Breastfeeding and Formula-Feeding Intentions of Pregnant Smokers and Non-Smokers Enrolled in the Eau Claire Women, Infants, and Children (WIC) Program

by

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ABSTRACT

Women who choose to smoke during pregnancy are less likely to breastfeed their infants than non-smokers. When smokers do breastfeed, it is usually for a shorter duration than the recommended length of six months. Several organizations and studies have determined that the benefits of smokers breastfeeding infants outweigh the risks and smokers should be encouraged to breastfeed. The purpose of this study was to identify reasons for intentions to breastfeed or formula-feed infants by pregnant smokers and non-smokers who were enrolled in the Eau Claire WIC program. In a quasi designed quantitative and qualitative study, infant feeding intentions of 22 smokers and 35 non-smokers were obtained through self-reported surveys at a baby shower or during individual appointments at the WIC clinic. Overall, more non-smokers intended to breastfeed their infants than smokers. Some of the reasons smokers were less likely to intend to breastfeed were: formula-fed previous children, lack of exposure to

breastfeeding, living with a smoker, feeling it was unsafe, limited knowledge of the health benefits of breastfeeding, lack of support from partner, and feeling that formula-feeding was more convenient than breastfeeding. The information gathered was used to develop recommendations for an educational program at the Eau Claire WIC program to increase breastfeeding only among women who choose to continue to smoke.

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Chapter I: Introduction

Among the majority of Americans, breastfeeding has fallen out of favor as the preferred infant feeding method as infant formulas have increased in popularity. Even though infant formulas have become more popular, they still are unable to duplicate the components of breast milk or the benefits breastfeeding provides to infants and mothers. Due to the benefits of breastfeeding, La Leche League International (2006a, n.p.) claims "breastmilk is liquid gold." Breast milk supplies a complete source of nutrients which is required by full-term infants for proper growth and development (Kalnins & Saab, 2006). Breastfeeding not only supplies infants with nutritional benefits, but it also can decrease their risk of acute and chronic diseases, enhance their immune system, and decrease their risk of food allergies (Institution of Medicine, 1991; Meek & Tippins, 2002). It is often overlooked that breastfeeding also provides benefits to the mother. Breastfeeding helps mothers lose weight that was gained during pregnancy faster, decrease postpartum bleeding, decrease risk of ovarian and breast cancer, and delay future pregnancies by postponing menstrual cycles (Meek & Tippins, 2002).

Even though breastfeeding has a multitude of positive qualities, not all women choose to breastfeed their infants. One group of women that has low breastfeeding rates are smokers. Studies have revealed that women who smoke during pregnancy are less likely to breastfeed their infants than women who are non-smokers (Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC study team, 2004). Women who smoke are also less likely to breastfeed as long as non-smokers (Liu, Rosenberg, & Sandoval, 2006). Studies have found that the main reasons for the decreased rate among these women are: low confidence in their ability to breastfeed, discouragement, belief that breast milk from

smokers is harmful, they are less willing to seek help for breastfeeding problems from health professionals because of the fear they will be labeled as a bad mother due to their smoking habit, decreased milk volume, lack of support, fussy and colicky infants, unaware of breastfeeding benefits, or never intended to breastfeed (Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006a; Scott, Binns, Oddy, & Graham, 2006). Smokers that are less likely to breastfeed are usually younger in age, less educated, did not attend pregnancy classes, and are having an unplanned pregnancy (Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006b; Scott, Binns, Oddy, & Graham, 2006).

The benefits of women of smoke and breastfeed their infants outweigh the negatives of not breastfeeding. Dr. Jack Newman, who has many publications on breastfeeding and has started a breastfeeding clinic in Canada, stated, "The risks of not breastfeeding are greater to the baby than the risks of breastfeeding and smoking. The decision is up to the mother and I would encourage her to breastfeed" (La Leche League International, 2006b, ¶6). Breastfed infants of women who smoke have a lower incidence of respiratory illness when compared to formula-fed infants of smokers (Villamagna, 2004). Many studies have also found that the rate and/or the severity of bacterial and viral infections are lower in breastfed infants when compared to formula-fed infants, even after controlling for maternal smoking (Pletta, Eglash, & Choby, 2000). Some of the negatives that can occur in breastfed infants of women who smoke include exposure to second-hand smoke and the effects of nicotine in breast milk, which, on rare occasion, can cause nausea, vomiting, abdominal cramps, and diarrhea in infants (La Leche League International, 2004).

The National Advisory Committee on Drugs removed nicotine from the "Drugs of Abuse-Contraindicated during Breastfeeding" list due to little evidence on whether the amount of nicotine found in breast milk poses a health risk to breastfed infants and to support an increase in breastfeeding rates. The amount of nicotine found in breast milk is 1.5-3.0 times higher than found in maternal plasma concentrations. Nicotine has a half-life of 60-90 minutes in breast milk (American Academy of Pediatrics, 2001). The nicotine in breast milk is not absorbed readily by the infant's intestines and is metabolized quickly (La Leche League International, 2004). Even though the National Advisory Committee on Drugs is no longer labeling nicotine as a drug of contraindication during breastfeeding, they still recommend that women stop smoking (American Academy of Pediatrics, 2001).

The recommended length of breastfeeding is the same for smokers and non-smokers. The American Academy of Pediatrics (2005), the American Academy of Family Physicians (2007), and the American Dietetic Association (2005) recommend women exclusively breastfeed their infants for the first six months of life. After 6 months, it is recommended to start adding solid foods to the infant's diet and continue to breastfeed for the first year or longer (American Dietetic Association, 2005).

The U.S. Department of Health and Human Services has added the objective of increasing the number of mothers who breastfeed their infants to *Healthy People 2010,* the national health goals for the United States. For this objective, Abbott Laboratories collected baseline data in 1998 which indicated that 64% of mothers in the United States breastfed their infants in the early postpartum period. At six months, 29% of mothers were breastfeeding and numbers continued to decrease to 16% at one year. The target

goal for *Healthy People 2010* is to increase the number of women who breastfeed in the early postpartum period to 75%, at six months to 50%, and at one year to 25% by the year 2010 (US Department of Health and Human Services, 2000).

The Women, Infants, and Children program, also known as the WIC program, promotes breastfeeding to smokers and non-smokers as the most beneficial infant feeding choice. Pregnant women who are involved with the WIC program are informed about the benefits of breastfeeding through counseling and educational materials and are greatly encouraged to use this form of infant feeding unless medical complications exist (Food and Nutrition Service, 2006).

WIC programs would increase their effectiveness if they continued to gain an understanding of the reasons why groups of women with low breastfeeding rates, such as smokers, choose not to breastfeed. It would allow the WIC program to create intervention strategies that would be more effective at reaching those women and increasing the number of breastfed infants.

Statement of the Problem

The purpose of this study was to identify reasons for intentions to breastfeed or formula-feed infants by pregnant smokers and non-smokers who are enrolled in the Eau Claire WIC program. During January 2007, two baby showers were held at the Eau Claire WIC clinic for enrolled pregnant women who were 18 years or older. While at the baby showers, the pregnant women who smoke and non-smokers were asked about their intended infant feeding choices with a written survey. The information gathered was used to develop recommendations for an educational program to increase breastfeeding only

among women who choose to continue to smoke. The Eau Claire WIC will use the recommendations when creating such a program.

Purpose of the Study

There is one research objective for this study. It is:

1. To identify reasons for intentions to breastfeed or formula-feed infants by pregnant smokers and non-smokers who are enrolled in the Eau Claire WIC program.

Definition of Terms

There are two terms that need to be defined to bring clarity to this paper. They are:

Exclusive breastfeeding: Infant is fed only breast milk; no solids, water or other liquids (Center for Disease Control and Prevent, 2005).

Women, Infants, and Children (WIC) Program: A program "to safeguard the health of low-income women, infants, and children up to age five who are at nutritional risk by providing nutritious foods to supplement diets, information on healthy eating, and referrals to health care" (Food and Nutrition Service, 2005, ¶1).

Assumptions and Limitations of the Study

It was assumed that the participants were truthful when completing the survey. It was also assumed that the women who completed the survey were enrolled in the Eau Claire WIC program and pregnant at the time of the survey. A limitation of the study that may have occurred was when the participants answered the survey, did they respond how they thought the researcher wanted them to answer instead of selecting the responses that best represented how they felt.

Methodology

This paper is comprised of five chapters. Chapter I introduces the topic of the paper and the need for this study. Chapter II includes a literature review of the breastfeeding rates in the United States and WIC population, benefits of breastfeeding for infants and their mothers, whether smokers should breastfed their infants, ways to decrease the risk of smoking on breastfed infants, and barriers to breastfeeding. Chapter III contains the methods used to conduct the study which includes quantitative and qualitative analysis. Chapter IV describes the results found during the study. Chapter V provides a discussion of the results and recommendations based on the results of the study. Following Chapter V are the references and the appendices.

Chapter II: Literature Review

Introduction

This chapter will discuss breastfeeding recommendations and the breastfeeding rates in the United States and among WIC participants, the nutritional value and protective agents in breast milk, and the benefits of breastfeeding to the mother. This chapter will cover the issue of whether smokers should breastfeed their infants along with ways to decrease the risks of smoking for breastfed infants. The last topic of this chapter discusses barriers to breastfeeding.

Breastfeeding Recommendations

Due to the health benefits breastfeeding offers to infants and mothers, organizations such as the World Health Organization, American Academy of Pediatrics, and American Dietetic Association recommend infants be exclusively breastfed for the first six months of life. After the infant is six months old, it is recommended to begin introducing solid foods into the infant's diet while continuing to breastfeed until the infant is 12 months old or longer (American Dietetic Association, 2005; Giglia, Binns, & Alfonso, 2006a).

Breastfeeding Rates in the United States

Compared to other countries, the United States has low breastfeeding rates. Around the world about 79% of infants are breastfed until they are 12 months old, but in the United States only about 17-20% of infants are breastfeed for the same length of time (American Dietetic Association, 2005). In order to combat this low rate, the US Department of Health and Human Services (2000) included increasing breastfeeding rates to their set of national health goals, *Healthy People 2010*. To set the baseline for this

goal, in 1998 Abbott Laboratories collected data on breastfeeding rates in the United States. For that year, their results showed 64% of infants were breastfed in the early postpartum period, 29% at six months, and 16% at 12 months. The target breastfeeding goals for 2010 are to increase the number of infants being breastfed in the early postpartum period to 75%, at six months to 50%, and at 12 months to 25% (US Department of Health and Human Services, 2000).

The National Immunization Survey in 2003 uncovered the fact that some states are already meeting the *Healthy People 2010* breastfeeding goals. There were 14 states that have a 75% initiation rate for breastfeeding. Those states included: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Kansas, Minnesota, Montana, Nevada, Oregon, Utah, Vermont, and Washington. There were six states meeting the 50% breastfeeding at six months goal. These states include: Hawaii, Idaho, Oregon, Utah, Vermont, and Washington. There were eight states that had a breastfeeding rate of 25% at 12 months which were: Alaska, California, Hawaii, Idaho, Oregon, Utah, Vermont, and Washington (American Dietetic Association, 2005). These results show that some states are making great strides at increasing their breastfeeding rates, but it also shows that there many more states that need to work to improve their breastfeeding rates in order to meet the national goals by 2010.

Along with trying to meet the national health goals of *Healthy People 2010,* the state of Wisconsin has a set of state health goals, *Healthiest Wisconsin 2010.* Wisconsin is also concerned about increasing the breastfeeding rate among the women in their state. By 2010, Wisconsin's goal is to increase the number of women who initiate breastfeeding

while at the hospital by 80% (Wisconsin Department of Health and Family Services, Division of Public Health, 2005).

Breastfeeding Rates among WIC Participants

The WIC program was created in 1972 by the US Department of Agriculture to serve breastfeeding women, infants, and children up to 5 years old. In order to enroll in this program, the participant must meet the income restriction of being at or below 185% of US poverty income and to be at nutritional risk. For those that are eligible, WIC provides nutrition education, supplement foods, breastfeeding educational materials, breastfeeding counseling and referrals for health and social services. An average of 1.95 million infants per month, which is about half of all infants in the United States, are enrolled in this program (Ryan & Zhou, 2006).

There are concerns that the WIC program may be contributing to the lower breastfeeding rates in the United States since the program provides infant formula at minimal or no cost to the participants. To help correct this problem, in 1989 the WIC Reauthorization Act was created which requires WIC programs to promote breastfeeding as the best infant feeding method, increase acceptance of breastfeeding and distribute breastfeeding educational materials (Guttman & Zimmerman, 2000; Ryan & Zhou, 2006).

Even after this Act passed, the breastfeeding rates among WIC participants still remain lower than non-WIC participants. WIC and non-WIC breastfeeding rates from 1978-2003 were compared in an article by Ryan and Zhou (2006) using data from the Ross Laboratories Mothers Survey (RMS). The results showed in each year from 1978 to 2003, WIC mothers were breastfeeding less than non-WIC mothers by an average of 23.6

± 4.4% (ranged from 13.6 – 29.2%). For breastfeeding initiation, the greatest difference between WIC and non-WIC rates occurred in 1990 which was 29.2%. When comparing breastfeeding rates at 6 months, for each year, more than twice as many non-WIC mothers where breastfeeding than WIC mothers (Ryan & Zhou, 2006).

Li et al. (2005) found similar results with breastfeeding rates when looking at the 2002 National Immunization Survey. The results of the survey found that children who were enrolled in WIC were less likely to ever been breastfed than children who were eligible but did not participate in WIC or children who were not eligible for WIC (63.2% vs. 86.0% vs. 80.1% ever breastfed; 26.4% vs. 55.8% vs. 43.8% for breastfed at 6 months; 12.1% vs. 25.9% vs. 19.6% for breastfed at 12 months). Children who were eligible, but did not participate in WIC had a higher rate of being breastfed at all points after birth (Li et al., 2005).

Even though the breastfeeding rates of WIC participants are lower than non-WIC participants, the rate of breastfeeding has improved among WIC participants since 1978 (Ryan & Zhou, 2006). Rates have been increasing for WIC participants, but this group still lags behind in meeting the 2010 goals.

Eau Claire WIC Program

According to Alexis Tuma, an Eau Claire WIC nutritionist, their pregnant participants usually have an appointment every two-three months at the WIC clinic (email conversation, June 11, 2007). Most women are provided breastfeeding information during their appointments on a one-on-one bias. Tuma said "I talk to them about breastfeeding at every appointment, but I REALLY focus on breastfeeding during their

last trimester visit" which is the women's last appointment before the infant is born. All of the dietitians working at the Eau Claire WIC clinic are certified in breastfeeding.

When the mother comes into the WIC clinic for her first appointment after the infant is born depends on when the mother calls to inform the clinic that she has given birth. Several mothers will call the WIC clinic while they are still in the hospital. After the mother calls, she needs to be seen by the WIC clinic within two weeks (Tuma, email conversation, June 13, 2007).

The second visit to the clinic for the infant and mother occurs approximately one month later. During this visit, the infant is weighed and length checked. The mother's hemoglobin is also checked during this time. The dietitian will discuss breastfeeding with the mother and help resolve any problems (Tuma, email conversation, June 13, 2007).

The women may call the WIC clinic if they are having breastfeeding difficulties. If problems do occur, the dietitians at the clinic will try to resolve the problem over the phone first, but the women can come to the clinic if needed (Tuma, email conversation, June 13, 2007).

When pregnant smokers come to the Eau Claire WIC clinic, the dietitians will discuss smoking cessation with them. Not all of the dietitians have extensive training on this subject area. Some of the smokers may also receive smoking cessation information from public health nurses if they are part of PNCC, prenatal care coordination, which is a Wisconsin Medicaid benefit geared towards helping women, who qualify, during and after pregnancy. The public health nurses and the WIC program can refer smokers to First Breath, a Wisconsin program that helps pregnant women stop smoking (Tuma, email conversation, June 11, 2007).

Milk is Species-Specific

Milk mothers produce for their young is species-specific (Pletta, Eglash, & Choby, 2000). A mother's milk is tailored to meet the needs of her infant. The nutrients found in breast milk are easily digested by infants and are in more bioavailable forms to increase their utilization (American Dietetic Association, 2005). To further meet the changing needs of infants, the composition of breast milk varies during feedings, from day to day, and as the infant ages (Pletta, Eglash, & Choby, 2000; La Leche League International, 2004). Since a mother produces breast milk specifically for her infant, no two mothers' breast milk is the exactly same. Due to the specificity of breast milk, "[h]uman milk is the food of choice for human infants; anything else is a distant second" (La Leche League International, 2004, p. 341). Formulas are created to mimic breast milk, but, unlike breast milk, formula is homogeneous from day to day and during feedings so it is unable to change along with the infant's needs (Pletta, Eglash, & Choby, 2000).

Nutritional Value of Breast Milk

Breast milk contains water, protein, fat, carbohydrates, vitamins, minerals and trace amounts of enzymes and hormones (La Leche League International, 2004). The main components of breast milk are carbohydrates, lipids, and proteins (Kalnins & Saab, 2006).

Carbohydrates

The main carbohydrate found in milk is lactose. Lactose is needed for the formation of the infant's brain and central nervous system. Human breast milk contains one and a half times the amount of lactose found in cow's milk. Due to this fact, cow's

milk does not contain enough lactose for proper brain and central nervous system development in human infants. To increase the nutritional value of formulas made from cow's milk, sucrose and other sugars are added, but unfortunately those sugars do not function like lactose in the body (La Leche League International, 2004).

There are benefits to having more lactose in breast milk than other forms of carbohydrate. Unlike some other forms of carbohydrates, in the body, lactose is broken down slowly, which helps to prevent spikes in blood glucose. The lactose in breast milk aids in the absorption of some minerals like calcium. Lactose also helps to promote beneficial bacteria in the digestive tract which helps to prevent the growth of harmful bacteria that can cause diarrhea (La Leche League International, 2004).

Lipids

Infants require lipids for energy and to build a fat layer under the skin for insulation to help keep warm (La Leche League International, 2004). The amount of lipids in breast milk changes during feedings. The milk created in the beginning of feedings is rich in carbohydrates, but as the feeding continues, the milk becomes hindmilk, which contains more lipids (Meek & Tippins, 2002; Kalnins & Saab, 2006).

Two important lipid components in breast milk are long chain polyunsaturated fatty acids and cholesterol. The long chain polyunsaturated fatty acids found in breast milk are arachidonic acid (ARA) and docosahexaenoic acid (DHA). These fatty acids are important in infant brain and retinal formation (Pletta, Eglash, & Choby, 2000). Studies have discovered that infants who were breastfed have a higher concentration of DHA in their blood and brain when compared to infants who were formula-fed (La Leche League International, 2004).

Cholesterol is often linked to its negative effects in the body, but for infants, cholesterol has benefits. Along with DHA and ARA, cholesterol is used for brain and nervous system development. Cholesterol is important for infants in their first 2 years of life. Breast milk supplies infants with the amount needed for proper development. Infant formulas often contain less cholesterol than what is found in breast milk. Some research suggests that an infant's exposure to cholesterol in breast milk may allow them to handle cholesterol from foods better as adults which could help decrease some health risks (La Leche League International, 2004).

In order to break down and digest lipids, lipase is required. This enzyme is found in breast milk and remains active in the infant's digestive tract, which allows the infant to use the lipids more efficiently (La Leche League International, 2004). Formula-feed infants do not receive this added assistance in lipid digestion since lipase is not found in infant formulas.

Proteins

The two main protein sources in milk are casein and whey. The ratio of these proteins is different in each species' milk. In human breast milk, the main protein component is whey. Whey proteins create softer, more easily digested curds which is better for infant digestive systems. Whey protein also provides infants with a higher nutritional value than casein (Department of Health and Human Service Office on Women's Health, 2003; La Leche League International, 2004; American Dietetic Association, 2005). The ratio of whey to casein increases as the breast milk matures (Kalnins & Saab, 2006).

Infant formulas based on cow's milk contain more casein than whey. Unlike whey, casein curd formations are large, tough, and rubbery, which makes it harder for the infant to digest. Infants who are fed formula made from cow's milk remain full longer because it takes longer for the infant to digest the casein proteins (La Leche League International, 2004).

Protective Agents in Breast Milk

Since breastfed infants are the physiological norm, infants who are alternatively fed should be measured against breastfed infants with regard to growth, health, and development (American Academy of Pediatrics, 2005; American Academy of Family Physicians, 2007). Breast milk contains antibodies made by the mother's body to help fight specific agents within her environment, which then provides infants with added protection. The amount of protection an infant receives from breast milk seems to be related to the length they are exclusively breastfed; infants who are exclusively breastfed longer have higher protection rates (Pletta, Eglash, & Choby, 2000; American Academy of Family Physicians, 2007).

Formula lacks any type of antibody, so, unlike breast milk, formula does not provide prevention against infections and illnesses (Pletta, Eglash, & Choby, 2000). Without the protective agents in breast milk, formula-fed infants are at a higher risk of developing infections and diseases. In both developing and developed countries, formula-fed infants have a higher morbidity and morality rate than breastfed infants. The rate is similar even in areas where people have access to clean, safe water and proper medical care (La Leche League International, 2004).

Boosting Infant's Immune System

Breast milk acts as "nature's vaccine" (La Leche League International, 2004, p. 356). When infants are born, their immune system is immature, which makes them less effective in fighting off infections (Pletta, Eglash, & Choby, 2000). The immune system of infants does not reach full maturely until five years old (Haug et al., 1998). Infants who are breastfed are given the building blocks for their immune system from their mother. When the mother comes into contact with pathogens or microbes, her body creates antibodies to fight against the foreign invaders which are transferred to the infant through breast milk (La Leche League International, 2004).

Secretory immunoglobulin A (IgA) is one of the most important antibodies found in breast milk. It protects the infant's mucosal membranes in the stomach, intestines, respiratory tract, and lungs against foreign proteins, pathogens, and other microbes. Some foreign invaders are able to pass through the mucosal walls and enter the bloodstream where they can cause inflammation, infections, and allergic reactions. The role of secretory IgA is to protect the mucosal membranes and prevent the foreign invaders from passing through the membranes (La Leche League International, 2004). Some of the invaders secretory IgA targets include: *E. coli*, Salmonella, Shigella, *H. influenzae, S. pneumoniae*, rotavirus, and respiratory syncytial virus (Pletta, Eglash, & Choby, 2000).

The largest amount of secretory IgA is found in colostrum, the breast milk produced in the first few days after delivery (La Leche League International, 2004; Kalnins & Saab, 2006). The amount of secretory IgA found in breast milk decreases as milk volume increases, but even with lower amounts, infants are still receiving enough to have a protective effect. Adult females are able to produce around 2.5g of secretory IgA

per day for their own protective needs and infants who are breastfeeding receive around 0.5-1.0g of secretory IgA per day through breast milk (La Leche League International, 2004).

Protection against Infections

By boosting the immune system, breast milk aids in preventing several types of infections. Due to this fact, several infectious diseases such gastrointestinal infections, urinary tract infections, and otitis media have a greater occurrence in formula-fed infants.

