

NATURE'S BEST: AN ANALYSIS OF A LACTATION EDUCATION NEEDS  
ASSESSMENT

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**Title**

Nature's Best: An Analysis of a Lactation Education Needs Assessment

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

**MASTER OF SCIENCE**

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## ABSTRACT

This thesis explores the perceptions of nurses regarding the importance of breastfeeding, the need for lactation education, and the barriers that may be preventing nurses from obtaining lactation education. Nurses working in Minnesota, North Dakota, or South Dakota were the focus. Secondary data from a lactation education needs assessment was used to explore the perceptions and barriers in these states. It was determined that 290 surveys were useable. The Health Belief Model was used to explore the relationship between the nurse's characteristics, perceived breastfeeding importance, perceived need for lactation education, likelihood to take action to obtain lactation education, and perceived barriers to lactation education.

Findings from this study indicate that several characteristics of nurses were significantly related to nurses' perceptions of breastfeeding and the need for lactation education. Among several findings, work setting and the level of nursing education were significantly related to nurses' perceptions of the importance of breastfeeding.

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## INTRODUCTION

A mother's body is beautiful and she has the power to create a future life for her infant with less childhood illnesses (diarrhea, ear infections, etc) and lower obesity rates. Breastfeeding is nature's way of providing a natural, healthy way to supply nutrients to newborns. Breast milk contains antibodies from the mother's body, which act as the newborn's first immunizations against diseases. It assures that an infant will have the potential to receive adequate growth and development (Canahuait & de Suarez, 2001). Besides offering the child nutrients, breastfeeding can also offer a mother protection from certain health-related issues. If the mother exclusively breastfeeds, she may not menstruate every month. Breastfeeding acts as a natural method of birth control, but like other forms of birth control, it is not 100 percent effective. According to the World Health Organization (WHO) (2009), breastfeeding may reduce the chance of breast and ovarian cancer in women and may help the new mother lose weight faster. Even armed with this knowledge, breastfeeding rates have remained relatively low in the United States.

According to Canahuati and de Suarez (2001), in the past, many highly developed cultures treated breastfeeding with respect. Now, however, industrialized countries are starting to view breastfeeding as difficult and unimportant. Mothers are reporting that there is a lack of cultural and social support towards breastfeeding in industrialized countries. Currently in the United States, many women are feeling that their rights and wishes are being threatened due to obscenity laws. Some states do not allow women to breastfeed in public due to obscenity statutes. In Minnesota, mothers are allowed to breastfeed in public or in a private area where it has been authorized for the mother to do so. North Dakota allows mothers to breastfeed in any authorized location (private or public). South Dakota

has no laws protecting mothers who breastfeed in public, but mothers are exempt from indecency laws. The mother/baby dyad is also threatened in the workplace due to the lack of consideration and support for breastfeeding mothers at work. Canahuati and de Suarez (2001) go on to say that the lack of support in highly developed cultures could potentially harm children and their families.

To fight against the lack of cultural and social support, several organizations were created. La Leche League International was created in the mid-1950s to provide breastfeeding information to mothers through experienced members of the organization. La Leche League has attempted to change how people see the practice of breastfeeding, but the journey has been arduous due to mixed beliefs about breastfeeding in the United States. The Ross Laboratories Mothers Survey (RLMS) started collecting data on the patterns of infant breastfeeding in the United States during the 1950s. Starting in the 1950s and 1960s, breastfeeding was steadily dropping and reached its lowest level in the 1970s. The levels then dramatically increased in the 1980s and dropped slightly in the 1990s. However, the RLMS shows that breastfeeding levels are increasing, but not at the rate desired by advocates (Ryan, Wenjun, and Acosta, 2002). The goal established by Healthy People 2020, which is sponsored by the United States Department of Health and Human Services, is to have 60.6 percent of infants being breastfed at 6 months. Of those infants born in 2006, 43.5 percent were breastfed at least once through 6 months; however, only 14.1 percent were exclusively breastfed through 6 months. In a 2009 study, only 2.9 percent of live births that were reported in 2007 occurred in facilities that offered lactation programs for new mothers (Healthy People 2020, 2011).

Internationally, breastfeeding is the number one choice for mothers, but in the United States, views on breastfeeding are impacting new mothers' decisions to breastfeed. Breastfeeding may be more popular internationally due to environmental and health related issues in those countries. There may be unclean water or formula is not available to mothers in third-world countries, so breastfeeding is strongly encouraged. With negative views on breastfeeding, many mothers decide not to breastfeed due to the tension it may create in their dual roles as mother and employee. Action has been taken to encourage mothers to breastfeed. WHO and United Nations Children's Fund (UNICEF) created a campaign, *Promotion, and Support of Breastfeeding: The Role of Maternity Hospitals*, in 1989 and from that campaign, the Baby Friendly Hospital Initiative (BFHI) was born.

To be a Baby Friendly hospital, a hospital that deals with women, children, and/or child-bearing families is required to complete ten steps to be certified (Canahuait & de Suarez, 2001). A study was done on the Baby Friendly hospitals in the United States and the researchers found that the breastfeeding initiation rate in 2001 was 83.8 percent. In the United States overall, the breastfeeding initiation rate was 69.5 percent in 2001. When comparing these two, one has to take into consideration that the Baby-Friendly hospital data came from hospital records and the overall United States data came from mail-in surveys (Merewood, Mehta, Chamberlain, Philipp, and Bauchner, 2005). Cattaneo and Buzzetti (2001) recommend that breastfeeding training be over three days and should be included in health care undergraduate courses. These researchers found that there was an improvement in lactation knowledge and in hospital practices. Data also showed that Baby-Friendly training led to an increase in breastfeeding rates (Cattaneo & Buzzetti, 2001).

New mothers commonly do not realize that their infants do not follow a feeding schedule the first few weeks. If a mother decides to breastfeed, she needs to understand that the baby will need to be with her more often for the first few weeks. Doctors recommend that mothers exclusively breastfeed their child until at least six months (Earle, 2002). WHO (2010) states that breastfeeding is *the* best source of nutrients for an infant under the age of six months. However, over two-thirds of new mothers living in the United States are not breastfeeding their infants at six months (WHO, 2010).

Health practitioners (pediatricians, nurses, etc.) who are encouraging mothers to breastfeed exclusively indicate that there are gaps in the breastfeeding knowledge that they received during college. With hospital stays shorter, doctors and nurses have to provide more consistent lactation advice in a much shorter period (Izatt, 1997). WHO recommends that nurses and other miscellaneous staff that work with women, children, and/or child-bearing families should have a minimum of 18 hours of breastfeeding education (Dodgson & Tarrant, 2007). Grossman and colleagues (2009) state that research on the impact of practitioner's education is exiguous and more research needs to be done to understand how practitioners are impacting the mother's decision to exclusively breastfeed. The key concern that is not well understood is the barriers that may impede the training process for health care practitioners. Limited information is available in the research literature regarding policies and practices within the health care community that impact lactation education. The extremely low number of lactation programs available for nurses is inconsistent with the value placed on lactation education by the U.S. Department of Health and Human Services in their 2020 Healthy People goal.

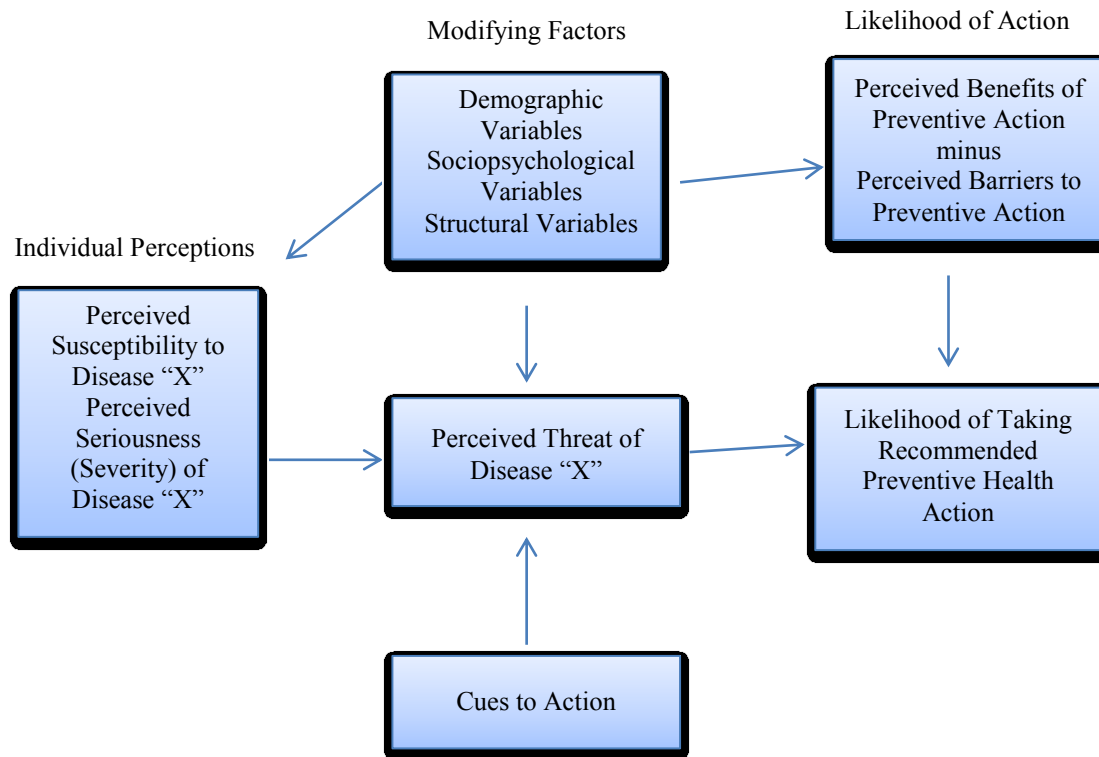
The purpose of this study was to explore this inconsistency. The focus was on the tri-state area of Minnesota, North Dakota, and South Dakota and examined the perception of nurses regarding lactation education. Specifically, the focus was on what factors were driving or impeding perceptions regarding the need for lactation education, especially among nurses who work with women, children, and child-bearing families. And, the relationship between perceptions and barriers and their influence on the actions of nurses with regard to lactation education was expanded on. A well-established theoretical model of health behavior known as the Health Belief Model was used to guide the research.

