6 weeks on the intervention group and would have been collected on the control group via stamped self-addressed mail on the BSES-SF and LATCH Score questionnaires to ascertain whether the participants were still breastfeeding or if they had weaned and when.

The follow-up questionnaires on BSES-SF and LATCH Scores sent to all participants via stamped mail questionnaires at 2 and 6 weeks post delivery were used to ascertain whether the mothers were still breastfeeding with increased self-efficacy and increased LATCH score. Research has shown that if a mother is breastfeeding at 6 weeks postpartum, she is more likely to continue to breastfeed at 6 months postpartum (Meedya et al., 2010; Wehelms et al., 2008). If there had been differences in the measurement indicators between the intervention and control groups in a positive direction, then it would have been inferred that the intervention made a difference in the women's self-efficacy for breastfeeding and breastfeeding duration between the two groups.

Phone calls. Prior to delivery, I planned to call each participant in the intervention group to determine if she was watching the breast hand expression video at home in order to become comfortable with hand expression when she delivered her baby. After delivery, apart from the stamped mailed questionnaires, I planned to make telephone calls to both intervention and control groups at 4 days, 2 and 4 weeks postpartum to find out whether the women had problem they could be helped with, or encouraged to take their babies for an outpatient follow-up appointment with the hospital lactation consultants. Phone calls at 4 days, 2 weeks and 4 weeks postpartum were planned to evaluate for any breastfeeding challenges and provide assistance. These time

frames after delivery coincide with the most vulnerable times when a mother's milk is being established and mother and baby are learning the skill of breastfeeding (Riordan, Miller, & Rawlins, 2001).

Instrumentation and Measures

The Breastfeeding Self- Efficacy Scale- Short Form (BSES- SF) developed by Dennis, (1999) was used to measure the mother's self- efficacy. BSES- SF is a Likert scale that ranges from 1 (not at all confident) to 5 (very confident), with breastfeeding, with a total score of 70. The total scores would be used to calculate participants' self- efficacy, a higher score on the scale indicates increased self- efficacy (Awano & Shimada, 2010). The scale's reliability was Cronbach alpha co-efficient of 0.90 (Awano & Shimada, 2010), which falls under high acceptable level (Frankfort- Nachmias & Nachmias, 2008).

The LATCH score instrument was used to measure and predict breastfeeding duration (Kumar, Mooney, Weiser, & Havstad, 2016). The LATCH scores range between 0 to 10 with zero being poor on the LATCH Score scale and 10 being the highest (Adams & Hewell, 1997). A consistent LATCH score between 8 and 10, is an indication that breastfeeding is going well. Research shows that mothers with a LATCH score of 9 or above at 16 to 24 hours after deliveries are more likely to be breastfeeding at six weeks than mothers with lower LATCH scores (Kumar et al., 2016). Riordan and Koehn, (1997) concluded in their study that used the LATCH score to predict duration of breastfeeding that higher LATCH scores correlated with longer duration of breast feeding at six weeks. The Cronbach alpha of LATCH score was 0.72 (Kumar et al., 2016), which

falls under an acceptable level (Frankfort-Nachmias & Nachmias, 2008). The LATCH score is a standardized scale used in the medical center where this research was conducted to measure how mother and baby were doing on breastfeeding. The score ranges between 1 and 10. The goal is to have a latch score between 8 and 10, out of 10, which indicates breastfeeding is going well. When breastfeeding is going well it increases mother's self- efficacy and the mother is more likely to continue to breastfeed her baby up to six months (Meedyia et al., 2010; Wehelms, Rodehorst, Stepan, Hertzoy & Berens, 2008).

The BSES –SF and the LATCH score scales are included in Appendices 1 and 2.

Data Analysis Plan

This section described the research question and the related hypotheses:

Research Question 1: What effect does breast hand expression teaching and lactation support have on the mother's self- efficacy for breastfeeding and breastfeeding duration among mother- baby dyads who receive breast hand expression teaching with lactation support, versus mothers-baby dyads who receive the standard care- lactation support, skin to skin contact and not receive specific hand expression teaching?

H₀₁: There is no difference in a mother's self – efficacy for breastfeeding and breastfeeding duration in mother- baby dyads who receive hand expression teaching and lactation support, versus mother- baby dyads who receive the standard care- lactation support, skin to skin contact and not receive specific hand expression teaching.

H_{A1}: There will be a significant difference in a mother's self – efficacy for breastfeeding and breastfeeding duration in mother- baby dyads who receive hand expression teaching and lactation support, versus mother- baby dyads who receive the standard care- lactation support, skin to skin contact and not receive specific hand expression teaching

Statistical analysis was used to create descriptive statistics on the demographic

Operational Definitions

Breastfeeding: A method of feeding a baby with breast milk directly from mother's breasts (World Health Organization, 2016).

Breastfeeding duration: This is the length of time a woman is breastfeeding her baby from the initial stage of exclusive breastfeeding, which includes any period of supplementary feeding to the time the baby is completely weaned off the breast (Noel-Weiss, Boersma, & Kujawa- Myles, 2012).

Covariate: A variable that may predict an outcome (Creswell, 2009).

Hand expression: Manually removing milk from the breast by using the hands.

Hand expression teaching: For the purpose of this study, teaching mothers how to do breast massage and manual expression of breast milk (Witt & Bolman, 2013), with layperson or professional assistance or the mother expressing breast milk without assistance.

Lactation support: Any breastfeeding assistance to the breastfeeding mother either from a layperson or a professional (Britton et al., 2007; Hung & Berg, 2011) in order to help her latch and position her baby properly during breastfeeding.

Mediator: A variable that explains the relationship between the dependent and independent variables (Creswell, 2009).

Mother-baby dyad: Mother and baby together (couplet).

Prenatal: The time period during pregnancy and before delivery of a baby (U.S. National Library of Medicine, 2013).

Postpartum hemorrhage: Excessive vaginal bleeding of more than 500 ml or 1000 ml of blood within the first 24 hours after delivery (Smith & Ramus, 2016).

Self-efficacy: Belief in one's own possibility of fulfilling a specific action and being confident about performing the task (Bandura, 1977).

Skin-to-skin contact: Placing the baby naked on the mother's bare chest and covering the back with blanket (Moore, Anderson, Bergman, & Nowswell, 2012).

Vaginal delivery: Birth of a baby through the vagina.

Cesarean delivery: A surgical procedure on a pregnant mother for delivering a baby through an incision in the abdominal wall and uterus (Mayo Clinic, 2012).

Data Analysis

Descriptive statistics were used to analyze demographic information. SPSS version 23 was used to analyze the data. An ANOVA analysis was conducted to test the hypothesis that determined if breast hand expression teaching with lactation support had effect on the dependent variables mothers' self-efficacy for breastfeeding. The ANOVA analysis compares the mean differences between two groups. The analysis showed a difference between the measurement indicators between the baseline data and post

intervention data in the positive direction, then it is inferred that the intervention made a difference in the mother's self- efficacy.