Gastrointestinal Infections

Breast milk has a significant role in helping to decrease the risk and severity of gastrointestinal related illnesses (American Academy of Pediatrics, 2005; American Dietetic Association, 2005). Diarrhea has been found to be one of the leading killers of infants and small children throughout the world. In 1995, a study conducted in the United States found the occurrence of diarrhea to be twice the rate in formula-fed infants than in breastfed infants. The results of another study found that infants who were breastfed for 13 weeks or longer had a decreased rate of gastrointestinal infections during their first year of life (La Leche League International, 2004).

Urinary Tract Infections

Breast milk can also help decrease an infant's risk of urinary tract infections (La Leche League International, 2004; American Academy of Pediatrics, 2005). Urinary tract infections are usually started by bacteria in the infant's stool. Breast milk promotes the growth of beneficial bacteria in the digestive tract which helps decrease the growth of harmful bacteria including the ones which cause urinary tract infections (La Leche League International, 2004).

Otitis Media

Several studies have linked breastfeeding with aiding in the protection of the middle ear which decreases the risk of otitis media (Pletta, Eglash, & Choby, 2000; La Leche League International, 2004; American Academy of Pediatrics, 2005; American Dietetic Association, 2005). According to a study conducted by Dewey, Heinig, and Nommsen-Rivers (1995) during the first year of life, infants having one or more occurrences of otitis media was 19% lower in breastfed infants when compared to formula-fed infants, as well as having 80% fewer prolonged occurrences than formula-fed infants.

In the United States, otitis media is most often linked with the bacteria *S. pneumoniae, H. influenzae,* and *M. catarrhalis* (Duffy et al., 1997). These strands of bacteria are targeted against by secretory IgA and prostaglandins from breast milk which decreases the chance of bacteria and other pathogens to attach in the body and cause inflammatory responses (Dewey, Heinig, & Nommsen-Rivers, 1995). Infant formula does not provide such protection to infants.

Protection against Other Infections

Breast milk aids in decreasing the risk of many other infections. The protective agents in breast milk can also decrease the infants' risk of respiratory infections, *H. influenzae* type B (HiB), pneumonia, bacterial meningitis, and necrotizing enterocolitis (La Leche League International, 2004; American Academy of Pediatrics, 2005; American Dietetic Association, 2005).

Protection against Chronic Diseases

Some research has linked breastfeeding with a decreased risk for chronic diseases later in life. Some of the diseases breastfeeding may help reduce are: type 1 and type 2 diabetes mellitus, lymphoma, leukemia, Hodgkin disease, hypercholesterolemia, cardiovascular disease, obesity, Crohn's disease, celiac disease, inflammatory bowel syndrome, asthma, and food allergies (Pletta, Eglash, & Choby, 2000; American Academy of Pediatrics, 2001; American Dietetic Association, 2005; American Academy of Family Physicians, 2007). Further research needs to be conducted in the area of breastfeeding protection and future chronic disease.

Type 1 Diabetes Mellitus

Many studies report that infants who were breastfed have a decreased risk of developing type 1 diabetes mellitus. In 2002, a European study found that if an infant was breastfed for any duration their risk for developing type 1 diabetes mellitus decreased by 41% (Schack-Nelson & Michaelseh, 2006). A study by Borch-Johnson et al. found there was a 2.5 increase in the risk of developing type 1 diabetes mellitus in infants who were formula-fed for at least 3 months when compared to breastfed infants (Davis, 2001).

How breastfeeding affects the risk level of type 1 diabetes mellitus is still debated. Some researchers think breastfeeding has a protective effect against the destruction of pancreatic β-cells. Lately more researchers are suggesting that the early introduction of foreign proteins from cow's milk and earlier weaning of breastfeeding which decreases the infant's exposure to the immune boosting effects of breast milk has more influence on the risk level for type 1 diabetes mellitus. Antibodies for a peptide fragment, ABBOS, which is found on bovine albumin in cow's milk, is thought to cross-react with pancreatic

β-cell receptors due to the similarity of the structures. It is this cross-react that may result in the autoimmunity of type 1 diabetes mellitus (Davis, 2001; Schack-Nelson & Michaelseh, 2006).

Food Allergies

The body creates an immune response when a foreign substance enters the body as a protection mechanism. Sometimes the body will create a response to a substance that is otherwise harmless like food. Once the body labels a substance as foreign it will create an immune response every time the body encounters the substance which results in the formation of an allergy. The chemicals produced during an immune attack create allergy symptoms such as the itchy eyes, runny nose, vomiting, diarrhea, and rashes (La Leche League International, 2004).

The immune boosting properties of breast milk can help prevent infants from developing food allergies. Secretory IgA which the infant receives through breast milk can help prevent allergens from entering the infant's bloodstream while the infant's immune system is still immature. Also before an infant is introduced to solids, breastfeeding limits their exposure to allergens.

Infant formulas are based on soy and dairy products which happen to be two of the eight most common food allergies. One bottle of cow's milk or soy based formula can be enough to sensitize infants to the proteins found in those foods which will lead to an allergic response every time the infant is exposed to those proteins. The recommendations for decreasing the risk of food allergies, especially if there is a family history, is to exclusively breastfeed infants for at least the first six months and then gradually introduce solid foods (Zeretzke, 1998; La Leche League International, 2004).

Mother's Benefits of Breastfeeding

Many women know that breastfeeding offers health benefits to infants, but many are unaware that it also provides benefits to the mother. Through a survey, Guttman and Zimmerman (2000) found that most women who formula-feed their infants did not believe that breastfeeding would provide any benefits to them. Similar to infants, the degree of benefits breastfeeding provides to mothers is dependent on the duration, frequency, and exclusiveness of breastfeeding.

Increased Oxytocin Levels

Breastfeeding causes an increase of oxytocin levels in the mother's body. The increased oxytocin reacts with the uterus and decreases it to pre-pregnancy size. If the infant breastfeeds within the first hour of birth the raised oxytocin levels will aid in the release of the placenta and decrease the amount of postpartum bleeding (Pletta, Eglash, & Choby, 2000; American Dietetic Association, 2005).

Amenorrhea

Women are less likely to ovulate when they are exclusively breastfeeding which can delay menstruation. This has been noted as the Lactation Amenorrhea Method (LAM) of contraception. If a mother breastfeeds her infant for six months with minimal supplementation and is amenorrheic, her risk of becoming pregnant during that time period is less than 2% (Pletta, Eglash, & Choby, 2000). Lactation amenorrhea also helps the mother conserve iron since there is less menstrual blood loss. This can lower the mother's risk of becoming anemic (American Dietetic Association, 2005; American Academy of Family Physicians, 2007).

Risk of Cancer

Risk of endometrial, ovarian, and breast cancers may be reduced when a mother breastfeeds. Studies are finding that the affect of breastfeeding on endometrial cancers is related to breastfeeding duration. The greatest protection against endometrial cancer is seen in women who breastfeed for at least 72 months, but this has not been seen in women over 55-years-old. Breastfeeding for 13-72 months may provide protection against endometrial cancer for up to 21 years.

Studies have shown that if a woman has ever breastfed, her risk for ovarian cancer is decreased. Studies have not yet indicated whether breastfeeding duration plays a role in the level of protection breastfeeding provides against ovarian cancer.

The role of breastfeeding in breast cancer prevention is still controversial. Some studies are finding no relationship between breastfeeding and/or duration of breastfeeding and the decreased risk of breast cancer. Other studies are finding a decreased risk of pre-menopausal breast cancer with longer durations of breastfeeding (Pletta, Eglash, & Choby, 2000). More research is needed on this topic.

Effect on Diabetes

Studies indicate that breastfeeding can have a positive effect on a mother's diabetes. For women with gestational diabetes, breastfeeding can help improve glucose profiles (American Dietetic Association, 2005). If the mother has type 1 diabetes and breastfeeds, her insulin needs will decrease even if her carbohydrate intake increases. Mothers who formula-feed their infants will resume their pre-pregnancy insulin doses (Pletta, Eglash, & Choby, 2000). Breastfeeding may also decrease the mother's risk of type 2 diabetes (American Dietetic Association, 2005).

Weight Loss

Breastfeeding can aid in losing weight gained during pregnancy. Breastfeeding can help women lose pregnancy weight faster than non-breastfeeding women. Women who exclusively breastfeed their infants for more than six months are more likely to achieve maximum weight loss when compared to non-breastfeeding women (American Dietetic Association, 2005).

Bone Density

Breastfeeding can have an affect on calcium metabolism. Breastfeeding can aid in the remineralization of bone to levels above the amount present before pregnancy. This may lead to a decrease in the mother's risk of post-menopausal osteoporosis which would decrease her chances of post-menopausal hip fixtures (American Dietetic Association, 2005; American Academy of Family Physicians, 2007).

Should Smokers Breastfeed their Infants?

The issue of whether mothers who continue to smoke should or should not breastfeed their infants is reviewed in terms of risks versus benefits for the infant and the mother. The benefits of breastfeeding that are stated in the above sections also apply to smokers who breastfeed their infants. Another benefit of smokers breastfeeding their infants is to help protect infants against respiratory infections which are more commonly seen in infants exposed to environmental tobacco smoke. Studies indicate that respiratory infections are lower among infants of smokers who are breastfed compared to formula-fed infants of smokers (American Academy of Pediatrics, 2001; Gregor, Kriebs, & Varney Burst, 2004; Villamagna, 2004; La Leche League International, 2006b).

Even though there are benefits for smokers to breastfeed their infants, there are also some risks. If the mother smokes 20 cigarettes or less a day, the amount of nicotine found in breast milk typically is not enough to cause adverse effects for the infant. But if a mother is a heavy smoker, which is usually defined as having over 20 cigarettes a day, some problems may occur with the infant due to the increased levels of nicotine in the breast milk (La Leche League International, 2004).

Some studies have found that infants of smokers are fussy regardless of feeding method. The study conducted by Matheson and Rivrud (1989) found that 40% of infants who were breastfed by smokers were considered colicky, defined as excessive crying for more than two-three hours a day for four days a week, compared to 26% of infants breastfed by non-smokers. A relationship between smoking and colic is also seen in formula-fed infants when living with one or more smokers (La Leche League International, 2006b). Nicotine exposure from breast milk is not the only cause of colicky infants; it may also be caused by air exposure to smoke.

Besides colic, infants of smokers who are breastfeed, on rare occasions, may experience nausea, vomiting, abdominal cramps, and diarrhea (La Leche League International, 2006b).

After weighing the benefits verse the risks of smokers breastfeeding, many studies and organizations are concluding that the benefits of smokers breastfeeding infants outweigh the negatives (American Academy of Pediatrics, 2001; Gregor, Kriebs, & Varney Burst, 2004; La Leche League International, 2004; Villamagna, 2004; La Leche League International, 2006b). According to the American Academy of Pediatrics, "it may be that breastfeeding and smoking is less detrimental to the child than bottle feeding and

smoking" so breastfeeding should be encouraged among smokers (American Academy of Pediatrics, 2001, ¶4).

Since at the present time, the benefits outweigh the risks of smokers breastfeeding their infants, the National Advisory Committee on Drugs, in 2001, removed nicotine from the list of drugs of abuse not compatible with breastfeeding. The Committee believes there is not enough evidence to prove that the amount of nicotine in breast milk places the infant at a health risk, but they are waiting for more data. The amount of nicotine found in breast milk is 1.5-3.0 times the amount found in maternal plasma concentrations. In breast milk and plasma, the half-life of nicotine is 60-90 minutes. By removing nicotine from the list, the Committee is also hoping to support the American Academy of Pediatrics' efforts to increase breastfeeding rates in the United States (American Academy of Pediatrics, 2001).

Ways to Decrease the Risks of Smoking on Breastfed Infants

A smoker can take precautions to decrease their infant's risk of potential harm from nicotine in breast milk and also from exposure to second-hand smoke. The best option would be for cessation of smoking by the mother along with anyone else living in the same house as the infant. There are other measures a mother can take if she chooses to continue to smoke, but none will be as effective in protecting the infant against risks as quitting completely. Since the infant's risks from maternal smoking are increased if the mother smokes more than 20 cigarettes per day, decreasing the amount of cigarettes smoked per day is recommended. Smoking fewer cigarettes will result in less nicotine in the breast milk and decrease the infant's exposure to second-hand smoke. By smoking away from the infant, in another room or, preferably, outside, the infant's exposure to

second-hand smoke can be decreased. This is also recommended for anyone else who is around the infant and chooses to smoke. The last recommendation for decreasing the infant's risks is for the mother to smoke right after breastfeeding. Since the half-life of nicotine in breast milk is 60-90 minutes, the amount of nicotine in breast milk is decreased or eliminated by the next nursing session depending on how many cigarettes are smoked and the time between feedings (Villamagna, 2004).

Barriers to Breastfeeding

Most women, whether they choose to breastfeed or formula-feed, feel that breast milk is better for their infants than formula (Hoddinott & Pill, 1999; Guttman & Zimmerman, 2000). But even though most women feel that breast milk is better, there are barriers to breastfeeding for some women which can cause them to select formula-feeding. Some of barriers to breastfeeding are specific to smokers, while others are barriers for both smokers and non-smokers.

Lower Breast Milk Volume

A common barrier to breastfeeding among smokers is the perception of low breast milk supply. Whether or not smoking causes a decrease in breast milk volume which in turn shortens the duration smokers breastfeed their infants is a controversial topic. Some studies have shown that smoking does lead to decreased breast milk supply, but the findings have not been consistent (Letson, Rosenberg, & Wu, 2002; Giglia, Binns, & Alfonso, 2006a).

One theory about smoking decreasing breast milk volume is related to nicotine and its effect on lowering the amount of prolactin produced, a hormone involved in stimulating lactation (Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, &

Alfonso, 2006a). A study by Anderson in 1985, found lower basal prolactin levels in smokers, but did not find a difference in the increase of prolactin between smokers and non-smokers. More recent studies report that there is no link between the amount of prolactin in the woman's plasma and the rate of breast milk synthesis. This leads to the question of to what degree the lower amount of prolactin produced in smokers is actually affecting the rate of breast milk synthesis. This issue is still uncertain (Donath, Amir, & ALSPAC study team, 2004).

Another theory of how nicotine decreases breast milk volume is the related affects to oxytocin, a hormone involved in the let-down process where milk is transported to the breast duct. Some authors have stated that nicotine inhibits the release of oxytocin, but the majority of the studies conducted on this issue have found that nicotine has no effect on the release of the oxytocin-linked neurophysin (Donath, Amir, & ALSPAC study team, 2004; Liu, Rosenberg, & Sandoval, 2006).

Researchers are now looking into another way nicotine might have an affect on oxytocin. The new thought is nicotine causes vasoconstriction which could lead to a decreased amount of blood flow to the breast affecting the amount of circulating oxytocin. This decreased amount of oxytocin might decrease the amount of milk that is transported to the milk duct. The end result would be decreased milk volume (Donath, Amir, & ALSPAC study team, 2004). Researchers are still exploring this theory.

One of the more well-known studies that measured breast milk supply and related factors was conducted by Hopkinson et al (1992). This study looked at the volume of breast milk that was expressed by mothers for their preterm infants. In the study, 11 women were smokers. The study found that smoking only accounted for only an 8%

variability of breast milk volume while expressing frequency, change in frequency, and day of initiation of expressing accounted for 56% variability (Hopkinson et al., 1992; Amir & Donath, 2002; Donath, Amir, & ALSPAC study team, 2004). There are more variables that affect breast milk volume than smoking alone such as when breastfeeding was initiated and frequency of breastfeeding.

According to Donath and Amir (2004), "if smoking had a negative physiological effect on breastfeeding, we would expect the effects of smoking to be seen universally" (p.1517). Many studies have shown that women who smoke can have successful lactation. A study conducted by Nafstad et al. found that 41% of Norwegian women who smoked 10 or more cigarettes per day were still breastfeeding their infants at six months postpartum. Another study of Jordanian women found that 86% of these women who smoked and had at least 17 years of education were breastfeeding their infants at two months. Other studies conducted in Hong Kong, New Zealand, and with urban aboriginal women in Western Australia were also finding that maternal smoking is not associated with a shorter duration of breastfeeding. If nicotine has a consistent negative effect on lactation, studies would not be finding smokers who are successfully breastfeeding their infants. These studies suggest that the lower rate of breastfeeding among smokers is not entirely due to physiological factors; it may be due to psychosocial factors (Amir & Donath, 2002; Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006a).

Intention

Breastfeeding intentions seem to have a larger influence on breastfeeding rates than physiological factors. A mother's breastfeeding intention during pregnancy is a

strong indicator of whether she will initiate breastfeeding and for what duration (Forster et al., 2004). Under the Theory of Reasoned Action created by Icek Ajzen and Martin Fishbein, it is stated that if a person intends to do an action, they will most likely carry out that action (Shaker, Scott, & Reid, 2004).

Studies report that there is a strong relationship between how a pregnant woman intends to feed her infant and the actual feeding method that is carried out when the infant is born. In a study conducted by Shaker, Scott, & Reid (2004), out of 66 women who intended to breastfeed when discharged from the hospital, 72.7% followed through on the intention, while 27.3% who intended to breastfeed were formula-feeding their infants. Twenty-two women intended to formula-feed and 95.5% followed through on that intention. Their results also showed out of 20 women who were undecided, during pregnancy, on which infant feeding method to use, 80% were formula-feeding their infants when discharged from the hospital (Shaker, Scott, & Reid, 2004).

Studies are also citing that smokers are less likely to intend to breastfeed their infants than non-smokers (Donath, Amir, & ALSPAC study team, 2004; Scott, Binns, Oddy, & Graham, 2006). Avon Longitudinal Study of Parents and Childhood (ALSPC), a longitudinal cohort study with data from 11,111 women, found that smokers had significantly lower breastfeeding intentions; 33.7% of smokers intended to breastfeed for at least four months while 47.4% of non-smokers intended to breastfeed for the same duration. This decreased intention among smokers has also been noted in other studies (Giglia, Binns, & Alfonso, 2006a; Scott, Binns, Oddy, & Graham, 2006).

The ALSPC study also found that if smokers had a strong intention to breastfeed their infants, they were more likely to succeed with their breastfeeding goals than non-

smokers who had lower intentions to breastfeed (Donath, Amir, & ALSPAC study team, 2004). According to Donath and Amir (2004), "women who are strongly motivated to breastfeed are more likely to succeed than women with low breastfeeding expectations, regardless of smoking status" (p. 1517).

Number of Cigarettes Smoked

The number of cigarettes a mother smokes also has an influence on breastfeeding rates. Many studies have found a difference in breastfeeding rates among light smokers (< 10 cigarettes/day) and heavy smokers (> 10 cigarettes/day) (Najdawi & Faouri, 1999; Amir & Donath, 2002; Liu, Rosenberg, & Sandoval, 2006). It has been found that light smokers are more likely to breastfeed their infants than heavy smokers (Amir & Donath, 2002). One study found that at two months postpartum, 70% of light smokers were breastfeeding compared to 55% of heavy smokers. The same study also found that at four months postpartum, 47% of light smokers were still breastfeeding compared to 40% of heavy smokers (Najdawi & Faouri, 1999).

A study conducted by Liu, Rosenberg, and Sandoval (2006) divided women into categories based on their smoking habits and compared breastfeeding rates. The results showed 92.8% of non-smokers initiated breastfeeding along with 94.1% of quitters (women who smoked before pregnancy, quit during pregnancy and were non-smokers after pregnancy), 82.1% of postpartum relapsers (women who smoked before pregnancy, quit during pregnancy, and began smoking after pregnancy), and 79.0% of persistent smokers (women who smoked before, during, and after pregnancy). This study was conducted in Oregon which has a high breastfeeding initiation rate.

The study also found that only the persistent smokers were at a high significant risk for not breastfeeding their infants after 10 weeks. Compared with non-smokers, persistent smokers were 2.3-2.4 times more likely to not breastfeed their infants 10 weeks after birth. The risk of decreased breastfeeding duration was not significantly different for the quitters and postpartum relapsers when compared to non-smokers. The study's overall finding was that if women quit smoking during pregnancy and decrease the number of cigarettes smoked during postpartum, breastfeeding duration may be increased (Liu, Rosenberg, & Sandoval, 2006).

Age of Mother

The mother's age can be a factor in breastfeeding duration and smoking habits. Studies are finding that women who are younger are less likely to breastfeed their infants and are more likely to be smokers (Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006a). A survey of the Breastfeeding National Immunization Data in 2005 showed that mothers less than 20 years old were breastfeeding their infants less than mothers 30 years or older at six months (14.8 ± 4.4 compared to 46.2 ± 1.3 half 95% confidence interval) and at 12 months (5.4 ± 2.3 compared to 24.2 ± 1.1) (Centers for Disease Control and Prevention, 2005). In a study conducted by Haug et al. (1998) it was found that 59% of women who were less than 20 years old were smokers while 20% of women 35 years or older were smokers.

Partner's Smoking Habit

If the father of the infant is a smoker, it may influence breastfeeding initiation and duration (Haug et al., 1998; Giglia, Binns, & Alfonso, 2006a). According to Di Napoli et

al. (2006) if an infant's father is a smoker, the chance of the infant being breastfed till three months is significantly lower when compared to infants with a non-smoking father.

This effect is also seen when a smoker, other than the father, is living with the mother. Horta et al. (1997) found when the mother, a non-smoker, and lived with a smoker there was an odds ratio of 1.31 of stopping breastfeeding by six months. If the mother was also a smoker the odds ratio decreased to 1.21 (Horta et al., 1997).

In a study done by Haug et al. (1998) it was found that if both parents were non-smokers, 34% of mothers were not breastfeeding their infants at six months. The study also found that if both parents were smokers, the number of mothers not breastfeeding their infants at six months had greatly increased to 67% (Haug et al., 1998). The lower rates of breastfeeding when both parents are smokers may be due to less support to quit smoking and/or less support to breastfeed.

Other Barriers to Breastfeeding

There are several more barriers to mothers' breastfeeding their infants. A study of the Wisconsin WIC programs found the two main barriers to breastfeeding were lack of adequate knowledge about breastfeeding and lack of support from partner, friends, and family for breastfeeding (Reifsnider & Eckhart, 1997). Other reasons include: unfavorable attitude towards breastfeeding, less than 12 years of education, low income, thinking breast milk is harmful if a smoker, no confidence in ability to breastfeed, embarrassment, did not attend prenatal classes, need to work or go to school, aggressive marketing of infant formula, negative perceptions about breastfeeding from prenatal provider, physical discomfort and thinking breastfeeding is inconvenient (Guttman & Zimmerman, 2000; Letson, Rosenberg, & Wu, 2002; Ryser, 2004; American Dietetic

Association, 2005; Giglia, Binns, & Alfonso, 2006a; Scott, Binns, Oddy, & Graham, 2006).

Conclusion

Breastfeeding provides many benefits to infants and mothers. It offers infants a complete source of nutrients and provides protective agents that help infants fight against infections and diseases. The benefits of breastfeeding for the mother are less well known, but they include decreased postpartum bleeding, amenorrhea, affect their risk of cancers and diabetes, aid in weight loss, and help increase bone density.

Even with all the benefits known, many women are still not breastfeeding their infants at a rate desired by the World Health Organization, American Academy of Pediatrics, and American Dietetic Association. In order to increase breastfeeding rates in the United States, the US Department of Health and Human Services included it on the list of national health goals, *Healthy People 2010*. Several states have already met these goals, but there are many more states that still need to improve their numbers of breastfeeding women.