## LITERATURE REVIEW

### Health Belief Model

Research has shown that health education, in general, changes over time and is impacted by changes in views on health issues, like vaccines, heart disease, and cancer. There are many theories about health education, but the one that most applies to this research is a theory of change model called the Health Belief Model (HBM). The theory has been used to explain change in health-related behaviors and as a guide to create health-related interventions (Janz, Champion, and Strecher, 2002). HBM has been used to predict how patients will act when presented with preventive health information. In addition, HBM has been used to understand noncompliance behavior when a person learns about a health condition. The valuable framework of HBM has been used by public health programs as a guide to market preventive health behaviors to communities (D'Souza, Zyngier, Robinson, Schlotterlein, and Sullivan-Mort, 2011). Similarly, HBM has been used by the larger medical community as the foundation for implementing health programs including cardiac rehabilitation, mammograms, and public vaccinations. The leading promise behind the theory is that if a person perceives him/herself at risk of developing a health condition, the person will take action to prevent the condition (Janz et al., 2002).

HBM has five key components: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. Figure 1 shows the relationship between individual perceptions, modifying factors and the likelihood of action. These three categories contain the five components that are important to the HBM.



*Figure 1.* Health Belief Model Components. Sociopsychological variables include: personality, social class, peer pressure, etc. Structural variables include: knowledge about the disease, prior exposure to the disease.

The first category (individual perceptions) contains the first two components of the HBM. The first perception component, perceived susceptibility, is an attitude an individual holds when they think they are at risk to a condition (e.g., contracting a virus or inheriting a disease) (Janz et al., 2002). Carpenter (2010) argues that a person will feel compelled to act if they believe that they are susceptible to a condition. The second perception component, perceived severity, reflects the seriousness a person attaches to the condition (e.g., consequences of contracting the virus or disease) (Janz et al., 2002). Carpenter (2010) argues that there is a direct correlation between a person’s perceived severity of a condition and their willingness to act to avoid that condition. For example, if a person has experienced bad consequences from the flu, that individual is more likely to get a flu shot



to avoid the condition. An individual will perceive an action as beneficial if it is believed to reduce the risk or seriousness of the condition (e.g., disease or virus). Thus, in the previous example, those who receive flu shots view them as beneficial. In short, a person will assess the benefits of specific actions. That person will use this assessment to contrast it with the next component of the HBM theory, perceived threats. Perceived threats are one component under the second major category of the model labeled modifying factors.

Modifying factors can be categorized into three main components. The first is perceived threats of a condition or disease. An individual will perceive a threat when they feel that there are social or medical consequences to the seriousness of leaving a health condition untreated. These consequences could be pain, effects on family life and work, and expensive medical costs. The individual will perceive a health condition as threatening when perceived susceptibility and perceived severity (individual perceptions) are combined (Janz et al., 2002).

Perceived threats also are influenced by contextual variables such as demographics, sociopsychological, and structural. These contextual variables represent the second main category of modifying factors within the HBM. Age, sex, and ethnicity are a few demographic variables that may impact how the individual will perceive a health condition. Sociopsychological variables could include: an individual's personality, social class, and peer pressure to take action (or not) against a health condition. Poorer communities will have less access to information about the perceived threat of a health condition and these individuals may not see the health condition as threatening. Structural variables would include the information/knowledge that is available to a community about the health condition. It can also include prior exposure to the health condition which may encourage

an individual to see the health condition as threatening if they have seen what the condition can do to a person (Janz, et al., 2002).

Finally, perceived threats are influenced by cues to action, the last category under modifying factors within the HBM. Cues to action are the strategies used to promote awareness of the health condition and information provided on how to avoid the health condition. Cues to action can be difficult to study because cues could be as easy as walking by a poster or sitting near someone who is coughing (Janz et al., 2002).

The final category within the HBM is likelihood of action. There are two main components within this category. First, the relationship between barriers and benefits. One can view this as cost-benefits analysis conducted by each individual when they are deciding whether to take action in regard to a health condition. Barriers are considered when the individual weighs the costs and benefits of a certain health behavioral action (Janz et al., 2002). A cost refers to the barriers that the individual will have to overcome to follow through with the action. These can include financial expenditures (Rosenstock, Strecher, and Becker, 1988). For an individual to change their behavioral patterns, the individual must see their current behavior as unsatisfactory and believe that they must perform an action to overcome the perceived threat and barriers of a certain health condition (Janz et al., 2002). If the cost seems too high or the barriers are perceived to be too great to overcome, then the person will likely discontinue with or avoid the preventative health behavior (Carpenter, 2010).

Janz and colleagues' research (2002) demonstrate that perceived barriers are “the most powerful single predictor” (p. 52) of how an individual responds to a threatening

health condition. For an individual to take action, a decision will be made after weighing the costs and benefits. Perceived benefits were the second strongest predictor (Janz et al., 2002). The relationship between perceived severity and the likelihood of taking action against a health condition is relatively low. This finding helps explain why various health promotion initiatives often fail. For example, showing the lung damage created by smoking is typically not persuasive in getting smokers to stop smoking. The severity of inaction is not a compelling motivator. This is also the case for seat belts or helmet use. Showing the results (severity) of car or motorcycle crashes is not a good motivator to change health behavior. Perceived susceptibility's relationship with health behavior was also shown to be low (Carpenter, 2010). This also demonstrates why changing health behavior for those most at-risk is very difficult because they do not view susceptibility as highly motivating. This is often referred to as the "it will not happen to me" phenomenon.

The end component of the HBM is the actual likelihood of a person to take action in regard to a health condition. As noted in the model diagram, this is influenced by the cost-benefits analysis the individual undertakes as well as the perceived threat of the health condition.

### Health Education over Time

Throughout our nation's history, "education has been an essential component of action to promote health and prevent disease" (Nutbeam, 2000, p. 259). However, several researchers believe that health education alone is not enough to accomplish key health behavior goals. Lifestyles, health services, surrounding environments, and health literacy also play a role in accomplishing key health behavior goals. It is not enough to just educate the public about a preventive health behavior. Health promoters need to consider the

community's social and health environments, the lifestyles of community members, and where the community members are in their health literacy knowledge (Nutbeam, 2000). According to WHO, health literacy is important when empowering the public (Nutbeam, 2000). Health literacy is not just reading material for the general public; it is the cognitive and social skills that determine how motivated a person is to maintain preventive health behaviors and how to use health information to stay healthy (Nutbeam, 2000).

Nurses have the potential to influence how the general public views breastfeeding through consistent and correct lactation counseling (Izatt, 1997). Izatt (1997) conducted a study over a 3 month period at a community hospital located in a Boston suburb. In this study, mothers who were attempting to breastfeed at 24 hours after birth were identified and 111 mothers completed a questionnaire about the information offered to them by health care providers during prenatal and postpartum appointments. The study showed that nurses provided breastfeeding information to 87 percent of the mothers in the study. Twenty-seven to 33 percent of mothers received breastfeeding information postpartum from an obstetrician or a pediatrician. Izatt (1997) suggests that to increase breastfeeding rates and to meet the Healthy People's breastfeeding goals, prenatal and postpartum counseling should support mothers from the beginning and encourage the continuation of breastfeeding. Watkins and Dodgson (2010) compiled fourteen articles that focused on breastfeeding and increasing knowledge and support in nurses and reviewed them for commonalities and contradictions. The synthesis revealed that mothers reported that their health care professional(s) were lacking in lactation knowledge (Watkins & Dodgson, 2010). This claim reinforces the need for more research on the effectiveness of lactation education for health professionals.

