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## **Breastfeeding knowledge, practice, attitudes, and influencing factors: Findings from a selected sample of breastfeeding mothers in Bemidji, Minnesota**

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Breastfeeding knowledge, practice, attitudes, and influencing factors: Findings from a  
selected sample of breastfeeding mothers in Bemidji, Minnesota

By

Hadeel Tanash

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Breastfeeding knowledge, practice, and influencing factors: Findings from a selected sample of breastfeeding mothers in Bemidji, Minnesota

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This Thesis has been examined and approved by the following members of the student's committee.

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## **Abstract**

Breastfeeding is generally considered by health professionals as the ideal feeding practice for infants. It is the first communication pathway between the mother and her infant. This study was designed to describe breastfeeding knowledge, attitudes, practice and influencing factors among breastfeeding mothers in Bemidji, MN. This cross-sectional study allowed the researcher to determine trends and other information about the sample in the Bemidji area. The participants for this study were breastfeeding mothers who gave a birth at Sanford Health located in Bemidji, MN. A written data collection instrument containing forty nine questions was used to collect data. The findings of this study showed that the participants were knowledgeable about breastfeeding and that they had positive attitudes toward breastfeeding. Also, the findings indicated that most of the mothers had received help from hospital staff regarding breastfeeding practice and most of the mothers had breastfed their baby just after birth or in less than one hour after birth.

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## Chapter 1

### Introduction

#### Overview

Historically, breastfeeding has generally considered by health professionals as the ideal feeding practice for infants. It is the first communication pathway between the mother and her infant. Previous studies confirm that breastfeeding has advantages for both babies and mothers, including providing the needed nutrition for the babies, boosting the baby's immune system, helping mothers to lose weight after pregnancy, and stimulating the uterus to return to its previous position before pregnancy (The Office on Women's Health, 2012). In addition, infants can absorb and digest breast milk more easily than baby formula (The Office on Women's Health, 2012).

World Health Organization (WHO) recommends breastfeeding as a main source of food for babies for the first six months, and encourages mothers to consider breastfeeding as the only feeding source. Between six months and two years old, it is recommended that mothers could use other supplemental sources (such as water, other liquids, or solid baby food) to feed their babies along with breastfeeding (WHO, 2013).

In the last decade, a breastfeeding rate in the United States has risen from 35 percent in 2000 to 49 percent in 2010 (Centers for Disease Control and Prevention (CDC), 2013). The *Healthy People* objectives for 2020, has set a target to increase the percentage of infants who are breastfed by 2020 to be 81.9 % for children who ever breastfed, 60.6% for children who breastfed for 6 months, 34.1% for children who breastfed for 12 months, 46.2% for children who

exclusively breastfed for 3 months, and 25.5% for children who exclusively breastfed for 6 months (United States Breastfeeding Committee, 2013).

Another effort for encouraging breastfeeding practice is "Baby Friendly" hospitals. More hospitals in Minnesota are achieving national "Baby Friendly" designations, which means that their maternity staff are trained to support new mothers when they indicate a willingness to try breastfeeding (Sanford Health, 2014). Therefore, researchers expected that the breastfeeding rate would increase within Minnesota State with more "Baby Friendly" hospitals but the CDC results show the opposite. The breastfeeding rates in Minnesota have declined from 81.9% in 2010 to 78% in 2012 for children who are ever breastfed and from 49% in 2010 to 35.5% in 2012 for children who exclusively breastfed at 3 months, and from 20.4% in 2010 to 16.1% in 2012 for children who are exclusively breastfed at 6 months (CDC, 2012; CDC, 2010). The following figures present these percentages for Minnesota and other states for 2010 and 2012.

Figure 1.1. Breastfeeding rate in 2010 (Centers for Disease Control and Prevention, 2010)

State	Ever Breastfed	Breastfeeding at 5 months	Breastfeeding at 12 months	Exclusive breastfeeding at 3 months	Exclusive breastfeeding at 6 months
<b>U.S. National</b>	<b>75.0</b>	<b>43.0</b>	<b>22.4</b>	<b>33.0</b>	<b>13.3</b>
Alabama	64.6	30.0	15.9	23.3	8.8
Alaska	<b>83.3</b>	<b>57.1</b>	<b>32.7</b>	<b>43.6</b>	<b>23.1</b>
Arizona	78.8	49.6	25.3	34.5	12.7
Arkansas	61.3	27.5	12.6	23.0	11.8
California	86.6	53.8	31.4	40.4	17.2
Colorado	88.7	57.7	29.3	46.8	22.5
Connecticut	71.0	49.3	21.7	39.0	19.5
Delaware	71.5	43.2	20.3	31.7	11.5
Dist of Columbia	65.4	44.1	23.7	29.1	11.7
Florida	73.4	38.0	17.3	30.6	9.9
Georgia	64.8	33.5	17.9	25.1	9.7
Hawaii	87.5	60.4	33.1	42.3	16.0
Idaho	88.9	53.2	30.8	41.5	21.8
Illinois	70.2	36.0	16.4	27.9	11.2
Indiana	70.5	37.8	16.9	29.2	10.5
Iowa	74.4	42.3	19.2	35.5	15.7
Kansas	79.6	47.4	20.2	37.3	18.5
Kentucky	58.7	29.6	13.1	26.4	12.0
Louisiana	56.6	20.2	9.8	22.0	7.8
Maine	75.2	48.2	27.6	45.5	18.2
Maryland	73.4	45.5	17.9	32.4	10.8
Massachusetts	77.6	50.1	23.3	37.9	20.5
Michigan	70.1	38.6	22.9	28.7	10.1
<b>Minnesota</b>	<b>81.9</b>	<b>51.7</b>	<b>26.6</b>	<b>49.0</b>	<b>20.4</b>
Mississippi	52.5	22.5	8.0	15.2	6.5
Missouri	72.6	38.2	19.4	28.2	12.4
Montana	88.5	55.4	34.8	50.8	23.0

Figure 1.2. Breastfeeding rate in 2012 (Centers for Disease Control and Prevention, 2012)

State	Ever Breastfed	Breastfeeding at 6 months	Breastfeeding at 12 months	Exclusive breastfeeding at 3 months	Exclusive breastfeeding at 6 months
U.S. National	76.9	47.2	25.5	36.0	16.3
Alabama	57.2	29.7	14.4	24.8	9.1
Alaska	85.1	54.6	31.7	46.6	21.0
Arizona	76.8	43.4	27.5	35.3	19.6
Arkansas	62.4	29.2	13.3	23.8	10.6
California	87.6	56.1	31.1	41.4	21.7
Colorado	87.5	56.9	27.3	50.7	26.6
Connecticut	79.1	48.4	23.8	35.8	12.6
Delaware	71.8	42.8	22.3	32.2	13.1
Dist of Columbia	72.5	46.6	24.2	33.0	14.8
Florida	77.0	46.2	30.1	38.9	19.2
Georgia	70.9	40.8	17.6	27.8	12.9
Hawaii	85.1	51.1	32.4	42.6	20.7
Idaho	90.8	58.9	35.4	52.4	23.2
Illinois	76.8	49.8	25.3	35.7	13.6
Indiana	72.6	39.2	20.9	31.3	13.8
Iowa	79.3	48.7	27.4	43.0	15.6
Kansas	80.2	45.1	23.1	37.8	17.4
Kentucky	59.4	27.3	10.8	21.1	9.6
Louisiana	53.5	23.6	11.9	17.3	9.6
Maine	76.1	41.5	23.1	37.9	15.2
Maryland	72.6	48.5	22.0	31.5	15.0
Massachusetts	84.2	56.8	34.5	40.8	16.5
Michigan	79.1	48.5	24.0	37.2	17.9
Minnesota	78.0	53.8	29.2	35.5	16.1
Mississippi	47.2	26.2	13.0	20.0	7.6

**Statement of the problem:**

Breastfeeding is an important topic in health education because of the many benefits that can be gained for babies, mothers, and communities. For example, the components of breast milk provide the needed nutrition for babies and boost the baby’s immune system. Also, practicing breastfeeding helps mothers lose weight after pregnancy and stimulates the uterus to return to its previous position before pregnancy (The Office on Women's Health, 2012). Breastfeeding has many benefits for the community including, breast milk contains no waste or pollution, and food

support programs, such as WIC program could reduce costs by encouraging breastfeeding and decreasing formula use (Montgomery & Splett, 1997).