A group that has low breastfeeding rates is the WIC population. From 1978 to the present, this population has had a lower breastfeeding rate than the non-WIC population. Even though the breastfeeding rates have been lower than the non-WIC population, there has been an increase in breastfeeding rates among the WIC population since 1978. The WIC program tries to increase the breastfeeding rates among their participants by promoting breastfeeding as the best infant feeding method, increasing acceptance of breastfeeding and distributing breastfeeding educational materials.

Another group that has low breastfeeding rates is smokers. With smokers, there is the issue of whether or not it is safe to breastfeed infants due to the nicotine in the breast milk and second-hand smoke. My studies and organizations have weighed the benefits verse the risks of smokers breastfeeding and the consensus is the benefits outweigh the risks. Smokers should be encouraged to breastfeed.

There can be many barriers for a mother when it comes to breastfeeding. It is not uncommon for smokers to have the perception of low milk supply and stop breastfeeding earlier than non-smokers. The mother's intentions, during pregnancy, of which infant feeding method to use when the infant is born is a strong indicator of the actual feeding method the mother will use to feed her infant. Studies report that a mother's breastfeeding intentions effect initiation and duration of breastfeeding more than physiological factors. Other barriers include the number of cigarettes the mother smokes, age of the mother, partner's smoking habit, and others.

When creating interventions to increase breastfeeding rates and duration, it is important to consider barriers women have to breastfeeding along with their infant feeding intentions in order to answer their questions and to debug breastfeeding myths. By increasing women's knowledge of the benefits of breastfeeding and increasing their confidence in their ability to breastfeed, it can help to influence their intentions to breastfeed their infants, which can help increase the rate of women who initiate breastfeeding and breastfeed for the recommended length.

Chapter III: Methodology

This was a quasi designed quantitative and qualitative study utilizing self-reported surveys to identify reasons for intentions to breastfeed or formula-feed infants by pregnant smokers and non-smokers who are enrolled in the Eau Claire WIC program. This chapter describes how the subjects were selected, a description of the sample, and the instrumentation that was used to carry out the study. The chapter also includes how the data was collected, the data analysis process, and limitations of the methodology.

Subject Selection and Description

Permission and approval for the study was obtained from the Eau Claire WIC program prior to subject selection. A list was provided of all pregnant women with an expected delivery date after February 2, 2007 who were enrolled in the Eau Claire WIC program. Having the list only contain women with an expected delivery date after February 2, 2007 ensured that all the subjects were pregnant at the time of survey completion. The list was organized by expected delivery dates with September 1, 2007 as the last date on the list. There were 172 pregnant women enrolled in the Eau Claire WIC that were in the selected range of expected delivery dates.

Two baby showers were held at the WIC clinic, where the participants were asked to complete the survey for this study. One shower was held on January 22, 2007 and the other on January 25, 2007. Two baby showers were needed due to the large number of pregnant women in the program and the limited amount of space in the clinic. Each woman on the list was mailed an invitation to one of the two baby showers. Eight-six women were invited to each baby shower. A copy of the invitations is located in Appendix A and B.

The participants for this study were not randomly selected. The sample population was composed of women who attended the baby showers and agreed to complete the survey. Only the surveys completed by women 18 years or older were considered in this study.

Instrumentation

A consent form was created to inform the participants of the purpose of the study, time commitment, cost, risks, benefits, confidentially, right to withdraw, and approval of the Institutional Review Board at the University of Wisconsin - Stout. The consent form indicated that by completing the survey, the participants understood the information that was provided and they agreed to take part in the study. A copy of the consent form is located in Appendix C.

The survey for this study was designed for easy completion by participants. The majority of survey asked participants to mark or circle the response that best represented their answer. A few questions asked the participants to explain their answers. The last section of the survey asked participants to indicate how much they agree or disagree with statements according to a 5-point Likert scale. The survey had 59 questions which included topics on: infant feeding intentions, feeding of past children, knowledge of breastfeeding, attitudes toward breastfeeding and formula-feeding, and smoking habits.

The questions on the survey were constructed using surveys from other research studies in order to fit the needs of this study (Baisch, Fox, & Goldberg, 1989; de la Mora et al., 1999; BMRB International, 2000; Guttman & Zimmerman, 2000). Three qualified professionals reviewed the survey to determine if the questions were appropriate for the sample population, readibility, format and content. The reviewers were professors at the

University of Wisconsin – Stout and held doctarate degrees. Two of the reviewers were registered dietitians. Survey questions were revised based on the input from the reviewers. The survey was not piloted due to time constraints. A copy of the survey is located in Appendix D.

Survey Description and Rationale

Question 1: Age in Years. The age of the participants was used to ensure that only surveys completed by women 18 years or older were used in this study. Studies have found that younger women were more likely to be smokers and were less likely to breastfeed their infants (Haug et al., 1998; Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006a). This question was used to determine if there was a relationship between age and smoking status; age and infant feeding intentions.

Question 2: Martial Status. This question was designed to gather demographic information related to the martial status of the participants. A list of possible responses was provided and the participant marked the answer that best represented of their martial status.

Question 3: What is your level of education? This question was used to gather demographic data about the participants as well as determine if there was a relationship between the participants' level of education and smoking status. Women with fewer years of education were more likely to smoke during pregnancy than women with higher education (Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC study team, 2004; Giglia, Binns, & Alfonso, 2006a). In the study conducted by Giglia, Binns, and Alfonso (2006a), smokers were more likely than non-smokers to not have completed high

school (54.2% vs. 29.5%) while non-smokers were more likely to have completed high school or bachelor degree than smokers (54.8% vs. 44.4%, 15.7% vs. 1.3%).

Question 4: What is your ethnicity? The responses to this question provided demographic information about the participants. This question offered an "Other" category in case the ethnicity of the participant was not represented on the list. If "Other" was selected, there was a line for the participants to write down their ethnicity.

Question 5: How far along are you in your pregnancy? Participants selected the range, in months, which best corresponded with how many months they had been pregnant. This question was used to ensure that all women completing this survey were pregnant.

Question 6: How do you intend to feed your baby during the next few months? This question was designed to determine the participants' infant feeding intentions by looking at four periods of time: the first week after birth; during the rest of the first month; during the second-fourth month; and beyond the fourth month. Each time period was labeled (a) through (d). After each time period were three categories of infant feeding methods: breastfeed; formula-feed; breastfeeding and formula-feed. The participants were asked to circle the infant feeding method that best represented their intentions for each of the four time periods.

Questions 7-32 came from the Survey of Infant Feeding created by BMRB International (2000). The questions were modified to fit the purpose of this study, but the same layout of the questions was used.

Question 7: Is this your first baby? This question was set up to be a dichotomous nominal with a yes or no answer. If this was their first infant, the participant skipped to

question 13 since questions 8-12 were regarding the participants' other children. If the participant had other children, they continued to question 8.

Question 8: How many biological children do you have in total (Do not count adapted children, step-children or foster children)? Participants answered this question based on how many biological children they had. They selected the range that was appropriate for representing the number of their biological children. The response to this question determined if the participants needed to answer questions 10-12 since these questions were based on how many children the participant had.

Question 9-12: How long did you breastfeed your first two children, third and fourth children, fifth and sixth children, and seventh child and the children that came after? These questions were structured to determine whether the participants' previous children were breastfed and, if so, for how long. These questions were used to determine if there was a relationship between the participants' feeding methods used with previous children and infant feeding intention of their current infant.

If participants only had one or two children, after answering this question, they skipped to question 13. If participants had three or more children, they continued to question 10 to answer how their third and fourth child was fed. If participants did not have more than four children, they skipped to question 13. The same procedure was used in question 11 and 12 depending on the number of children the participant had.

Question 13: When did you start receiving prenatal (pregnancy) care? This question had participants select a range consisting of months of pregnancy that best represented when they started receiving prenatal care. This question provided an

overview of when the participants started receiving prenatal care and when they may have started receiving nutrition education about infant feeding methods.

Question 14: Who is providing you with prenatal care? This question was designed to allow participants to mark all the responses that fit their situation since some participants were receiving prenatal care from more than one provider. The question also allowed participants to select "Other" and write in a provider if they were receiving care from someone that was not on the list. This question offered information on who was providing the participants with prenatal care and which prenatal providers had the opportunity to give participants education regarding infant feeding methods.

Question 15: Have any of the prenatal providers you selected above asked how you plan to feed your baby? This question was a dichotomous nominal with a yes or no answer. Since infant feeding intentions during pregnancy were a strong indicator of actual feeding method used when the infant was born, it would be beneficial for prenatal providers to discuss infant feeding with their patients/clients (Shaker, Scott, & Reid, 2004). This was also a question that WIC was required to ask pregnant women enrolled in their program.

Question 16: Have your prenatal provider(s) discussed with you the different ways to feed your baby (breastfeeding and formula-feeding)? This question was used as a filter question for questions 17. If none of the participants' prenatal providers discussed this question with them, they were asked to skip to question 18 since question 17 further builds on question 16.

Prenatal providers could help shape a woman's infant feeding intentions through discussing different infant feeding method. As mentioned in question 15, a woman's

infant feeding intentions, during pregnancy, had a strong correlation with the actual feeding method used when the infant was born, making pregnancy an opportune time for prenatal providers to discuss infant feeding methods with their patients/clients (Shaker, Scott, & Reid, 2004).

Question 17: If feeding your baby was discussed with you, who were the individuals? This question provided an overview of who had discussed infant feeding methods with the participants. This question allowed participants to mark all responses that best represented their situation or write in a provider that was not on the list.

Question 18: Have you attended any classes that included talks or discussions about feeding babies? Along with question 17, this question provided further information on the participants' exposure to different infant feeding methods and nutrition education on the different infant feeding methods. A study that looked at the relationship between breastfeeding rates and prenatal class attendance revealed that a higher percentage of women who attended prenatal classes were breastfeeding at two weeks, six weeks, and three months when compared to women who did not attend prenatal classes (Reifsnider & Eckhart, 1997).

Question 19: Were you taught how to prepare or mix formula at the classes you attended? This question was used to provide an understanding of what type of knowledge the participants were exposed to during their classes and if preparation method of formulas influenced their decision on which infant feeding method to use. For example, if the participants felt mixing/measuring formula was too confusing, it may have influenced them to decide that breastfeeding would be easier or if they found preparing formula to

be easy and convenient it may have influenced them to select formula-feeding as the preferred feeding method.

Question 20: Were you taught breastfeeding techniques (such as proper positioning of the baby) at the classes you attended? If participants were able to practice or to visually see how to do breastfeeding techniques, it may increase their level of confidence in their ability to perform the task. According to Hoddinott and Pill (1999):

> Breast feeding is best considered a practical skill and a performing art. Like other bodily skills – for example, swimming – it usually needs to be learnt. Developing the confidence, commitment, and knowledge necessary to perform this new behavior may be more effectively gained through apprenticeship to a breastfeeding mother rather than theoretically in consultations or from books (p. 34).

Question 21: Have you received positive advice about breastfeeding from any of the following people or organizations? This question was used to determine if a relationship existed between the positive advice a participant received and infant feeding intentions. The amount of positive advice participants received could influence their intended infant feeding method if the positive advice was welcomed. Since WIC has a responsibility to promote breastfeeding, this question was also used to determine if the participants felt that the WIC staff was providing them with positive advice about breastfeeding.

Question 22: Have you received negative advice about breastfeeding from any of the following people or organizations? This question was used to determine if the participants were receiving any negative advice about breastfeeding and who provided

the advice. The study conducted by Guttman and Zimmerman (2000) found if pregnant women received negative advice about breastfeeding, the advice usually came from their friends and family. The responses to this question were also correlated with infant feeding intentions to determine if there was a relationship.

Question 23: Do you know any mothers with young babies? This question was intended be a filter question for question 24. If the participants answered no to this question, they skipped to question 25.

Question 24: Would you say that most of the mothers you know with young babies formula-feed or breastfeed their babies? The intent of this question was to determine participants' exposure to breastfeeding or formula-feeding. Hoddinott and Pill (1999) found in their study that a woman's exposure to others breastfeeding had a strong influence in their own confidence in their own ability to breastfeed and their initiation of breastfeeding. The woman's exposure could result in a positive or negative influence on her breastfeeding intentions. The researchers (Hoddinott & Pill, 1999, p. 32) stated that "Crucial factors determining women's reactions were the nature of their relationship to the breastfeeding woman, the presence of other people and their reaction, the frequency of exposure, the perceived appropriateness of the setting, and their own level of body confidence."

Question 25: Do you think it's safe for a woman to breastfeed when she is a smoker? The responses to this question were used to gauge the participants' knowledge about whether or not smokers should breastfeed. Since many studies and organizations have determined that smokers should breastfeed their infants since the benefits outweigh the negatives, the answer to this question should be yes (American Academy of

Pediatrics, 2001; Gregor, Kriebs, & Varney Burst, 2004; La Leche League International, 2004; Villamagna, 2004; La Leche League International, 2006b).

The number of 'no' responses was used to indicate the need for providing education on this issue to participants. This question also allowed participants to explain their reason for selecting no and these responses could be used when addressing this issue with women enrolled in the WIC program.

Question 26: Have you smoked cigarettes at all in the last 2 years? The responses to this question were used to obtain a smoking history of the participants.

Question 27: Do you smoke cigarettes at all now? Since this study was geared towards looking at differences between smokers and non-smokers, this question needed to be asked to determine how many smokers completed the survey and that information was used to make comparisons. If the participants were non-smokers, they skipped to question 32 since questions 28-31 were related to the participants' smoking habits.

Question 28: If yes, how many cigarettes do you smoke? This question provided a range of how many cigarettes the participants smoked in a day. According to Amir and Donath (2002) light smokers (< 10 cigarettes/day) are more likely to breastfeed then heavy smokers (>10 cigarettes/day). Also the risks for infants of smokers decreased with fewer cigarettes the mother smoked (La Leche League International, 2004).

Question 29: Since learning about your pregnancy, did you do any of the following with your smoking habit? This question was added to the survey to obtain more information about the smoking habit of the participants. The results of this question also showed the participants' commitment to quit smoking and their possible understanding of the health risks that smoking during pregnancy can cause.

Question 30: When your baby is born, will you: (a) stop smoking, (b) continue smoking and formula-feed the baby, and (c) continue smoking and breastfeed the baby. This question provided responses of the mothers' intentions for smoking after the baby was born and her infant feeding intentions if she continued to smoke.

Question 31: Please explain your answer to question #30. Unlike the other questions on the survey, this question did not provide choices for answers. Instead, the participants were asked to write down their answer about why they selected their response in question 30. This provided a better understanding of the participants' reasoning for why they selected that particular response for question 30 regarding smoking intentions after birth of their infant.

Question 32: Do any of the people you live with smoke cigarettes? The results from this question were used to determine if there was a relationship between living with a smoker or non-smoker and infant feeding intentions. Studies revealed that mothers who lived with someone who smoked were less likely to breastfeed as long of a duration compared to mothers who lived with a non-smoker (Horta et al., 1997).

Questions 33-47 came from the Iowa Infant Feeding Attitude Scale (de la Mora et al., 1999). These questions were presented in an agree/disagree format. The scale used a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree and had the participants circle the number that best represented their opinion. The survey for this study used the same wording and Likert scale that was used in Iowa Infant Feeding Attitude Scale.

Studies showed that mothers who breastfed scored higher on this scale which favored breastfeeding over formula-feeding. This survey had validity for predicting the

actual infant feeding methods that was eventually used by the mother (de la Mora et al., 1999; Shaker, Scott, & Reid, 2004). The Iowa Infant Feeding Attitude Scale did not take into consideration whether or not the women answering the survey were smokers or non-smokers. These questions were used to get an overview of the participants' knowledge and views on breastfeeding.

Question 33: The nutritional benefits of breast milk last only until the baby is weaned from breast milk. Shaker, Scott, and Reid (2004) used the Iowa Infant Feeding Attitude Scale for their study and when this question was asked to their subjects, they found mothers who were breastfeeding when discharged from the hospital were more likely to disagree with the statement when compared to mothers who were formula-feeding at discharge (90.6% vs. 61.8%, $P < 0.001$).

Question 34: Formula-feeding is more convenient than breastfeeding. In the study conducted by Shaker, Scott, and Reid (2004), it was discovered that mothers who were formula-feeding their infants agreed with this statement more than mothers who were breastfeeding (52.7% vs. 17.0%, $P < 0.001$). Guttman and Zimmerman (2000) found similar results in their study. Mothers who formula-fed believed that breastfeeding was less convenient and limited the mother's freedom more than formula-feeding (Guttman & Zimmerman, 2000).

Question 35: Breastfeeding increases mother-infant bonding. The responses to this question were used to determine if the participants felt breastfeeding was an important part way for the mother to connect with her infant. Shaker, Scott, and Reid (2004) found that mothers who were breastfeeding were more likely to agree with this statement than mothers who were formula-feeding (77.3% vs. 50.9%, $P = 0.004$).

Question 36: Breast milk is lacking in iron. This question was used to determine the participants' knowledge of what nutrients breast milk provided for the infant. In the Shaker, Scott, and Reid (2004) study, 60% of mothers who formula-fed agreed that breast milk was lacking in iron while 37.7% of mothers who breastfed agreed.

Question 37: Formula-fed babies are more likely to be overfed than are breastfed babies. The mothers in Shaker, Scott, and Reid (2004) study, for the most part, were neutral on this question (49.1% of breastfeeding mothers vs. 41.8% of formula-feeding mothers, $P = 0.019$). But there was a larger portion of formula-feeding mothers who disagreed with this statement than the breastfeeding mothers (40.0% vs. 22.7%) (Shaker, Scott, & Reid, 2004).

Question 38: Formula-feeding is the better choice if a mother plans to work outside the home. This issue could be a large factor in whether a mother decided to breastfeed or formula-feed. Shaker, Scott, and Reid (2004) found that more mothers who chose to formula-fed agreed with this statement more than mothers who breastfed, but the numbers were fairly close between groups (47.3% vs. 41.5%, $P = 0.019$). Several subjects in the Guttman and Zimmerman (2000) study said they thought breastfeeding was better for their infants, but chose to formula-feed because they needed to go back to school or work. Some subjects said they chose formula-feeding so that others could help them out with the infant while they were at school or work (Guttman & Zimmerman, 2000).

Question 39: Mothers who formula-feed miss one of the greatest joys of motherhood. This question provided an overview of the participants' feelings of formula-feeding. In the Shaker, Scott, and Reid (2004) study, more mothers who breastfed agreed with this statement (49.1% vs. 16.4%, $P < 0.001$).

Question 40: Women should not breastfeed in public places such as restaurants. "Breastfeeding is practically nonexistent in the U.S. in the public eye" (Guttman & Zimmerman, 2000, p. 1459), which could influence whether or not people felt mothers breastfeeding in public was appropriate. Shaker, Scott, and Reid (2004) found that the mothers who were formula-feeding were more likely to disagree with this statement than mothers who were breastfeeding (81.9% vs. 75.5%, $P = 0.319$). Guttman and Zimmerman (2000) found different results in their study when they compared the subjects' views of breastfeeding in public with the infant feeding method they used. They found that more mothers who formula-fed had a higher negative option of mothers breastfeeding in public than mothers who breastfed (29% vs. 22%) while more mothers who breastfed felt that people, overall, had more of a negative reaction to seeing a woman breastfeeding in public than mothers who formula-fed (50% vs. 40%) (Guttman & Zimmerman, 2000).

Question 41: Babies fed breast milk are healthier than babies who are fed formula. This question was used to determine the participants' knowledge of the benefits breastfeeding provided to infants. Shaker, Scott, and Reid (2004) determined that mothers who breastfed were more likely to agree with this statement (60.4% vs. 25.5%, $P < 0.001$).

Question 42: Breastfed babies are more likely to be overfed than formula-fed babies. This question was similar to question 37, with breastfed and formula-fed switched in the sentence. In Shaker, Scott, and Reid's (2004) study, like question 37, more mothers who formula-fed disagreed with this statement compared to mothers who breastfed (63.6% vs. 52.8%, $P = 0.131$.

Question 43: Fathers feel left out if a mother breastfeeds. A father's opinion of breastfeeding could influence which infant feeding method the mother chooses since it would effect how supportive the father will be of the infant feeding choice (Scott, Binns, Oddy, & Graham, 2006). In Shaker, Scott, and Reid's (2004) study more mothers who formula-fed agreed with this statement (30.9% vs. 17.0%, $P = 0.185$).

Question 44: Breast milk is the ideal food for babies. Most mothers believed that breastfeeding was better for their infants than formula-feeding, no matter whether they actually breastfed or formula-fed their infants (Hoddinott & Pill, 1999). Guttman and Zimmerman (2000) found that many mothers in their study who formula-fed "believed 'breast was best' in terms of its physiological and psychosocial aspects" (p. 1466), but did not breastfed due to other barriers such as demands school or work, lack of support, and embarrassment. The Shaker, Scott, and Reid's (2004) study found that more mothers who breastfed agreed with this statement (60.4% vs. 25.5%, $P < 0.001$).

Question 45: Breast milk is more easily digested by the baby than formula. This question was used to gauge the participants' knowledge of breast milk. Shaker, Scott, and Reid (2004) found that more mothers who breastfed agreed with this statement (69.8% vs. 43.7%, $P = 0.009$).

Question 46: Formula is as healthy for an infant as breast milk. This question was included in the survey to determine if participants were aware of the differences in health benefits between formula and breast milk. More mothers who breastfed their infants disagreed with this statement than mothers who formula-fed according to the Shaker, Scott, and Reid (2004) study (51% vs. 21.8%, $P < 0.001$).

Question 47: Breastfeeding is more convenient than formula feeding. This question was similar to question 32, with breastfeed and formula-feed switched in the sentence. Studies found that most mothers felt that the method of infant feeding they selected was more convenient. The definition of convenience was probably different for breastfeeding and formula-feeding mothers. Breastfeeding mothers may have felt it was more convenient to not need to prepare bottles while formula-feeding mothers may have felt is was more convenient to be able to leave for a longer period of time and have someone else care for the infant (Guttman & Zimmerman, 2000; Shaker, Scott, & Reid, 2004). In Shaker, Scott, and Reid's (2004) study it was found that more mothers who breastfed agreed with this statement (58.5% vs. 27.3%, $P < 0.001$).

Questions 48-52 and 54-56 came from a questionnaire that was used by Baisch, Fox, and Goldberg (1989) to determine attitudes towards breastfeeding among teens. Using their questionnaire, Baisch, Fox, and Goldberg (1989) found a significantly higher attitude score among teens who intended to breastfeed their infants than teens who intended to formula-feed (mean = 68.6 vs. 58.2). Like the Iowa Infant Feeding Attitude Scale, their questionnaire also had the participants rate their reponses on a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree. The same Likert scale was used on the survey for this study. Some questions were revised to fit the purpose of this study.

Question 48: Breastfeeding means no one else can feed the baby. More participants in the Baisch, Fox, and Goldberg (1989) study agreed with this statement than disagreed (49% vs. 39%). As stated in question 47, some mothers found breastfeeding to be inconvenient since no one else could feed the infant. Also as stated in question 38, if no one was able to feed the infant, it could have prevented the mother

from going back to school or work. Because of these reasons, some mothers may have felt that breastfeeding did not fit their lifestyle and chose to formula-fed their infants since they could not get assistance with feeding their infants.