A disturbing finding by Grossman and colleagues (2009) reveals that some textbooks used in nursing school are using incorrect or outdated information and this is leading to the need for nurses to seek additional sources of information. To understand why the information was outdated or incorrect, Philipp, McMahon, Davies, Santos, and Jean-Marie (2007) analyzed six nursing textbooks published between 1999 and 2006. The textbooks were scored using a standardized evaluation sheet that used breastfeeding criteria from the American Academy of Pediatrics (AAP) and the World Health Organization (WHO). The findings indicate current evidence-based gold standards are not consistently used in all nursing textbooks. Nursing textbooks use different standards and breastfeeding recommendations change over the years. One nursing school may use older textbooks that use older breastfeeding standards while another nursing school might be using the most recent evidence-based information.

Similarly, Watkins and Dodgson (2010) found through their synthesis of fourteen research articles that mothers report that they feel nurses are not confident about their breastfeeding knowledge and this can lead to confusing information for the mothers. Libbus (1994) states that one reason for the lack of encouragement of breastfeeding in American society is the increased emphasis of individual choice given to patients. Nurses are balancing the respect for patient's autonomy with the desire to promote best health practices. Even though nurses agree that breastfeeding is best, it is believed that some nurses do not encourage breastfeeding because the nurse is concerned that it will prompt guilt in the mother if she does not breastfeed.

DiGirolamo, Grummer-Strawn, and Fein (2003) conducted a study using data from a longitudinal study of expectant mothers and new mothers with a total sample of 1620

mothers. This longitudinal mail survey was conducted by the U.S. Food and Drug Administration. DiGirolamo and colleagues (2003) found that 61 percent of physicians and 42 percent of hospital staff were not perceived by mothers as showing a preference for a specific feeding method. Discrepancy between physicians and hospital staff is creating confusion and heightening the need for clarity and consensus in policy. The lack of information among hospital staff suggests policy preferences by medical institutions may be ambiguous thereby creating barriers for nurses. More research on the barriers to providing breastfeeding support by nurses may offer valuable insight into this discrepancy. DiGirolamo and colleagues (2003) argue that hospital staff including nurses are important to breastfeeding support and that there should be measures taken to reduce barriers to lactation education.

Lactation education, however, is not enough to encourage mothers to breastfeed. Research has shown that a positive attitude in nurses towards breastfeeding support for mothers makes a difference as well (Ekstrom, Matthiesen, Widstrom, and Nissen, 2005). In a study conducted by Ekstrom and colleagues (2005), 168 health care professionals including nurses living in the southwest part of Sweden participated in a study designed to create an instrument that would assess nurses and midwives' attitudes towards breastfeeding. The study's results showed that nurses who state that they have a positive attitude toward breastfeeding are able to promote breastfeeding better than nurses who have negative attitudes (Ekstrom et al., 2005). If a mother shows interest in breastfeeding, a nurse, who has a keen interest in promoting breastfeeding and believes that breastfeeding is best, should be the one to offer support and guidance to that mother.

## Training Programs

To increase the rates of exclusive breastfeeding among mothers, Rea, Venancio, Martines, and Savage (1999) suggest that people start considering using lactation consultants or counselors. A counselor does not tell the mother what to do; instead, counselors offer breastfeeding information and help the mother decide what works for her. Empowering the mother will help her feel that the final decision is up to her and if she decides to breastfeed, the counselor will guide her throughout the breastfeeding journey. An evaluation of a 5-6 day training course for breastfeeding counselors revealed that as a result of the course, mid-level health workers showed a statistically significant increase in breastfeeding knowledge (Rea et al., 1999).

Researchers from Sweden (Ekstrom, Widstrom, and Nissen, 2006) were interested in how mothers perceived breastfeeding support when the nurses and midwives were well-trained in breastfeeding counseling. They randomized ten municipalities located in southwest Sweden into either an intervention or control group. The nurses and midwives who were in the intervention municipality received a process-orientated training in breastfeeding counseling. Questionnaires were handed out to mothers, who were in an antenatal center or child health center located in the municipalities, and 540 mothers responded. The questionnaire asked about the support mothers received from nurses and midwives and the family classes in which the mothers were enrolled. During and after pregnancy, mothers reported that they received better breastfeeding information from the nurses and midwives who were part of the intervention group. Nine months after the birth of the child, the mothers involved in the intervention group knew significantly more about

where to seek breastfeeding information and were more satisfied with the information they did receive than women who were part of the control group.

Nurses, who work in a Neonatal Intensive Care Unit (NICU), have the most constant contact with the mother and child during the child's hospitalization relative to any other health professional. Bernaix, Schmidt, Arrizola, Iovinelli, and Medina-Poelinez (2008) state that if any intervention should be implemented it should focus on nurses who deal the most with mothers and infants. These researchers studied the long term effect of the implementation of an educational intervention geared towards nurses who work in the NICU. A convenience sample was used and 64 NICU nurses located in a Midwestern children's hospital participated in the study. Mothers with high-risk infants were also studied and 19 mothers were involved in the first sample and 13 mothers were part of the second sample. The intervention focused on improving lactation knowledge and being supportive of breastfeeding through a time-series pretest/posttest controlled study (Bernaix et al., 2008). A 4-hour intervention program was included in the study with empowerment tactics to motivate the nurses to encourage breastfeeding to mothers. The results showed that the intervention program was effective. Nurses showed an increase in breastfeeding knowledge and an improvement in breastfeeding attitudes and beliefs (Bernaix et al., 2008).

A three day course, "Breastfeeding: Recent Advances," was created by the Department of Obstetrics and Gynecology and the Catholic University of Chile, Santiago. The course was supported by the Institute for Reproductive Health and it served as an element of a research study by Valdes, Pugin, Labbok, Perez, Catalan, Aravena, and Adler (1995). The course was offered to 360 health professionals including nurses to update their



breastfeeding knowledge and program approaches to lactation education. They studied the impact that the course had on health professionals and they found encouraging results. A questionnaire was sent out two years later to all participants with known addresses with 62 participants responding. A stratified systematic sample was conducted and 38 additional participants were contacted via the telephone, resulting in a total sample size of 100 participants. The results indicate that 69 percent of health professionals made changes to their clinical practice after attending the course and 49 percent of these professionals stressed breastfeeding to mothers. However, only seven percent encouraged mothers, after taking the course, to exclusively breastfeed for the recommended six months. The questionnaire in the study done by Valdes and her colleagues (1995) was not able to fully explore the attitudes and reasons why only seven percent of nurses encouraged mothers to exclusively breastfeed. Nonetheless, the study did show that attitudes were somewhat impacted by the three day course.

Another course, Project Help (Hospital Education in Lactation Practices) was implemented at four Massachusetts hospitals with low breastfeeding rates. The course was offered at least twice to each hospital. Researchers conducted pre- and post-tests to analyze any changes in breastfeeding initiation based on whether the professional was educated in lactation skills. Researchers found that there was an increase in breastfeeding initiation at three of the four hospitals after the course was implemented; however, in only one of the three hospitals was the increase in breastfeeding initiation statistically significant. These studies demonstrate that health education by itself increases breastfeeding initiation in a hospital setting (Grossman et al., 2009).

## Public Health and Economics

Nurse administered public health interventions are known to promote positive health behaviors. Breastfeeding is seen as a health promotion program and many funders require documentation of the cost-effectiveness of the program. Currently, health intervention programs struggle to get funding until they can prove that it is cost-effective. Nurses involved in health intervention programs are key individuals in transmitting information about the benefits of the health intervention in question. Breastfeeding intervention programs are great examples of where nurses play a key role in teaching the mother proper breastfeeding techniques and the benefits of breastfeeding for both mother and child. What breastfeeding promoters have to be conscious of is that there are direct and indirect economic effects of a breastfeeding program. Direct effects include: medical care of the mother during breastfeeding; medical care for the child; and taking time off of work to breastfeed/pump. Indirect effects include: funding public health agencies breastfeeding programs; breastfeeding promotion activities; providing space for breastfeeding/pumping; and health systems having to pay medical care expenses (Frick, Milligan, White, Serwint, and Pugh, 2005).

Currently, taxpayers are paying for baby formula for mothers and infants involved in WIC (Women, Infants, and Children) and Medicaid. If more mothers were to breastfeed, there would be fewer taxpayer dollars spent on baby formula and breastfeeding promotion. Breastfeeding can result in lower medical expenses for the mother and child (Frick et al., 2005).