The rate of breastfeeding in the state of Minnesota has been decreased from 81.9% in 2010 to 78% in 2012 (CDC, 2010; CDC, 2012). Consequently health educators in Minnesota could improve the awareness of breastfeeding in their communities. The researcher is interested in improving the awareness of breastfeeding in her area of residence (Bemidji, MN). In order to improve the awareness toward breastfeeding in Bemidji, Minnesota, breastfeeding knowledge, practice, and attitudes were investigated to identify the factors that will encourage breastfeeding practice. In addition, the findings of this research can be a reference for other researchers.

### **Purpose**

This study aimed to:

1. Describe the breastfeeding knowledge, attitudes and practice among selected mothers in Bemidji, Minnesota.
2. Identify factors that influence breastfeeding practice for the study sample.
3. Provide a reference study about breastfeeding in Bemidji, MN.

### **Need for the Study:**

According CDC (2010; 2012) statistics, the breastfeeding rate in MN has declined in 2012 compared to the rate in 2010. This study provides information about the breastfeeding mothers' knowledge and breastfeeding attitudes and practice in Bemidji, MN. There are no previous studies about this topic within the Bemidji area. Furthermore, this study describes the knowledge, attitudes, and practice towards breastfeeding and assessed potential factors

associated with breastfeeding practices specifically among sampled mothers in Bemidji, Minnesota.

This study is important because it may encourage mothers to choose breastfeeding as an appropriate feeding method for their infants. Also, it clarifies the factors that affect breastfeeding among mothers in Bemidji, MN. By describing breastfeeding practice and the factors that could affect it, the researcher provides data for future studies about breastfeeding in Bemidji, MN. Publishing the findings of this study helps state and national health institutions to promote the breastfeeding choice in and provides the appropriate foundation for breastfeeding programs and interventions in Bemidji. In addition, health educators could use this published information to promote breastfeeding.

**Research questions:**

1. What are the sampled infants' demographic characteristics?
2. What is the sampled mothers' knowledge about breastfeeding?
3. What are the sampled mothers' attitudes toward breastfeeding?
4. What are the sampled mothers' demographic characteristics (mothers' age, mothers' level of education, and family income)?

**Limitations of the study:**

Access to information about this topic was limited, because there are no previous published studies about breastfeeding in Bemidji, Minnesota.

**Delimitations:**

1. The time frame for completing this study was six months.
2. The location was Sanford Health in Bemidji, MN.
3. The sample consisted of breastfeeding mothers in Bemidji, MN.
4. Participants were limited to mothers who gave birth in hospital (specifically, Sanford Health).
5. Selected participants' babies were: 24 months and under, full term, and without any sign of major birth defects such as:
  - Genetic defects (such as, down syndrome and other conditions).
  - Mouth/facial defects (such as, cleft lip and/or cleft palate).
  - Heart defects, and musculoskeletal defects including arm and leg defects.
  - Stomach/intestinal defects.
  - Eye defects.

**Assumptions:**

1. Participants were breastfeeding mothers.

This was assumed because the aim of the study was to describe breastfeeding mothers' knowledge and attitudes toward breastfeeding.
2. The supplemental feedings participants' infants might have received were due to hospital policy, not maternal request.

According to Sanford Health policies, babies are not given supplemental feedings if the mother does not so desire. Therefore, whether or not the baby received supplemental formula at the hospital was assumed to not be related to the mothers' beliefs about breastfeeding.

3. Breastfeeding is easy and problem free.
4. All mothers gave birth at Sanford Health in Bemidji, MN.

### **Definition of terms**

Breastfeeding: the method of feeding a baby with milk directly from the mother's breast (Bristow, 2012). Breastfeeding is the normal way of providing young infants with the nutrients they need for healthy growth and development (WHO, 2013).

Colostrum, the yellowish, sticky breast milk produced at the end of pregnancy (WHO, 2013).

Exclusive breastfeeding: breast milk only, excluding water, other liquids, and solid foods (WHO, 2013).

## **Chapter 2**

### **Review of Literature**

#### **Introduction**

This research was designed to collect descriptive data about breastfeeding mothers' knowledge, attitudes and practice in Bemidji, MN. This chapter presents an overview of previous research. Literature reviewed is categorized as: 1) definition of breastfeeding; 2) benefits of breastfeeding for infants, mothers, and the community; 3) information about breastfeeding rates; and factors that influence breastfeeding.

#### **Definition of breastfeeding**

While there are many definitions for breastfeeding, for this study the World Health Organization (WHO) definition of breastfeeding is used. WHO has defined breastfeeding as the normal method to provide infants with the nutrients they need for healthy growth and development (WHO, 2013). The following figure depicts the recommended criteria for infant feeding practices from WHO (2007).

Figure 2.1. WHO criteria for infant feeding practices (World Health Organization (WHO), 2007)

Feeding practice	Requires that the infant receive	Allows the infant to receive	Does not allow the infant to receive
Exclusive breastfeeding	Breast milk (including milk expressed or from a wet nurse)	ORS, drops, syrups (vitamins, minerals, medicines)	Anything else
Predominant breastfeeding	Breast milk (including milk expressed or from a wet nurse) as the predominant source of nourishment	Certain liquids (water and water-based drinks, fruit juice), ritual fluids and ORS, drops or syrups (vitamins, minerals, medicines)	Anything else (in particular, non-human milk, food-based fluids)
Complementary feeding <sup>a</sup>	Breast milk (including milk expressed or from a wet nurse) and solid or semi-solid foods	Anything else: any food or liquid including non-human milk and formula	NA
Breastfeeding	Breast milk (including milk expressed or from a wet nurse)	Anything else: any food or liquid including non-human milk and formula	NA
Bottle-feeding	Any liquid (including breast milk) or semi-solid food from a bottle with nipple/teat	Anything else: any food or liquid including non-human milk and formula	NA

## Benefits of breastfeeding for mothers, babies, and community

Breastfeeding has short-term and long-term benefits for infants, mothers, and the community. The following sections explain these benefits in detail and provide statistics to show the importance of breastfeeding.

### Breastfeeding benefits for infants

The components of breast milk provide the needed nutrition for babies, and boost the baby's immune system. These breast milk components are easier to absorb and digest than baby formula because it contains living growth factors, hormones and enzymes which help a baby to easily digest all the goodness from every feeding (The Office on Women's Health, 2012). Breast milk composition starts as colostrum then changes to mature milk, which gives the child the

appropriate nutrition for his/her development process from newborn to older infant (Powe, et al., 2011). One of the most important benefits of breast milk is that it contains living components such as infection fighting antibodies, white blood cells, red blood cells, and anti-viral factors (Taylor, 2013).