Question 49: I think breastfeeding will be good for my baby. Eighty percent of the participants in the Baisch, Fox, and Goldberg (1989) study agreed with this statement while only 6% disagreed. As stated in question 44, most mothers believed that breastfeeding was better for their infants than formula-feeding no matter what infant feeding method they used.

Question 50: I would feel embarrassed if someone saw me breastfeeding. In many studies, embarrassment was commonly mentioned among mothers as a reason they did not breastfeed (Ryser, 2004; American Dietetic Association, 2005; Hoddinott & Pill, 1999). Many mothers were embarrassed about breastfeeding because "A woman's main perception of her breasts typically has erotic connotations in Western societies" (Guttman & Zimmerman, 2000, p. 1459). In Baisch, Fox, and Goldberg's (1989) study, the number of teens that agreed with this statement was only 1% lower than the number that disagreed with the statement (41% vs. 42%).

Question 51: I have heard from someone who breastfed that breastfeeding hurts. Hearing about negative experiences other mothers had with breastfeeding could influence which infant feeding method the mother chooses. Like question 50, there was only a 1% difference between the participants agreeing and disagreeing with this statement in the Baisch, Fox, and Goldberg (1989) study. More participants agreed with this statement than disagreed (40% vs. 39%) (Baisch, Fox, & Goldberg, 1989).

Question 52: I don't think I know enough about breastfeeding. This question was used to determine how much the participants felt they knew about breastfeeding. The results of this question were used to determine if there was a relationship between the participants' knowledge level of breastfeeding and their infant feeding intentions. In the Baisch, Fox, and Goldberg (1989) study, 51% agreed with this statement while 30% disagreed (Baisch, Fox, & Goldberg, 1989).

Question 53: Women who smoke produce breast milk that is harmful to the baby. This question was added to the survey to provide information on the participants' knowledge level about smokers breastfeeding their infants. The responses to this question were used to determine if there was a difference in option among smokers and non-smokers in regards to this statement.

Question 54: My partner wants me to breastfeed. As stated in question 43, a father's support of the infant feeding method could influence the mother's decision of which method was used. The results of the cohort study conducted by Shaker, Scott, and Reid (2004) found that mothers who thought their partners preferred breastfeeding consistently had higher breastfeeding rates than the mothers who thought their partners preferred formula-feeding or were indifferent to which method was used. The results of their study showed that 53% of the mothers who thought their partners preferred breastfeeding were exclusively breastfeeding at three moths and 59% of the mothers were maintaining breastfeeding at six months compared to 26% and 30% of the mothers who thought their partners preferred formula-feeding or were indifferent (Shaker, Scott, & Reid, 2004). In the Baisch, Fox, and Goldberg (1989) study, 27% of the participants agreed with this statement while 43% disagreed.

Question 55: My family wants me to formula-feed. The information stated in question 54 also apply to this question. The Shaker, Scott, and Reid (2004) study also found that mothers who thought their family preferred breastfeeding had higher breastfeeding rates. The Baisch, Fox, and Goldberg (1989) study found that more of the participants disagreed with this statement (38% vs. 20%).

Question 56: Breastfeeding prevents me from going back to school or work. This question was similar to question 38. As stated in question 38, if a mother felt that breastfeeding would prevent her from going back to school or work, it could strongly influence whether she initiated breastfeeding and/or for how long she would breastfeed. A large majority of the participants in the Baisch, Fox, and Goldberg (1989) study disagreed with this statement (80% vs. 6%).

Questions 57-59 came from the survey that was conducted by Guttman and Zimmerman (2000). Their survey scored questions on a 5-point Likert scale with 1 = not at all and 5 = extremely. For the use in the survey for this study, the Likert scale was changed to match the scale used by the previous questions. The format of the questions were changed to fit the needs of this study.

Question 57: Breastfeeding has health benefits for the mother. Guttman and Zimmerman's (2000) study found that most of the mothers who had formula-fed did not feel that breastfeeding provided health benefits for the mother. Out of 55 mothers who formula-fed, 38.0% thought breastfeeding did not provide any benefits, 40.0% thought it provided some benefits and 20.0% thought it provided mothers with a lot of benefits. The results of the mothers who had breastfed showed that the majority felt that breastfeeding provided benefits to the mother. Out of 75 mothers who had breastfed, 20.9% thought it

did not provide any benefits to the mother, 22.4% thought it provided some benefits and 56.7% thought breastfeeding provided a lot of benefits.

Question 58: Formula-feeding is what people thing makes a "good mother." This question was used to determine what the participants felt were society's views on infant feeding methods. In the Guttman and Zimmerman (2000) study, the majority of both mothers who breastfed and mothers who formula-fed felt that neither breastfeeding nor formula-feeding made someone a "good mother." From the mothers who breastfed, 23.3% answered 'a lot' for breastfeeding making someone a "good mother" and 10.3% for formula-feeding while mothers who formula-fed, 17.0% answered 'a lot' for breastfeeding and 5.7% for formula-feeding (Guttman & Zimmerman, 2000).

Question 59: Formula-feeding ties the mother down. This question is related to question 34. This question showed how the mothers viewed formula-feeding in terms of providing them with freedom and convenience. In the Guttman and Zimmerman (2000) study, in response to this question, the majority of mothers who had breastfed and mothers who had formula-fed selected 'not at all' for this statement.

The last question on the survey was "Do you have any other comments you would like to make regarding breastfeeding, the WIC program, etc?" This question was not included in the numbering of the survey since this was only to be used if the participants wanted to share something with the researcher or the WIC program that they weren't able to express by answering the previous questions on the survey.

Data Collection Procedures

Each baby shower began at 6:00 PM and took place in the conference room at the Eau Claire WIC clinic. Since some participants brought family members, only the

pregnant women who were enrolled in WIC were given a consent form and survey as they entered the room. The participants received a brief verbal explanation of the survey and explained that their participation was voluntary. The participants were asked to read over the consent form before taking the survey and were told they could take the consent form home in case they had further questions about the survey.

The first 15 minutes of the baby shower were dedicated to the completion of the survey. Having the survey as the first activity of the shower decreased the chances of biases in case breastfeeding was discussed later in the baby shower. The surveys were collected from the participants when finished and placed face down in a box. If some participants were not finished with the survey within the 15 minutes or if some individuals came in late, they continued working on the survey during the games, between games or after all games were finished.

Before the baby shower games began the participants and their family members were asked to write their names down on a slip of paper for a chance to win a prize later in the evening. The first baby shower game of the evening was the "Poppy Diaper" game. Seven different chocolate candy bars were melted in seven different diapers that are labels A-G. The candy bars used were Kit-Kat, Snickers, 100 Grand, Nestle Crunch, Reese's, Butterfinger and Hershey's with Almonds. The participants were given a score card lettered A-G and a line for the participants to write down their guess of what type of candy bar was used in each diaper. The participants could only look and smell the melted candy, not taste. When each participant had seen all the diapers, the answers were read off. The participant who had the most answers correct won the game. If more than one individual had the correct answer, the winner was determined by whose birthday was the

closest to August 1st which was the expected delivery date of the WIC Director and the birthday of a WIC staff member who were both helping with the baby shower. The winner of the game was allowed to select a prize from a diaper cake with baby blankets, boppy pillow, and sling carrier.

After the Poppy Diaper game, the names on the slips of paper were mixed around in a box and one name was drawn. The winner was able to select a prize from the remaining options.

The final game of the baby shower was "Do you know your baby food?" The labels of seven jars of baby food, containing different fruits and vegetables, were removed and labeled 1-7. The types of baby food included: applesauce, carrots, peaches, bananas, green beans, sweet potatoes, and squash. The participants were given a score card similar to the one used in the "Popper Diaper" game. The jars were passed around the room and again the participants wrote down their guesses on a score card. When all participants had made their guesses, the answers were revealed. The winner was determined using the same methods as the "Poppy Diaper" game and the winner was able to select a prize.

After the "Do you know your baby food" game, the participants were able to ask questions, complete their surveys, and have refreshments. While the participants were leaving, each person was given a gift bag as a thank you for completing the survey. The gift bag included: four diapers, apple, orange, sippy cup, baby toothbrush, disposable bib, baby spoon, and two nursing pads.

Data Analysis

There were several methods used to analyze the data for this study. The data was analyzed using the Statistical Program for Social Sciences (SPSS), version 14.0. A frequency was run on all questions to determine the division of how the participants answered the questions.

A chi-squared test was run to compare the four infant feeding intention groups with the non-Likert scale survey questions. A chi-squared test was also run to compare the non-Likert scale survey questions with the smoking status of the participants.

An Independent t-test was run to compare the differences between smoking status and the Likert scale questions on the survey. For the infant feeding intention groups, an ANOVA was run on the Likert scale questions to determine if there were significant differences between the groups. For the questions that had a significant difference between groups, the Student-Newman-Keuls and the Duncan tests were run to determine, out of the four groups, which groups were sigificantly different from the others.

Limitations

A limitation of the study that may have occurred was when the participants answered the survey, did they respond how they thought the researcher wanted them to answer instead of selecting the responses that best represented how they felt. Only pregnant women 18 years or older enrolled in the Eau Claire WIC participated in this study, therefore the results of this study should be used cautiously with other WIC clinics, with non-pregnant women, and women younger than 18-years-old.

Chapter IV: Results

This chapter contains the results of the study including participant information and demographic characteristics. Information on the survey questions related to smoking status and infant feeding intentions are also discussed in this chapter.

Study Participation

Out of the 172 pregnant WIC participants who received an invitation, 20% attended both baby showers. All women who attended the baby showers completed the survey. Four surveys were discarded as the women were under the age of 18 years. The final sample was 18% of the total population. Subsequently, in an effect to obtain a larger sample size, the WIC staff had other pregnant women who met the criteria for this study complete the survey when they came in for their appointment at the WIC clinic. The women were also given a gift bag upon survey completion. Twenty-seven more surveys were collected using this method. A total of 58 surveys, or 34% of the total population, were collected for this study.

Demographic Characteristics

The demographic characteristics of the participants are represented in Table 1. The age of the women who completed the survey ranged from 18-39 years old with a mean age of 24.5. For the purpose of data analysis, the women's ages were placed in three age ranges: 18-24, 25-31, and 32-39.

The vast majority of the women who completed the survey were White/Caucasian (87.7%). There were no African Americans who completed the survey. The ethnicities in the "other" category included: African American/White, Hispanic, and Hispanic/Puerto Rican/French.

The most common education levels among the women were those who graduated high school (36.2%) and those with some college or vocational/technical school education (37.9%). A post bachelor's degree was the least common education level of the women who completed the survey (1.7%).

Most women who completed the survey were either single (34.5%) or married (39.7%). Only 1.7% of women selected "separated" to represent their martial status.

Table 1

Demographic Information of the WIC Participants Who Completed the Survey

Demographics	WIC participants
Age range	
18-24	53.4
25-31	36.1
32-39	10.2
Ethnicity	
African Americans	0.0
Asian	1.8
Hmong	3.5
Native American	1.8
White/Caucasian	87.7
Other	5.3
Education level	
Less than high school	5.2
Some high school	12.1
Graduated high school	36.2
Some college or vocational/technical school	37.9
College degree	6.9
Post bachelor's degree	1.7
Martial status	
Single	34.5
Engaged	12.1
Living together	12.1
Married	39.7
Separated	1.7

Note. Numbers are percentages. Fifty-eight women responded to all categories except the ethnicity question; 57 women provided an answer for that question.

Pregnancy Term

At time of survey completion, overall, more women were in their 4-6th month of pregnancy (43.1%). The least number of women were in their 7-9th month of pregnancy (24.1%). There were significantly more non-smokers in their 1-3rd months and 4-6th months of pregnancy when compared to smokers (see Table 2). There were significantly more smokers in their 7-9th month of pregnancy than non-smokers.

Table 2

Gestation, in Months, of Smokers and Non-Smokers

Smoking status	1-3rd month	4-6th month	7-9th month	χ^2	Significance level
Smoker (n = 22)	27.3	27.3	45.5	8.635	0.013*
Non-smoker (n = 35)	37.1	51.4	11.4		

Note. Numbers are percentages.

*p < 0.05.

Smoking Status

The women were asked about their smoking status during the last two years and their smoking status at time of survey completion. More than half of the women who completed the survey had smoked cigarettes at some point during the last two years (67.2%). Among smokers, significantly more women had smoked at some point within the past two years (see Table 3).

Table 3

Number of Women who Smoked at Some Point in the Last Two Years

Smoked at all in last two years	Smoker (n = 22)	Non-smoker (n = 34)	χ^2	Significance level
Yes	95.5	52.9	11.419	0.001***
No	4.5	47.1		

Note. Numbers are in percentages.

***p < 0.001

At the time of survey completion, more than half of the women stated they were currently non-smokers (61.4%). One out of 58 women did not provide a response regarding her current smoking status. When comparing the women's smoking status with other survey results, the women's smoking status at time of survey completion was used.

As shown in Table 4, among the women who were smokers at the time of the survey most smoked between 5-9 cigarettes/day. The least number of women selected 10-14 or ≥ 15 cigarettes smoked/day to represent their smoking habit.

Table 4

The Number of Cigarettes Smoked/Day among Reported Smokers

Number of cigarettes smoked/day	Percent
1-4	40.9
5-9	50.0
10-14	4.5
≥ 15	4.5

Since learning they were pregnant, 4.5% of the smokers quit completely. Some women stopped smoking when they learned they were pregnant, but at the time of survey completion, they had started smoking again (9.1%). Nineteen out of the 22 smokers reported that they decreased the amount of cigarettes they smoked since learning they were pregnant.

Infant Feeding Intentions during Four Time Periods

The women were asked how they intend to feed their infants during four different time periods: first week after birth, rest of first month, during second-fourth month, and beyond fourth month (see Table 5). For the first four months after birth, more women indicated that they intended to breastfeed their infants. As the time periods increased, the number of women who intended to breastfeed decreased.

The number of women who intended to formula-feed their infants during the first week after birth and the rest of the first month was approximately 30%. The number of women who intended to formula-feed beyond the fourth month increased to 44.2%. Beyond the fourth month, more women indicated they intended to formula-feed their infants instead of breastfeed.

The number of women who reported intentions of using a combination of breastfeeding and formula-feeding increased as the time period increased. The intentions of doing combination feeding started at 5.7% during the first week after birth and increased to 28.8% beyond the fourth month.

Table 5

Infant Feeding Intentions during Four Time Periods

Time period	Breastfeed (%)	Formula-feed (%)	Combination feed (%)
First week after birth[a]	64.2	30.2	5.7
During rest of first month[b]	57.7	30.8	11.5
During the 2nd-4th month[c]	41.2	37.3	21.6
Beyond fourth month[d]	26.9	44.2	28.8

[a]First week after birth: n = 53 women; [b]During rest of first month: n = 52 women; [c]During the 2nd-4th month: n = 51 women; [d]Beyond fourth month: n = 52 women.

Infant Feeding Intention Groups

In order to compare the women's infant feeding intentions with the results from the survey, four groups of the overall infant feeding intentions were created: "breastfeed only," "formula-feed only," "breastfeed/combination feed to formula-feed," and "breastfeed to combination feed." Out of 58 women who completed the survey, 54 marked their infant feeding intentions for all four time periods.

The "breastfeed only" group included women who intended to exclusively breastfeed their infants from birth to beyond the fourth month (n = 14). The "formula-feed only" group was composed of women who intended to exclusively formula-feed their infants from birth to beyond the fourth month (n = 17). The "breastfeed/combination feed to formula-feed" group combined two categories into one group due to the lower number of women who selected these feeding intentions. This group was compromised of women who intended to start with breastfeeding or combination feeding and switch to

formula-feeding sometime within the time periods given on the survey (n = 9). The "breastfeed to combination feed" group were women who intended to start with breastfeeding and switch to combination feeding sometime within the time periods given on the survey (n = 14).

Smokers and Non-Smokers within Infant Feeding Intention Groups

The number of smokers and non-smokers within the "breastfeed only" and "formula-feed only" group was close to 50%-50%. Within the "breastfeed only" group there were slightly more non-smokers than smokers (53.8% vs. 46.2%) while the "formula-feed only" group had slightly more smokers than non-smokers (52.9% vs. 47.1%). The "breastfeed/combination feed to formula-feed" and "breastfeed to combination feed" groups had a greater amount of non-smokers than smokers (77.8% vs. 22.2% and 64.3% vs. 35.7%).

Age

Among the "breastfeed only", "breastfeed/combination feed to formula-feed", and "breastfeed to combination feed" groups, more women were in the 18-24 age range when compared to the other age ranges (see Table 6). Out of those three groups, the "breastfeed/combination feed to formula-feed" group had the highest percentage of women in the 18-24 age range (88.8%). Among the three groups, the number of women in each age range decreased as the range increased. The "breastfeed/combination feed to formula-feed" group was the only group that did not have any women in the 32-39 age range.

Among the "formula-feed only" group there were more women in the 25-31 age range than the other ranges. When compared to the other three groups, the "formula-feed

only" group had the lowest percentage of women in the 18-24 age range. Like the other groups, the "formula-feed only" group had the lowest percent of women in the 32-39 age range.

When dividing the women's age by smoking status, a similar pattern was seen between smokers and non-smokers. Both smokers and non-smokers had 54% of their members in the 18-24 age range. As seen with the infant feeding intention groups, the number of women in each age range decreased as the range increased.

Table 6

The Percent of Women in Each Age Range Based on Infant Feeding Intention Groups and Smoking Status

Women who completed the survey	N	Age ranges		
		18-24	25-31	32-39
Infant feeding intention groups				
Breastfeed only	14	49.8	35.6	14.2
Formula-feed only	17	35.3	53.0	11.8
Breastfeed/combination feed to formula-feed	9	88.8	11.1	0.0
Breastfeed to combination feed	14	57.1	28.4	14.2
Smoking status				
Smoker	22	54.4	31.7	13.6
Non-smoker	35	54.3	40.0	5.8

Note. Numbers are percentages.

Education Level

The majority of the women in all infant feeding intention groups reported being in one of two education categories: graduated high school or some college or vocational/technical school. Most of the women in "breastfeed only" and "breastfeed/combination feed to formula-feed" groups had selected graduated high school as their level of education (42.9% and 66.7%). For the "formula-feed only" and "breastfeed to combination feed" groups, most of the women had some college or vocational/technical school as their highest level of education (41.2% and 50.0%). The "breastfeeding only" group was the only group that contained a woman who had a post bachelor's degree.

When the division of education level was made between smokers and non-smokers, like the infant feeding intention groups, the majority of the women were in the graduated high school category or some college or vocational/technical school category. More smokers had selected graduated high school to represent their education level (36.4%) while more non-smokers selected some college or vocational/technical school as their education level (42.9%).

Feeding Method Used With Previous Children

Thirty-six out of the 58 women who completed the survey had other biological children. Of these women, half reported having one or two children. Five women had three or four children. Only one woman had five or six children.

The infant feeding methods women used with previous children were compared against their feeding intentions of their current infant. The feeding methods used with first or second child will be discussed. Due to the lower number of women who had more

than two children, the results from these women were not used since many categories only had results from one woman.

Among the "breastfeed only" group, the vast majority had breastfed their previous children for more than eight months (75.0%). Among the "formula-feed only" group, 71.4% did not breastfeed their previous children. More women in the "breastfeed/combination feed to formula-feed" group breastfed their previous children (66.7%) than women who did not breastfeed previous children (33.3%). More women in the "breastfeed to combination feed" group breastfed their previous children for 3-5 months (57.1%) while 42.9% breastfed previous children for 0-2 months.

Among the women who completed the survey, in general, more non-smokers reported they breastfed their previous children than smokers (76.2% vs. 53.9%). Among the non-smokers, the most frequent breastfeeding length with previous children was 0-2 months (38.1%). Among the smokers who breastfed, the most frequent breastfeeding lengths for previous children were 0-2 months and more than eight months (23.1% of women for each range).

Prenatal Providers

Most of the women who completed the survey indicated that they were receiving prenatal care from a doctor (58.6%) and the WIC program (53.4%). A small number of women (5.2%) were receiving prenatal care from someone other than a doctor, midwife or the WIC program. As represented in Table 7, the number of smokers receiving prenatal care from a doctor was significantly higher than non-smokers. The number of non-smokers receiving prenatal care from a midwife was significantly higher than smokers.

Table 7

Providers to Smokers and Non-Smokers for Prenatal Care

Prenatal provider	Provided prenatal care	Smoker (n = 22)	Non-smoker (n = 35)	χ^2	Significance level
Doctor	Yes	86.4	40.0	11.912	0.001***
	No	13.6	60.0		
Midwife	Yes	18.2	57.1	8.412	0.004**
	No	81.8	42.9		
WIC	Yes	68.2	45.7	2.749	NS
	No	31.8	54.3		
Other	Yes	4.5	5.7	0.037	NS
	No	95.5	94.3		

**p < 0.01. ***p < 0.001. NS = not significant.

The vast majority of women indicated that their prenatal providers had asked them how they planned to feed their infant (86.2%) and discussed with them the different ways to feed their infant (82.8%). More women indicated that a WIC nutritionist, above the other providers, had discussed with them the different infant feeding methods they could use (81.3%). Smokers reported at a significantly higher rate than non-smokers that a doctor had discussed different infant feeding methods with them (see Table 8). Non-smokers reported at a significantly higher rate than smokers that a midwife had discussed different infant feeding methods with them.

Table 8

Did Prenatal Provider(s) Discuss with Smokers and Non-Smokers the Different Ways to Feed Their Infant

Prenatal provider	Discussed ways to feed infant	Smoker (n = 19)	Non-smoker (n = 28)	χ^2	Significance level
Doctor	Yes	68.4	32.1	5.983	0.014*
	No	31.6	67.9		
Midwife	Yes	21.1	53.6	4.970	0.026*
	No	78.9	46.4		
Nurse	Yes	36.8	21.4	1.344	NS
	No	63.2	78.6		
WIC nutritionist	Yes	84.2	82.1	0.034	NS
	No	15.8	17.9		
Someone else	Yes	5.3	7.1	0.067	NS
	No	94.7	92.9		

Note. Numbers are in percentages.

*p < 0.05

Prenatal Classes

Only 12 out of the 58 women indicated that they had attended a prenatal class that discussed infant feeding. Of the 12 women, 33.3% reported that they were taught how to prepare or mix formula and 83.3% reported they had been taught breastfeeding techniques.

Advice about Breastfeeding

The women who completed the survey were asked to mark all the people or organizations that had given them any advice about breastfeeding, both positive and negative. The women were able to select from a list that included: doctor, family member, friend, midwife, nurse, WIC, or someone else.

Positive Advice

Overall most women received positive advice about breastfeeding from a family member, friend, and the WIC program (see Figure 1). The majority of women in all the infant feeding intention groups indicated that they received positive advice from the WIC program. The "formula-feeding only" group was the only group where most of the women indicated that merely one out of the seven people/organization listed in the survey provided them with positive advice about breastfeeding, which was the WIC program. The vast majority of the women who completed the survey reported that they did not receive positive advice from someone else other than the people/organization listed on the survey (94.8%).