## Hospital Policies

Breastfeeding has emerged as a public health priority and hospitals are attempting to implement policies that encourage breastfeeding. Managnaro, Marseglia, Mami, Paolata, Gargano, Mondello, Puliafito, and Gemelli (2008) state that rates of initiation and duration of breastfeeding may be impacted by hospital policies and practices. This study was conducted at an Immunization Centre in Messina, Italy and a structured questionnaire was used. Each mother who used this facility was asked to participate and upon consent, each mother was interviewed. In total, 1010 mother-infant pairs were interviewed. The study revealed a causal link between hospital practices/policies and breastfeeding initiation and duration. This link, however, means that hospital and staff need to be fully integrated with regard to the policy. Thus, the success of hospitals and other health facilities who adopt breastfeeding initiatives is a function of the support level of medical and nursing staff, and their willingness to implement the initiative (Wright, Rice, and Wells, 1996). This means that board members and health professionals including nurses need to be part of the decision making process to bring about change.

The intent of this study was to advance the understanding of health beliefs related to lactation education barriers. The research literature is clear that education training of nurses is central to improving the participation rates of new mothers who breastfeed. The research literature also provides compelling evidence that significant barriers exist that prevent nurses from obtaining lactation education and certification. The relationship between perceptions of lactation education among nurses and what motivates or impedes their willingness to obtain lactation education was explored. The HBM was used as a theoretical perspective to guide the research. The HBM model was adapted to focus specifically on the

linkage between perceptions and actions and what factors modify that relationship. The modified HBM model is shown in Figure 2. It consists of the three categories, modifying factors, individual perceptions, and likelihood of action.

The adapted model suggests that modifying factors will directly impact how nurses perceive breastfeeding and the need for lactation education. These perceptions serve as the basis for their willingness to take action with regard to obtaining lactation education. However, the likelihood of taking action is a function of the barriers that need to be overcome. Perceived threats from the original HBM were not included in the modified model because the survey used in this study did not ask nurses about the perceived threat of mothers not breastfeeding.

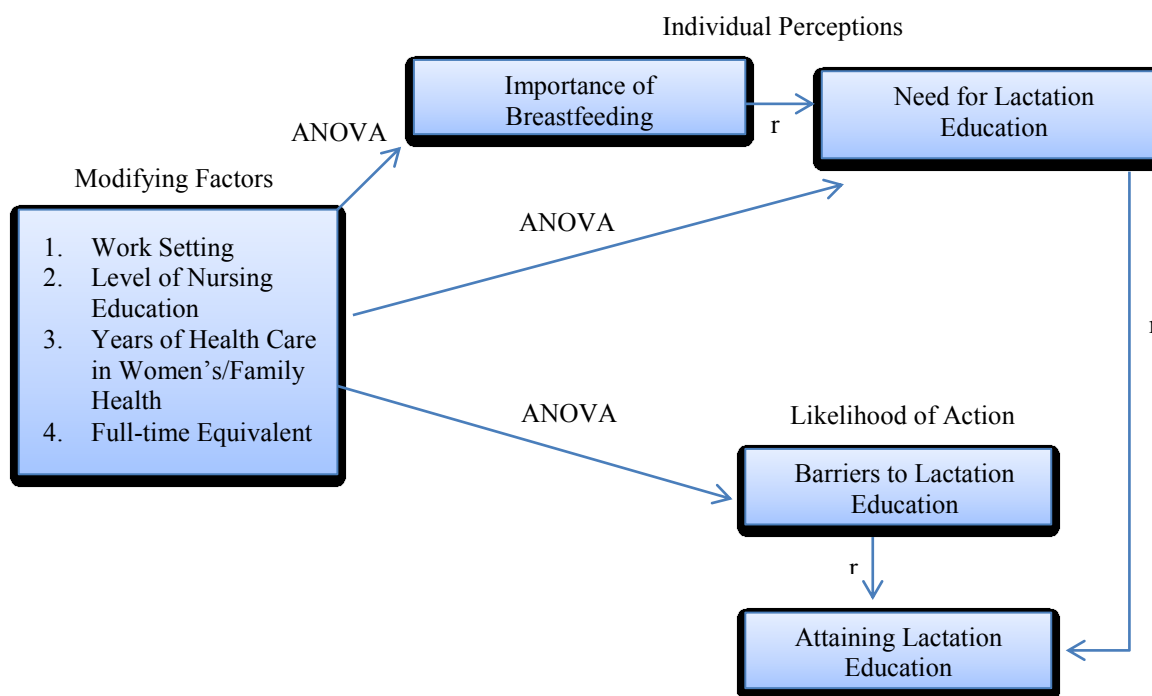


Figure 2. Modified Health Belief Model Components

The literature suggests that barriers to achieving lactation education include the availability of training programs which currently are not adequate to address the need for

comprehensive information about breastfeeding. Nurses state that breastfeeding is important, but that they lack the means and perhaps opportunity of obtaining lactation education. This study specifically focused on nurses and was restricted to the tri-state area of Minnesota, North Dakota, and South Dakota.

The center element and beginning point of the modified model is the characteristics of the nurses, including the environment in which they practice. These are referred to as modifying factors which influence the individual perceptions and the likelihood that nurses will take action. For example, the modified HBM suggests that nurses' perceptions of the need for lactation education would be directly related to their characteristics. Therefore, the level of nursing education and years of being in the health care field should increase their view of the importance of breastfeeding. Similarly, nurses who work in different health care settings and have different employment status (e.g., full-time, part-time, or casual) should feel differently about breastfeeding. Also, the characteristics of nurses (modifying factors) should be directly related to the barriers they perceive impeding their opportunity to attain lactation education. This study tested these assumptions and provided insight into the relationship between barriers and nurses actions to obtaining lactation education. This knowledge can be used by future policy makers and researchers to better equip nurses and the medical community to overcome these barriers.

## METHODOLOGY

### Study Design

The data set that was used in this study was from a needs assessment of lactation education that was conducted in the tri-state area of Minnesota, North Dakota, and South Dakota. The Minnesota Department of Health Statewide Health Improvement Program awarded a grant to Otter Tail County Public Health to conduct a study on lactation education. The purpose of the study was to determine if there was a need for lactation education programs in the tri-state area. A probability sample of nurses was obtained using a two tier stratified sampling process. The questionnaire was divided into three main parts and gathered information regarding attitudes, perceptions, and barriers pertaining to lactation education.

The survey was designed and implemented by staff of the North Dakota State Data Center (NDSDC) with the help of nurses, including Marian Kershner from Otter Tail County Public Health. The sampling frame was developed in two stages. First, a complete list of the tri-state areas hospitals, clinics, and public health facilities was compiled using health directories, web sources, and lists from hospital associations. The sampling frame was narrowed to those facilities that were more likely to employ nurses that worked with women, children, and child-bearing families. Hospitals, clinics, and public health settings were included in the list if they had OB-GYN units or indicated in some way that women, children and child-bearing families were a particular focus of the facility. Since a lactation education training program was being considered in the Fargo/Moorhead (F/M) area, distance to Fargo/Moorhead was an important element of the study. Thus, the sampling

frame was divided into three tiers. Tier One included all health care settings within a 150 mile radius from the Fargo/Moorhead (F/M) area. Tier Two included all health care settings that were within a radius of approximately 151-280 miles from the F/M area and the third tier included all facilities outside a radius of 280 miles but within the tri-state area. The second stage of the sampling design centered on randomly selecting hospitals, clinics, and public health settings within each tier through a simple random sampling process.

A packet of surveys was mailed in December 2010 to nursing supervisors at each of the health care settings picked in the random selection process. The nursing supervisor was asked to distribute the surveys to nurses in their facilities, who were currently working with women, children, and child-bearing families. The number of beds in each health care setting was used to determine the number of surveys in the packets each facility received. The national estimate of 1.5 nurses per bed was used as the initial threshold. Next, the national average of 19 percent of all nurses are OB/GYN nurses and was used as an estimate of the total nursing sample of interest for the survey. If the number of beds was not reported, a ratio of 10 physicians to 3 nurses was used as a proxy and is based on data from the American Medical Association. Each state received approximately one-third of the total surveys sent out to the three states. In Minnesota, 255 surveys were mailed to nurses in 34 hospitals/clinics. In North Dakota, 230 surveys were mailed to 13 hospitals/clinics and 230 surveys were mailed to 20 hospitals/clinics in South Dakota.

The sampling design for public health nurses was different because of their smaller numbers. Survey packets containing 2-3 surveys were sent to each of the state's county public health units encompassing 201 counties. The accompanying cover letter in each packet requested that the surveys be distributed to nurses who worked with women,

children, and child-bearing families. Anonymity of respondents was maintained by not asking for names or personal addresses. Once the nurses had completed the surveys, they were requested to mail back the survey in the enclosed postage-paid return envelope that was included with each survey packet. A total of 1,074 surveys were mailed to nurses with a response rate of 27 percent or 290 useable surveys. This provided a probability sample of nurses with a confidence interval of 95 percent and error rate below 5 percent.