In the United States, infants who are breastfed have lower mortality rates compared to infants who were not breastfed (Chen & Rogan, 2004). Also, breastfeeding is associated with decreasing acute illnesses such as gastrointestinal infections, lower respiratory tract diseases and acute otitis media (Mountford & Salcines, 2006). Further, in developed countries researchers found that for infants who were not breastfed risk of dying from infectious diseases in the first month is six times greater than infants who were breastfed (Chen & Rogan, 2004). Similarly, breastfeeding has been linked to the decrease in the risk of gastrointestinal infections, lower respiratory tract diseases and acute otitis media for infants in developed countries (Stanley et al., 2007). Also, according to Stanley and colleagues (2007), breastfeeding practice plays a significant role in reducing the rates of childhood obesity, certain allergic conditions, type 2 diabetes and leukemia.

However, a published report from WHO claimed that breastfeeding has a small association with preventing obesity (Horta & Victora, 2013). Breastfeeding reduced the percentage for obesity at school age by about 20%, after modifying for related factors such as infant birth weight, parental overweight, parental smoking, dietary factors, physical activity and maternal socioeconomic status (Owen, Martin, Whincup, Smith, & Cook, 2005).

In addition, breastfeeding has other long-term benefits for infants, such as such as higher cognitive outcome in full-term infants, less cardiovascular mortality in adults and lower adult

blood pressure (Stanley et al., 2007). However, these benefits could be achieved if the other risk factors have been considered (Stanley et al., 2007).

### **Breastfeeding benefits for mothers**

Practicing breastfeeding helps mothers lose weight after pregnancy and stimulates the uterus to return to its previous position before pregnancy (The Office on Women's Health, 2012). Also, breastfeeding helps in decreasing the risk of type 2 diabetes, breast cancer (Collaborative Group on Hormonal Factors in Breast Cancer, 2002) and ovarian cancer (Rosenblatt & Thomas, 1992). A study about the association between duration of lactation and incidence of type 2 diabetes, was conducted with two groups of mothers in the Nurses' Health Study (NHS). For the first group, without history of gestational diabetes, the risk of developing type 2 diabetes was reduced 4% for each additional year of breastfeeding. For the second group with gestational diabetes, the risk of developing type 2 diabetes was reduced 12% for each additional year of breastfeeding (Stuebe, Rich-Edwards, Willett, Manson, & Michels, 2005).

Another advantage for breastfeeding is decreasing the risk of breast cancer among breastfeeding mothers. According to Collaborative Group on Hormonal Factors in Breast Cancer (2002), there is an association between breastfeeding and breast cancer, and the longer women breast feed the more they are protected against breast cancer. The researchers found that the risk of breast cancer decreased by 4.3% for every 12 months of breastfeeding, and 7% for each birth. Further, many studies reviewed linked breastfeeding and the reduction in the risk of ovarian cancer. Specifically these studies concluded that the women who breastfeed had 21% less risk of ovarian cancer compared to mothers who never breastfed (Stanley et al., 2007).

### **Breastfeeding benefits for community**

Breastfeeding has many benefits for the community including: 1) breast milk contains no waste or pollution; 2) food support programs, such as the WIC program could reduce costs by encouraging breastfeeding and decreasing formula use; 3) breastfeeding mothers will have healthy babies, therefore they will have less absence from work, because they do not have to stay home as frequently because their children are healthier (Breastfeeding Moms, 2012). In addition, one study found that United States government could save about 4 million dollars from the cost of the formula use, if 50% of infants were exclusively breastfed for the first three months of life. Exclusive breastfeeding decreases the demand on formula use; therefore, the government could spend this money on formula support programs (Montgomery & Splett, 1997).

### **Factors Influencing Breastfeeding**

There are many factors that influence the practice of breastfeeding including: psychosocial factors (such as knowledge and attitudes), demographic characteristics, hospital practices, and environmental support. These factors differ by nation; therefore, the effect of these factors on the rate of breastfeeding differs by nations and individual circumstances.

#### **Psychosocial factors**

Knowledge and attitudes (psychosocial factors) are important factors that influence breastfeeding prevalence in general (Chambers, McInnes, Hoddinott, & Alder, 2007). Mothers in Bemidji, MN obtained their knowledge about breastfeeding from different resources such as: physicians, books or articles about breastfeeding, internet, and from mother to mother (M. Auger, personal communication, November 6, 2013). Health care providers should be aware that their own beliefs and attitudes toward breastfeeding may affect a woman's choice to breastfeed

(Auger, 2013). Mothers' trust their health care providers; therefore, care providers opinions regarding a particular issue such as breastfeeding could be considered.

**Demographic characteristics: Maternal age, maternal level of education, and family income.**

According to CDC (2010), there is a significant association between breastfeeding rates and socio-demographic characteristics for mothers including maternal age, maternal education level, and family income. It has been found that breastfeeding rates increased with increasing maternal age for all race-ethnicity groups. Older mothers are more likely to choose breastfeeding than young mothers (McDowell, 1999; Wang, 2006; & Kennedy-Stephenson, 2010). However, low level of maternal education has been linked with low breastfeeding rates (Bertini, Perugi, Dani, Pezzati, Tronchin, Rubaltelli, 2003). Also, breastfeeding rates were higher among mothers who have high family incomes than for mothers who have low family income (McDowell, Wang, & Kennedy-Stephenson, 2010).

**Hospital practices**

To improve breastfeeding rates it is important to involve healthcare providers in the process of encouraging mothers to choose breastfeeding for their children. A published joint statement from WHO and UNICEF to improve breastfeeding rates recommended that all healthcare facilities encourage breastfeeding choice (World Health Organization & UNICEF, 2003).

## **Starting breastfeeding within an hour after delivery, supplementing newborns with formula, and using bottles before discharge**

Initial breastfeeding within at least one hour after delivery reduces neonatal mortality by 22%, and it could prevent more than one million newborn deaths every year all over the world (Jana, 2009). In developing countries, initial breastfeeding reduces deaths due to diarrheal disorders and lower respiratory tract infections in children. It could save about 1.45 million lives each year (Jana, 2009). Also, many infants receive supplemental formula at the nursery after delivery whether due to the hospital policy or maternal request. Further, researchers concluded that supplementing newborns with formula is associated with short exclusive breastfeeding duration (Shenoi, Nair, Saili, & Vaidya, 2012). In addition, WHO recommends avoiding using bottles before hospital discharge, and during the breastfeeding establishment time. Using bottles leads to nipple confusion, because it provides a larger amount of milk in less time than mother's breast which requires more energy from the baby to get enough milk. Therefore, bottles will reduce the sucking time from the mother's breast (Neifert, Lawrence, & Seacat, 1995). Also, research has found that replacing bottles by cups or tubs has been linked with increased breastfeeding prevalence (Collins, Ryan, & Hiller, 2004).

### **Environmental factors**

#### **Commercial incentives for formula feeding**

Many mothers in the United States receive infant formula samples as a commercial incentive to bottle feed (Howard, Howard, Lawrence, Andresen, DeBlieck, & Weitzman, 2000). Howard and colleagues (2000) found that breastfeeding initiation and duration over a two week period is not affected by this commercial formula gift (Howard et al., 2000). On the other hand, other findings indicated that commercial formula samples are associated with decreasing the

duration of exclusive breastfeeding at all times, but does not affect the duration of non- exclusive breastfeeding (Donnelly, Snowden, Renfrew, & Woolridge, 2000).