Threats to Validity

Quasi-experimental pretest posttest research has limitations (Jaikumar, n.d). Some factors might lead to incorrect inferences in the study, which might pose as threats to the validity of the study (Cooper, Hedges & Valentine, 2009). There may be threats to internal validity, content validity, empirical validity, and construct validity of the study. These threats to validity were discussed as:

Internal Validity

Internal validity is how well an experiment conducted without confounding factors. Fewer confounding factors increases the internal validity of the study. The validity of a study signifies how correct the results of the experiment are (Frankfort-Nachmias and Nachimias, 2008), In this study the use of a convenience sample posed a threat to the internal validity of this study. A computer-generated code was used to assign participants to either intervention or control groups, which would reduce bias and increase the internal validity of this study. The procedures for intervention and data collection were strictly followed to increase the internal validity of the study. Permission was obtained from Dennis and Faux (1999) on BSES- SF; and permission was not required from Adams & Hewell, (1997) on LATCH score scale before using their scales for data collection, as the LATCH Score was in public domain. This study had one independent variable with two levels and two dependent variables, which might increase

the chances of confounding factors interference in the results. The confounding variables such as history, maturation effect may affect the internal validity of the present study.

Content Validity

Content validity means that the measurement instrument covers all the attributes that were purported to measure, without missing any relevant things to the phenomenon (Frankfort- Nachmias & Nachmias, 2008). Face and sampling validity are the two common types of content validity available (Frankfort- Nachmias, 2008), and in this study only sampling validity was applicable. A literature search was conducted and appropriate instruments were located, which is the Breastfeeding Self- Efficacy Scale- Short Form (SF) ([BSES-SF] developed by Dennis and Faux (1999); and LATCH score instrument (Adams & Helwell, 1997). These instruments measured what this study intended to measure (Brockpp & Hastings- Tolsma, 2003), which was the effect of breast hand expression and lactation support on a mother's self- efficacy for breastfeeding and breastfeeding duration. I reviewed other similar work done by several researchers to choose appropriate and reliable instruments, (BSES-SF) and LATCH score instruments, were found by other researchers to be reliable and valid instruments (Awano & Shimada, 2010; Kumar et al., 2016). Researchers in similar settings have used the instrument BSES- SF, and LATCH score.

Empirical Validity

Empirical validity is the “relationship between a measuring instrument and measured outcomes” (Frankfort- Nachmias et al., 2008.p. 150). The instrument should be appropriate for measuring the requisite indices as evidenced by statistics, for the study to

be empirically valid (Trochim, 2006). This study measured the dependent variables of self- efficacy for breastfeeding and breastfeeding duration, which the literature review showed BSES- SF and LATCH Score instruments were appropriate to measure those dependent variables (Awano & Shimada, 2010, Kumar et al., 2016), self- efficacy and breastfeeding duration.

Construct Validity

Assessing the validity of how well an instrument measures what it is supposed to measure is an essential component to ensure construct validity (Frankfort-Nachmias & Nachmias, 2008). To address the threats to construct validity, the instrument must measure what it is supposed to measure or else the results will be misleading and meaningless and not reliable (Frankfort-Nachmias & Nachmias, 2008). Therefore, to address the issue of construct validity, the instrument is measuring the construct of interest and not measuring something else. In this study, it is expected the instrument was intended to measure self- efficacy and breastfeeding duration, and not measuring something else, in order not to violate the construct validity. Thus, careful attention in this study was enforced during the data procedure and data collection to ensure the instruments measured the right elements of self-efficacy for breast-feeding and breastfeeding duration.

Effects of History

History effect can affect the internal validity of this study. For example, the experience of the woman observing a family member or friend breastfeed could influence the subject's knowledge or attitude towards breastfeeding. Also support of a

breastfeeding mother such as family, spouse or friend could affect the internal validity of the study. This study employed first time mothers, but may not capture if the women had observed family member or friend breastfeed in the past

Maturation Effect

Maturation effect can affect the internal validity of any study because people can change, or situation can change. All these changes can affect the internal validity of any study if not addressed. In this study, since the participants were followed for up to 6 weeks postpartum, the participants may change, their situation and circumstances may change or they may drop out from the study. These changes could affect the internal validity of this study (Polit, & Beck, 2008).

To address these threats to internal validity in this study, randomly assigned code is used to minimize the internal validity threats. Additional subjects were recruited to make up for attrition (Polit, & Beck, 2008).

Ethical Procedures

The Institutional Review Board (IRB) approval of the research site and Walden IRB were obtained and written informed consent obtained from the participants before initiating the study and data collection. Confidentiality of the participants' information and research data throughout the study were in safe lock cupboard that only this researcher has access to. Participants' personal information was separate from the data to avoid identification of participants by their personal information (Rudestam & Newton, 2015).

Ethical principles relate to research of human participants as summarized in Belmont Report (1974) include respect for participants, beneficence and justice. I provided a detailed explanation to participants before they made an informed decision to participate in the study. Informed consent rules were strictly adhered, to ensure participants were given full information including the benefits and risks associated with the study (in this study no anticipated risk), before they voluntarily agreed to participate in the study. They were given information that they have the right to leave the study at any time, and the participants were never coerced to join or stay in the study (Rudestam & Newton, 2015). There were no harassment or pressure for the participants to fill the questionnaires. The participants' confidentiality and anonymity were kept throughout the study. To ensure this, each participant's private information was protected using codes instead of identifying information. The coded documents and the identifying documents were in a separate locked location to which only I have access. Multiple roles may present ethical issue. Collecting data in my place of employment may have resulted in an ethical dilemma but I would not have provided care in any of the participants.

Summary

This chapter explained the research study, research questions and the related hypotheses, population of the study, sampling and sampling procedures, threats to validity and ethical procedures. The research design is the core blue print of a study. It provides the road map for the study. The research design clearly directs the study, and what is needed in the study. A good research design yields credible and reliable study

(Frankfort- Nachmias & Nachmias, 2008). Chapter 4 followed this chapter 3, which describes the data analysis and results of the study.

Chapter 4: Results

Introduction

The purpose of this study was to determine the effects of hand expression with lactation support on mothers' self-efficacy for breastfeeding and breastfeeding duration among mother-baby dyads after vaginal and CS delivery. The research question was the following: What effect does breast hand expression teaching and lactation support have on the mother's self-efficacy for breastfeeding and breastfeeding duration among mother-baby dyads who receive hand expression teaching with lactation support, versus mother-baby dyads who receive the standard care lactation support and do not receive specific hand expression teaching? Quantitative methods were most appropriate to address the research question using two standardized scales—the Breastfeeding Self-Efficacy Scale Short Form (BSES-SF; Dennis, 1999) and LATCH Scores (Adams & Hewell, 1997)—to measure women's self-efficacy for breastfeeding and breastfeeding duration. The independent variable, with two levels, was breast hand expression teaching with lactation support. Dependent variables were self-efficacy for breastfeeding and breastfeeding duration.