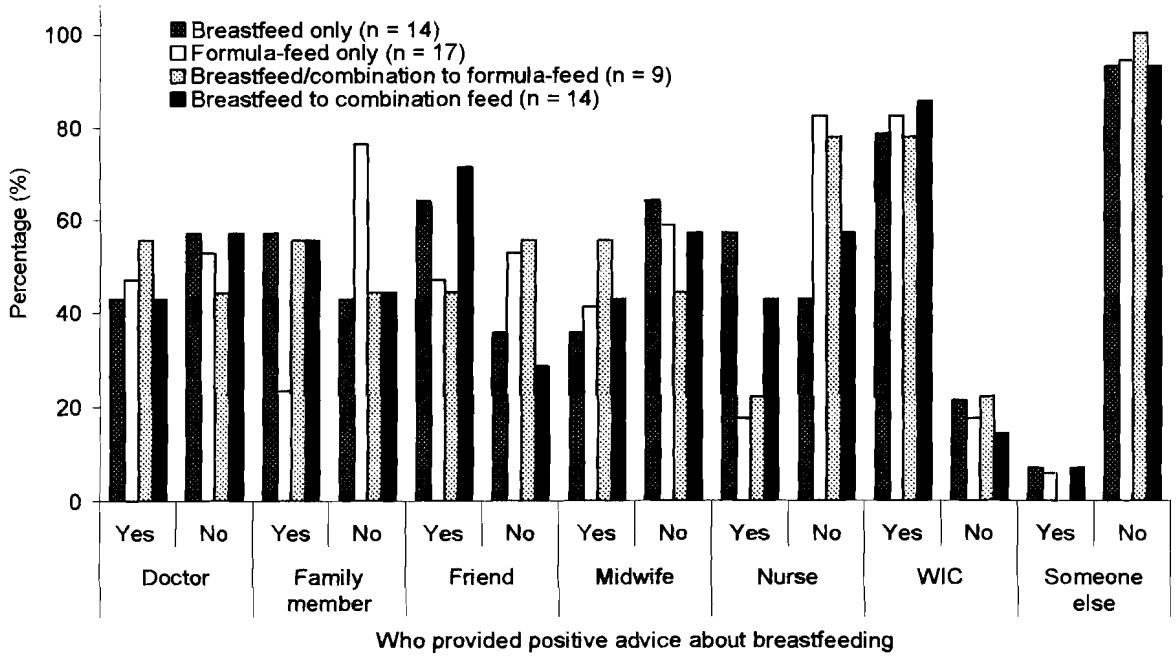

Figure 1. Relationship between Who Provided Positive Advice about Breastfeeding and Infant Feeding Intention Groups

Similar to the division between the infant feeding intention groups, the vast majority of smokers and non-smokers had been given positive breastfeeding advice from the WIC program as represented in Table 9. Most smokers and non-smokers indicated that they did not receive positive advice from a nurse or from someone other than the people/organization that was listed on the survey. The majority of the positive advice smokers received came from a doctor and friend. More smokers received positive advice from a doctor than non-smokers at an approaching significance level ($p = 0.051$). Non-smokers were given most of their positive advice from a family member and midwife. Non-smokers had a significantly higher rate of receiving positive advice from a midwife than the smokers received.

Table 9

People Who Provided Positive Advice about Breastfeeding to Smokers and Non-Smokers

People or organization	Provided advice	Smoker (n = 22)	Non-smoker (n = 35)	χ^2	Significance level
Doctor	Yes	63.6	37.1	3.803	0.051
	No	36.4	62.9		
Family member	Yes	40.9	57.1	1.424	NS
	No	59.1	42.9		
Friend	Yes	63.6	48.6	1.236	NS
	No	36.4	51.4		
Midwife	Yes	18.2	57.1	8.412	0.004**
	No	81.8	42.9		
Nurse	Yes	40.9	28.6	0.925	NS
	No	59.1	71.4		
WIC	Yes	81.8	80.0	0.029	NS
	No	18.2	20.0		
Someone else	Yes	9.1	2.9	1.053	NS
	No	90.9	97.1		

**$p < 0.01$

Negative Advice

Overall, few women reported that they received negative advice from the people/organization listed on the survey. As shown in Figure 2, based on infant feeding intention groups, no women indicated that a doctor, midwife, WIC, or someone other

than the people/organization listed on the survey provided them with negative advice. Women reported that they received negative advice from a family member, friend, and a nurse. Only 1.9% of the all the women who completed the survey marked a nurse as providing negative advice. More women were given negative advice from a friend than a family member (18.5% vs. 11.1%).

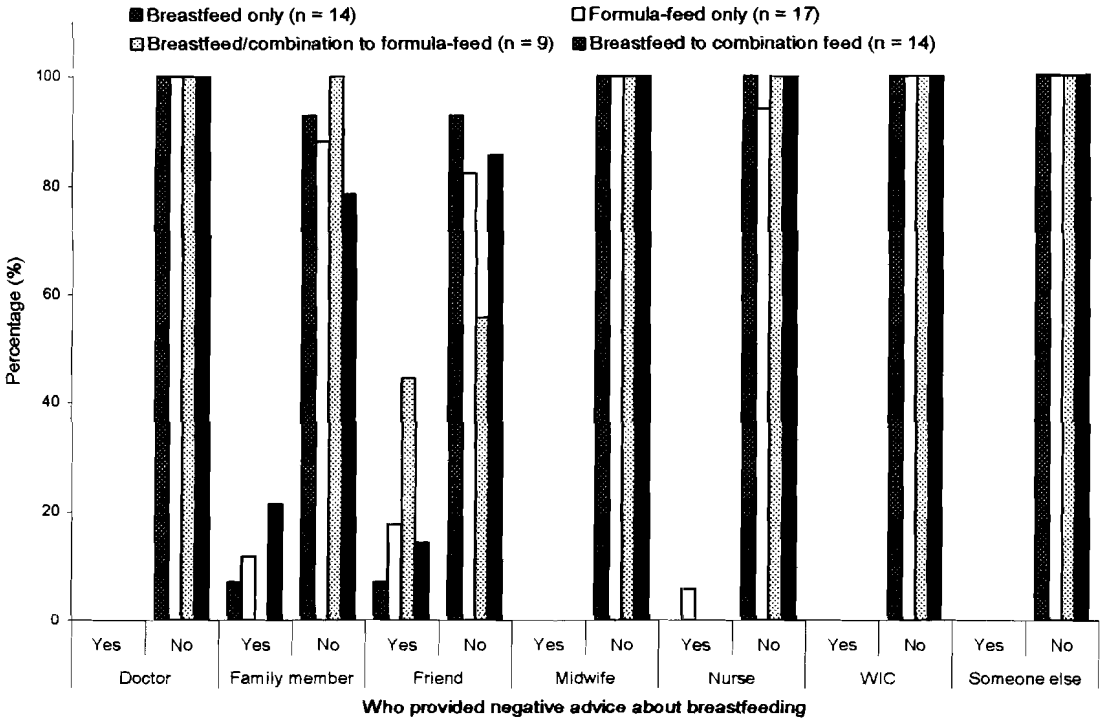

Figure 2. Relationship between Who Provided Negative Advice about Breastfeeding and Infant Feeding Intention Groups

Figure 3 represents who provided the women, based on smoking status, negative advice about breastfeeding. Overall more non-smokers received negative advice about breastfeeding than smokers (42.9% vs. 27.3%). Like the infant feeding intention group divisions, neither smokers nor non-smokers received negative advice from a doctor or midwife. Unlike the intention groups who did not receive any negative advice from

someone other than the people/organization listed on the survey, 2.9% of non-smokers received negative advice from someone else. Most of the negative advice was given by a family member or friend. Both smokers and non-smokers were given more negative advice from friend than a family member (18.2% vs. 9.1% for smokers and 25.7% vs. 11.4% for non-smokers).

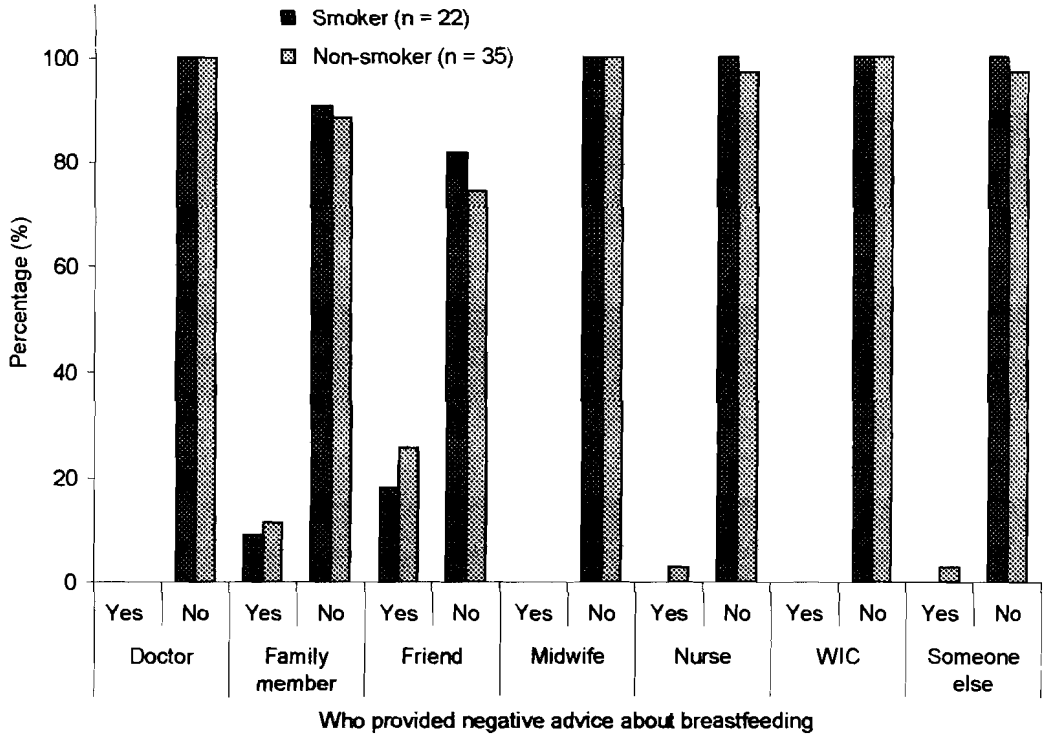

Figure 3. Relationship between Who Provided Negative Advice about Breastfeeding and Smoking Status of the Women

Exposure to Breastfeeding and Formula-Feeding

The vast majority of the women who completed the survey knew mothers with young infants. Most women reported that of the mothers they knew, more formula-fed their infants than breastfed (55.8% vs. 11.5%). Among the "breastfeed only" group, the

same number of women reported that most of the mothers they knew formula-fed or about half of the mothers they knew breastfed and the other half formula-fed their infants (45.5%). The "breastfeed to combination feed" group was the only group where more women reported that about half of the mothers they knew breastfed and the other half formula-fed their infants (46.2%). When the women were divided based on smoking status, for both smokers and non-smokers, most of the mothers they knew formula-fed their infants.

Infant Feeding Intentions among Smokers and Non-Smokers

As shown in Table 10, more non-smokers were intending to breastfeed their infants than smokers during the first four months after birth. Beyond the fourth month more smokers intended to breastfeed their infants than non-smokers (28.6% vs. 23.3%). The difference between breastfeeding intentions among smokers and non-smokers was greatest during the first week after birth (15.6%) and the differences between the two groups continued to decrease as the time periods increased. Non-smokers had a greater decrease in breastfeeding intentions over the four time periods than smokers.

During each of the four time periods, smokers intended to formula-feed at a higher rate than non-smokers (see Table 10). The formula-feeding intentions of smokers remained relatively similar for all four time periods with only a 6.7% increase from the first week after birth to beyond the fourth month while non-smokers had a 20% increase in formula-feeding intentions for the same time periods. Like the breastfeeding intentions, formula-feeding intentions among smokers and non-smokers were fairly similar beyond the fourth month (4.3% difference).

The intentions to do a combination of breastfeeding and formula-feeding increased among smokers and non-smokers from the first week after birth to beyond the fourth month (see Table 10). Non-smokers had a greater increase in combination feeding intentions than smokers (26.6% increase vs. 19.3% increase).

Table 10

Smoker's and Non-Smoker's Infant Feeding Intentions during Four Time Periods

Infant Feeding Intentions	Smokers (n = 21)	Non-smokers (n = 29)
First week after birth		
Breastfeed	54.4	70.0
Formula-feed	40.9	23.3
Combination feed	4.5	6.7
Rest of first month		
Breastfeed	50.0	62.1
Formula-feed	45.5	20.7
Combination feed	4.5	17.2
During 2nd-4th month		
Breastfeed	38.1	41.4
Formula-feed	47.6	31.0
Combination feed	14.3	27.6
Beyond 4th month		
Breastfeed	28.6	23.3
Formula-feed	47.6	43.3
Combination feed	23.8	33.3

Note. Numbers are percentages.

Infant Feeding Intentions and Number of Cigarettes Smoked

More women in the "breastfeed only" and "breastfeed to combination feed" groups reported smoking 1-4 cigarettes/day (50.0% and 60.0%). More women in the "formula-feed only" and "breastfeed/combination feed to formula-feed" groups smoked 5-9 cigarettes/day (55.6% and 100.0%).

Out of the 22 women who reported they were smokers at the time of survey completion, two women indicated they smoked more than nine cigarettes/day. One woman smoked 10-14 cigarettes/day and was in the "formula-feed only" group. The other woman smoked more than 15 cigarettes/day and was in the "breastfeed only" group.

Infant Feeding Intentions and Smoking Status Once Infant is Born

Sixty-five percent of the smokers intended to stop smoking once their infant was born. Thirty percent of the women stated they would continue to smoke when their infant was born and intended to formula-feed their infants. Only 5% of the women planned to continue to smoke and breastfeed their infants.

Table 11 contains the responses the women made in regards to why their smoking status would change once the infant was born. Most of the women expressed the desire to quit smoking. A few women planned to use medication once the infant was born to help them quit. Some women stated their wanting or not wanting to breastfeed as a reason why their smoking status would change.

Table 11

Smokers' Explanations of Why Their Smoking Status Will Change Once Their Infant is Born

Theme	Explanation
Taking medicine	"I'll be able to use medication to help me."
	"Medicine."
Trying to quit	"I'm almost fully there. No smoking around the baby."
	"I hope to quit soon because I'm pregnant and because I plan to breastfeed."
	"I plan on quitting before I have the baby."
	"I want to quit now."
	"I want to stop."
	"Stop smoking."
	"Stop smoking if I can."
	"Will try for a couple of days."
Breastfeeding	"Want to breastfeed."
	"I will NOT breastfeed."

Living with Smoker or Non-Smoker

When the women were asked if anyone they lived with smoked cigarettes, overall, the two most frequent responses were "yes, my partner smokes" (46.4%) and "no, nobody else who I live with smokes" (41.1%). The response with the lowest frequency was "yes, someone else I live with smokes" (5.4%).

Among the women in the "breastfeed only," "formula-feed only," and "breastfeed/combination feed to formula-feed" groups, more selected that their partner smoked (66.7%, 47.1%, and 44.4%). The "breastfeed to combination feed" group was the only group that had more women report that no one they live with smoked (64.3%).

When dividing the women based on smoking status, more smokers reported that their partner smoked (63.6%). Among the non-smokers, half the women reported that no one they lived with smoked.

Safety of Smokers Breastfeeding

Out of the 52 women who answered the survey question, 69.2% felt it was not safe for a smoker to breastfeed their infant. As represented in Figure 4, among all infant feeding intention groups, more women indicated that it was not safe for smokers to breastfeed. The "formula-feed only" and "breastfeed/combination feed to formula-feed" groups had a larger majority of women who felt that it was not safe for smokers to breastfeed (80.0% and 77.8%) than the other two groups. The "breastfeed only" group had the largest number of women who felt that it was safe for smokers to breastfeed (45.5%) when compared to the other groups. The "breastfeed only" group had the smallest difference between women who agreed and disagreed about the safety of smokers breastfeeding (9% difference). The largest difference between women who agreed and disagreed was noted in the "formula-feed only" group (60.0% difference).

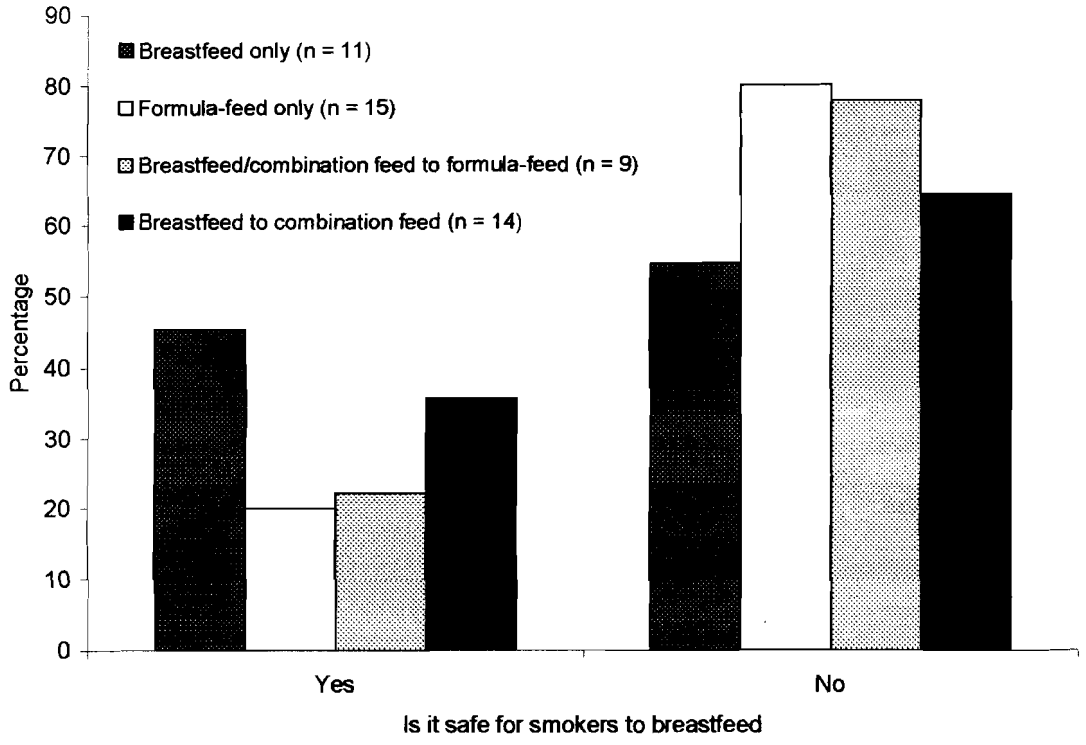

Figure 4. Women's Thoughts on the Safety of Smokers Breastfeeding Based on Infant Feeding Intention Groups

Like with the infant feeding intention groups, the majority of smokers and non-smokers felt that it was unsafe for smokers to breastfeed (57.9% and 75.8%). When comparing smoking status, more non-smokers than smokers felt that it was not safe for smokers to breastfeed. The difference in opinion between non-smokers and smokers about the safety for smokers breastfeeding was 17.9%.

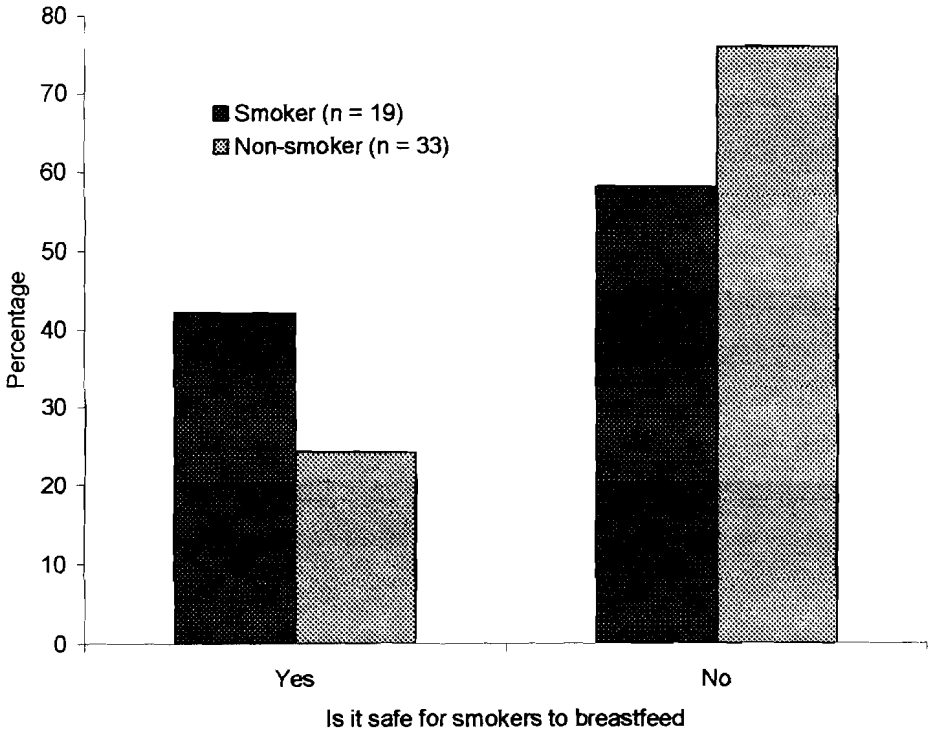

Figure 5. Smoker's and Non-Smoker's Thoughts on the Safety of Smokers Breastfeeding

If the women reported that it was unsafe for smokers to breastfeed, they were asked to explain their reason for selecting that response. Out of the 36 women who felt it was unsafe for a smoker to breastfeed, 27 women provided an explanation for their reasoning. The responses the women gave are represented in Table 12. The majority of the women provided a response that was related to concerns of harming the infant with nicotine and other cigarette chemicals in the breast milk and second-hand smoke. A few women provided responses related to the side effects of a smoker breastfeeding such as increasing the infant's risk of breathing problems and addiction to nicotine. A few responses were placed in an "other" category since they did not fit into another overall category. The responses in this category can be found in Table 12.

Table 12

Explanations about Why Women Felt That it was Unsafe for Smokers to Breastfeed Their Infants

Theme	Explanation
Harming the infant	"Baby gets nicotine"
	"Nicotine"[a]
	"The baby gets the nicotine"
	"Bad for baby"
	"Not healthy"
	"Not healthy for baby"
	"I heard that it's bad for the baby"
	"Isn't healthy for anything"
	"Some say it affects the baby too"
	"The baby could be at risk"
	"Because of the toxins in ciggerets"
	"Pass on toxins"
	"Nicotine might get in the blood which goes through milk to baby?"
	"The nicotine is in the mother's system and transfers through the breast milk"
	"Chemicals get into the breast milk"
	"Chemicals in milk"
	"Chemicals in smoke"
	"Because it is going to your baby also"
	"Second hand smoke is worse"
	"Why give breast milk with smoke when formula is likely better for them"
Side effects	"Nicotine can still be introduced to the baby making higher risk for asthma"
	"It may cause breathing problems"
	"The baby wants the nicotine"
Other	"Not sure"
	"Personal opinion"
	"They shouldn't be smoking"

[a]Two women gave this explanation.