### **Mothers returning to work outside the home after delivery**

Women's rate of employment in the United States has increased in the last three decades, from 47.7% in 1980 to 53.6% in 2010 (Gibbs, 2010). Based upon their findings, Vinses and Kennedy (1997) concluded that returning to work among breastfeeding mothers is associated with earlier weaning for their babies. However, employers in the US are required to provide a private place for breastfeeding employees to express breast milk since the passage of the Affordable Care Act in 2010 (United States Department of Labor, 2010). This may encourage more working mothers with infants to breastfeed at work.

### **Biomedical factors**

WHO provides a list of medical conditions for both mothers and babies that affect breastfeeding (WHO, 2009). This report suggests permanent avoidance of breastfeeding for mothers who have HIV, and temporary avoidance of breastfeeding for mothers who have: herpes simplex virus type 1 (HSV-1); illnesses that prevent mothers from taking care of their babies such as sepsis; and maternal medications that could affect the infants health. WHO provides, also, a list of health conditions including: breast abscess, hepatitis B, hepatitis C, mastitis, and tuberculosis, that mothers with these conditions could continue breastfeeding but they should consider bottle feeding instead.

Also, infants with specific medical conditions including classic galactosemia, maple syrup urine disease, and phenylketonuria, should not receive breast milk or any other milk except specialized formula according to doctors' orders. On the other hand, other conditions including

infants born weighing less than 1500 g (very low birth weight), infants born at less than 32 weeks of gestational age (very pre-term), and newborn infants who are at risk of hypoglycaemia, may need other food in addition to breast milk for a limited period ( WHO, 2009).

### **Breastfeeding Rates:**

In the past decade, breastfeeding rates in the United States have continued to rise. The rate in 2010 was 75% and it has increased to 76.9% in 2012 for babies who ever breastfed (CDC, 2012; CDC, 2013). On the other hand, the breastfeeding rates in Minnesota have declined from 81.9% in 2010 to 78% in 2012 for children who are ever breastfed (CDC, 2012).

According to Amy Fjerstad, the Obstetrics/Pediatrics (OB/Peds) Station Coordinator at Sanford Bemidji Medical Center, 991 mothers gave a birth at Sanford Bemidji Medical Center and 791 of these mothers breastfed their newborns. Therefore, the 2012 rate of breastfeeding in Bemidji, MN for babies who ever breastfed and who were born in Sanford Bemidji Medical Center was 79.8% (A. Fjerstad, personal communication, December 20, 2013).

### **Summary**

Breastfeeding is the ideal and the oldest feeding method of a child (The Office on Women's Health, 2012). Mothers get their information and advice on the methods of feeding their infants from a variety of different sources including relatives, their mothers, health professionals, friends, books, magazines and baby food manufacturers (Worsfold, 1996). There are many factors that influence breastfeeding choice such as psychosocial factors, social demographic characteristics, hospital practice, environmental factors, and medical factors. It has been found that breastfeeding has several advantages to both the breastfed infant and his/her mother.

## **Chapter Three**

### **Methodology**

The purpose of this study was to provide descriptive analysis about breastfeeding mothers' knowledge attitudes and practices in Bemidji, MN. This study also identified factors that influence breastfeeding practice for this sample and may serve as a reference for future of this topic. In order to conduct this research, data from the sample was collected using a written questionnaire. This chapter will explain the methods that were used to answer the following questions for the selected sample:

1. What are the sampled infants' demographic characteristics?
2. What is the sampled mothers' knowledge about breastfeeding?
3. What are the sampled mothers' attitudes toward breastfeeding?
4. What are the sampled mothers' demographic characteristics (mothers' age, mothers' level of education, and family income)?

### **Research design**

This study used a cross-sectional design that allowed the researcher to determine trends about breastfeeding and other sample characteristics. This type of research design does not require follow-up, therefore, it is less costly and less time intensive than other designs. The researcher used descriptive statistics including means, frequencies, and other statistical measures to analyze quantitative data collected.

## **Subject selection**

The participants for this study were breastfeeding mothers, who gave birth at Sanford Health in Bemidji, MN after March, 2012. Subject selection criteria included: their babies are 24 months of age and under, full term, and without any sign of major birth defects such as: genetic defects (Down syndrome and other conditions), mouth/facial defects (cleft lip and/or cleft palate), heart defects, musculoskeletal defects (including arm/leg defects), stomach/intestinal defects, and eye defects.

A group of 30 breastfeeding mothers, who were members of a breastfeeding mothers group in Bemidji, MN, were asked to participate in the research to investigate their attitudes, knowledge and practices about breastfeeding. The sample is a convenience sample, because the participants are volunteers and they were chosen based on their availability. Also, they were members of non-profit breastfeeding support group in Bemidji, MN.

## **Instrumentation**

A written questionnaire was used to collect the data. The questionnaire was in English, and the researcher was available during distribution of the instrument to answer any questions about the questionnaire from the subjects.

Based upon review of many studies and surveys about breastfeeding, the final survey was designed. Mothers were asked to answer the questions after introducing the goals of the study and its objectives (see Appendix A). The researcher submitted the MSU, M IRB application and following IRB approval (see Appendix B), data were collected. The consent form was distributed to the participants prior to data collection. The consent form enabled the participants to

understand the study goals and their responsibilities in the study. Also, the consent form assured the participants' confidentiality (see Appendix A).

The questionnaire had forty-nine questions divided into five sections (A, B, C, D, and E). (see Appendix C). Section (A) includes ten questions to collect information about the baby and make sure that the participants' babies satisfied the requirements of the study. For example, questions in section (A) assess if the participants' babies were: 24 months and under, full term, and without any sign of major birth defects. Section (B) contains seven questions about participants' demographic information such as their age, family income, and employment status to assess the factors that could influence breastfeeding practice. Section (C) contains twenty-three questions about feeding methods and time for the babies. These questions were designed to assess the hospital and maternity care practice toward breastfeeding. Section (C) also was used to assess the factors that influence breastfeeding such as hospital practice. Section (D) contains twelve questions that assessed mothers' attitudes toward breastfeeding. Section (E) contains six questions to assess mothers' knowledge about breastfeeding. Finally, question number forty-nine is an open ended question to elicit any comments about the questionnaire.

The questionnaire contains questions to ensure data validity. For example, question number 10 asked "Did your baby have any sign of the following major birth defects?" If the mother answered "Yes" and she chose any of the answers, then she continued answering the rest of the questions, the answers are invalid. Test-retest reliability was used to measure the reliability of the instrument. Also, two lactation consultants and three breastfeeding moms were asked to review and answer the questionnaire. Based on their feedback the final copy of the questionnaire was developed.

As the literature review showed, many factors influence breastfeeding practice. Socio-demographic variables that were measured in this study were the following:

For Mothers: age (in years), education, and income. For babies: sex, age (in months) at the date of the questionnaire distribution, and birth weight.

### **Data collection**

Data were collected from a group of breastfeeding mothers in Bemidji, MN. This group of breastfeeding mothers meets every two weeks, and the survey was distributed by the researcher during one of these meetings (on April 8, 2014). Also, the lactation consultant in Bemidji, MN, provided the researcher with data and statistics about the breastfeeding rates and other information from the Sanford Health information system.

### **Pilot Study**

The researcher used small group of breastfeeding mothers (three mothers) from the study sample, and two lactation consultants to answer the survey questions for a pilot study. Based on the pilot study respondents' feedback and responses to the survey questions, the researcher made changes in the data collection instrument as indicated (see Appendix D).