### Analysis

A modified form of the Health Belief Model (HBM) served as the guide to analyzing nurses' opinions about lactation education and what influenced nurses' actions to obtain lactation education. The hypothesis was that the modifying factors (work setting, level of nursing education, years of health care experience, full-time employment) would influence the nurse's attitudes and perceptions of the importance of breastfeeding which would lead to an appreciation of the need for lactation education, thus driving their desire to obtain that education. The modified HBM model also suggested that attainment of lactation education would be inversely correlated with barriers to breastfeeding and lactation education. Thus, the likelihood that the nurse would take action to get lactation education would be influenced by the perceived magnitude of the number of barriers. Similarly, as the modifying factors increase, the likelihood that the nurse would perceive breastfeeding as important would also increase and that would increase the perception that lactation education opportunities were needed in their communities. Finally, as the modifying factors increased the likelihood that the nurse would take action in addressing the barriers also would increase and improve the likelihood the nurse would attain lactation education. The value in exploring the impact of modifying factors (work setting, level of



nursing education, years of health care experience in a women's/family health care facility, and full-time employment) was driven by the literature which demonstrated that there is a lack of consistent and reliable information in nursing school regarding the importance of breastfeeding. This was reinforced by research that shows the economic benefits of promoting exclusive breastfeeding.

There are three main components to the modified Health Belief Model. The first is labeled modifying factors which are the independent variables and they measure the characteristics of the nurses. In short, background characteristics of the nurse should influence his/her perceptions. Four main characteristics were used in the analysis. The first labeled, work setting, referred to the work setting of the nurse. Work setting was organized into three categories based on the type of health care facility. The response categories of community/public health and WIC were combined into the first category which was labeled public health care. Next, the response categories of hospital and clinic were combined into the second category which was labeled private health care. The third category was the response category "other." The second characteristic that was identified was nursing education. In this study, the focus was on five levels of nursing education. The first was a Licensed Practical Nurse (LPN). To be licensed as a LPN, an individual needs to complete a 1 to 2 year practical nursing program. The next two levels were Registered Nurses (RN), which are more specialized and receive more in-depth education. There were two levels of RNs used in this study: a 2-year RN and a 4-year RN. A 2-year RN has received a license in nursing or an associate degree and a 4-year RN has earned a baccalaureate degree in nursing. The fourth level was a master's degree in nursing. A nurse with a master's degree has more options to specialize. The fifth level was a Ph.D. in

nursing or a Doctor of Nursing Practice (DNP). Nurses with a Ph.D./DNP are able to conduct research. For this study, the levels of nursing education were considered a categorical variable with five options; 1) LPN, 2) 2-year RN, 3) 4-year RN, 4) Masters/Ph.D., and 5) other. The third characteristic identified to the number of years that the nurse has worked with women, children, and/or child-bearing families as a health care professional. It had five response categories, 1) less than 5 years, 2) 5 to 9 years, 3) 10 to 14 years, 4) 15 to 19 years, and 5) 20 years or more. The final characteristic identified the working status of the nurse. This was a categorical variable with three response types, 1) full-time, 2) part-time, and 3) PRN/casual, which is the category for flexible hours. Nurses were asked to classify themselves based on their last two-week pay period.

The dependent variables correspond to the two remaining components of the modified HBM. They were the individual perceptions and likelihood of action. In the analysis, the first topic of interest was how nurses viewed breastfeeding, specifically, how important they believed it was. A question on the survey was used that asked nurses to rank “how important is breastfeeding” using a Likert scale from 1 to 5 with 1 being “not at all important” and 5 being “very important.” This was viewed as a continuous measure, thus the relationship was analyzed between the nurse’s characteristics, the modifying factors, and perceived importance of breastfeeding using Analysis of Variance (ANOVA). Next, the modified HBM indicated that perceived importance of breastfeeding would be positively correlated with perceived need for lactation education. This assumption was tested by using a question on the survey that asked nurses to rate the level of need of lactation education opportunities for nurses and other health care providers. This question on the survey also used a Likert scale with 1 being “very low” and 5 being “very high.”

Once again, this was viewed as a continuous measure, thus Spearman's correlation coefficient was used to measure the relationship between perceived importance and perceived need for lactation education. Spearman's correlation coefficient was appropriate for this analysis because it was designed to adjust for categorical variables that are viewed as continuous measures such as Likert scales.

The third component of the modified HBM was likelihood of action. The model indicated that the motivation for a nurse to obtain lactation education would be influenced by the characteristics of the nurse (modifying factors) and by the nurse's perceptions of the need for lactation education. However, perceived barriers to receiving lactation education and one's ability to overcome those barriers would ultimately influence the nurse's course of action. Thus, three analyses were performed to test this component of the model.

The first analysis examined if the level of perceived barriers influenced a nurse's action with regard to getting lactation education. A question on the survey was used that asked about the barriers to lactation education that exist for nurses in the tri-state area. There were 14 options the nurse could select. A few of the options included: distance, course offerings are too expensive, and lack of support from administration. Nurses were asked to select all of the barriers that applied. A continuous measure was created for these fourteen response categories by simply counting the number of barriers each nurse identified. The assumption was that the greater the number of barriers identified, the less likely the nurse would perceive their ability to overcome those barriers, thereby, reducing the amount of lactation education they received. The amount of lactation education a nurse received was measured by a series of questions from the survey. One question from the survey asked about lactation consultant certification. If the individual answered that they

were currently obtaining or had lactation education in the past 2 years, the participant was asked about how their lactation courses were taught. The courses could have been taken as self-paced or as an instructor-led seminar in a classroom or online. If the participant stated that the training course was self-paced, the participant was asked to select from a list of six options for the total number of contact hours. The options were: 0 to 4 hours, 5 to 9 hours, 10 to 14 hours, 15 to 19 hours, 20 hours or more and other. Now, if the course was instructor-led, a seminar in a classroom, or online, the participants were asked to select from a list of eight options about the number of days the course lasted. The eight options were: 1 hour, series of 1 hour sessions, 1 day, 2 days, 3 days, 4 days, 5 days, and other. A separate analysis was performed for the self-paced vs. instructor-led training. However, each was viewed as a continuous measure and Spearman's correlation coefficient was used to measure the relationship.

Next, the relationship between perceived need for lactation education and nurse's action in obtaining lactation education was measured. The modified model suggested that these two measures would be positively correlated. Spearman's correlation coefficient was used to test this assumption.

Finally, the relationship between nurse's characteristics (modifying factors) and perceived barriers was explored. ANOVA was used for this analysis.

### Methodological Issues

When using secondary data, several methodological issues can arise. One is using survey data that was not originally designed for the research under consideration. Using a survey from a previous study can limit the information and/or questions that the researcher

wants to answer. This is the case for this study. However, the survey used in this study was sufficiently detailed to provide important insight into the research questions and help advance the literature for nurses, hospital administrators, and policy makers.

An important methodological issue of concern when using secondary data sources is that the information may be outdated and may not reflect the current conditions. However, since the North Dakota State Data Center conducted the original research study between 2010 and 2011, the data are still very timely and reflect current breastfeeding attitudes and lactation education needs in the tri-state area. A second important value of secondary data sources is that they are cost effective and time savers. The main reason that secondary data was used for this study was to save on expenses.

### Ethical Issues

To ensure that all participants were treated equally and ethically, this study went through and was approved by North Dakota State University's Institutional Review Board (IRB). With each survey, a cover letter was attached and stated that the survey was voluntary and the participants could stop at any time. Each letter informed the participants that the results would be reported in aggregate form.

Anonymity and confidentiality are important in any research study. In this specific research study, anonymity was safeguarded by not asking for personal information (i.e., name and address). If any of the participants wrote any personal information, the statement was not used in the analysis. In this study, only the work setting and state were recorded and used in the analysis.

Data security is an issue when using secondary data. All files that pertained to this study were placed in a secure file with access limited to the researcher and staff. All other files on personal computers that were used in this study were locked. This ensured that the data was only accessible to the researcher and staff.

## RESULTS

Using the Health Belief Model (HBM) as the guiding theory, it was hypothesized that the modifying factors (work setting, level of nursing education, years of health care experience, full-time equivalent employment) would influence the nurse's attitudes and perceptions of the importance of breastfeeding which would lead to an appreciation of the need for lactation education, thus driving their desire to obtain that education. This theory was tested by using a random sample of nurses in the tri-state area of Minnesota, North Dakota, and South Dakota obtained from a survey conducted in December of 2010. Out of 1,074 distributed surveys, 290 useable questionnaires were returned, which resulted in a 27 percent response rate. The distribution of responses was: 128 from Minnesota, 90 from North Dakota, and 72 from South Dakota. The return rate resulted in an error rate for the sample of below 5 percent with a confidence interval of 95 percent. A quick summary of the characteristics of the nurses revealed that most nurses stated that they work at a private health care facility (N=181). Based on level of nursing education, more nurses had a 4-year Registered Nurse (RN) degree than any other level of education (N=139) and only seven nurses stated that they had a masters/Ph.D. degree. The majority of the nurses stated that they had 20 or more years of experience in women's/family health care (N=96). Out of the 290 completed surveys, 216 nurses stated that they work full-time (See Appendix A for tables).