The alternative hypothesis was that there would be a significant effect on a mother's self-efficacy for breastfeeding and breastfeeding duration in mother-baby dyads who received hand expression teaching with lactation support. The null hypothesis stated that the intervention would not have any effect on the participants' self-efficacy and breastfeeding duration. In this chapter, I discuss the data collection process and the results of the study.

Data Collection

I originally planned for data collection to occur at a major healthcare center in Oregon using a quasi-experimental pretest-posttest design with an intervention group and a control group of pregnant women at 36 weeks of pregnancy or later. However, the research coordinator of obstetric doctors denied me access to the center's pregnant patients because pregnant women were reserved for their National Institute of Health (NIH)-funded studies. I then found an alternative data collection site at another health care facility in Oregon that was a partner facility. The initial study design was modified to a one-group quasi-experimental pretest-posttest design due to restrictions at the new facility.

After IRB approval was granted, data collection began and took 3.75 months to complete. Data collection occurred from June 1, 2017, through September 25, 2017. Data were collected at four points, beginning when each participant was enrolled. All participants were pregnant and at 36 weeks or more gestation. Baseline data were collected, which included demographic information, the Breastfeeding Self-Efficacy Scale—Short Form (BSES-SF) and LATCH Score Scale at 1 to 3 hours after delivery. Postintervention data were collected at Day 2 postpartum (hospital discharge) and at 2 weeks and 4 weeks postpartum using the BSES-SF (Dennis, 1999) to measure the participants' self-efficacy for breastfeeding. In addition, the LATCH Score Scale (Adams & Hewell, 1997) was used to measure breastfeeding duration. I created a log for each participant to record when breastfeeding and hand expression were initiated. Postpartum data pertained to each participant's breastfeeding status, if she received breastfeeding

consultation after discharge from the hospital, the day on which white milk was established, and whether the baby was jaundiced or received phototherapy (Appendix D). Thirty-five participants agreed to participate in the study, but three participants were excluded because they did not meet inclusion criteria: One baby was admitted to the NICU after delivery, one mother was excluded due to age (39 years old), and one mother was excluded for not returning the follow-up questionnaires or answering phone calls. Therefore, the final number of participants was 32.

Participants

This study included a population of American pregnant women who received their prenatal care and delivered their babies at the study hospital. The sample size, as determined by G*Power, was 20, using repeated measures ANOVA to give the study 95% power with Cohen's d of 0.8 (Cohen, 1988) and alpha level of 0.05 with a medium effect size of 0.5. However, I recruited 35 participants to account for attrition, and the final number of participants was 32.

The mean age of the sample was 27.9 ($SD = 4.5$) years old. Most of the participants were married (78%), had graduated from high school (47%), were employed full time (63%), were non smokers (88%), and were non drinkers (91%). All of the participants (100%) had a breastfeeding support person who was their spouse, family member, or friend.

Data Analysis

Demographic information was analyzed using SPSS 23. A one-way repeated measures ANOVA was conducted on each of the dependent variables to determine if the

null hypothesis should be retained. The repeated measure ANOVA specified one significance difference of a within-subject factor, time (independent measure). A Bonferroni post hoc test was used to test which pairs of measures (e.g., baseline vs. first postintervention) significantly differed from each other. Prior to testing the hypotheses, the assumptions of normality for the dependent measures for each level of the within-subject factor and equality of variances of the differences between levels of the within-subject factors (i.e., sphericity) were examined. The study p -value was set at $p < 0.05$ for tests of the effectiveness of breast hand expression teaching with lactation support.

Treatment/Intervention Fidelity

Treatment fidelity ensures that a study can adequately test a hypothesis in relation to the underlying theory on which the study was built (Resnick, 2012). To maximize treatment fidelity in this study, Bandura's self-efficacy theory was the underlying theory used to test the hypothesis (Resnick, 2012).

However, the initial plan was for the labor and delivery nurses (or me) to administer the intervention on breast hand expression within the first 1 to 3 hours after delivery. However, given that the new study site was a long drive away from where I live, the following remedy was implemented to address possible setbacks to treatment fidelity: The participants were given a link to the website housing the hand expression video (Witt & Bolman, 2013) to teach them and their support person how to correctly perform hand expression as well as position and latch their baby, so that they would be comfortable with hand expression before delivery. The participants were encouraged to perform breast hand expression within the first hour of delivery after breastfeeding their

baby. In this study, 29 (91%) of participants initiated breast hand expression within the first hour following delivery after breastfeeding their baby, and only 4 (9%) participants initiated hand expression between the first and second hours after delivery. All of the participants said that they were comfortable with breast hand expression and fed their baby the colostrum.

The breast hand expression video (Witt & Bolman, 2013) was used to provide proper education to the participants and their support persons on performing the treatment, breast hand expression, within the first hour after delivery. Hence, the breast hand expression video as a teaching tool standardized the training for the participants to ensure that they delivered the same intervention, breast hand expression, accurately and consistently.

Study Results

Descriptive Statistics

All of the study participants were female, with an average age of 27.9 ($SD= 4.5$) years old. Three-quarters of the participants were married (78%), and 22% were single. Each of the participants had a breastfeeding support person who was her spouse, family member, or friend. In terms of highest level of education, about half of the participants had graduated from high school (47%), 16% had an associate's degree, 25% had a bachelor's degree, and 9% had a post doctorate. The majority of the participants were employed full time (63%), while 9% were employed part time and 28% were not employed. The majority of the participants were current non smokers (88%) and current non drinkers (91%). Table 1 provides more detailed descriptive demographic data.

Table 1

Participants' Sociodemographic Characteristics (Categorical Variables)

	<i>N</i>	%
Marital status		
Single	7	21.9
Married	25	78.1
Education		
Less than high school graduate	1	3.1
High school graduate	15	46.9
Associates degree	5	15.6
Bachelor's degree	8	25.0
Post doctorate	3	9.4
Employment status		
Part time	3	9.4
Full time	20	62.5
Not employed	9	28.1
Monthly income		
Less than \$2,500	7	21.9
\$2,500-\$5,000	17	53.1
\$5,001-\$7,500	4	12.5
\$7,501-\$10,000	0	0.0
Greater than \$10,000	1	3.1
Did not respond	3	9.4
Smoking status		
Never smoked	28	87.5
Recently stopped	4	12.5
Current alcohol consumption		
None	29	90.6
1 drink per week	3	9.4

Table 2 provides descriptive statistics for study outcomes. The results showed that Latch Score and Breast Feeding Self-Efficacy Score increased over time. Measures of skew and kurtosis, box plots, and the Shapiro-Wilk test were used to assess the assumption of normality. Based on high values of skewness and kurtosis and significant values for the Shapiro-Wilk test, the data were determined to be non normally distributed. Data were thus normalized with a log transformation prior to analyses. It should be noted that the self-efficacy measure at the third posttest had a perfect score for all participants. Although that is the best outcome, the data point was excluded from further analyses because it would have been a constant in models of change (i.e., there is no variance to be modeled).