### **Data processing and analysis**

After collecting the data, the data were summarized and organized by using the appropriate descriptive statistics. Data were analyzed by SPSS software. Descriptive statistics were calculated including central tendency, the mean, and variability as indicated by measures of variance and standard deviation for variables such as mothers' knowledge score.

## **Chapter 4**

### **Findings**

#### **Introduction**

This descriptive study aimed to investigate sampled breastfeeding mothers' knowledge, attitudes and practices toward breastfeeding in Bemidji, MN. Also, this study aimed to provide a description of the demographic characteristics of breastfeeding mothers' and their infants in Bemidji, MN. This chapter presents the data gathered through the questionnaire. It also describes the techniques used in the analysis of the data collected. The most appropriate statistical techniques for this research were descriptive statistics. Descriptive statistics describe the basic features and summarize the data using a combination of tabulated description.

Thirty mother-infant pairs participated in this study. All the participants in this study were eligible subjects and all participants' information was included in the analysis. A description of the findings relevant to the problem and research questions is explained. First, descriptive statistics about mothers and infants are presented. Findings are then used to answer the research questions. In addition, tables are included to present the data collected. Finally, the last section is a summary of the research findings.

#### **Findings for research questions**

##### **Research question 1: What are the sampled infants' demographic characteristics?**

Data collected about the infant participants is shown in Table 4.1. Of the 30 children, (63.33%; n=19) of the infants were females. Most of the infants, (86.66%; n=26) were born naturally (vaginal delivery). The researcher found that (66.66%; n=20) children were born at a

normal birth weight (2500 g – 4000 g) and (80.00%; n=24) of the infants were the first child of the mother.

Table 4.1

*Infant demographic characteristics*

Characteristics (n=30)		N	%
Infant sex	Male	11	36.66%
	Female	19	63.33%
Infant age	> 24 month	30	100.00%
Birth weight	Less than 2500g (< 5.5 lbs)	0	0%
	2500g-4000g (5.5 lbs – 8.8 lbs)	20	66.66%
	Greater than 4000g (> 8.8 lbs)	10	33.33%
Method of childbirth (delivery)	Vaginal Birth	26	86.66%
	Cesarean Section	4	13.33%
First baby	Yes	24	80.00%
	No	6	20.00%

**Psychosocial factors**

**Research question 2: What is the sampled mothers’ knowledge about breastfeeding?**

The research data collection instrument included six true or false questions to assess mothers’ knowledge about breastfeeding. The responses to these questions are presented in Table 4.2. It was found that (93.33%; n=28) of mothers surveyed believed that breast milk is more easily digested than formula, and (93.33%; n=28) believed that breastfeeding helps mothers to

lose weight after pregnancy. Nearly all of the mothers (96.66%; n=29) said that breastfeeding helps the uterus to return to its pre- pregnancy state more quickly. Also, nearly 97.00% (n=29) of the mothers believed that breast milk contains all the essential nutrients for a newborn child and colostrum contains essential antibodies necessary to help the child’s immune system. Similarly, all except one of the mothers (96.66%; n=29) disagreed with the statement “infant formula and breast milk have the same health benefits”.

Table 4.2

*Mothers’ Knowledge*

Question	T/F	N	Percentage
Breast milk is more easily digested than formula.	True	28	93.33%
	False	2	6.66%
Breastfeeding helps mothers to lose weight after pregnancy.	True	28	93.33%
	False	2	6.66 %
Breastfeeding helps the uterus to return to its pre- pregnancy state more quickly.	True	29	96.66%
	False	1	3.33%
Infant formula and breast milk have the same health benefits.	True	1	03.33%
	False	29	96.66%
Breast milk contains all the essential nutrients for a newborn child.	True	29	96.66%
	False	1	3.33%
Colostrum contains essential antibodies necessary to help the child’s immune system.	True	29	96.66%
	False	1	3.33%

The following table shows that the mean knowledge score for the six items was 5.70 (SD = 0.560) with scores ranging from four to six.

Table 4.3

*Mothers' Knowledge Score*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Number of correct answers	30	2.00	4.00	6.00	5.7000	.59596

**Research question 3: What are the sampled mothers' attitudes toward breastfeeding?**

The findings about mothers' attitudes are displayed in Table 4.4, which shows that (70.00%; n=21) of the mothers strongly disagreed that benefits of breastfeeding are limited for a specific period. Also, it was found that 23 mothers (76.66%) strongly disagreed that formula feeding is more convenient than breastfeeding. The findings of this study showed that the majority of the participants (60.00%; n=18) strongly disagreed that formula-fed babies are more likely to gain weight more quickly than breast-fed infants. Twenty-six mothers, about 87.00% strongly agreed that breastfed babies are healthier than formula-fed infants. All (100.00%; n=30) mothers sampled agreed that breast milk is the ideal food for babies, breast feeding is more convenient than formula, breast milk is cheaper than formula, and breastfeeding can enhance intimacy between mother and infant. More than half of the mothers (76.66%; n=23) strongly disagreed that if the mother intends to resume work, formula feeding is a better choice. Data collected revealed that (60.00%; n=18) of the mothers strongly agreed that mothers who formula-

feed their children will miss out on certain bonding experiences. Of the mothers sampled, 26, (about 87.00%) strongly disagreed that women should not breastfeed in public places (such as restaurants). Fifteen of the mothers (50.00%) strongly disagreed that when mothers breastfeed babies, fathers will feel isolated.

Table 4.4

*Mothers' Attitude*

	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Benefits of breastfeeding are limited for a specific period.	21 (70.00%)	7 (3.33%)	2 (6.66%)	0	0
Formula-feeding is more convenient than breastfeeding.	23 (76.66%)	3 (10.00%)	4 (13.33%)	0	0
Formula-fed babies are more likely to gain weight more quickly than breast-fed infants.	18 (60.00%)	2 (6.66%)	10 (3.33%)	0	0
Breastfed babies are healthier than formula-fed infants.	0	0	0	4 (3.33%)	26 (86.66%)
Breast milk is the ideal food for babies.	0	0	0	1 (3.33)	29 (96.66%)
Breast feeding is more convenient than formula.	0	0	0	3 (10.00%)	27 (90.00%)

Breast milk is cheaper than formula.	0	0	0	1 (3.33)	29 (96.66%)
Breastfeeding can enhance intimacy between mother and infant.	0	0	0	3 (10.00%)	27 (90.00%)
If the mother intends to resume work, formula feeding is a better choice.	23 (76.66%)	5 (16.66%)	2 (6.66%)	0	0
Mothers who formula-feed their children will miss out on certain bonding experiences.	0	0	0	12 (40.00%)	18 (60.00%)
Women should not breastfeed in public places (such as restaurants).	26 (86.66%)	4 (13.33%)	0	0	0
When mothers breastfeed babies, fathers will feel isolated.	15 (50.00%)	11 (36.66%)	4 (13.33)	0	0

**Research question 4: What are the sampled mothers’ demographic characteristics (mothers’ age, mothers’ level of education, and family income)?**

Demographic characteristics are described in Table 4.5, which shows that (46.66%; n=14) mothers were aged between 30-34 years at the time of survey, and (43.33%; n=13) were aged between 30-34 years at the time of delivery. The percentage of mothers who had completed College/Technical School is 46.66% (n=14) and 33.33% (n=10) listed their occupation as

homemakers. Over half the mothers (53.33%; n=16) indicated that their annual family income is \$40,000 to less than \$60,000.