Results of Likert Scale Questions

Results Based on Infant Feeding Intentions

More women in the "breastfeed only" group knew the nutritional quality of breast milk over infant formula (see Table 13). In the "breastfeed only" group, more women disagreed with the statement "The nutritional benefits of breast milk only last until the baby is weaned from breast milk." More women in the "breastfeed/combination feed to formula-feed" group agreed that infants received nutritional benefit from breast milk only while they were being breastfeed. Significantly more women in the "breastfeed only" group agreed that breast milk was the ideal food for infants than women in the "formula-feed only" group. The "formula-feed only" group had the least number of women who agreed that breast milk was the ideal food for infants (31.3%). Significantly more women in the "breastfeed only" group agreed with the statement, "Breast milk is more easily digested by infant than formula," than women in the "formula-feed only" and "breastfeed/combination feed to formula-feed" groups.

Table 13

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to the Nutritional Quality of Breast Milk

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
Breast milk is the ideal food for babies.	Breastfeed only	13	4.77	Between	3	3.985	3.820	0.016*
	Formula-feed only	16	2.81					
	Breastfeed/combination feed to formula-feed	9	3.67	Within	47	1.043		
	Breastfeed to combination feed	14	3.36					
Breast milk is more easily digested by the baby than formula.	Breastfeed only	13	4.38	Between	3	3.100	3.505	0.022*
	Formula-feed only	16	3.31					
	Breastfeed/combination feed to formula-feed	9	3.44	Within	48	0.884		
	Breastfeed to combination feed	14	3.86					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$

The women were asked questions related to the health benefits of breastfeeding (see Table 14). Significantly more women in the "breastfeed only" group than women in the "breastfeed/combination feed to formula-feed" and "formula-feed only" groups agreed that infants fed breast milk were healthier than infants fed formula. Significantly more women in the "breastfeed/combination feed to formula-feed" group than women in the "formula-feed only" group agreed that infants fed breast milk were healthier than infants fed formula. When asked if "Formula is as healthy for an infant as breast milk," significantly more women in the "formula-feed only" group agreed than women in the "breastfeed only" group. Out of the four groups, the "breastfeed only" group had significantly more women who agreed that breastfeeding had health benefits for the mother. Significantly more women in the "breastfeed to combination feed" group than the "formula-feed only" group agreed that breastfeeding had health benefits for the mother.

Table 14

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to the Health Benefits of Breastfeeding

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
Babies fed breast milk are healthier than babies who are fed formula.	Breastfeed only	13	4.77	Between	3	9.520	12.708	0.000***
	Formula-feed only	16	2.81					
	Breastfeed/combination feed to formula-feed	9	3.67	Within	48	0.749		
	Breastfeed to combination feed	14	3.36					
Formula is as healthy for an infant as breast milk.	Breastfeed only	12	2.33	Between	3	4.094	3.409	0.025*
	Formula-feed only	17	3.59					
	Breastfeed/combination feed to formula-feed	14	2.71	Within	48	1.201		
	Breastfeed to combination feed	9	3.00					
Breastfeeding has health benefits for the mother.	Breastfeed only	13	4.77	Between	3	7.614	10.996	0.000***
	Formula-feed only	16	3.00					
	Breastfeed/combination feed to formula-feed	14	3.93	Within	48	0.692		
	Breastfeed to combination feed	9	3.67					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$. ***$p < 0.001$.

The women were asked their opinions on what their partner's and family's views were on infant feeding methods (see Table 15). When the women were asked if their partner wanted them to breastfeed, significantly more women in the "formula-feed only" group disagreed when compared to the three other infant feeding intention groups. None of the women in the "breastfeed only" group felt that their partner did not want them to breastfeed and that their family wanted them to formula-feed. Significantly more women in the "breastfeed only" group disagreed that their family wanted them to formula-feed their infants when compared to the women in the "breastfeed/combination feed to formula-feed" and "formula-feed only" group.

The survey asked women their opinions on the convenience of different infant feeding methods (see Table 16). Significantly more women in the "formula-feed only" group than women in the "breastfeed only" group agreed that formula-feeding was more convenient than breastfeeding. When asked if "Breastfeeding was more convenient than formula-feeding," significantly more women in the "breastfeed only" group agreed than the other three groups. For the same question there were also significantly more women in the "breastfeed to combination feed" group than women in the "formula-feed only" group who agreed. Significantly more women in the "breastfeed/combination feed to formula-feed" group agreed that formula-feeding was a better choice if the mother plans to work outside the home than the women in the "breastfeed only" group.

Table 15

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to the Women's Support of Others on the Different Infant Feeding Methods

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
My partner wants me to breastfeed.	Breastfeed only	13	4.15	Between	3	8.410	7.446	0.000***
	Formula-feed only	16	2.38					
	Breastfeed/combination feed to formula-feed	9	3.78	Within	48	1.129		
	Breastfeed to combination feed	14	3.36					
My family wants me to formula-feed.	Breastfeed only	13	1.62	Between	3	4.008	3.418	0.025*
	Formula-feed only	16	2.81					
	Breastfeed/combination feed to formula-feed	9	2.78	Within	48	1.173		
	Breastfeed to combination feed	14	2.36					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$. ***$p < 0.001$.

Table 16

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to Convenience of Feeding Methods

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
Formula-feeding is more convenient than breastfeeding.	Breastfeed only	12	2.67	Between	3	4.130	3.715	0.018*
	Formula-feed only	17	3.88					
	Breastfeed/combination feed to formula-feed	9	3.33	Within	48	1.112		
	Breastfeed to combination feed	14	2.93					
Breastfeeding is more convenient than formula feeding.	Breastfeed only	12	3.83	Between	3	7.655	7.803	0.000***
	Formula-feed only	17	2.06					
	Breastfeed/combination feed to formula-feed	9	2.78	Within	48	0.981		
	Breastfeed to combination feed	14	3.07					
Formula-feeding is the better choice if mother plans to work outside the home.	Breastfeed only	13	2.31	Between	3	4.330	3.596	0.020*
	Formula-feed only	17	3.35					
	Breastfeed/combination feed to formula-feed	9	3.67	Within	49	1.204		
	Breastfeed to combination feed	14	2.79					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$. ***$p < 0.001$.

Some survey questions were geared towards determining the women's views on how infant feeding methods affect the relationship between mother and infant (see Table 17). Significantly more women in the "breastfeed only" and "breastfeed/combination feed to formula-feed" groups than the "formula-feed only" group agreed that breastfeeding increases mother-infant bonding. When asked if "Mothers who formula-feed miss one of the great joys of motherhood," significantly more women in the "formula-feed only" group than the women in the "breastfeed only" group disagreed.

The women were asked about their feelings on breastfeeding (see Table 18). Significantly more women in the "formula-feed only" group than the other three groups disagreed that breastfeeding would be good for their infant. In the "breastfeed only" and "formula-feed only" groups, significantly more women disagreed than the women in the "breastfeed/combination feed to formula-feed" group that they did not know enough about breastfeeding.

Table 17

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to How Infant Feeding Methods Affect the Relationship between Mother and Infant

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
Breastfeeding increases mother-infant bonding.	Breastfeed only	13	4.62	Between	3	4.134	3.146	0.033*
	Formula-feed only	17	3.47					
	Breastfeed/combination feed to formula-feed	9	4.56	Within	49	1.314		
	Breastfeed to combination feed	14	4.29					
Mothers who formula-feed miss one of the great joys of motherhood.	Breastfeed only	13	3.62	Between	3	4.066	3.029	0.039*
	Formula-feed only	16	2.31					
	Breastfeed/combination feed to formula-feed	9	2.89	Within	47	1.342		
	Breastfeed to combination feed	13	2.85					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$.

Table 18

Likert Scale Questions with Significant Difference between Infant Feeding Intention Groups Related to Women's Feeling about Breastfeeding

Likert scale questions	Infant feeding intention groups	N	Means	Groups for ANOVA	df	Mean Square	F	Significance level
I think breastfeeding will be good for my baby.	Breastfeed only	13	4.62	Between	3	10.313	13.191	0.000***
	Formula-feed only	16	2.94					
	Breastfeed/combination feed to formula-feed	8	4.38	Within	49	0.782		
	Breastfeed to combination feed	14	4.71					
I don't think I know enough about breastfeeding.	Breastfeed only	13	1.92	Between	3	4.390	3.920	0.014*
	Formula-feed only	16	2.38					
	Breastfeed/combination feed to formula-feed	9	3.44	Within	47	1.120		
	Breastfeed to combination feed	14	2.71					

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*p < 0.05. ***p < 0.001.

Results Based on Smoking Status

When dividing the results related to knowledge of the nutritional quality of breast milk based on the women's smoking habits, results were mixed. More smokers, when compared with non-smokers, disagreed that the nutritional benefits of breast milk lasted only while the infant was breastfed and breast milk was lacking in iron (63.6% vs. 52.9% and 68.2% vs. 57.6%). More non-smokers than smokers agreed that breast milk was the ideal food for infants and breast milk was more easily digested by the infant than formula (75.8% vs. 57.1% and 53.0% vs. 42.8%).

Smokers and non-smokers had varying views on the convenience of different infant feeding methods. Significantly more smokers than non-smokers reported formula-feeding to be more convenient than breastfeeding (see Table 19). Non-smokers agreed more often than smokers that breastfeeding was more convenient than formula-feeding. For the statement "Formula-feeding is the better choice if a mother plans to work outside the home," significantly more smokers agreed than non-smokers (see Table 19). No non-smokers agreed that breastfeeding would prevent them from going back to school or work while 23.8% of smokers felt breastfeeding would prevent them from going back to school or work. The majority of both smokers and non-smokers disagreed that formula-feeding would limit their freedom (66.6% and 64.7%). Most smokers and non-smokers disagreed with the statement "Breastfeeding means no one else can feed the baby" (76.2% vs. 73.6%).

The women were asked questions about how infant feeding methods affect the relationship between mother and infant. The majority of smokers and non-smokers agreed that breastfeeding increased mother-infant bonding (72.7% vs. 76.5%). More

smokers than non-smokers agreed that mothers who formula-feed miss one of the great joys of motherhood (40.0% vs. 29.4%). Most of the smokers and non-smokers disagreed that people think formula-feeding makes a "good mother" (61.9% and 64.7%).

The survey also contained health-related Likert scale questions. Approximately 23% of both smokers and non-smokers disagreed that formula-fed infants were more likely to be overfed than breastfed infants. More smokers and non-smokers disagreed that breastfed infants were more likely to be overfed than formula-fed infants (45.0% and 55.9%). The percent of smokers and non-smokers who agreed that infants fed breast milk were healthier than infants fed formula were fairly close (52.3% and 50.0%). When asked if formula was as healthy for infants as breast milk, 28.6% of smokers both disagreed and agreed with this statement. Among non-smokers, more disagreed that formula was as healthy as breast milk (38.2% vs. 26.5%). More than half of both smokers and non-smokers agreed that breastfeeding would be good for their infant (68.2% and 71.9%). Approximately 35% of non-smokers agreed that women who smoked produced breast milk that was harmful to the infant while 28.5% of smokers agreed with this statement. Over half of both smokers and non-smokers agreed that breastfeeding had health benefits for the mother (64.7% and 57.1%).

The survey asked the women questions to determine their views on women breastfeeding in public. More of both smokers and non-smokers disagreed with the statement "Women should not breastfeed in public places such as restaurants" than those who agreed with the statement (42.9% vs. 33.3% for smokers and 58.9% vs. 17.7% for non-smokers). When asked if the women would feel embarrassed if someone saw them breastfeeding, 36.4% of smokers both disagreed and agreed. There was a larger

difference between the non-smokers who agreed they would be embarrassed and those that disagreed (50.0% disagreed and 17.6% agreed).

Some survey questions were related to the support from others that women had for the different infant feeding methods. More non-smokers than smokers indicated that their partner wanted them to breastfeed the infant (44.1% vs. 38.1%). When asked if "Fathers feel left out if a mother breastfeeds," significantly more non-smokers disagreed than smokers (see Table 19). The number of women who reported that their family wanted them to formula-feed the infant was low; 9.6% of smokers agreed while 11.7% of non-smokers agreed that their family wanted them to formula-feed.

The women were asked if they had heard from someone that breastfeeding hurts, nearly half of both smokers and non-smokers agreed that they received this information (47.6% and 41.2%). When the women were asked about breastfeeding knowledge, 28.6% of smokers and 14.7% of non-smokers felt they did not know enough about breastfeeding.

Table 19

Likert Scale Questions with Significant Differences between Smokers and Non-Smokers

Likert scale question	Smoking status	N	Mean	SD	SE	t value	Significance level
Formula-feeding is more convenient than breastfeeding.	Smoker	21	3.57	1.287	0.281	2.150	0.036*
	Non-smoker	34	2.88	1.066	0.183		
Formula-feeding is the better choice if a mother plans to work outside the home.	Smoker	22	3.45	1.299	0.277	2.778	0.008**
	Non-smoker	34	2.62	0.954	0.164		
Fathers feel left out if a mother breastfeeds.	Smoker	21	3.24	1.446	0.316	2.544	0.014*
	Non-smoker	34	2.38	1.045	0.179		

Note. These questions used a 5-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree).

*$p < 0.05$. **$p < 0.01$.

Other Comments

Women wrote comments regarding breastfeeding, the WIC program, etc. if they wanted to share something with the researcher or the WIC program that they were not able to express by answering the previous questions on the survey. Comments that were provided included positive and negative feelings toward breastfeeding and their gratitude toward the WIC program. All comments can be found in Appendix E.

Chapter V: Discussion

This chapter will include a discussion of the results revealed in this study. Recommendations for an educational program to increase breastfeeding only among Eau Claire WIC participants who choose to continue to smoke will also be provided in this chapter.

Discussion

Study Participation

At the time of survey completion the total population of pregnant women at the Eau Claire WIC program was 172. Fifty-eight surveys, or 34% of the total population, were obtained from women who matched the criteria for the study. The criteria included: women needed to be pregnant at time of survey completion, enrolled in the Eau Claire WIC program, and 18 years or older.

Demographics

Ages of the 58 women who completed the survey for this study ranged from 18-39 years old. More than half of the women were in the 18-24 age range. The fewest number of women were in the 32-39 age range. The vast majority of the women were White/Caucasian (87.7%). Among the sample for this study, most women had graduated high school or had some college or vocational/technical school. The martial status that most women selected was single and married.

Number of Smokers

Out of the 57 women who reported their smoking status at the time of survey completion, 38.6% were smokers. The average percentage of women enrolled in all

Wisconsin WIC programs who smoke during pregnancy is 24.5%, so the number of smokers was higher in this study (First Breath, 2007).

Smokers and Non-Smokers within Infant Feeding Intention Groups

There were a mixture of smokers and non-smokers in all infant feeding intention groups. Out of all four groups, the "formula-feed only" was the only group that had more smokers than non-smokers. This may be due to smokers thinking it was unsafe for them to breastfeed their infants. The "breastfeed/combination feed to formula-feed" and "breastfeed to combination feed" groups contained the most non-smokers.

Number of Cigarettes Smoked

Overall, the results of this study showed that smokers who intended to breastfeed their infants exclusively at birth were more likely to smoke less than smokers who intended to either use formula exclusively or combination feeding at birth. More smokers in the "breastfeed only" and "breastfeed to combination feed" groups reported smoking 1-4 cigarettes/day. In the "formula-feed only" and "breastfeed/combination feed to formula-feed" groups, more smokers reported smoking 5-9 cigarettes/day. The Liu, Rosenberg, and Sandoval (2006) study also found that women who were light smokers (< 10 cigarettes/day) were more likely to breastfeed than women who were heavy smokers (> 10 cigarettes/day).

Changes in Smoking Status

The majority of the smokers indicated that once they learned they were pregnant they decreased the number of cigarettes smoked/day which is a positive finding (86.4%). More than half the smokers reported they planned to stop smoking once their infant was born. Thirty-five percent of the smokers said they were going to continue to smoke after

the infant was born. Out of the women who were planning to continue to smoke, the vast majority were intending to formula-feed (85.7%) and only a small percentage were intending to breastfeed.

The survey asked women to explain their responses about why their smoking status will change once the infant is born. Only 12 of the 20 women who answered the question related to changing their smoking status provided an explanation. The explanations were divided into three overall themes: taking medication, trying to quit and breastfeeding. A few women felt that using medication after the infant was born would help them change their smoking status. These women may have felt that changing their smoking habit would be too difficult without the aid of medication or they had tried to quit without medications in the past and were unsuccessful. Using medication would involve the women's physician since most smoking cessation medications are only available through prescription. Physicians determine if, during pregnancy, the risks of using smoking cessation medication outweigh the risks of continued smoking (Washington State Department of Health, 2002). The women in this survey who mentioned taking medication may have been told by their physician that the risks of smoking cessation medication outweighed the risks of them continuing to smoke which was why they were waiting to use the medication until after delivery.

The majority of the women's explanations fell under the theme of trying to quit. The fact that many smokers reported they were trying to quit at the time of survey completion indicates that they understood that smoking is harmful to their infants. The statement "I'm almost fully there. No smoking around the baby," indicates that this

woman was dedicated to smoking cessation and understood that second-hand smoke was harmful to the infant.

A few of the explanations implied that the women did not have a lot of confidence in their ability to stop smoking. Some of these explanations included: "Stop smoking if I can" and "Will try for a couple of days." Women that were trying to quit, especially the women who were not confident they could make the change, would benefit from extra support and encouragement from family, friends, and organizations like the WIC program and First Breath, a Wisconsin program that helps pregnant women stop smoking. These women are more likely to follow through with their desire to stop smoking if they have the support and encouragement of others (First Breath, n.d.).

Breastfeeding was a theme for some women as the reason for their intended smoking change once the infant was born. The explanations were for and against breastfeeding. The women who stated they wanted to breastfeed are probably considering that it was safer for them to stop smoking if they wanted to breastfeed. It is clear one woman was against breastfeeding when considering the statement, "I will NOT breastfeed." This woman selected that she would continue to smoke once the infant was born and formula-feed. This woman may have felt that it was unsafe for her to breastfeed while she was a smoker or she had negative feelings towards breastfeeding for another reason such as negative advice from others.

Infant Feeding Intentions during Four Time Periods

It was encouraging to find that more women indicated they intended to breastfeed during the first four months after birth than women who intended to formula-feed or combination feed. As the time periods on the survey increased, the difference between

the number of women who intended to breastfeed and formula-feed decreased until, beyond the fourth month, more women intended to formula-feed than breastfeed. This change in intended feeding methods was largely due to a 37.3% decrease in breastfeeding intentions from the first week after birth till beyond the fourth month. During the same time period, there was a 14% increase in formula-feeding intentions. The decrease in breastfeeding intentions seen in this study was not surprising since; overall, the WIC population has a lower rate and duration of breastfeeding than non-WIC participants (Li et al., 2005; Ryan & Zhou, 2006).

While the number of women intending to breastfeed decreased, the number of women who intended to do combination feeding increased 23.1% from the first week after birth till beyond the fourth month. The largest decrease in breastfeeding intentions (16.5%) occurred in the same time frame as the largest increase in combination feeding intentions (10.1%); between the first and second month. Since between the first and second month was the largest decrease in breastfeeding intentions and largest increase in combination feeding intention, this would be an opportune time for the women to be contacted by the WIC program to reinforce the benefits of breastfeeding and to help the women with any breastfeeding problems they may be experiencing.

When the women were divided based on smoking status, it was found that for the first four months after birth, more non-smokers intended to breastfeed their infants than smokers. Other studies have found similar results of smokers having lower breastfeeding intentions than non-smokers (Donath, Amir, & ALSPAC Study Team, 2004; Giglia, Binns, & Alfonso, 2006a; Scott, Binns, Oddy, & Graham, 2006). In the Avon Longitudinal Study of Parents and Childhood study, it was also found that fewer smokers

intended to breastfeed for at least four months when compared to non-smokers (Donath, Amir, & ALSPAC Study Team, 2004).

Beyond the fourth month, there were more smokers intending to breastfeed than non-smokers, but the difference between the two groups was small and not significant (5.3%). As seen with the infant feeding intention groups, the number of smokers and non-smokers who intended to breastfeed decreased as the time period increased. Again this is not surprising since the WIC population has a lower rate and duration of breastfeeding than the non-WIC population.

In this study, the number of smokers intending to formula-feed remained fairly similar from the first week after birth till beyond the fourth month (6.7% difference). As the time period increased, more non-smokers than smokers intended to combination feed (26.6% vs. 19.3%).

Age

Other studies have found that younger women were less likely to breastfeed their infants and were more likely to be smokers (Haug et al., 1998; Letson, Rosenberg, & Wu, 2001; Donath, Amir, & ALSPAC Study Team, 2004; Giglia, Binns, & Alfonso, 2006a). This study did not find similar results regarding younger women being less likely to intend to breastfeed their infants. In this study, overall, the women who were intending to breastfeed their infant at any point after birth were younger than the women who were intending to exclusively formula-feed their infants from birth. In the "breastfeed only," "breastfeed/combination feed to formula-feed," and "breastfeed to combination feed" groups, more women were in the 18-24 age range (49.8%, 88.8%, and 57.1%). The "formula-feed only" group had more women in the 25-31 age range (53.0%).

Among the women who smoked, more than half were in the 18-24 age range. Therefore, similar to results found in other studies, the younger women were more likely to be smokers.

Education Level

In other studies, women with fewer years of education were more likely to smoke during pregnancy than women who had higher levels of education (Letson, Rosenberg, & Wu, 2001; Donath, Amir, & ALSPAC Study Team, 2004; Giglia, Binns, & Alfonso, 2006a). This was also seen among the women in this study. The smokers were more likely to have graduated high school while non-smokers were more likely to have had some college or vocational/technical school.

Feeding Method used with Previous Children

It is not surprising that the majority of women reported similar feeding intentions for their current infant that they used with previous children. All women in the "breastfeed only" group reported they breastfed their previous children. The majority of women in the "formula-feed only" group did not breastfeed previous children and those that did, only breastfed for a short period of time (0-2 months).

Fewer smokers breastfed previous children than non-smokers. Smokers being less likely to breastfeed their infants than non-smokers has been reported in other studies (Letson, Rosenberg, & Wu, 2002; Donath, Amir, & ALSPAC Study Team, 2004). In this study, even though more non-smokers breastfed previous children, they did not breastfeed for the recommended length of six months (American Dietetic Association, 2005; Giglia, Binns, & Alfonso, 2006a). The most frequent breastfeeding length of previous children for non-smokers was 0-2 months.

Prenatal Care

Over half the women indicated that the WIC program was providing them with prenatal care, which was to be expected since that is a service of the program. More women reported that a WIC nutritionist, above all the other providers, had discussed different infant feeding methods with them. WIC nutritionists are required to discuss infant feeding methods with their pregnant participants. Due to that fact it would be assumed that all of the women who completed the survey should have reported that a WIC nutritionist discussed infant feeding methods with them, but only 81.3% reported they had. This may indicate that some WIC nutritionists were not discussing this topic with the participants or the participants may have felt the WIC nutritionists did not provide them with enough information. Even though it was not reported by all women, it is important that the WIC program continues to require their employees to provide women with quality infant feeding information, debug myths, and answer questions about infant feeding methods to allow women to make a well-formed decision on which feeding method to use.

Significantly more smokers than non-smokers received prenatal care from a doctor. Because of this doctors would have more of an opportunity to discuss infant feeding methods with smokers than non-smokers. The results of this study found this to be similar. Significantly more smokers than non-smokers reported that doctors had discussed different infant feeding methods with them.