Table 2

Descriptive Statistics for Study Outcomes (Continuous Variables)

	Baseline		Posttest 1		Posttest 2		Posttest 3	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Latch Score	7.13	1.24	8.69	0.74	9.91	0.30	9.97	0.18
Breastfeeding Self-Efficacy	24.94	10.30	50.22	8.08	65.72	3.38	70.00	0.00

Note. SD = standard deviation. Means and standard deviations reported are in the original metric.

Statistical Analysis of LATCH Score

Tables 3 through 5 provide information on the one-way repeated measure ANOVA for the Latch Scores. Sphericity of the data could not be assumed, as evidenced by a significant Mauchley's test of sphericity ($\chi^2[5] = 83.00, p < .001$). Thus, evaluation of the change over time was based on the Greenhouse-Geisser test to adjust for no sphericity which showed that change over time was significantly different from zero

($F[1.40, 43.35] = 124.43, p < .001$) and associated with a large effect size (partial $\eta^2 = .801$). This signifies that the intervention, breast hand expression with lactation support, had a significantly positive effect on breastfeeding duration at 6 weeks postpartum.

Table 3

Estimated Marginal Means: Time, Transformed LATCH Scores

Time	Mean	Std. error	95% confidence interval	
			Lower bound	Upper bound
1	2.659	.042	2.574	2.744
2	2.945	.023	2.899	2.991
3	3.147	.008	3.130	3.164
4	3.157	.005	3.168	3.168

Table 4

Mauchly's Test of Sphericity^b: LATCH Score Measures

Within-subjects effect	Mauchly's W	Approx. chi-square	df	Sig.
Time	.061	83.002	5	.000
		Epsilon ^a		
Within-subjects effect	Greenhouse-Geisser	Huynh-Feldt	Lower-bound	
Time	.466	.481		.333

Note. Tests the null hypothesis that the error covariance matrix of the orthonormal zed transformed dependent variables is proportional to an identity matrix.

^aMay be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the tests of within-subject effects in Table 5. ^bDesign: Intercept.

Table 5

Test Within-Subject Effects: Measure of LATCH Scores

Source	Type III sum of squares	<i>df</i>	Mean square	<i>F</i>	Sig.	Partial eta squared
Time						
Sphericity assumed	5.232	3	1.744	124.434	.000	.801
Greenhouse- Geisser	5.232	1.398	3.742	124.434	.000	.801
Huynh-Feldt	5.232	1.444	3.623	124.434	.000	.801
Lower bound	5.232	1.000	5.232	124.434	.000	.801
Error time						
Sphericity assumed	1.303	93	.014			
	1.303	43.347	.030			
Greenhouse- Geisser	1.303	44.764	.029			
Huynh-Feldt	1.303	31.000	.042			
Lower bound						

Post-Hoc Analyses (LATCH Scores)

Table 6 presents a Bonferroni post hoc pairwise comparison of means, which showed that the baseline Latch score was significantly lower than all of the postintervention Latch scores (all p -values $< .001$), the second Latch postintervention score was significantly lower than the third and fourth Latch postintervention scores (all p -values $< .001$), but the third postintervention Latch score did not significantly differ from the fourth Latch score ($p = .963$). Thus, based on results of the one-way repeated measure ANOVA and the post hoc pairwise comparison, the null hypothesis that the mean scores were equal across time was rejected.

The post-hoc pairwise comparisons revealed that over time, Latch scores significantly increased from baseline through the third post intervention. The Latch scores leveled out between the third and fourth measurements (see Figure 2 for the log transformed estimated marginal means over time).

Table 6

Bonferroni Post Hoc Pairwise Comparisons: LATCH Score Measures

(I) time	(J) time	Mean difference (I - J)	Std. error	Sig. ^a	95% confidence interval for difference ^a	
					Lower bound	Upper bound.
1	2	-.286*	.032	.000	-.377	-.194
	3	-.488*	.041	.000	-.60	-.373
	4	-.498*	.040	.000	-.612	-.384
2	1	.286*	.032	.000	.194	.377
	3	-.202*	.020	.000	-.259	-.145
	4	-.212*	.021	.000	-.272	-.153
3	1	-.488*	.041	.000	.373	.603
	2	-.202*	.020	.000	.145	.259
	4	-.010*	.007	.963	-.030	.010
4	1	-.498*	.040	.000	.384	.612
	2	-.212*	.021	.000	.153	.272
	3	-.010*	.007	.963	-.010	.030

Note. Based on estimated marginal means.

^aAdjustment for multiple comparisons: Bonferroni.

*The mean difference is significant at the .05 level.