This data indicates that most of the mothers surveyed are educated, and all of them have at least some college/technical school education. Also, as shown in Table 4.5 most, (83.32%; n=25) of the sample is aged 25 years or older and (76.66%; n=23) have family income more than \$40,000/ year. This confirms the literature review that there is a significant association between breastfeeding rates and socio-demographic characteristics for mothers including maternal age, maternal education level, and family income (CDC, 2010). Also, survey responses show that almost 47% (n=14) of the mothers are employed and (30%; n=9) of the mothers reported that their workplace provides a private place to express breast-milk and breast feed and provides a refrigerator to store breast-milk.

Table 4.5

*Social demographic characteristics of mothers*

Demographical and other characteristics		
Maternal age (n= 30)	≤ 24	5 (16.66%)
	25-29	6 (20.00%)
	30-34	14 (46.66%)
	≥ 35	5 (16.66%)
	Mode	14 (46.66%)
Maternal age at delivery (n= 30)	≤ 24	6 (20.00%)
	25-29	6 (20.00%)
	30-34	13 (43.33%)

	≥ 35	5 (16.66%)
	Mode	13 (43.33%)
Maternal level of education (n= 30)	Less than 9th grade	0
	9th-12th grade (No Diploma or GED)	0
	High School Graduate (Diploma or GED)	0
	Some college/Technical School	10 (33.33%)
	College/Technical School Graduate	14 (46.66%)
	Some Graduate/Professional School	0
	Graduate/Professional School Degree	6 (20.00%)
	Mode	14 (46.66%)
Family income (n= 30)	Less than \$20,000	4 (13.33%)
	\$20,000 to less than \$40,000	3 (10.00%)
	\$40,000 to less than \$60,000	16 (53.33%)
	\$60,000 to less than \$80,000	4 (13.33%)
	\$80,000 or more	3 (10.00%)
	Don't Know	0
	Mode	16 (53.33%)
Maternal employment status (n= 30)	Full-time employed	7 (23.33%)
	Part-time employed	7 (23.33%)
	Self-employed	0
	Out of work and looking for work	2 (6.66%)
	Out of work but not currently looking for work	0
	A homemaker	10 (33.33%)

	A student	3 (10.00%)
	Military	0
	Retired	0
	Unable to work	1 (3.33%)
	Mode	10 (33.33%)
Workplace provides a private place to express breast-milk and breast feed	Yes	9 (30.00%)
	No	5 (16.66%)
	Don't work	16 (53.33%)
Work provides a refrigerator to store breast-milk.	Yes	9 (30.00%)
	No	5 (16.66%)
	Don't work	16 (53.33%)

### **Hospital practices**

Table 4.6 presents findings about hospital practice including starting breastfeeding within an hour after delivery. As reported in Table 4.6, the initiation of breastfeeding at less than 1 hour after birth was reported by (86.66%; n=26) mothers, and (80%; n=24) mothers surveyed received help from hospital staff regarding breastfeeding. Additionally, (93.33%; n=28) mothers did not supplement feeding their newborns with formula and (93.33%; n=28) mothers did not use bottle feeding before hospital discharge.

Table 4.6

*Hospital practices*

Receive any help from hospital staff regarding breastfeeding	Yes	24	80.00%
	No	6	20.00%
Starting breastfeeding after delivery	Less than 1 hour after birth	26	86.66%
	1 – 3 hours after birth	3	10.00%
	4 –11 hours after birth	1	3.33%
	12 –23 hours after birth	0	
	24 hours or more after birth	0	
	Don't know/Don't remember	0	
Supplementing newborns with formula	Yes	2	6.66%
	No	28	93.33%
Using bottles before discharge	Yes	2	6.66%
	No	28	93.33%

**Summary:**

Findings from this research indicate that the participants were knowledgeable about breastfeeding; they answered the questions that assessed their knowledge correctly. For example, they were able to recognize the benefits of breastfeeding and the importance of colostrum. The findings also suggest that the mothers surveyed have positive attitudes toward breastfeeding. In addition, mothers surveyed are educated; all of them completed at least have some college/technical school education.

## **Chapter 5**

### **Summary and Discussion**

#### **Introduction**

This descriptive study aimed to investigate sampled breastfeeding mothers' knowledge, attitudes and practices toward breastfeeding in Bemidji, MN. Also, this study aimed to provide a description of the demographic characteristics of sampled breastfeeding mothers' and their infants. In addition, this study aimed to investigate the factors that may influence breastfeeding practice. In this chapter, the summary of the research, conclusions, and recommendations are presented.

#### **Summary of Research Problem**

Breastfeeding is an important in health education because of the many benefits that can be gained for babies, mothers, and communities. This study was a descriptive study that aimed to describe mothers' social demographic characteristics (mothers' age, mothers' level of education, and family income), mothers' knowledge about breastfeeding, mothers' attitudes toward breastfeeding, and breastfeeding practice among sampled breastfeeding mothers in Bemidji, MN. Also, this study provides a baseline study about breastfeeding in Bemidji, MN. There are no previous published studies about breastfeeding within the Bemidji area. This study is the first study that investigates breastfeeding knowledge, attitude and influencing factors among breastfeeding mothers in Bemidji, MN. Therefore, this study provides information about knowledge, practice, and influencing factors in Bemidji, MN, and can be a reference for future studies about this topic.

This study was conducted to answer the following research questions:

- 1) What are the sampled infants' demographic characteristics?
- 2) What is the sampled mothers' knowledge about breastfeeding?
- 3) What are the sampled mothers' attitudes toward breastfeeding?
- 4) What are the sampled mothers' demographic characteristics (mothers' age, mothers' level of education, and family income)?

### **Summary of Method and Description of Selected Subjects**

A written data collection instrument containing forty-nine questions was used to collect pertinent information. The findings were analyzed by descriptive statistics. The thirty participants for this study were breastfeeding mothers in who gave a birth at Sanford Health located in Bemidji, Minnesota. Their children were under 24 months and had no signs of major birth defects.

### **Summary of findings:**

The findings showed that the participants are knowledgeable about breastfeeding and that they have positive attitudes toward breastfeeding. Previous research has found that maternal age, maternal education level and family income have been shown consistently to be positively associated with breastfeeding in developed countries (CDC, 2010). In this study, it was found that all of the participants are educated, all of them had at least two years of college. Also, the findings indicated that most of the mothers had received help from hospital staff regarding breastfeeding practice. Findings for this study indicated that most of the mothers had breastfed their baby just after birth or in less than one hour after birth.

**Conclusions:**

As demonstrated in Chapter 4, (tables 4.2, 4.3 and 4.4) it can be concluded that most of the mothers are aware of breastfeeding benefits and their attitudes toward breastfeeding were positive. The data indicated that mothers surveyed are knowledgeable about breastfeeding benefits. Their answers confirm that knowledge is an important factor that influences breastfeeding prevalence. This information affirms information presented in the literature review (Chambers et al. 2007), (see Chapter 2) about the association between mothers' knowledge and breastfeeding practice.

From table 4.6, page 30-31 it can be implied that hospital practices play significant role in practicing breastfeeding and the results show that 80.00% (n=24) of the mothers had received help from hospital staff regarding breastfeeding. It can be concluded that the Sanford health hospital is using a good strategy in the labor department by encouraging mothers to initiate breastfeeding within 30 minutes after birth and avoiding using bottles before hospital discharge.