Significantly more non-smokers than smokers reported they were receiving prenatal care from a midwife, so midwives would have more of an opportunity to discuss infant feeding methods with non-smokers. This study found that significantly more non-

smokers than smokers had a midwife discuss the different infant feeding methods with them.

Prenatal Classes

Only 20.7% of the women who completed the survey attended a prenatal class that discussed infant feeding. A study conducted by Reifsnider and Eckhart (1997) found that women who attended prenatal classes had higher breastfeeding rates up till the third month after birth than women who did not attend prenatal classes. Considering that study, increasing the number of women who attend prenatal classes may have a beneficial effect on increasing breastfeeding rates among the women at the Eau Claire WIC program.

Among the women who attended prenatal classes that discussed infant feeding, the vast majority were taught breastfeeding techniques (83.3%). It is positive that most of the women who attended prenatal classes were taught breastfeeding techniques since according to Hoddinott and Pill (2006, p. 34) breastfeeding is a "practical skill" which needs to be learned through practice. By learning the techniques, it can help women to develop "confidence, commitment, and knowledge necessary to perform this new behavior" (Hoddinott & Pill, 2006, p. 34). By increasing a woman's confidence in her ability to breastfeed and providing her with the knowledge to help her successfully breastfeed, it may influence her intentions to breastfeed along with the duration she breastfeeds her infant.

Positive Advice about Breastfeeding

It was not surprising that out of the seven people/organizations listed in the survey, more women indicated that they had been positive advice about breastfeeding from the WIC program (79.3%) since one of the goals of the WIC program is to promote

breastfeeding among its participants. Overall, more women did not receive positive advice about breastfeeding from a doctor, midwife, nurse or someone one else not listed in the survey. The lower percentage of doctors and midwives providing positive advice to women in this study may also be due to the fact that the women receiving prenatal care from a doctor were not getting care from a midwife and vice versa.

Out of the seven people/organizations that were listed in the survey for providing positive breastfeeding advice, the WIC program was the only person/organization that more women in the "formula-feed only" group reported had given them positive breastfeeding advice. More women in the other infant feeding intention groups had reported that more than one person/organization had provided them with positive advice. The fact that the women in the "formula-feed only" group were not getting as much positive breastfeeding advice as most of the women in the other groups may have influenced the women's intentions to formula-feed their infants. The women in the other infant feeding intention groups received more positive advice and those women were intending to breastfeed their infants for some length of time after birth. The views of people who women have a close relationship with can affect their thoughts on breastfeeding (Department of Health and Human Services Office on Women's Health, 2000).

When the women were divided based on smoking status, there was a difference in who was providing the women with positive advice about breastfeeding. More smokers heard positive advice from a friend while more non-smokers received positive advice from a family member.

Significantly more smokers received positive breastfeeding advice from a doctor than non-smokers which is not surprising since more smokers were receiving prenatal care from a doctor than non-smokers. Significantly more non-smokers received positive advice from a midwife than smokers, but more non-smokers were receiving prenatal care from a midwife than smokers. It is encouraging to see that smokers and non-smokers were receiving positive advice about breastfeeding from one of their main prenatal providers. Many women find the support of their health care provider as "the single most important intervention the health care system could have offered to help them breastfeed" (Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005, p.23). Unfortunately from this survey it can not be determined what positive advice the women were given and how often they received positive advice.

Negative Advice about Breastfeeding

No women reported that they received negative advice about breastfeeding from a doctor, midwife, or the WIC program. One woman did report that she received negative advice from a nurse. That is unfortunate to learn, but, overall, it is encouraging to find that none of the women's main prenatal providers gave them negative breastfeeding advice.

Most of the negative advice the women were given was from a friend or family member. Pregnant women receiving negative breastfeeding advice from friends and family was also noted in the Guttman and Zimmerman (2000) study. Many women use the advice from their friends and family to help them make their decision on which infant feeding method to use and if their family and friends have a negative opinion on breastfeeding, the women may be more likely to formula-feed their infants (Department

of Health and Human Services Office on Women's Health, 2000; Shealy, Li, Benton-Davis, & Grummer-Strawn, 2005).

The women who received more negative breastfeeding advice from a family member were in the "breastfeed to combination feed" group and were non-smokers. Women who were given more negative advice from a friend were largely in the "breastfeed/combination feed to formula-feed" group and were also non-smokers. Interestingly, the women in "formula-feed only" group did not receive more negative breastfeeding advice than the other groups. Women in both the groups that were given the most negative advice, intend to start with breastfeeding exclusively or combination feeding and switch to formula-feeding exclusively or combination feeding. Since these women were intending to breastfeed their infants after birth in some form, perhaps they might intend to breastfeed longer if they were not given negative advice from family and friends.

Another interesting finding was more non-smokers were given negative breastfeeding advice than smokers. Perhaps they received more negative advice since more non-smokers than smokers were intending to breastfeed their infants during the first couple months.

Exposure to Breastfeeding and Formula-Feeding

Fifty-two of the women who completed the survey knew mothers with young infants. More than half of the women reported that most of the mothers they knew formula-fed their infants. Only six women knew mothers who had breastfed their infants. This lack of exposure to mothers who breastfed may be a factor influencing the infant feeding intentions of the women in this study. A woman's exposure to others

breastfeeding can strongly influence breastfeeding intentions. According to researchers Hoddinott and Pill (2006, p. 32) "Crucial factors determining women's reactions [to breastfeeding] were the nature of their relationship to the breastfeeding woman, the presence of other people and their reaction, the frequency of exposure, the perceived appropriateness of the setting, and their own level of body confidence."

Living with Smoker or Non-Smoker

Most of the women who completed the survey either lived with a partner who smoked or did not live with any one who smoked. When the women were divided based on infant feeding intentions, the "breastfeed to combination feed" group was the only group that had more women report that no one they live with smoked. More women in the other three groups reported that their partner smoked. Studies have found that women who had a partner who smoked were more likely to breastfeed for a shorter duration than women who lived with a non-smoker (Horta et al., 1997; Haug et al., 1998; Di Napoli et al. 2006). Based on the results of those studies the women in this study who are living with a non-smoker may be more likely to breastfeed for a longer duration than women living with a smoker.

When the women were divided based on smoking status, more smokers reported that their partner smoked while more non-smokers reported no one they lived with smoked. In a study done by Haug et al. (1998) it was found that if both parents were non-smokers, 34% of mothers were not breastfeeding their infants at six months. The study also found that if both parents were smokers, the number of mothers not breastfeeding their infants at six months had greatly increased to 67% (Haug et al., 1998). The women in this study who are smokers and had a partner who smoked may be more likely

breastfeed for a shorter duration that women who were non-smokers and lived with a non-smoker. Since more than half of the smokers in this study had partners who smoke dand the effect it could possibly have on breastfeeding duration, it would be beneficial to not only try to help the mother stop smoking, but try to help her partner stop smoking as well.

Safety of Smokers Breastfeeding

More than half of the women felt that it was unsafe for smokers to breastfeed their infants. Such a high number indicates that more education needs to be provided to inform women that the benefits outweigh the risks of smokers breastfeeding their infants.

The "formula-feed only" group had more women report it was unsafe for smokers to breastfeed then women in the other groups. This was also the only group had more smokers than non-smokers. The smokers within this group may be intending to formula-feed because they think it would be harmful for them to breastfeed their infants.

More women in the "breastfeed only" group felt it was safe for smokers to breastfeed than the other three groups. This might indicate that women within this group have a better understanding that it is more beneficial to breastfeed even if the woman is a smoker. But among the women in this group, there was only a 9% difference between those who felt it was safe and those who felt it was unsafe, with more women feeling it was unsafe. There were no infant feeding intention groups that had more women who felt it was safe for smokers to breastfeed.

When looking at the women's responses based on smoking status, more non-smokers than smokers felt it was unsafe for smokers to breastfeed. Even though more smokers than non-smokers felt it was safe to breastfeed, among the smokers there were

more who felt it was unsafe. These responses show that smokers are not the only ones who would benefit from more accurate information about the safety of smokers breastfeeding. By providing accurate information to smokers, they can feel that it is safe for them to breastfeed their infants and that it is a better choice than formula-feeding. Teaching non-smokers that it is better for smokers to breastfeed, may allow them to be more to be supportive of smokers who breastfeed instead of feeling that the smokers are doing something unsafe to their infants.

When the women were asked to provide an explanation for why they felt it was unsafe for smokers to breastfeed, three overall themes were noted: harming the infant, side effects, and other. The majority of women provided an explanation that was related to harming the infant. For this theme, the women referred to the nicotine and other chemicals in the cigarette and second-hand smoke. The women were aware that the nicotine and other chemicals from the cigarette the mother smoked reach the infant through the breast milk. A woman was able to clearly show that she understood how the nicotine reaches the infant with the comment, "The nicotine is in the mother's system and transfers through the breast milk." Another woman seemed a little unsure of how the nicotine from the mother's cigarette was transferred to the infant through breast milk. Her response was "Nicotine might get in the blood which goes through milk to baby?" These women probably made the connection between nicotine and other cigarette chemicals being harmful to the mother and since they could be found in breast milk, it would be harmful to breastfed infant. A woman's response of "Why give breast milk with smoke when formula is likely better for them" shows the thinking that breastfeed is good for the infant, but once it has "smoke" mixed in, it is no longer the better choice, so it would be safer to feed the infant formula since it would not contain nicotine and other chemicals.

Second-hand smoke was also noted under the theme of harming the infant. The explanation was "Second hand smoke is worse." From this response, the woman may have felt that the second-hand smoke that the infant would be exposed to from the mother would be more harmful than the nicotine in the breast milk. This woman is correct that second-hand smoke is a risk to infants of smokers, which is why it is recommended for people to smoke away from the infant, in another room or, preferably, outside to help decrease this risk (Villamagna, 2004).

The second theme noticed was side effects. A couple of women felt breathing problems was a side effect of infants being breastfed by a smoker. A woman wrote "Nicotine can still be introduced to the baby making higher risk for asthma." This woman had made the connection between the nicotine in the breast milk and asthma problems for the infant, but the connection is not linked by the nicotine in the breast milk. Respiratory infections are more commonly seen in infants who are exposed to second-hand smoke. The fact that these women felt that it was unsafe for smokers to breastfeed due to respiratory problems shows they are unaware that respiratory infections are lower among infants of smokers who are breastfed compared to formula-fed infants of smokers (American Academy of Pediatrics, 2001; Gregor, Kriebs, & Varney Burst, 2004; Villamagna, 2004; La Leche League International, 2006b). So the infant of a smoker would be provided more protection against respiratory problems if they were breastfed instead of formula-fed.

Another explanation under the side effect theme was "The baby wants the nicotine." This woman was concerned that the infant would become addicted to the nicotine. The benefits of smokers breastfeeding their infant still outweigh the risks even when the infants' nicotine addiction is taken into consideration.

There were a few explanations that did not fit into a specific theme, so they were labeled as "other." A woman felt that it was unsafe for a smoker to breastfeed, but was unsure of why it is unsafe. With all the news and advertising on the dangers of smoking and the harmful effects of smoking during pregnancy, it is understandable that someone would make the connection between a smoker breastfeeding being unsafe without knowing the exact reason and without being provided accurate information that it is better for smokers to breastfeed over formula-feed.

Another woman felt that it was a "Personal opinion." This woman may have been referring to the smoker's personal opinion on whether or not she wants to breastfeed and continue to smoke rather than the safety of a smoker breastfeeding being the personal opinion. If the woman meant the explanation "personal opinion" to refer to the safety of a smoker breastfeeding, then she should have supplied her personal opinion since the survey question was asking for the women's opinion on why she felt it was unsafe.

The final explanation under this theme was "They shouldn't be smoking." From this statement it can be implied that the woman did not think the mother should be smoking at all, during pregnancy, or while breastfeeding. This woman probably understood the health risks of smoking and because of the risks thought people should not smoke. By this response it can be assumed this woman is a non-smoker.

Likert Scale Questions

Safety of Smokers' Breast Milk

When women were asked if smokers produce harmful breast milk, 38% of smokers and non-smokers were neutral which was the most common response within both groups. The fact that more women, no matter their smoking status, were neutral may indicate that they were unsure of how smoking affects the breast milk and what affect that has on the

infant. There were more non-smokers than smokers who agreed that smokers produce breast milk that is harmful to the infant (35.2% vs. 28.5%).

Nutritional Quality of Breast Milk

The women in "breastfeed only" group were more familiar with the superior nutritional quality of breast milk over formula than the women in the other three groups. More women in the "breastfeed only" group disagreed that the nutritional benefits of breast milk only last until the infant is weaned. In the Shaker, Scott, and Reid (2004) study women who were breastfeeding when discharged from the hospital also disagreed with that statement when compared to women who were formula-feeding at discharge. Interestingly, in this study, the women in the "breastfeed/combination feed to formula-feed" group not the "formula-feed only" group was more likely to think that the nutritional benefits of breast milk only lasted while the infants were breastfeeding.

Significantly more women in the "breastfeed only" group agreed that breast milk was the ideal food for infants than the "formula-feed only" group. This finding is not similar to what was found in other studies. Other studies found that most mothers believed that breastfeeding was better for their infants than formula-feeding, no matter whether they breastfed or formula-fed their infants (Guttman & Zimmerman, 2000; Hoddinott & Pill, 2006).

Significantly more women in the "breastfeed only" group than the "formula-feed only" and "breastfeed/combination feed to formula-feed" groups agreed that infants can digest breast milk easier than formula. This may show that the women in the "breastfeed only" group have a better understanding that infant's bodies digest breast milk and formula differently due to the nutritional composition of each.

Smokers and non-smokers showed different knowledge of the nutritional quality of breast milk, but based on survey responses, more smokers and non-smokers agreed that breast milk has a high nutritional quality. Smokers were more likely to think that the nutritional benefits of breast milk still lasted after the infant was weaned and that breast milk was not lacking in iron. More non-smokers thought that breast milk was the ideal food for infants and that breast milk was more easily digested than formula.

Health-Related Questions

When asked questions related to the health benefits of breastfeeding, the least number of women who agreed that breast milk had more health benefits for the infant and mother than formula and that infants fed breast milk are healthier than infants fed formula were in the "formula-feed only" group. Not surprisingly, more women in the "breastfeed only" group agreed with those statements. Shaker, Scott, and Reid (2004) found similar results in their study; mothers who breastfed thought breast milk was healthier than formula for their infants.

There were significantly more women in the "formula-feed only" group than the "breastfeed only" group who felt formula was just as healthy as breast milk. In the Shaker, Scott, and Reid (2004) study more women who breastfed did not feel that formula was as healthy as breast milk when compared to women who formula-fed. Like the Shaker, Scott, and Reid study, each group of women in this study felt that the infant feeding method they selected was healthier for their infant.

Significantly more women in the "breastfeed only" group agreed that breastfeeding has health benefits for the mother than women in the other three groups. The women who were intending to breastfeed had a better understanding of the health benefits of breastfeeding. Similar to this study, the Guttman and Zimmerman (2000) study found that

most of the women who formula-fed did not think that breastfeeding provided health benefits to the mother while more than half of the women who breastfed did think that breastfeeding was providing them with health benefits. Since there was such a significant difference between the women in the "breastfeed only" group and the other three groups in the agreement of breastfeeding providing health benefits to the mother, this is a topic that should be discussed with the pregnant women at the Eau Claire WIC so that more women would know that breastfeeding not only benefits their infants, but benefits them as well.

Based on smoking status, more smokers than non-smokers agreed that breastfeeding has health benefits for the mother. Within each of the two groups, there were more smokers and non-smokers who agreed than disagreed.

The percentage of smokers and non-smokers who agreed that infants fed breast milk were healthier than infants fed formula was fairly close around 50%. There was not a large difference seen between smokers or non-smokers on the agreement that breastfed infants are healthier, but within the two groups, about 50% agreed and about 50% disagreed.

When asked if formula is as healthy for infants as breast milk, more smokers reported they were neutral on the statement (42.9%). The same number of smokers agreed and disagreed with the statement. This might show that smokers were unsure of what the health benefits of formula are and how they compare to the benefit from breast milk. Non-smokers were less neutral on this statement. There were more non-smokers who disagreed that formula is as healthy as breast milk. This may indicate that non-smokers are more aware of the health benefits of breast milk and know that it has more benefits than formula.

Support of Family and Partner

Social support women in populations with lower breastfeeding rates receive for infant feeding methods can greatly influence the method she uses (Department of Health

and Human Service Office on Women's Health, 2000). In the Shaker, Scott, and Reid (2004) study, mothers who thought their partners preferred breastfeeding consistently had higher breastfeeding rates than mothers who thought their partners preferred formula-feeding or were indifferent to which method was used. In this study, the women's views of their family's and partner's opinion of infant feeding methods, for the most part, matched the infant feeding method the women were intending to use.

There were significantly more women in the "formula-feed only" group than the other three groups who disagreed that their partner wanted them to breastfeed while none of the women in the "breastfeed only" group disagreed that their partner wanted them to breastfeed. Significantly more women in the "breastfeed only" group disagreed that their family wanted to formula-feed their infants when compared to the women in the "breastfeed/combination feed to formula-feed" and "formula-feed only" group. None of the women in the "breastfeed only" group agreed that their family wanted them to formula-feed.

Based on smoking status, more non-smokers than smokers felt that their partner wanted them to breastfeed. More non-smokers agreed that the father would feel left out if the mother breastfeeds. Since more smokers agreed that their partners would feel left out if their infants were breastfed, it may be one of the reasons more smokers' partners were not encouraging them to breastfeed.

Convenience

More women in the "breastfeed only" and "formula-feed only" groups agreed that the infant feeding method they were intending use was the most convenient method. Similar results were found in the Guttman and Zimmerman (2000) study and the Shaker, Scott, and Reid (2004) study.

Significantly more women in the "breastfeed/combination feed to formula-feed" group agreed that formula-feeding is a better choice if the mother plans to work outside the home than the women in the "breastfeed only" group. The women in the "breastfeed/combination feed to formula-feed" group may have felt that allowing the caretaker to use formula instead of pumped breast milk would be an easier choice. Or the women may have been unsure of how they could continue to breastfeed if they were away from their infant while at work. Several women in the Guttman and Zimmerman (2000) study said they thought breastfeeding was better for their infants, but they chose to formula-feed because they needed to go back to school or work and formula-feeding allowed others to help with the infant when the mother was away.

Like with the infant feeding intention groups, more smokers and non-smokers agreed that the infant feeding method they were intending to use was the most convenient. More smokers were intending to formula-feed and significantly more smokers than non-smokers felt that formula-feeding was more convenient. More non-smokers were intending to breastfeed and more non-smokers than smokers felt that breastfeeding was the more convenient method. Since more smokers reported they thought formula-feeding was more convenient, it is not surprising that significantly more smokers than non-smokers agreed that formula-feeding was the better feeding method if the mother was working outside the home.

None of the non-smokers felt that breastfeeding would prevent them from going back to school or work while a small amount of smokers agreed that it would prevent them (23.8%). It is interesting to note that more smokers and non-smokers did not agree that breastfeeding would prevent them from going back to work or school when more

women indicated that formula-feeding was a better feeding method if the women worked outside the home. Maybe the women were given more time off from work or school than they planned to breastfeed, so it would not be a concern when the time came to go back to work or school.

The Effect of Infant Feeding Methods on Mother-Infant Relationship

The least number of women who thought that breastfeeding increases the mother-infant bond and that women who do not breastfeed are missing one of the greatest joys of motherhood were in the "formula-feed only" group while more women in the "breastfeed only" group agreed with those statements. Like in this study, the Shaker, Scott, and Reid (2004) study found more women who were breastfeeding than formula-feeding felt that breastfeeding increased the mother-infant bond and that women who did not breastfeed were missing one of the greatest joys of motherhood.

A similar amount of smokers and non-smokers felt that breastfeeding increased the mother-infant bond. More smokers than non-smokers felt that mothers who formula-feed miss one of the greatest joys of motherhood. This is interesting since there were more smokers who were intending to formula-feed than non-smokers.

Feelings about Breastfeeding

Most women in this study agreed that breastfeeding would be good for their infant (70.9%). The majority of the women in the Baisch, Fox, and Goldberg (1989) study also felt that breastfeeding would be good for their infant. Out of the four infant feeding intention groups, significantly more women in the "formula-feed only" group disagreed that breastfeeding would be good for their infant. Since these women were intending to formula-feed, they probably felt that formula-feeding would be good for their infant.

More women in the "breastfeed only" and "formula-feed only" groups reported that they felt they knew enough about breastfeeding. The women in the "formula-feed only" group that indicated they knew enough about breastfeeding may have felt that they had the knowledge about breastfeeding, but for some reason they were still intending to formula-feed their infants. Perhaps those were the women who received negative breastfeeding advice or did not have the support of family and friends.

There were more women in the "breastfeed/combination feed to formula-feed" and "breastfeed to combination feed" groups than the "breastfeed only" and "formula-feed only" groups that agreed they did not know enough about breastfeeding. These women may have been intending to not exclusively breastfeed because they did not feel they knew enough to breastfeed successfully. Women who were intending to combination feed may benefit from additional information on proper techniques, how to deal with common breastfeeding problems and who to connect if they are having difficulties. Increasing their comfort level about breastfeeding may influence them to breastfeed for a longer duration.

The difference between the number of smokers who reported they did or did not know enough about breastfeeding was small (4.8%) and not significant. There was a bigger, although not significant, difference between the numbers of non-smokers who reported they did or did not know enough about breastfeeding with more women reporting they did know enough.

Limitations

A limitation that may have occurred was when the participants answered the survey, did they respond how they thought the researcher wanted them to answer instead

of selecting the responses that best represented how they felt. Only pregnant women 18 years or older enrolled in the Eau Claire WIC participated in this study, therefore the results of this study should be used cautiously with other WIC clinics, with non-pregnant women, and women younger than 18-years-old.

Conclusions

As seen in other studies, smokers in this study, overall, were less likely to intend to breastfeed than non-smokers (Donath, Amir, & ALSPAC Study Team, 2004; Scott, Binns, Oddy, & Graham, 2006). Some of the reasons smokers were less likely to intend to breastfeed were: most formula-fed previous children, lack of exposure of other women breastfeeding, living with a smoker, feeling that it was unsafe for smokers to breastfeed, limited knowledge of the health benefits of breastfeeding compared to formula-feeding, lack of support from partner to breastfeed, and feeling that formula-feeding was more convenient than breastfeeding.

Recommendations

Educational Program for Increasing Breastfeeding Rates among Smokers

Recommendations for an educational program for increasing breastfeeding rates among smokers at the Eau Claire WIC program are based on results of this study that were different between smokers and non-smokers. Since the "formula-feed only" group had the largest number of smokers out of all four infant feeding intention groups, recommendations are also based on differences that were seen between the "formula-feed only" group and the other groups. Lastly recommendations are also based on results of other studies that have created educational programs for increasing breastfeeding rates.

Intentions

The role of intention during pregnancy should be taken into consideration when creating educational classes or information for increasing breastfeeding rates among smokers due to the large influence it has on which infant feeding method the mother chooses to use. According to the Theory of Reasoned Action if a person intends to do an action, they will most likely carry out that action (Shaker, Scott, & Reid, 2004). There were more smokers in the "formula-feed only" group than the other three groups, so it would be important to target these women during their pregnancy to encourage them to breastfeed by discussing the benefits of breastfeeding, the women's concerns, their reasons for and against breastfeeding and measuring their level of readiness to breastfeed. It would be beneficial to start targeting these women earlier in pregnancy to allow more time for persuasion and to allow the women more time to consider the length they will breastfeed.