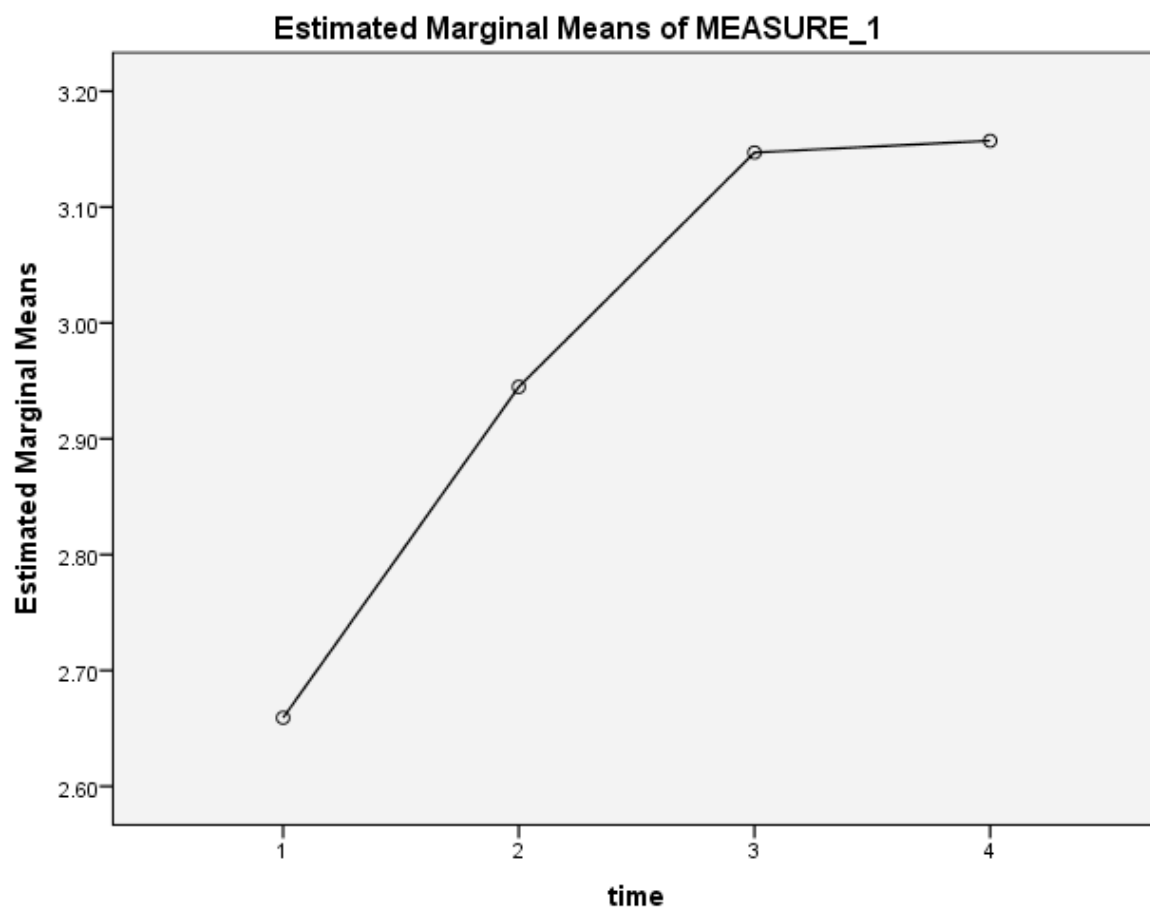


Figure 2. Estimated log-transformed LATCH score marginal means from baseline through third postintervention test.

Statistical Analysis of Self-Efficacy

Tables 7 and 8 present the one-way repeated measure ANOVA for the Breast Self-Efficacy scores. The sphericity of the data could not be assumed as evidenced by a significant Mauchly's test of sphericity ($\chi^2[2] = 17.15, p < .001$). Thus, evaluation of the change over time was based on the Greenhouse-Geisser test to adjust for non-sphericity which showed change over time was significantly different from zero ($F[1.39, 43.19] = 246.79, p < .001$) and associated with a large effect size (partial $\eta^2 = .88$). Hence, these results signify that breast hand expression had large effect on the participants' self-efficacy for breastfeeding with effect size of .888 (partial $\eta^2 = .888$).

Table 7

Mauchly's Test of Sphericity^b: Self-Efficacy Measures

Within-subjects effect	Mauchly's <i>W</i>	Approx. chi-square	<i>df</i>	Sig.
Time	.565	17.154	2	.000
Within-subjects effect	Greenhouse-Geisser	Epsilon ^a Huynh-Feldt	Lower bound	
Time	.697	.719	.500	

Note. Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

^aMay be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the tests of within-subjectt effects table. ^bDesign: Intercept.

Table 8

Tests of Within-Subjects Effects: Self-Efficacy Measures

Source	Type III sum of squares	<i>df</i>	Mean square	<i>F</i>	Sig.	Partial eta squared
Time						
Sphericity	171.095	2	85.547	246.787	.000	.888
Assumed	171.095	1.393	122.803	246.787	.000	.888
Greenhouse- Geisser	171.095	1.438	118.955	246.787	.000	.888
Huynh-Feldt Lower bound	171.095	1.000	171.095	246.787	.000	.888
Time						
Sphericity	21.492	62	.347			
Assumed						
Greenhouse- Geisser	21.492	43.191	.498			
Huynh-Feldt Lower bound	21.492	44.588	.482			
	21.492	31.000	.693			

Post-Hoc Analyses (Self-Efficacy)

Table 9 shows a Bonferoni Post Hoc pair-wise comparison of means which revealed that the baseline score was significantly lower than all of the Breast Self-Efficacy post intervention scores (*all p-values <.001*) and the second Breast Self-Efficacy posttest score was significantly lower than the third Breast Self-Efficacy posttest score (*p <.001*).

Thus, based on results of the one-way repeated measure ANOVA, I rejected the null hypothesis because Breast Self-Efficacy scores significantly increased from baseline to the first post intervention and from the first to the second post intervention indicating a statistically significant change (see Figure 3 for the log transformed estimated marginal means over time).

Table 9

Bonferoni Post Hoc Pairwise Comparisons Estimates: Self-Efficacy Measures

Time		Mean	Std. error	95% confidence interval		
				Lower bound	Upper bound	
1	2	4.900	.173	4.546	5.253	
	3	7.066	.096	6.869	7.263	
		8.104	.037	8.028	8.180	
(I) time	(J) time	Mean difference (I - J)	Std. error	Sig. ^a	95% confidence interval for difference ^a	
					Lower bound	Upper bound
1	2	-2.167*	.163	.000	-2.579	-1.754
	3	-3.204*	.176	.000	-3.649	-2.760
2	1	2.167*	.163	.000	1.754	2.579
	3	-1.038*	.087	.000	-1.258	-.818
3	1	3.204*	.176	.000	2.760	3.649
	2	1.038*	.087	.000	.818	1.258

Note. Based on estimated marginal means.

^aAdjustment for multiple comparisons: Bonferroni.

*The mean difference is significant at the .05 level.