**Recommendations:**

Recommendations for further research:

For future studies, it will be helpful to expand this study and include non-breastfeeding mothers to calculate the rate of breastfeeding in the area and to find the factors that encourage breastfeeding practice. Also, a comparison between breastfeeding mothers and non-breastfeeding mothers can be made. Finally, including non-breastfeeding mothers in this type of study may enhance their awareness and encourage all mothers to breastfeed.

#### Recommendations for health education practice:

Health educators should encourage mothers to practice breastfeeding and explain the importance of continuing to breastfeed after returning to work or school. Also, health educators should provide the appropriate support regarding mother's decisions about breastfeeding and provide written guidelines for mothers and hospitals staff about breastfeeding practice. As was confirmed in this study, breastfeeding sampled mothers were knowledgeable about breastfeeding and have positive attitudes toward breastfeeding. It is important to disseminate this knowledge and these attitudes among all mothers in Bemidji, to enhance infant and maternal health. Health educators in many settings could assist greatly in achieving this goal to improve the breastfeeding rate in Bemidji.

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## **Appendix A: Consent form**

Dear Mothers,

I am a graduate student at Minnesota State University, Mankato currently working on my thesis which is titled, "Breastfeeding knowledge, practice, and influencing factors." This research will attempt to investigate breastfeeding knowledge and attitudes among mothers in Bemidji, MN, and to identify factors that influence their breastfeeding practice. The information you provide will be kept confidential. You will not record your name anywhere on this survey, so information will be anonymous. The information you provide can be viewed only by authorized research staff members: Hadeel Tanash (myself); and Dr. Judith Luebke, thesis advisor. The survey takes about 20 minutes to complete.

Please read the following consent form:

This research will be supervised by Dr. Judith Luebke. I understand that I can contact Dr. Luebke at 507-389-5938 or by email at [judith.luebke@mnsu.edu](mailto:judith.luebke@mnsu.edu) about any concerns I have about this project. I understand that I also may contact the Minnesota State University, Mankato Institutional Review Board Administrator, Dr. Barry Ries, at 507-389-2321, or by email at [barry.ries@mnsu.edu](mailto:barry.ries@mnsu.edu) with any questions about research with human participants at Minnesota State University, Mankato.

I understand that participation in this project is voluntary and I have the right to stop at any time. By completing this questionnaire, I agree to participate in this study and state that I am at least 18 years of age.

I understand that none of my answers will be released and no names will be recorded. I understand that participating in this research has minimal risks, that is, the probability of harm or discomfort anticipated in the research are not greater than those encountered in daily life. I understand that participating in this study will help the researchers better understand selected mothers' knowledge and attitudes toward breastfeeding, and factors that influence breastfeeding practice. My decision whether or not to participate in this research will not affect my relationship to Minnesota State University, Mankato, nor will a refusal to participate involve a penalty or loss of benefits. I understand I may discontinue participation any time before data collection is complete without penalty or loss of benefits.

Please keep this copy of this consent form for your records.

Sincerely,

Hadeel Tanash [hadeel.tanash@mnsu.edu](mailto:hadeel.tanash@mnsu.edu)

[IRB#: 581657-2](#)

## **Appendix B: IRB Approval**



March 6, 2014

Dear Judith Luebke:

I made a mistake on your review and asked that you use 881657 as the IRBNet Id number. That is not correct. The number is 581657. Please be sure to correct this on your consent form.

Re: IRB Proposal entitled "[581657-2] Breastfeeding knowledge, practice, and influencing factors: Findings from a selected sample of breastfeeding mothers in Bemidji, Minnesota"  
Review Level: Level II

Your IRB Proposal has been approved as of March 6, 2014. On behalf of the Minnesota State University, Mankato IRB, I wish you success with your study. Remember that you must seek approval for any changes in your study, its design, funding source, consent process, or any part of the study that may affect participants in the study. Should any of the participants in your study suffer a research-related injury or other harmful outcome, you are required to report them to the IRB as soon as possible.

The approval of your study is for one calendar year from the approval date. When you complete your data collection or should you discontinue your study, you must notify the IRB. Please include your log number with any correspondence with the IRB.

This approval is considered final when the full IRB approves the monthly decisions and active log. The IRB reserves the right to review each study as part of its continuing review process. Continuing reviews are usually scheduled. However, under some conditions the IRB may choose not to announce a continuing review. If you have any questions, feel free to contact me at [irb@mnsu.edu](mailto:irb@mnsu.edu) or 507-389-5102.

The Principal Investigator (PI) is responsible for maintaining signed consent forms in a secure location at MSU for 3 years. If the PI leaves MSU before the end of the 3-year timeline, he/she is responsible for following "Consent Form Maintenance" procedures posted online.

Cordially,

A handwritten signature in black ink, appearing to read "Mary Hadley", written in a cursive style.

Mary Hadley, Ph.D.  
IRB Coordinator

## **Appendix C: Questionnaire**

(A) Baby's basic information (Questions 1- 10 are about your baby). Please check the response that is true for your baby.

- 1) Gender
  - a) \_\_\_\_\_ Female
  - b) \_\_\_\_\_ Male
- 2) Baby's current age  
\_\_\_\_\_ months \_\_\_\_\_
- 3) Gestational age (at birth):
  - a) \_\_\_\_\_ 37-42 weeks
  - b) \_\_\_\_\_ Less than 37 weeks
  - c) \_\_\_\_\_ More than 42 weeks
- 4) Birth weight:
  - a) \_\_\_\_\_ Less than 2500g (< 5.5 lbs)
  - b) \_\_\_\_\_ 2500g-4000g (5.5 lbs – 8.8 lbs)
  - c) \_\_\_\_\_ Greater than 4000g (> 8.8 lbs)
- 5) Method of childbirth (delivery):
  - a) \_\_\_\_\_ Vaginal Birth
  - b) \_\_\_\_\_ Cesarean Section
- 6) Is this your first baby?
  - a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 7) If No, did you breastfeed your previous child/children?
  - a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 8) Most recent baby/babies:
  - a) \_\_\_\_\_ Single birth
  - b) \_\_\_\_\_ Twins
  - c) \_\_\_\_\_ Triplets
  - d) \_\_\_\_\_ Quadruplets
- 9) Did you give birth at Sanford Bemidji Medical Center in Bemidji, MN?
  - a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No

10) Did your baby have any signs of the following major birth defects: (please check all that apply). If your child has **no sign** of major birth defects please go to **section B**

- a) \_\_\_\_\_ Genetic defects (Down syndrome and other conditions)
- b) \_\_\_\_\_ Mouth/facial defects (cleft lip and/or cleft palate)
- c) \_\_\_\_\_ Heart defects
- d) \_\_\_\_\_ Musculoskeletal defects (including arm/leg defects)
- e) \_\_\_\_\_ Stomach/intestinal defects
- f) \_\_\_\_\_ Eye defects

(B) Mother's Information: (Questions 11-16 pertain to your personal information). Please check the response that is true for you.

11) Current age:

\_\_\_\_\_ years old

12) How old were you when this baby was born?