To test the theory, first the relationship was examined between the nurse's characteristics (modifying factors) and the nurse's perception of the importance of breastfeeding using ANOVA. As shown in Table 1, the two modifying factors that were significantly related to nurse's perceptions of the importance of breastfeeding were work

setting ( $F(2, 276)=6.222, p<.05$ ) and level of nursing education ( $F(4, 275)=2.476, p<.05$ ). Post Hoc tests were conducted to examine if any of the pairwise comparisons among the different responses within either work setting (i.e., public health care, private health care, or other) or education level (i.e., LPN, 2-year RN, 4-year RN, masters/Ph.D., or other) were significantly different using Tukey HSD since there was equal variance by work setting ( $p<.01$ ) and education level ( $p<.05$ ). The only significant difference in perception by work setting was between nurses who worked in public health care settings (community/public health facilities and WIC) who viewed breastfeeding as slightly more important ( $M=4.79$ ) compared to nurses who work in private health care (hospitals and clinics) ( $M=4.51$ ). The results indicate that nurses in community health care settings view the importance of breastfeeding at a higher level than those in hospitals or clinics. Overall, nurses viewed breastfeeding as very important with an average ranking of 4.61 on a scale from 1 to 5 with 1 being “not at all important” and 5 being “very important.” The only significant difference by education level was between a 4-year Registered Nurse (RN) ( $M=4.72$ ) and a LPN ( $M=4.38$ ). This means that RNs with a 4-year degree viewed the importance of breastfeeding at a higher level than those with a 2-year degree. There were no significant differences between the importance of breastfeeding and the number of years of working in women’s/family health care or full-time equivalent employment.



Table 1

*ANOVA Significance Tests: Importance of Breastfeeding by Modifying Factors*

Modifying Factors	N	Mean	F	Sig.
Work setting				
Public health care	100	*4.79	6.222	0.002
Private health care	174	*4.51		
Other	5	4.60		
Total	279	4.61		
Level of nursing education				
LPN	39	*4.38	2.476	0.045
2-year RN	82	4.56		
4-year RN	134	*4.72		
Masters/Ph.D.	7	4.57		
Other	18	4.56		
Total	280	4.61		
Years of health care in women's/family health				
Less than 5 years	55	4.64	0.653	0.626
5 to 9 years	68	4.66		
10 to 14 years	31	4.71		
15 to 19 years	33	4.61		
20 years or more	92	4.53		
Total	279	4.61		
Full-time equivalent				
Full-time	210	4.59	1.524	0.220
Part-time	63	4.65		
PRN/casual	7	5.00		
Total	280	4.61		

Significance at  $\alpha=0.05$ ; \*Significant pairwise comparisons at  $\alpha=0.05$

It was hypothesized that if nurses believed that breastfeeding was important it would lead to an appreciation of the need for lactation education opportunities. Therefore, the second series of analyses examined the relationship between the modifying factors and an appreciation of the need for lactation education. Once again ANOVA was used to test if the modifying factors were related to a perceived need for lactation education. As shown in Table 2, the only modifying factor that showed a significant relationship was work setting ( $F(2, 283)=4.242, p<.05$ ). A Post Hoc test was run using the Dunnett test because unequal variance was determined. A significant relationship was found between nurses who work in

public (M=4.08) and private (M=3.74) health care facilities. Nurses in the public setting perceived a great need for lactation education compared to nurses in the private setting. No significant relationship was found between the nurse's perception of the need for lactation education and the other modifying factors, level of nursing education, years of health care in women's/family health, and full-time equivalent employment.

Table 2

*ANOVA Significance Tests: Need for Lactation Education Opportunities by Modifying Factors*

Modifying Factors	N	Mean	F	Sig.
Work setting				
Public health care	102	*4.08	4.242	0.015
Private health care	179	*3.74		
Other	5	4.40		
Total	286	3.87		
Level of nursing education				
LPN	40	3.70	1.222	0.302
2-year RN	84	3.85		
4-year RN	139	3.96		
Masters/Ph.D.	7	4.29		
Other	16	3.56		
Total	286	3.88		
Years of health care in women's/family health				
Less than 5 years	55	3.91	1.314	0.265
5 to 9 years	69	3.86		
10 to 14 years	31	4.26		
15 to 19 years	34	3.85		
20 years or more	96	3.78		
Total	285	3.88		
Full-time equivalent				
Full-time	215	3.88	1.279	0.280
Part-time	64	3.94		
PRN/casual	7	3.29		
Total	286	3.88		

Significance at  $\alpha=0.05$ ; \*Significance pairwise comparison at  $\alpha=0.05$

Spearman's correlation coefficient test was used to examine the relationship between the likelihood that the nurse perceived breastfeeding as important and the

perception that lactation education was needed. The likelihood that the nurse perceived breastfeeding as important was found to be significant and positively correlated to the perceived need for lactation education ( $\rho(278)=.304, p=.000$ ). Thus, the more nurses' perceived breastfeeding to be important the more the lactation education they perceived was important. However, that relationship was only moderate.

Next, the relationship was explored between perceived need for lactation education and nurse's action in obtaining lactation education again using Spearman's correlation coefficient. The perceived need for lactation education was found to not be significantly related to their action in obtaining lactation education through self-paced courses ( $\rho(24)=.201, p=.173$ ). Similarly, the perceived need for lactation education was not significantly related to the nurse's action in obtaining lactation education from instructor-led courses ( $\rho(71)=.098, p=.207$ ).

Spearman's correlation coefficient was used to examine the relationship between obtaining lactation education and perceived barriers to obtaining lactation education. The modified HBM model suggested that attaining lactation education would be inversely correlated with barriers to breastfeeding and lactation education. The relationship with self-paced lactation education and perceived barriers was not significant ( $\rho(24)=.267, p=.103$ ). The relationship between instructor-led lactation education courses and perceived barriers also was not significant ( $\rho(72)=-.045, p=.354$ ). More private health nurses took self-paced lactation education courses ( $n=19$ ) than did public health care nurses ( $n=8$ ). However, more public health care nurses took instructor-led lactation education courses ( $n=68$ ) than did private health care nurses ( $n=31$ ).

ANOVA was used to examine the relationship between nurse's characteristics (modifying factors) and perceived barriers. As shown in Table 3, two of the five modifying factors were significantly related to perceived barriers. Work setting ( $F(2, 286)=3.357, p<.05$ ) and level of nursing education ( $F(4, 284)=3.590, p<.05$ ) were significantly related to perceived barriers. Post Hoc tests were run using the Dunnett test due to unequal variance and significant pairwise comparisons were found. Nurses who worked in public settings indicated, on average, more perceived barriers to lactation education than did nurses in private health care facilities ( $M=2.57$  and  $M=2.12$ , respectively). Regarding education, two significant pairwise comparison relationships were found. First, nurses with a masters/Ph.D. ( $M=3.57$ ) reported significantly more perceived barriers than nurses with a LPN ( $M=1.83$ ). Second, nurses with a masters/Ph.D. ( $M=3.57$ ) also reported significantly more perceived barriers than nurses with a 2-year RN ( $M=2.06$ ). These relationships were not in the direction that was hypothesized. Originally, it was thought that nurses with a LPN or a 2-year RN would perceive they had the greatest number of barriers standing in their way to obtaining lactation education. The number of years of working in women's/family health care and full-time equivalent employment were not significantly related to barriers to lactation education. The top six barriers were: lactation education courses were not available, distance to lactation education courses, lactation education was not a priority in the workplace, lactation education course offerings were too expensive, lack of interest among physicians, and lack of support from administration.

The top five barriers stated by public health nurses were: distance to lactation education courses, lactation education courses were not available, lactation education course offerings were too expensive, lactation education was not a priority in the

workplace, and there was a lack of lactation education interest among physicians. Among private health care nurses, the top five barriers were: lactation education courses were not available, distance to lactation education courses, lactation education was not a priority in the workplace, lack of lactation education support from administration, and lack of lactation education interest among nurses.

Table 3

*ANOVA Significance Tests: Perceived Barriers by Modifying Factors*

Modifying Factors	N	Mean	F	Sig.
Work setting				
Public health care	103	*2.57	3.357	0.036
Private health care	181	*2.12		
Other	5	2.00		
Total	289	2.28		
Level of nursing education				
LPN	41	*1.83	3.590	0.007
2-year RN	84	+2.06		
4-year RN	139	2.42		
Masters/Ph.D.	7	++3.57		
Other	18	2.61		
Total	289	2.27		
Years of health care in women's/family health				
Less than 5 years	55	2.24	1.673	0.156
5 to 9 years	70	2.24		
10 to 14 years	32	2.41		
15 to 19 years	34	1.74		
20 years or more	96	2.46		
Total	287	2.27		
Full-time equivalent				
Full-time	216	2.26	0.339	0.713
Part-time	65	2.31		
PRN/casual	7	2.71		
Total	288	2.28		

Significance at  $\alpha=0.05$ ; \*,+ Significance pairwise comparison at  $\alpha=0.05$

## DISCUSSION

This study was conducted to explore the perceptions of nurses regarding breastfeeding and the barriers that may have been preventing them from obtaining lactation education. The purpose was to examine the perceptions regarding the need for lactation education among nurses working in the tri-state area of Minnesota, North Dakota, and South Dakota. The Health Belief Model (HBM) was used as the theoretical tool to guide the research. To understand the nurses' perceptions about lactation education, the original HBM model was modified to explore the relationships between modifying factors, individual perceptions and likelihood of action. ANOVA and Spearman's correlation coefficient was used to understand the relationship between these three categories.