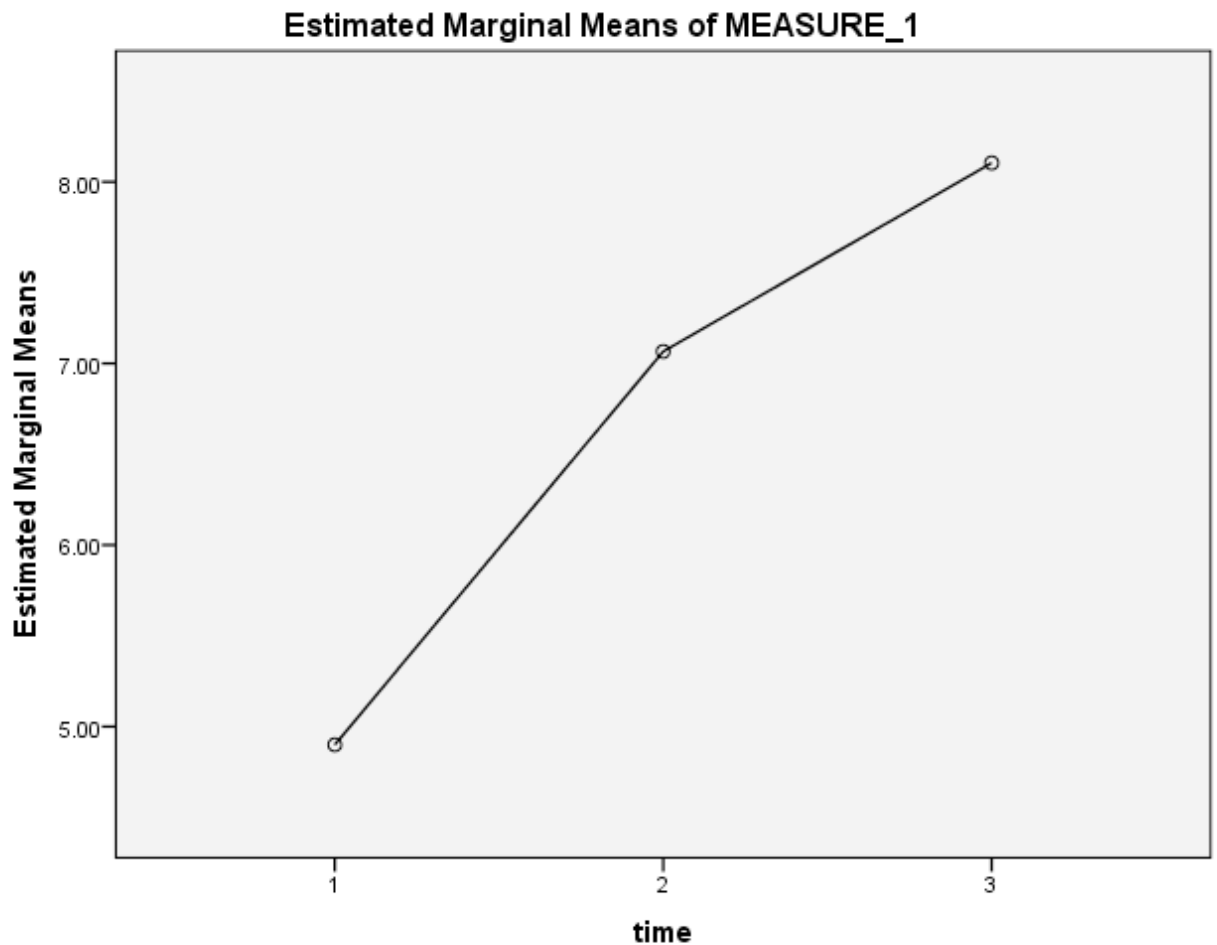


Figure 3. Estimated log-transformed breast self-efficacy marginal means from baseline through second postintervention test.

Summary

The data analysis above showed that the one way repeated measure ANOVA and the post hoc analysis conducted to test the hypothesis for this study, revealed a statistically significant large effect of the intervention breast hand expression with lactation support on the dependent variables, self-efficacy for breastfeeding with effect size of 0.888 and breastfeeding duration with effect size of 0.801.

Thus, this signifies that intervention breast hand expression with lactation support had large effects on the participants' self- efficacy for breastfeeding and breastfeeding duration at 6 weeks postpartum. In chapter 5, I will discuss my key findings in the study, limitations of the study, make recommendations for further research and discuss the implications of this study for social change with its ripple effects on infants, mothers, workforce and economic effects on the society.

All the participants said they were comfortable with the hand expression and fed their baby the colostrum.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to determine the effect of breast hand expression with lactation support on a woman's self-efficacy for breastfeeding and breastfeeding duration. This study was a quantitative in nature and was designed to fill the gap in literature about the effect of breast hand expression with lactation support on a woman's self-efficacy for breastfeeding and subsequent breastfeeding duration. This preliminary study was also aimed at providing data for healthcare workers and lactation consultants to develop policies and guidelines to increase women's self-efficacy for breastfeeding and breastfeeding duration.

Thirty-two participants were enrolled in the study. The average age was 27.9 ($SD = 4.5$), and 29 (91%) participants had white milk established at 2 days postpartum, except for the Cesarean delivery participant, whose white milk was established on Day 3 postpartum. In the follow-up telephone survey, almost all of the participants, 29 (91%), had initiated breast hand expression within the first 1 hour after delivery after the initial breastfeeding, and only 4 (9%) participants had initiated hand expression between 1 hour and 2 hours after delivery. The results of the study revealed a statistically significant large effect of the intervention, breast hand expression with lactation support, on the dependent variables: self-efficacy for breastfeeding, with an effect size of 0.888, and breastfeeding duration, with an effect size of 0.801. These results signify that breast hand expression with lactation support had large effects on the participants' self-efficacy for breastfeeding and breastfeeding duration at 6 weeks postpartum. In this study, the follow-

up phone calls to answer the participants' questions may have had a positive effect on the women's self-efficacy for breastfeeding and breastfeeding duration. There was no difference in the time in which white milk was established between the participants who initiated hand expression within the first hour or two after delivery.

Interpretation of Findings

There were three major outcomes in this intervention study. First, the study results revealed that hand expression with lactation support had a significant effect on the mothers' self-efficacy for breastfeeding and breastfeeding duration. Second, the intervention increased exclusive breastfeeding duration at 6 weeks postpartum with strong effect. All of the participants reported increased self-efficacy for breastfeeding and were all exclusively breastfeeding with increased self-efficacy at 6 weeks postpartum. Third, the LATCH Scores and the participants' self-efficacy significantly increased over time, with large effects of 0.801 and 0.888, respectively.

Breastfeeding Self-Efficacy

The results of my study show that breastfeeding self-efficacy increased over time. The results show that the baseline breastfeeding self-efficacy score was significantly lower than all of the breast self-efficacy post intervention scores (all p -values $< .001$), and the second breast self-efficacy post intervention score was significantly lower than the third breast self-efficacy post intervention score ($p < .001$). The current findings corroborate previous data reported by Otsuka et al. (2014) that revealed that self-efficacy intervention enhanced breastfeeding self-efficacy and prolonged breastfeeding duration. The results of this study did not support the findings of Chan et al. (2016), who reported

that intervention increased participants' self-efficacy for breastfeeding at 2 weeks postpartum and enhanced breastfeeding duration.

Breastfeeding Duration

The results of my study are supported by other studies that revealed that support in any form, whether from a layman or a health care professional, increased duration of breastfeeding for up to 6 months postdelivery (Britton et al., 2007; Hung & Berg, 2011). Because the participants in this study were still breastfeeding at 6 weeks postpartum, it is more likely that the participants would breastfeed for up to 6 months, given that all of the participants said that breastfeeding was going well and that they wanted to continue breastfeeding their babies for as long as possible, probably due to increased self-efficacy (Chan et al., 2016). Research has shown that if a mother is breastfeeding at 6 weeks postpartum, she will be more likely to continue to breastfeed at six months (Meedya et al., 2010; Wehelms et al., 2008).