\_\_\_\_\_ years old

13) Highest education level:

- a) \_\_\_\_\_ Less than 9th grade
- b) \_\_\_\_\_ 9th-12th grade (No Diploma or GED)
- c) \_\_\_\_\_ High School Graduate (Diploma or GED)
- d) \_\_\_\_\_ Some college/Technical School
- e) \_\_\_\_\_ College/Technical School Graduate
- f) \_\_\_\_\_ Some Graduate/Professional School
- g) \_\_\_\_\_ Graduate/Professional School Degree

14) Employment Status:

- a) \_\_\_\_\_ Self-employed
- b) \_\_\_\_\_ Out of work and looking for work
- c) \_\_\_\_\_ Out of work but not currently looking for work
- d) \_\_\_\_\_ A homemaker
- e) \_\_\_\_\_ A student
- f) \_\_\_\_\_ Military
- g) \_\_\_\_\_ Retired
- h) \_\_\_\_\_ Unable to work

15) Does your workplace provide a private place to express breast-milk and breast feed?

- a) \_\_\_\_\_ Yes
- b) \_\_\_\_\_ No
- c) \_\_\_\_\_ Do not work

16) Does your work provide a refrigerator to store breast-milk?

- a) \_\_\_\_\_ Yes
- b) \_\_\_\_\_ No
- c) \_\_\_\_\_ Do not work

17) Of the following income categories, which one describes the total income of your household, before taxes?

- a) \_\_\_\_\_ Less than \$20,000
- b) \_\_\_\_\_ \$20,000 to less than \$40,000
- c) \_\_\_\_\_ \$40,000 to less than \$60,000
- d) \_\_\_\_\_ \$60,000 to less than \$80,000
- e) \_\_\_\_\_ \$80,000 or more
- f) \_\_\_\_\_ Don't Know

(C) Feeding information: (Questions 18-30 pertain to your breastfeeding experience). Please check the response that is true for you.

18) After your baby was born, how long did you stay in the hospital?

- a) \_\_\_\_\_ 1- 23 hours
- b) \_\_\_\_\_ 1 day
- c) \_\_\_\_\_ 2 days
- d) \_\_\_\_\_ 3 days
- e) \_\_\_\_\_ more than 3 days
- f) \_\_\_\_\_ Don't know

19) While in the hospital, did you receive any help from hospital staff regarding feeding your baby?

- a) \_\_\_\_\_ Yes
- b) \_\_\_\_\_ No

20) If YES, how useful was the help that you received with feeding your baby?

- a) \_\_\_\_\_ Very useful
- b) \_\_\_\_\_ Somewhat useful
- c) \_\_\_\_\_ Not very useful
- d) \_\_\_\_\_ Don't know/Don't remember
- e) \_\_\_\_\_ Not applicable

21) In the first two days after your baby was born, what was your baby fed? (Note: breast milk includes colostrum)

- a) \_\_\_\_\_ Breast milk at all feedings
- b) \_\_\_\_\_ Combination of breast milk and other fluid
- c) \_\_\_\_\_ Formula at all feedings
- d) \_\_\_\_\_ Other, please explain \_\_\_\_\_
- e) \_\_\_\_\_ Don't Know

- 22) How soon after birth did you try to breastfeed your baby for the first time?
- a) \_\_\_\_\_ Less than 1 hour after birth
  - b) \_\_\_\_\_ 1 – 3 hours after birth
  - c) \_\_\_\_\_ 4 –11 hours after birth
  - d) \_\_\_\_\_ 12 –23 hours after birth
  - e) \_\_\_\_\_ 24 hours or more after birth
  - f) \_\_\_\_\_ Don't know/Don't remember
- 23) Was your baby fed anything other than breast milk after you started breastfeeding?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
  - c) \_\_\_\_\_ Don't know/Don't remember
- 24) If yes, what was fed to your baby?
- a) \_\_\_\_\_ Formula
  - b) \_\_\_\_\_ Glucose (sugar) water
  - c) \_\_\_\_\_ Water
  - d) \_\_\_\_\_ Other  
Please specify \_\_\_\_\_
  - e) \_\_\_\_\_ Don't know
- 25) Were you offered free infant formula from the hospital?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 26) Have you received any formula samples discharge from the hospital?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 27) When you had your baby, did you have any medical condition that required permanent avoidance of breastfeeding?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 28) When you had your baby, did you have any medical condition that required temporary avoidance of breastfeeding?
- a) Yes
  - b) No
- 29) When your baby was born, did he/she have any medical condition that prevented breastfeeding?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No
- 30) When your baby was born, did he/she has any medical condition that required feeding other food in addition to breast milk?
- a) \_\_\_\_\_ Yes
  - b) \_\_\_\_\_ No

(D) For each of the following questions please check the box closest to your opinion

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
31) Benefits of breastfeeding are limited for a specific period.					
32) Formula-feeding is more convenient than breastfeeding.					
33) Formula-fed babies are more likely to gain weight more quickly than breast-fed infants.					
34) Breastfed babies are healthier than formula-fed infants.					
35) Breast milk is the ideal food for babies.					
36) Breast feeding is more convenient than formula.					
37) Breast milk is cheaper than formula.					
38) Breastfeeding can enhance intimacy between mother and infant.					
39) If the mother intends to resume work, formula feeding is a better choice.					
40) Mothers who formula-feed their children will miss out on certain bonding experiences.					
41) Women should not breastfeed in public places (such as restaurants).					
42) When mothers breastfeed babies, fathers will feel isolated.					

(E) The following questions pertain to your knowledge about breastfeeding. Please check the response that you believe to be true.

43) Breast milk is more easily digested than formula.

a) \_\_\_\_\_ True

b) \_\_\_\_\_ False

44) Breastfeeding helps mothers to lose weight after pregnancy.

a) \_\_\_\_\_ True

b) \_\_\_\_\_ False

- 45) Breastfeeding helps the uterus to return to its pre- pregnancy state more quickly.
- a) \_\_\_\_\_ True
  - b) \_\_\_\_\_ False
- 46) Infant formula and breast milk have the same health benefits.
- a) \_\_\_\_\_ True
  - b) \_\_\_\_\_ False
- 47) Breast milk contains all the essential nutrients for a newborn child.
- a) \_\_\_\_\_ True
  - b) \_\_\_\_\_ False
- 48) Colostrum contains essential antibodies necessary to help the child's immune system.
- a) \_\_\_\_\_ True
  - b) \_\_\_\_\_ False
- 49) Please add any comments you would like to make about this survey:

Thank you for your participation.

## **Appendix D: Pilot study**

Questions before pilot study	Questions after pilot study
2) How old is your baby?  _____ months _____	2) Baby's current age  _____ months _____
5) Method of childbirth (delivery):  a) _____ Natural childbirth  b) _____ Cesarean Section	5) Method of childbirth (delivery):  a) _____ Vaginal Birth  b) _____ Cesarean Section
8) Baby was:  a) _____ Single birth  b) _____ Twins  c) _____ Triplets  d) _____ Quadruplets	8) Most recent baby/babies:  a) _____ Single birth  b) _____ Twins  c) _____ Triplets  d) _____ Quadruplets
15) If you work, does your work provide a private place to express breast-milk and breast feed?  a) _____ Yes  b) _____ No	15) Does your workplace provide a private place to express breast-milk and breast feed?  a) _____ Yes  b) _____ No  c) _____ Do not work
16) If you work, does your work provide a refrigerator to store breast-milk?	16) Does your work provide a refrigerator to store breast-milk?

<p>a) _____ Yes</p> <p>b) _____ No</p> <p>c) _____ Do not work</p>	<p>a) _____ Yes</p> <p>b) _____ No</p> <p>c) _____ Do not work</p>
<p>25) Do you accept any free infant formula?</p> <p>a) _____ Yes</p> <p>b) _____ No</p>	<p>25) Were you offered free infant formula from the hospital?</p> <p>a) _____ Yes</p> <p>b) _____ No</p>