The hypothesis was that the modifying factors would be related to nurses' perceptions and their likelihood to take action to gain lactation education. Also, it was hypothesized the characteristics of the nurses (modifying factors) would be related to the barriers they feel impede their opportunity to attain lactation education. The modified HBM suggested that the attainment of lactation education would be inversely correlated with barriers to lactation education.

After running ANOVA and Spearman's correlation coefficient tests, only a few of the hypotheses were supported regarding the relationship between modifying factors and nurses' perceptions about lactation education or barriers to obtaining that education. The modifying factors that were significantly related to the nurses' perceptions of the importance of breastfeeding were work setting and level of nursing education. Specifically, the pairwise comparison showed that nurses who work in public health care facilities differed from nurses who work in private health care facilities. Also, a significant

relationship was found between 4-year RNs and LPNs. Post Hoc tests were run to understand the relationship between the nurses' characteristics and the perceived barriers to obtaining lactation education. Pairwise comparisons showed that work setting and the level of nursing education were significant. Nurses from public health care differed from nurses who work in private health care. Also, two pairwise comparisons were discovered for the level of nursing education. There exists a relationship between nurses with a LPN degree and nurses with a masters/Ph.D. and another exists between nurses with a 2-year RN degree and nurses with a masters/Ph.D. The lack of significant relationships among the other characteristics regarding the importance of breastfeeding and the barriers to obtaining lactation education may be due to an interaction effect with other demographic variables. For example, nurse's age and the size of the city may need to be controlled in order to differentiate among the other characteristics examined. Age may prove to impact how nurses view breastfeeding because of the time period they attended nursing school. Younger nurses may view breastfeeding as more important than older nurses because breastfeeding was viewed differently several years ago. More urban cities may have more access to lactation education courses than nurses from rural towns. Another reason may be because employed nurses are mothers as well and they may be experiencing difficulties in the workplace to continue to breastfeed their own child. Future research should study how these two characteristics impact the perception of the importance of breastfeeding.

Work setting was the only modifying factor found to be significantly related to the nurses' appreciation of the need for lactation education opportunities. A significant difference was found between nurses who work in a public health care facility and nurses who work in a private health care facility. Funding may be one of the reasons why public

health care nurses feel that there is a higher need for lactation education opportunities in their community. Public health care facilities have a harder time ensuring that their patients pay for medical services and do not receive as much funding as private health care facilities. Public health care facilities try to serve the whole community using government funds (i.e., Medicaid and Medicare). Public health care nurses may have more contact with nursing mothers because they work directly with the community and are involved with breastfeeding awareness. Prevention is a main focus of public health and private health care facilities focus on reaction medicine. Private health care facilities deal more with specialized services and react once a disease/condition arises. Patients who go to a private health care facility pay more for such services. Nurses who work in a public health care system may not have access to funds to help obtain lactation education. Private health care nurses may have more opportunities, while being employed, to receive funds to obtain lactation education. Further research should analyze the impact that private and public funding has on the nurses' perception of the need for lactation education opportunities in a community.

Another potential reason why work setting may have been significantly related to the nurses' appreciation for the need for lactation education could be that baby formula companies are giving health care facilities free care packages for the newborn and mother. Both private and public health care facilities receive free formula samples to give to mothers when they are released from the hospital. Nurses in these settings may feel that they are limited in providing information about breastfeeding because formula companies are offering free products. This may be why nurses feel that there is a need for lactation education opportunities in their communities so they can educate themselves more about



breastfeeding. Then, they can encourage mothers to breastfeed more often. Researchers should analyze the impact that baby formula companies have on the need for lactation education opportunities for nurses and breastfeeding for new mothers.

Support was found for the hypothesis that there would be a relationship between the nurses' perception about the importance of breastfeeding and the perception of the need for lactation education in the community. The relationship was found to be moderate. If the nurse perceived breastfeeding as important, he/she was more likely to perceive a need of lactation education in his/her community.

There was no support for the hypothesis that if the nurse perceived a need for lactation education in his/her community, he/she would more likely take action to obtain lactation education. Neither self-paced nor instructor-led lactation education was significantly related to the need for lactation education. This may be due to the relatively small number of nurses who answered both the question about perceived need and obtaining lactation education. Another reason why nurses believe there was a need for lactation education, but did not take action to obtain lactation education could be because the few barriers that nurses stated may have prevented them from taking action. For example, those barriers may have been funding or distance to lactation education courses.

Also, it was hypothesized that obtaining lactation education would be inversely correlated with the number of barriers to lactation education. The data did not support this hypothesis. The amount of self-paced and instructor-led lactation education courses was not significantly related to the number of barriers nurses had in obtaining education. First, more nurses answered that they did take the course, but once they were asked to fill out how many hours the course was, nurses may not have either remembered how many hours

so they did not mark an answer and/or did not understand that they were to fill in the total number of hours. Secondly, the small sample size for nurses who answered the questions about obtaining lactation education may have impacted the relationship with the number of barriers. Finally, the average number of barriers felt by nurses in their community was two. This may show that nurses believe that there are not many barriers preventing them from obtaining lactation education. Further research should be conducted to fully understand the relationship between obtaining health/lactation education and the barriers to obtain that education.

Philipp and colleagues (2007) found that nursing textbooks are using inconsistent information about breastfeeding. To move lactation education forward, these issues need to be addressed. Nurses stated in this study that breastfeeding was important and that there was a need for lactation education in the tri-state area. There are barriers to obtaining lactation education and nurses should be offered the chance to overcome these barriers. There are several key stakeholders and important community members that can improve the opportunities for nurses to obtain lactation education.

First, instructors should address the inconsistent and outdated information that is being circulated in nursing textbooks. There needs to be a unified breastfeeding golden standard for nurses to follow nationwide. Also, policy makers (i.e., health care administrators, key community members) should address the negative views about breastfeeding in our society. Several foreign countries (i.e., parts of South America, Africa, and Asia) have successfully implemented breastfeeding policies that encourage mothers to breastfeed. Additionally, the policy makers should consider changing the obscenity laws that may be preventing mothers from breastfeeding in public.

Second, health care administrators play a key role in how the health care community addresses the lack of information about certain diseases or health conditions. Health care administrators should focus their energy on addressing the barriers stated by nurses in the community and offer local opportunities for nurses to obtain lactation education. Hospitals and clinics should give incentives for nurses to further his/her lactation education to ensure that all mothers have a chance to work with a nurse who understands the importance of breastfeeding.

Finally, nurses are among the first health care professionals to work with women, children, and child-bearing families. Nurses understand where the inconsistencies lie and what needs to be addressed in the community because nurses see the day-to-day barriers of obtaining lactation education. Policy makers (i.e, health care administrators, key community members) should work with local nurses from both public and private health care settings to address the barriers in the community that are preventing nurses from obtaining lactation education. Also, policy makers and health care administrators should create awareness of the importance of breastfeeding and encourage nurses to take self-paced or instructor-led lactation education courses.

As with any study, there are limitations. In this study, the sample size is relatively low and may have skewed the results. Plus, the response rate is 27 percent. For example, responses to two questions on the survey, self-paced and instructor-led lactation education courses were relatively a small. Thus, a larger sample size and higher response rate may have resulted in different findings. Additionally, future researchers should be careful in how the questions are worded, specifically those related to lactation education courses to ensure that nurses understand that if they do not remember the total number of hours they

received, they should give an estimate. A suggestion would be to have a “do not remember” option on those specific questions to give the nurse a chance to answer the question. The survey used in this study was limited to only a few categories in the original Health Belief Model. The model had to be modified to better understand the current lactation education situation in the tri-state area. Future studies could add perceived threat to the modified HBM model and address perceived threat in the survey tool. The modified HBM model in this study implies causation, but the model was limited to correlation analysis because the survey questions were not created to understand causation. The survey was used to better understand where the tri-state area stood on breastfeeding and lactation education. Future researchers should study if there is causation between modifying factors, individual perceptions, and likelihood of action. To study causation, an updated or new version of the survey used in this study should be implemented. Only a few questions were used from the original lactation education needs assessment survey. Future researchers should be better able to understand what questions to ask nurses after this study because there are key themes that this study has brought forward. For example, wording makes a difference in how nurses may respond to questions about lactation education courses, work setting and the level of nursing education impact the perception of the importance of breastfeeding and the need for lactation education, and there may be interaction effects that should be researched further. Also, another area of focus could be the potential personal guilt felt by nurses who have children and are not able to breastfeed due to work.