Results of this study are aligned with the work of Awano and Shimada (2010; Meedya et al., 2010), which demonstrated that increased self-efficacy increases duration of breastfeeding. The study results support those of Grassley and Sauls (2011), who found that women who received an intervention were more likely to initiate breastfeeding in the first hour of life, which has been shown to increase breastfeeding duration (GiGirolamo et al., 2008; Murray et al., 2007). However, Pound et al. (2015) found no significant difference between the intervention and control groups of women who exclusively breastfed until 3 months postpartum regardless of the level of breastfeeding

support. Souza and Fernandes (2014) also reported that increased self-efficacy scores did not increase breastfeeding duration.

Theoretical/Conceptual Findings

In this study, it was theorized that the intervention, hand expression with lactation support, could increase a woman's self-efficacy for breastfeeding and subsequently increase duration of breastfeeding. The results show that hand expression with lactation support had a positive effect on the women's self-efficacy for breastfeeding, which increased breastfeeding duration. This aligns with Bandura's SET, which postulates that if an individual believes in the ability to fulfill a specific action and is confident about performing the task, actual performance of the task will result, because what people believe they can do depends on their self-efficacy to perform the particular task (Bandura, 1997). The participants believed that they felt comfortable breastfeeding their babies with increase self-efficacy; hence, they continued to breastfeed at 6 weeks postpartum. The results also revealed that self-efficacy and breastfeeding duration increased over time from the baseline scores.

Limitations of the Study

A limitation in this study was the one-group design, which did not allow for a control comparison. Convenience sampling and using one group of women from one institution limited the generalizability of the study to other breastfeeding mothers. This study was also limited to only English-speaking American women, thereby excluding women who spoke other languages. This study was also limited to first-time pregnant mothers, thereby excluding women who had babies previously. Lastly, this

study was limited to 6 weeks follow-up duration; long-term follow-up for 6 months or more was not feasible due to time and resource constraints.

Recommendations

Future studies should explore the use of more rigorous research designs with a control group. Inclusion of pregnant women who speak languages other than English would provide a more robust and diverse sample. Research on the effect of breast hand expression with lactation support on self-efficacy for breastfeeding and breastfeeding duration should be conducted using multiple sites to make the study more generalizable to other populations.

This study found a significant effect of breast hand expression with lactation support on participants' self-efficacy and breast-feeding duration. Because data were collected for 6 weeks, longitudinal studies are needed to follow participants for longer periods of time (i.e., 6 months or longer) to strengthen this evidence and allow healthcare professionals and lactation consultants to formulate policy around this important phenomenon to increase women's self-efficacy and consequently increase breastfeeding duration (Chan et al., 2016)

Implications

Implications for Theory

Bandura's self-efficacy theory was used to test the hypothesis that breast hand expression teaching and lactation support have effects on mothers' self-efficacy for breastfeeding and breastfeeding duration. The results of this study support Bandura's theory because increased self-efficacy is embedded in the three factors that influence self-

efficacy according to SCT, from which Bandura's theory originated (Bandura, 1977). The first of these factors is behavior of the individual; in the study, mothers had an intention to breastfeed. The second factor is the environment in which mother and baby found themselves, which included hospital support for hand expression and exclusive breastfeeding. In relation to personal/cognitive factors, the mother believes that she can perform hand expression and breastfeed with comfort (Hector et al., 2005).

Implications for Practice

The study provides data and perspectives on the effects of hand expression with lactation support on a mother's self-efficacy for breastfeeding and subsequently increased breastfeeding duration up to 6 weeks postpartum. The results of this study provide data that will help to fill the gap in the literature concerning the effects of breast hand expression with lactation support on a woman's self-efficacy for breastfeeding and breastfeeding duration. The results of this study may also provide data for healthcare professionals and lactation consultants to formulate policy to increase women's self-efficacy and subsequently increase breastfeeding duration (Awano & Shimada, 2010).

Implications to Positive Social Change

This study contributes to positive social change because increasing the length of breastfeeding improves health outcomes of infants to achieve optimal growth and development (Laureate Education, 2015g; WHO, 2015), with ripple effects of less infant morbidity and mortality and a healthier workforce. When infants are healthy, there are fewer missed work days for parents to take care of their sick babies, which leads to a stronger workforce. Enhancing the length of breastfeeding may also save society

resources, in that research has shown that \$13 billion would be saved if 90% of mothers breastfed their babies for 6 months (Bartick & Reinhold, 2010; LaLeche League International, 2016; Tuthill et al., 2015). This study may create awareness of how to increase a woman's self-efficacy for breastfeeding and consequently increase the duration of breastfeeding. Because the women in this study were exclusively breastfeeding with increased self-efficacy at 6 weeks postpartum, it was likely that they would continue to breastfeed for a longer duration of up to 6 months and beyond due to increased self-efficacy (Awano & Shimada, 2010; Chan et al, 2016; Meedya et al., 2010; Wehelms et al., 2008).

Conclusion

In conclusion, this study was a preliminary investigation of the effect of breast hand expression with lactation support on a woman's self-efficacy for breastfeeding and breastfeeding duration. Despite the limitation of the one group repeated measure design, this study yielded significant data that add to the body of knowledge, especially concerning the large effects of the intervention on self-efficacy and breastfeeding duration. This study also showed that follow-up phone calls are necessary to answer women's questions during difficult times at home before they give up on breastfeeding. Since breast hand expression with lactation support increases a woman's self-efficacy for breastfeeding and breastfeeding duration, education and policies can be implemented that could increase women's self-efficacy for breastfeeding and breastfeeding duration. The findings of this study also have significant implications for healthcare professionals' and lactation consultants' use of the Breastfeeding Self-Efficacy Scale—Short Form to assess

breastfeeding mothers' self-efficacy (Dennis, 1999) prior to hospital discharge, which could capture low self- efficacy scores that might indicate early discontinuation of breastfeeding. It may be a reasonable goal for healthcare professionals and lactation consultants to provide lactation support to new mothers so that their self- efficacy is enhanced or maintained, and to subsequently increase breastfeeding duration.