It is encouraged that women create a breastfeeding plan (Forster et al., 2004). The breastfeeding plan would include the duration women are intending to breastfeeding. This plan causes women to think about how long they plan to breastfeed before the infant is born. Women who set an intended breastfeeding length are more likely to breastfeed for that length of time than women who do not have an intended breastfeeding length determined (Donath, Amir, & ALSPAC Study Team, 2004). The women should be encouraged to select a longer breastfeeding length, but the length selected should also be realistic so the women are more likely to available the goal.

Support of the Partner

When WIC nutritionists are discussing breastfeeding, it would be beneficial to have the women's partner present so they can also be given accurate information and feel more comfortable with the idea of his partner breastfeeding. The partner's views on infant feeding methods can greatly influence which method the women chooses to use. Most of the women in the "formula-feed only" group felt that their partner did not want them to breastfeed which may be a big reason why they are intending to formula-feed, so it would be important to involve the women's partner.

It would also be beneficial for the partner to be at the appointments to learn breastfeeding techniques along with the mother. This way the partner could provide assistance to the mother if breastfeeding problems arise.

Another way to involve partners would be to create a men's support group. This would provide men the opportunity to discuss with one another their thoughts on breastfeeding and to learn from one another. By discussing breastfeeding with other men, they may not feel as left out of the infant feeding process and feel more comfortable about their partners breastfeeding.

Breastfeeding Advice from Others

Many women use the advice of others to help them determine which infant feeding method to use. It is recommended that the WIC nutritionist discuss with the women what advice they have been given. The WIC nutritionists can help reinforce the positive advice. For the negative advice, the WIC nutritionists can correct any incorrect information, teach ways breastfeeding problems can be resolved, and help increase the women's confidence in their ability to breastfeed successfully. According to Ryser (2004,

p. 304) "as negative attitudes decrease and positive attitudes increase, breastfeeding rates improve." Also by discussing the advice women are given, the WIC nutritionists can provide breastfeeding information that is tailored to each woman's thoughts and concerns instead of just providing the general information that is given to all women.

Support during First Month after Delivery

The Eau Claire WIC program sees women and their infants within two weeks of the women calling the clinic to say they have given birth. It is important that the WIC nutritionists discuss how breastfeeding is going during the first appointment after birth since the mother and infant are still learning how to properly breastfeed and frustrations during this time may cause women to switch to formula-feed.

Since the largest decrease in breastfeeding intentions among the women who completed the survey was between the first and second month, it is important to reinforce breastfeeding and help resolve breastfeeding problems during the first month after delivery to encourage women to continue to breastfeeding for a longer duration.

Safety of Smokers Breastfeeding

Most women felt that it was unsafe for smokers to breastfeed their infants which indicates that more education needs to be provided on this issue. In order for smokers to feel comfortable about breastfeeding their infants, their opinion about the safety of breastfeeding would need to change. It is recommended to provide smokers with accurate information explaining that the benefits of them breastfeeding outweigh the risks. If the women plan to continue to smoke after the infant is born, breastfeeding would provide the infant with more protection than formula-feeding. Due to antibodies found in breast milk, infants are provided added protection against the risks of their mother's smoking

habit. Formula lacks antibodies, so it can not provide infants with added protection. It is recommended to discuss the safety of smokers breastfeeding while the women are pregnant so they feel comfortable with the idea of breastfeeding by the time the infant is born.

Since most women reported that smokers breastfeeding was unsafe due to nicotine and other cigarette chemicals in the breast milk, it is recommended that ways to decrease the infants' exposure to nicotine in breast milk be discussed. One way to decrease the infants' risk is for the mother to decrease the number of the cigarettes smoked/day. Smoking fewer cigarettes results in less nicotine in the breast milk decreasing the amount infants receive. Another way to decrease the amount of nicotine found in breast milk is for the mother to smoke right after she breastfeeds. Since the half-life of nicotine in breast milk is 60-90 minutes, the amount of nicotine in breast milk is decreased or eliminated by the next nursing session depending on how many cigarettes are smoked and the time between feedings (Villamagna, 2004).

A couple of women also made comments that it was unsafe for smokers to breastfeed because it results in respiratory problems for the infant. Respiratory problems are more commonly seen in infants of smokers than infants of non-smokers. The respiratory problems are related to exposure to second-hand smoke not the nicotine in the breast milk. It is recommended to mention to women that infants of smokers have fewer respiratory infections if they are breastfed instead of formula-fed due to the antibodies found in breast milk (American Academy of Pediatrics, 2001; Gregor, Kriebs, & Varney Burst, 2004; Villamagna, 2004; La Leche League International, 2006b). To decrease the

infants' exposure to second-hand smoke, the mother or any other smoker should smoke away from the infant, in another room or, preferably, outside (Villamagna, 2004).

Smoking Cessation

Smoking cessation or decreasing the number of cigarettes smoked/day should be encouraged not only during pregnancy, but after delivery as well. If women are trying a smoking cessation method and not planning to smoke while using it, the nicotine patch is recommended over the nicotine gum because the patch causes lower nicotine plasma than the gum. The nicotine gum releases varying amounts of nicotine depending on how rapidly the gum is chewed (Washington State Department of Health, 2002).

Several women reported that they were trying to stop smoking. These women should be provided with extra support and encouragement to help them meet their goal.

In this study, more smokers reported that their partner also smoked. It would be beneficial to provide smoking cessation assistance to women's partners, refer them to a program that could help, or create a smoking cessation support group for men since a partner's smoking habits can have an influence on the women breastfeeding duration (Horta et al., 1997; Haug et al., 1998; Di Napoli et al. 2006).

Feeding Method used with Previous Children

This study found that most women in the "formula-feed only" group had not breastfed previous children and more non-smokers than smokers breastfed previous children. The Reifsnider and Eckhart (1997) study found that women who formula-fed previous children breastfed for a shorter duration than women who never formula-fed previous children. Due to this, it is recommended that women who formula-fed previous

children receive extra breastfeeding encouragement and support so they do not fall back to using formula.

Also since the infant feeding method used with previous children is the most common method women use with current infants, it is important to reach women who are having their first child. If they breastfeed their first child, they will be more likely to breastfeed other children in the future.

Knowledge of Breastfeeding and Formula-Feeding

It is recommended to assess the women's knowledge of breastfeeding. In order to gauge the women's knowledge level, it would be more beneficial to ask women open-ended questions such as "What do you know about breastfeeding" and not "Are you going to breastfeed or formula-feed" (Ryser, 2004). By getting an understanding of the women's knowledge level, it can be determined what breastfeeding and formula-feeding information the women need to be given to allow them to make an informed decision on which infant feeding method to use. Such information should include: nutritional components, benefits provided to the infant and the mother, and the difference in how infants digest the two.

Prenatal Classes

Due to the low number of women who reported attending prenatal classes and the influence it could have on the infant feeding method used, it would be beneficial to provide or encourage women to attend prenatal classes. It is recommended that the classes provide women with an opportunity to not only learn about breastfeeding techniques, but to also practice breastfeeding techniques such how the infant latches on to the breast. Having the women's partner or family member also attend prenatal classes

would allow them to assist the women once the infant is born and help the women work through breastfeeding problems.

From the Reifsnider and Eckhart (1997) study other possible topics for prenatal classes or one-on-one appointments to help increase breastfeeding rates include:

1. How lactation occurs
2. Prenatal breast care
3. Self-care for the breastfeeding mother
4. Breastfeeding and work
5. Resources for breastfeeding mothers

Survey

After using the survey created for this study, a few questions should be reworded for better clarification or follow-up questions asked to obtain more information. Additional questions related to attendance of prenatal classes would have been beneficial, such as, how many classes have you attended, what topics were covered during class, and were you given the opportunity to practice proper breastfeeding techniques. If the participants had been asked to provide examples of the positive and negative breastfeeding advice they had received instead of just who had given them the advice, there would be a better understand of what information was being provided to the women.

It would have been useful to have asked the participants if they had heard or been told by someone that it is unsafe for a smoker to breastfeed since the views of others could have influenced the participants' thoughts on the issue. It would have also been helpful to have determined if they had heard or been told that it is better for a smoker to

breastfeed than formula-feed to better determine the participant's exposure to such information.

If the survey is to be used again, the Likert scale questions should be changed from a 5-point scale to an even-numbered scale. An even-numbered scale would prevent participants from selecting neural and it would force them to decide their level of agreement or disagreement. This would have provided better results for those questions.

Future Studies

A beneficial future study with the Eau Claire WIC program would be to expand on this current study. Determine the smoker's infant feeding intentions at the beginning of her pregnancy. Provide an experimental group of smokers with the recommended educational program that was stated in the above sections and provide a control group of smokers with Eau Claire WIC's current educational program. After the infant is born, follow up with the smokers in each group to determine if the women's feeding intention was different or the same as the method actually used and the length that method was used. Rate the effectiveness of the recommendations.

Another beneficial study would be to look at the pregnant smokers at the Eau Claire WIC program who are younger than 18 years old since this group was not included in this study. Smokers younger than 18 years old may have different reasons for not wanting to breastfeed than the ones stated in this study. And if they do, a different educational program can be tailored to that population to better help increase their breastfeeding rates.

Since smoker's partners have a large influence on which infant feeding method she will use, it would be beneficial to determine the partner's thoughts and concerns

about breastfeeding. This would provide a better understanding of the support the women will receive from their partners and what education should be provided to the partners to help them be more supportive of breastfeeding.

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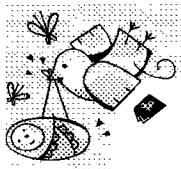
Appendix A: Invitation to January 22nd Baby Shower




YOU'RE INVITED

TO A

BABY SHOWER

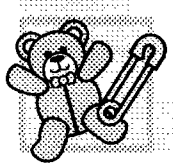
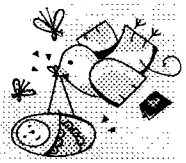
to celebrate the upcoming birth of your baby

When: January 22, 2006 from 6-8PM

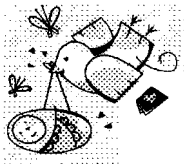
Where: Eau Claire WIC clinic

What: Receive a free gift bag! Come and relax! Enjoy games, have snacks and visit with other moms-to-be.

Hosted by: Eau Claire WIC staff & Annie Hibbs, UW-Stout graduate student

Appendix B: Invitation to January 25th Baby Shower




YOU'RE INVITED

TO A

BABY SHOWER

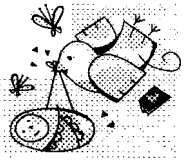
to celebrate the upcoming birth of your baby

When: January 25, 2006 from 6-8PM

Where: Eau Claire WIC clinic

What: Receive a free gift bag! Come and relax! Enjoy games, have snacks and visit with other moms-to-be.

Hosted by: Eau Claire WIC staff & Annie Hibbs, UW-Stout graduate student

Appendix C: Consent Form

Consent to Participate in UW-Stout Approved Research

Title: Intentions to Breast- or Formula-feed of Smoking and Non-Smoking Pregnant Women at the Eau Claire Women, Infants, and Children Program (WIC).

Researcher:
Annie Hibbs
612-419-5609
hibbsa@uwstout.edu

Advisor:
Lydia Chowa
715-232-3285
chowal@uwstout.edu

Description:
The purpose of this study is to determine reasons why smoking and non-smoking pregnant women at the Eau Claire WIC intend to breast- or formula-feed their infants through the attached survey. The results from the surveys will be used by the Eau Claire WIC to create an education program to help increase breastfeeding rates among smoking and non-smoking women.

Time Commitment and Cost:
Your participation only includes the completion of a survey which takes approximately 10 minutes. The survey includes questions on: infant feeding intentions, feeding of past children, knowledge of breastfeeding, attitudes towards breastfeeding and formula-feeding, and smoking habits. There is no cost to you for participating in this study.

Risks and Benefits:
There is very little risk of causing any psychological, emotional or behavioral problems by taking the survey. Since the results from this study will be used at a later date, it will provide benefits to future pregnant women enrolled in the WIC program. The benefit to future pregnant women will be to provide them with better education related to breastfeeding their infants and to help increase breastfeeding rates.

Confidentiality:
The following survey is confidential so you will not be linked to your responses. To ensure that your responses can't be linked to you, **please do not sign your name on any of the pages**.

Right to Withdraw:
Your participation in this study is voluntary and you may withdraw from the study at any time without any consequences. If at a later time you wish to withdraw from the study there will be no way of identifying which survey was yours after turning it into the researcher because names are not included on the surveys.

IRB Approval:
This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the

ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Researcher or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

Researcher:
Annie Hibbs
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Advisor:
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IRB Administrator:
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foxwells@uwstout.edu

Statement of Consent:
By completing the following survey you are indicating that you understand about the information provided above and you agree to participate in the project titled Intentions to Breast- or Formula-feed of Smoking and Non-Smoking Pregnant Women at the Eau Claire Women, Infants, and Children Program (WIC).

Appendix D: Survey

Infant Feeding Choices of Pregnant Women at Eau Claire WIC

Directions: Please circle or place a mark on the line in front of the response that best represents your answer for each question. **Please do not write your name on the survey.** This is a confidential survey so your response can't be linked to you.

1. Age: _____ (years)

2. Marital Status:
   ____ (a) Single
   ____ (b) Engaged
   ____ I Living together
   ____ (d) Married
   ____ (e) Separated
   ____ (f) Divorced
   ____ (g) Widowed

3. What is your level of education?
   ____ (a) Less than high school
   ____ (b) Some high school
   ____ I Graduated high school
   ____ (d) Some college or vocational/technical school
   ____ (e) College degree
   ____ (f) Post bachelor's degree

4. What is your ethnicity?
   ____ (a) African American
   ____ (b) Asian
   ____ I Hmong
   ____ (d) Native American
   ____ (e) White/Caucasian
   ____ (f) Other _____

5. How far along are you in your pregnancy?
   ____ (a) 1-3 months
   ____ (b) 4-6 months
   ____ I 7-9 months
   ____ (d) greater than 9 months

6. How do you intend to feed your baby during the next few months?
   (Please circle the answer that best represents your response for a-d)

(a) 1st week after birth:	Breastfeed	Formula-feed	Breast & formula-feed
(b) During rest of 1st month:	Breastfeed	Formula-feed	Breast & formula-feed
I During the 2nd-4th month:	Breastfeed	Formula-feed	Breast & formula-feed
(d) Beyond 4th months:	Breastfeed	Formula-feed	Breast & formula-feed

7. Is this your first baby?
   ____ (a) Yes → skip to question 13
   ____ (b) No

8. How many biological children do you have in total?
   (Do not count adopted children, step-children or foster children)
   ____ (a) 1-2
   ____ (b) 3-4
   ____ (c) 5-6
   ____ (d) 7 or more

9. How long did you breastfeed your 1st two children (oldest and second oldest)?
   ____ (a) I didn't breastfeed these children
   ____ (b) 0-2 months
   ____ (c) 3-5 months
   ____ (d) 6-8 months
   ____ (e) more than 8 months

10. How long did you breastfeed your 3rd and 4th children?
    (If question doesn't apply to you, skip to question 13)
    ____ (a) I didn't breastfeed these children
    ____ (b) 0-2 months
    ____ (c) 3-5 months
    ____ (d) 6-8 months
    ____ (e) more than 8 months

11. How long did you breastfeed your 5th and 6th children?
    (If question doesn't apply to you, skip to question 13)
    ____ (a) I didn't breastfeed these children
    ____ (b) 0-2 months
    ____ (c) 3-5 months
    ____ (d) 6-8 months
    ____ (e) more than 8 months

12. How long did you breastfeed your 7th child and the children that came after?
    (If question doesn't apply to you, skip to question 13)
    ____ (a) I didn't breastfeed these children
    ____ (b) 0-2 months
    ____ (c) 3-5 months
    ____ (d) 6-8 months
    ____ (e) more than 8 months

13. When did you start receiving prenatal (pregnancy) care?
    ____ (a) 0-2 months of pregnancy
    ____ (b) 3-5 months of pregnancy
    ____ (c) 6-8 months of pregnancy
    ____ (d) 9 months of pregnancy or later

14. Who is providing you with prenatal care? (mark all that apply)
    ____ (a) Doctor
    ____ (b) Midwife
    ____ (c) WIC
    ____ (d) Other -
    _____

15. Have any of the prenatal providers you selected above asked how you plan to feed your baby?
    ____ (a) Yes
    ____ (b) No

16. Have your prenatal provider(s) discussed with you the different ways to feed your baby (breastfeeding and formula-feeding)?
    ____ (a) Yes
    ____ (b) No → skip to question 18

17. If feeding your baby was discussed with you, who were the individuals? (mark all that apply)
    ____ (a) Doctor
    ____ (b) Midwife
    ____ (c) Nurse
    ____ (d) WIC nutritionist
    ____ (e) Someone else -
    _____

18. Have you attended any classes that included talks or discussions about feeding babies?
    ____ (a) Yes
    ____ (b) No → skip to question 21

19. Were you taught how to prepare or mix formula at the classes you attended?
    ____ (a) Yes
    ____ (b) No

20. Were you taught breastfeeding techniques (such as proper positioning of the baby) at the classes you attended?
    ____ (a) Yes
    ____ (b) No

21. Have you received **positive** advice about breastfeeding from any of the following people or organizations? (mark all that apply)
    ____ (a) Doctor
    ____ (b) Family member
    ____ (c) Friend
    ____ (d) Midwife
    ____ (e) Nurse
    ____ (f) WIC
    ____ (g) Someone else _____

22. Have you received **negative** advice about breastfeeding from any of the following people or organizations? (mark all that apply)
    ____ (a) Doctor
    ____ (b) Family member
    ____ (c) Friend
    ____ (d) Midwife
    ____ (e) Nurse
    ____ (f) WIC
    ____ (g) Someone else _____

23. Do you know any mothers with young babies?
    ____ (a) Yes
    ____ (b) No → skip to question 25

24. Would you say that most of the mothers you know with young babies formula-feed or breastfeed their babies?
    ____ (a) Most of them formula-feed
    ____ (b) Most of them breastfeed
    ____ (c) About half of them formula-feed and half of them breastfeed
    ____ (d) Don't know

25. Do you think it's safe for a woman to breastfeed when she is a smoker?
    ____ (a) Yes
    ____ (b) No, please explain why not.
    _____

26. Have you smoked cigarettes at all in the last 2 years?
    ____ (a) Yes
    ____ (b) No

27. Do you smoke cigarettes at all now?
    ____ (a) Yes
    ____ (b) No → skip to question 32

28. If yes, how many cigarettes do you smoke:
    ____ (a) 1-4 cigarettes per day
    ____ (b) 5-9 cigarettes per day
    ____ (c) 10-14 cigarettes per day
    ____ (d) 15 or more cigarettes per day

29. Since learning about your pregnancy, did you do any of the following with your smoking habit:
    ____ (a) Decreased the amount you smoke
    ____ (b) Gave up and started again
    ____ (c) Increased the amount you smoke
    ____ (d) Smoking the same amount
    ____ (e) Quit completely

30. When your baby is born, will you:
    ____ (a) Stop smoking
    ____ (b) Continue smoking and formula-feed the baby
    ____ (c) Continue smoking and breastfeed the baby

31. Please explain your answer to question #30: -
    _____

32. Do any of the people you live with smoke cigarettes?
    ____ (a) Yes, my partner smokes
    ____ (b) Yes, someone else I live with smokes
    ____ (c) No, nobody else who I live with smokes
    ____ (d) Not applicable – I live alone

For each of the following statements, please indicate how much you agree or disagree by circling the number that most closely represents your opinion.

	Strongly Disagree		Neutral		Strongly Agree
33. The nutritional benefits of breast milk last only until the baby is weaned from breast milk.	1	2	3	4	5
34. Formula-feeding is more convenient than breastfeeding.	1	2	3	4	5
35. Breastfeeding increases mother-infant bonding.	1	2	3	4	5
36. Breast milk is lacking in iron.	1	2	3	4	5
37. Formula-fed babies are more likely to be overfed than are breastfed babies.	1	2	3	4	5
38. Formula-feeding is the better choice if a mother plans to work outside the home.	1	2	3	4	5
39. Mothers who formula-feed miss one of the great joys of motherhood.	1	2	3	4	5
40. Women should not breastfeed in public places such as restaurants.	1	2	3	4	5
41. Babies fed breast milk are healthier than babies who are fed formula.	1	2	3	4	5
42. Breastfed babies are more likely to be overfed than formula-fed babies.	1	2	3	4	5
43. Fathers feel left out if a mother breastfeeds.	1	2	3	4	5
44. Breast milk is the ideal food for babies.	1	2	3	4	5
45. Breast milk is more easily digested by the baby than formula.	1	2	3	4	5
46. Formula is as healthy for an infant as breast milk.	1	2	3	4	5
47. Breastfeeding is more convenient than formula feeding.	1	2	3	4	5
48. Breastfeeding means no one else can feed the baby.	1	2	3	4	5
49. I think breastfeeding will be good for my baby.	1	2	3	4	5
50. I would feel embarrassed if someone saw me breastfeeding.	1	2	3	4	5

	Strongly Disagree		Neutral		Strongly Agree
51. I have heard from someone who breastfed that breastfeeding hurts.	1	2	3	4	5
52. I don't think I know enough about breastfeeding.	1	2	3	4	5
53. Women who smoke produce breast milk that is harmful to the baby.	1	2	3	4	5
54. My partner wants me to breastfeed.	1	2	3	4	5
55. My family wants me to formula-feed.	1	2	3	4	5
56. Breastfeeding prevents me from going back to school or work.	1	2	3	4	5
57. Breastfeeding has health benefits for the mother.	1	2	3	4	5
58. Formula-feeding is what people think makes a "good mother".	1	2	3	4	5
59. Formula-feeding ties the mother down.	1	2	3	4	5

Do you have any other comments you would like to make regarding breastfeed, the WIC program, etc.?

Thank you for taking the time to fill out this survey.

Appendix E: Comments Regarding Breastfeeding, WIC Program, Etc.

Comments from women who completed the survey
"The WIC program is a very good program. It has helped me out a lot. I'm very grateful that we have the WIC program available to us."
"You guys push breastfeeding too much."
"It's a great program!"
"I did my best. I found out I have a lot to learn about breastfeeding, but I'm still choosing to do it."
"I think that if people are going to breastfeed then they should NOT smoke b/c maybe they don't realize it but they are just basically letting there child smoke b/c that child is getting all the nicotine the mom is getting, and that is the same with drinking too! But I think that a mom shouldn't be smoking through there pregnancy either or drinking alcoholic beverages it is not good or safe for your baby!"
"No, I had no problems with breastfeeding."
"I am strongly against breastfeeding."
"Breastfeeding is great! If it works for you and your baby. Some babies nurse and others don't. My 2 babies didn't nurse well. I say try it, and if it doesn't work and puts too much stress on you and your baby - give it up! And don't' feel guilty about it. Your baby will turn out just fine!"
"I feel more women need to breastfeed in public. It's natural and should not be scoffed at."