This study is one of a few attempts at understanding the inconsistency of breastfeeding information and the barriers to obtaining lactation education in the tri-state area of Minnesota, North Dakota, and South Dakota. Further research is needed to better

understand what needs to be addressed, where to focus future work regarding the value of breastfeeding and who to focus the research on.

Overall, nurses working in the tri-state area view breastfeeding as important and believe that there is a need for lactation education. Policy makers, health care administrators, and nurses need to work together to overcome the obstacles preventing nurses from obtaining lactation education and educating the community about the importance of breastfeeding for both mother and child. Breastfeeding has been proven to provide health benefits for both mother and child. American society currently has mixed feelings about breastfeeding and it is up to policy makers, health care administrators, and nurses to reverse the negative views of breastfeeding.

Nurses are one of the first health care professionals to work with women, children, and child-bearing families and this study begins to demonstrate the need for additional understanding of nurses' ability to further educate themselves and the community about breastfeeding. Research literature has shown that foreign countries have been successful in implementing policies and encouraging mothers to breastfeed children until at least six months. This study shows that the tri-state area needs to address the barriers and provide nurses with more opportunities to educate women and child-bearing families about breastfeeding. Nurses are key members of the breastfeeding community and should be given the chance to provide mothers with helpful, updated information. Breast milk is nature's best nutrient for infants and hopefully in the future nurses will have the opportunity to learn more about nature's best.

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APPENDIX A. DEMOGRAPHICS

Table A1

*Work Setting*

Work Setting	N	Percent
Private health care	181	62.6
Public health care	103	35.6
Other	5	1.7
Total	290	99.9

Table A2

*Level of Nursing Education*

Level of Nursing Education	N	Percent
4-year RN	139	48.1
2-year RN	84	29.1
LPN	41	14.2
Other	18	6.2
Master's/Ph.D.	7	2.4
Total	289	100.0

Table A3

*Years of Health Care in Women's/Family Health*

Years of Working	N	Percent
20 or more years	96	33.4
5 to 9 years	70	24.4
Less than 5 years	55	19.2
15 to 19 years	34	11.8
10 to 14 years	32	11.1
Total	287	99.9

Table A4

*Full-time Employment*

Full-time Employment	N	Percent
Full-time	216	75.0
Part-time	65	22.6
PRN/casual	7	2.4
Total	288	100.0

Table A5

*How Important is Breastfeeding*

Importance of Breastfeeding	N	Percent
1-Not at all important	1	0.4
2	0	0.0
3	18	6.4
4	68	24.3
5-Very important	193	68.9
Total	280	100.0

Table A6

*Level of Need for Lactation Education in their Community*

Need for Lactation Education	N	Percent
1-Very low	8	2.8
2	17	5.9
3	71	24.7
4	97	33.8
5-Very high	94	32.8
Total	287	100.0

Table A7

*Lactation Education Courses were taken as Self-paced*

Self-paced Lactation Courses	N	Percent
No	76	83.5
Yes	15	16.5
Total	91	100.0

Table A8

*Total Number of Contact Hours in Self-paced Lactation Education Courses*

Number of Contact Hours	N	Percent
0 to 4 hours	11	45.8
5 to 9 hours	6	25.0
20 or more hours	5	20.8
10 to 14 hours	1	4.2
15 to 19 hours	1	4.2
Total	24	100.0

Table A9

*Lactation Education Courses were taken as Instructor-led/in a Classroom/Online Format*

Instructor-led Lactation Courses	N	Percent
Yes	69	76.7
No	21	23.3
Total	90	100.0

Table A10

*Course Length of Lactation Education Courses that were taken as Instructor-led/in a Classroom/Online Format*

Course Length	N	Percent
1 day	22	30.6
5 days	16	22.2
1 hour	12	16.7
2 days	10	13.9
3 days	5	6.9
Series of 1 hour	3	4.2
4 days	2	2.8
0	1	1.4
Other	1	1.4
Total	72	100.1

Table A11

*Number of Identified Barriers to Lactation Education*

Barriers to Lactation Education	N	Percent
1	93	32.1
2	82	28.3
3	51	17.6
4	28	9.7
5	16	5.5
0	11	3.8
6	5	1.7
7	4	1.4
Total	290	100.0



### Preferences for Delivery of Courses

Q12. Are you interested in improving your lactation skills and knowledge?

- Yes     No (*skip to Q16*)

Q13. How would you most like to obtain your lactation education? (choose one)

- Online self-paced training courses (e.g., E-learning)     Face-to-face classes/seminars  
 Webinar classes     Other (specify) \_\_\_\_\_  
 Video conferencing

Q14. What is the maximum distance you would be willing to travel to receive lactation education?

- Less than 60 miles     120 miles or more  
 60 to 119 miles     I am not willing to travel

Q15. What is your preferred course length for lactation education? (choose one)

- 1 hour     1 day     3 days     5 days  
 Series of 1 hour sessions     2 days     4 days     Other (specify) \_\_\_\_\_

### Type of Curriculum and Course Offerings

Q16. The World Health Organization/UNICEF Baby-Friendly Hospital Initiative requires that nurses working with childbearing families in officially designated sites have 20 hours of lactation education; MDs and Advanced Practice nurses must have at least 3 hours of lactation education.

Are you familiar with these requirements?

- Yes     No

Q17. What lactation courses are/would be beneficial to healthcare providers in your community? (choose all that apply)

- Basic orientation to breastfeeding     Course specific to hospital nurses: maternity care/NICU  
 Community-based breastfeeding promotion     Course specific to hospital nurses: Peds/PICU  
 Course specific to WIC staff     Course specific to Public Health Maternal Child Health nurses  
 Course specific to clinic nurses: Peds     Course specific to dietitians  
 Course specific to clinic nurses: OB/GYN     None  
 Course specific to MDs     Other (specify) \_\_\_\_\_  
 Preparation for Baby-Friendly Hospital Certification  
 Preparation for International Board Certified Lactation Consultant (IBCLC)  
 Preparation for Joint Commission on Accreditation of Healthcare Organizations (JACHO) requirements

Q18. What barriers to lactation education exist for healthcare providers in your community? (choose all that apply)

- Distance     Format of courses haven't met my learning style  
 Not a priority in the workplace     Courses have not been appropriate  
 Courses are not available     Course offerings are too long  
 Lack of interest among nurses     Course offerings are too short  
 Lack of interest among physicians     Course offerings are too expensive  
 Lack of interest among dietitians     None  
 Lack of support from administration     Other (specify) \_\_\_\_\_

Q19. What is your preferred method of communication regarding notification of courses? (choose one)

- Letter/postcard     Facebook     Workplace communication  
 Email     Website     Other (specify) \_\_\_\_\_

Q20. Do you have other comments regarding lactation education for practicing healthcare professionals?

*Thank you!*

APPENDIX C. IRB

**NDSU**

**NORTH DAKOTA STATE UNIVERSITY**

701.231.8995

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*Institutional Review Board*

*Office of the Vice President for Research, Creative Activities and Technology Transfer*

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*Federalwide Assurance #FWA00002439*

*Expires April 24, 2011*

Monday, November 08, 2010

Dr. Richard Rathge  
Sociology and Anthropology/State Data Center  
IACC 424

Re: IRB Certification of Human Research Project:

**“Lactation Education Needs Assessment Survey”**  
Protocol #HS11106

Co-investigator(s) and research team: **Kay Schwarzwalter, Ramona Danielson, Karen Olson, Ashley Wiertzema, Stephanie Hinrichs**

Study site(s): **varied**

Funding: **Otter Tail Public Health**

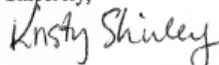
It has been determined that this human subjects research project qualifies for exempt status (category # 2) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, *Protection of Human Subjects*). This determination is based on the protocol form received 11/3/2010 and consent/information sheet received 11/3/2010.

Please also note the following:

- This determination of exemption expires 3 years from this date. If you wish to continue the research after 11/7/2013, the IRB must re-certify the protocol prior to this date.
- The project must be conducted as described in the approved protocol. If you wish to make changes, pre-approval is to be obtained from the IRB, unless the changes are necessary to eliminate an apparent immediate hazard to subjects. A *Protocol Amendment Request Form* is available on the IRB website.
- Prompt, written notification must be made to the IRB of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Any significant new findings that may affect the risks and benefits to participation will be reported in writing to the participants and the IRB.
- Research records may be subject to a random or directed audit at any time to verify compliance with IRB policies.

Thank you for complying with NDSU IRB procedures; best wishes for success with your project.

Sincerely,



Kristy Shirley, CIP, Research Compliance Administrator