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Appendix A: Breastfeeding Self- Efficacy Scale—Short Form (Dennis, 1999)

Breastfeeding Self-Efficacy Scale – Short Form

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

1 = not at all confident

2 = not very confident

3 = sometimes confident

4 = confident

5 = very confident

Not at all confident**Very Confident**

1	I can always determine that my baby is getting enough milk	1	2	3	4	5
2	I can always successfully cope with breastfeeding like I have with other challenging tasks	1	2	3	4	5
3	I can always breastfeed my baby without using formula	1	2	3	4	5

	as a supplement					
	I can always ensure that my baby is properly latched on					
4	for the whole feeding	1	2	3	4	5
	I can always manage the breastfeeding situation to my					
5	satisfaction	1	2	3	4	5
	I can always manage to breastfeed even if my baby is					
6	crying	1	2	3	4	5
7	I can always keep wanting to breastfeed	1	2	3	4	5
	I can always comfortably breastfeed with my family					
8	members present	1	2	3	4	5
	I can always be satisfied with my breastfeeding					
9	experience	1	2	3	4	5
	I can always deal with the fact that breastfeeding can be					
10	time consuming	1	2	3	4	5
	I can always finish feeding my baby on one breast before					
11	switching to the other breast	1	2	3	4	5
	I can always continue to breastfeed my baby for every					
12	feeding	1	2	3	4	5
13	I can always manage to keep up with my baby's	1	2	3	4	5

breastfeeding demands

14	I can always tell when my baby is finished breastfeeding	1	2	3	4	5
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Appendix B: The LATCH Score Scale (Adams & Hewell, 1997)

	0	1	2
L: Latch	Too sleepy or reluctant No Latch achieved	Repeated attempts Hold nipple in mouth Stimulate suck	Grasp breast Tongue down Lips flanged
A: Audible swallowing	None	A few with stimulation	Rhythmic sucking Spontaneous and intermittent <24 hours. Spontaneous and frequent > 24 hours old
T: Type of nipple	Inverted	Flat	Averted (after stimulation)
C: Comfort (breast/Nipple)	Engorged Cracked /bleeding/large Blister or bruises Severe discomfort	Filling Reddened/small Blister or bruises Mild/moderate discomfort	Soft Non tender
H: Hold (positioning)	Full assist (staff holds infant at breast	Minimal Assist Teach 1 side: mother does other Staff holds and then mother takes over	No assist from staff Mother able to position/hold infant

Appendix C: Demographic Data

1. Name

2. DOB

3. Expected date of delivery

4. Marital status

₁ Single ₂ Married ₃ Divorced/Separated ₄ Widowed

5. Do you intend to breastfeed

Yes NO

6. Who is your breastfeeding support person:

7. Number of children

8. Highest level of education you have completed?

₁ Less than high school ₂ High School ₃ Associate Degree
₄ Bachelor's Degree ₅ Post Graduate

9. Which one of the following best describes your employment status?

₁ Employed Full Time ₂ Employed Part Time
₃ Self Employed ₄ Not Employed

10. What is your monthly income?

₁ Less than \$2,500 ₂ \$2,500 - 5,000 ₃ \$5,001 - \$7500
₄ \$7,501 - 10,000 ₅ More than \$10,000 ₆ Prefer not to answer

11. Smoking history

- ₁ Current smoker (have you smoked within the last month?)
- ₂ Recent (stopped smoking between one month and one year ago)
- ₃ Former (stopped smoking more than one year ago)
- ₄ Never smoked

12. If you smoke, on average how many cigarettes do you smoke per day?

_____ number of cigarettes

13. On average, how often do you drink alcoholic beverages (beer, wine, or liquor)?

(Note: 1 drink is equal to 1.5 ounces of liquor, 12 ounces of beer, or 5 ounces of wine)

- ₁ Never
- ₂ One or fewer alcoholic drinks per week
- ₃ 2-7 drinks per week
- ₄ More than 7 alcoholic drinks per week

Appendix D: Telephone Follow-Up Call

Research Subjects' Telephone Follow up Call

Hello, my name is Florence Omekara. I'm calling from Salem Hospital as a follow up on your breastfeeding, as a subject enrolled in a breastfeeding research study. Am I speaking to _____ (name of subject)?

I got your phone number from you during recruitment at birthing education class/hospital tour at Salem Hospital. Is this a good time to talk? I expect this phone call will take about five minutes. If this is not a good time, what is a good time to call you? (If it is a good time, I will continue).

I'm calling to find out how breastfeeding is going for you and your baby, and to answer any question you may have.

1. Are you still breastfeeding your baby? Yes _____ No _____
2. Is your baby latching well? Yes _____ No _____
3. Are you still confident in breastfeeding your baby? Yes _____ No _____
4. If no, how long did you breastfed your baby? _____
5. Did you receive out patient lactation consultation? Yes _____ No _____
6. Do you need any breastfeeding help? Yes _____ No _____
7. If you need further breastfeeding help, can you call out patient lactation for follow up appointment at 503-814-4539
8. At what day did your white milk come in?
 - a. Day 1
 - b. Day 2

c. Day 3

d Day 4

9. Was your baby jaundice?

a. Yes

b. No

If yes, was baby on bilirubin light (phototherapy)

a. Yes

b. No

Thank you so much for your time today.

Appendix E: Research Flier



Research Opportunity

You are invited to participate in a breastfeeding research study to determine the effects of breast hand-expression with lactation support on the mother's comfort level for breastfeeding and breastfeeding duration after delivery.

To qualify to participate in this breastfeeding study, you will meet the following requirements:

You will:

- be a first time mother
- be 18 to 38 years old
- deliver at Salem Hospital
- have no major health issues
- intend to breastfeed your baby
- be willing to complete a short initial questionnaire after consent
- be willing to complete several questionnaires while in the hospital
- After discharge, be willing to receive 2 phone calls and complete questionnaires at your home.

Your total time is about 15 minutes to fill out the surveys, watch a brief teaching/video and phone surveys over a six-week period.

If you are interested in participating, please tell the birthing class educator to call: Florence Omekara RN, IBCLC, (503) 442- 6985

Appendix F: Benefits of Breastfeeding

Benefits to Infants include:

- Nutritional and immunological benefits against several diseases such as otitis media, upper and lower respiratory infections, pneumonia, intestinal disorders, staphylococcal aerus, streptococcus, allergies, diabetes, rheumatoid arthritis, many childhood cancer and meningitis (LaLechee League, 2016).

Benefits to Mothers- Reduces the risk of:

- Breast cancer
- Ovarian cancer
- Uterine cancer
- Postmenopausal osteoporosis

Benefits to the Society:

- Saves societies resources
- Save \$ 13 billion dollars per year in healthcare cost, if 90% of mothers breastfeed for 6 months (Bartick & Reinhold, 2010; Mass, 2011).
- Save 911 infant deaths per year (Bartick & Reinhold, 2010).
- Promote healthy workforce by reducing parental sick time off

Appendix G: Hand Expression Video (Witt & Bolman, 2013)

- Five-Minute Breast Hand Expression Video

www.BFMEDNEO.com (Witt & Bolman, 2013).

Appendix H: Authorization to Use Breastfeeding Self-Efficacy Scale—Short Form

The Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF) is under the copy right of

Dr. Cindy-Lee Dennis (2003). Permission to use the BSES-SF must be obtained in writing or via email prior to use. There is no charge for this use. However, the requester must agree to forward a copy of all research to the developer following any investigation.

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“I am enrolled
in the
Breastfeeding
Study at Salem
Health

