

Running head: BENEFITS OF BREASTFEEDING

1

## The Benefits of Breastfeeding

Helen Lenae Byers

A Senior Thesis submitted in partial fulfillment  
of the requirements for graduation  
in the Honors Program  
Liberty University  
Spring 2015

Acceptance of Senior Honors Thesis

This Senior Honors Thesis is accepted in partial fulfillment of the requirements for graduation from the Honors Program of Liberty University.

---

Tamra Rasberry, PhD, M.S.N., RN  
Thesis Chair

---

Emilee B. Harker, M.S.N., RN  
Committee Member

---

Monica Rose Brennan, D.M.I.N  
Committee Member

---

Marilyn Gadomski, Ph.D.  
Assistant Honors Director

---

Date

**Abstract**

It is important to educate women of childbearing age, their families, and society of the benefits that breastfeeding has over bottle-feeding and formula-feeding. The benefits of breastfeeding are in three main categories. First, the developmental, physical, emotional, and spiritual benefits of the baby will be discussed. Then the physical, emotional, and spiritual benefits for the mother will be talked about along with possible contraindications or difficulties. Finally, the financial benefits of breastfeeding over feeding an infant from the bottle will be discussed as it relates to the family and government. The goal is to persuade that breastfeeding is a superior nutritional resource and has numerous physiological, psychological and financial benefits for all members of society.

### **Breastfeeding**

Breastfeeding has always been a topic of interest and practicality to women across the globe. Immediately after the creation of the world, starting with the first man and woman, breastfeeding was the only way to provide newborns with the adequate amount and quality of nutrients they needed to grow and develop. It was not until the 20<sup>th</sup> century that safe alternatives to breastfeeding began to be marketed as international commercial products. The four main breastfeeding alternatives were the following: modified mammalian milk, unmodified mammalian milk, formula made from grains or legumes, or breast milk from another lactating mother (O'Conner, 1998).

The utilization of modified mammalian milk was formula based on cow's milk and was made available in the 20<sup>th</sup> century. Cow's milk or goat milk are examples of unmodified mammalian milk but were found to potentially cause metabolic problems within the infant and therefore is not recommended for use. The third breastfeeding alternative was made from grains or legumes. These products would have been made out of soy products, or other gruel which are low in proteins and carbohydrates and therefore would not have been sufficient for infant development and growth. The final alternative to breastfeeding was to pay a wet nurse to breastfeed the child instead. Wet nurses became increasingly popular during the 20<sup>th</sup> century for three main reasons. The first was because upper-class women did not want to spend the time and effort breastfeeding but still desired the benefits that breast milk provided to their children. Wet-nursing was also implemented among childbearing women because it was an easy way for breastfeeding women to earn a little extra income. Finally, wet-nursing was practiced out of necessity in order to provide nutrients to orphaned newborns and infants. Wet nurses continue to

exist today. As alternatives to breastfeeding became increasingly popular within the 20<sup>th</sup> century scientists and society became more interested in the similarities and differences between breast milk and breast milk alternatives. For several years people considered both options to have the same benefits for the infant and the mother, but recent studies have begun to demonstrate that breastfeeding holds many more advantages over any other breast milk alternative. As a result, hospitals have become increasingly breastfeeding friendly (O'Conner, 1998).

Breastmilk is the gold standard for protective nutrients supplementation to a newborn infant. The composition of breast milk will change according to the infant's nutritional and passive protection needs in order to meet the baby's needs for growth, development, and overall health (Walker, 2010). During the first six months postpartum, breast milk requires no additional fluid or vitamin supplementation besides vitamin D and iron. Although the amount of breast milk that is ingested by breastfed infants is difficult to be determined, nutritional intake is considered more important than the quantity when it comes to the nutritional health of a newborn. Nutritional intake is considered adequate when the newborn gains 20 to 30 grams per day. When breast-feeding it is assumed that babies have ingested an adequate amount of breast milk in accordance to their stomach size based on the cessation of crying and decreased agitation that is typically triggered by hunger. However, studies have shown that almost all babies require calorie intake of 95 to 130 kcal/kg/day. Whether breast or bottle fed, it is accepted that feeding regimens are established based on an infant's weight, age, developmental stage, and stomach capacity (Davidson et al., 2012).

### **Benefits to Baby**

While there are numerous benefits for the infant, one of the most persuasive is that breastfeeding is considered to be the number one way to reduce mortality among newborns. Exclusive breastfeeding has been estimated to prevent 13 % of deaths to children under five years of age that live in a low income country (Mathur & Dhingra, 2013). The inability to keep non-human milk products clean is one of the primary reasons for high infant mortality within developing countries in the 20th century. (O'Conner, 1998). Along with sanitary packaging and storage of formula, obtaining clean water that can be used to bottle feed an infant reconstituted formula is problematic for many families worldwide. The use of unpurified water to prepare formula milk created a diarrhea epidemic in Botswana in 2005, after formula was mixed with contaminated water. This epidemic demonstrates the dangers and difficulties that the use of formula may pose to a newborn's health. The risk of child death increased 50 times during this time period (Mead, 2008).

Breast milk on the other hand is produced and stored within the breasts until the baby is ready to feed. If the infant is fed on demand and feeds directly from the mother's breasts and the infant therefore receives fresh and safe warm milk at every feeding. Additionally it can be noted that as the milk is sucked from the breast replacement milk will be produced therefore reducing the chance of infection and thereby increasing the milk's beneficial properties. Unless complications occur such as infection or inadequate calorie consumption by the nursing mother (500 extra calories per day) this supply and demand cycle should continue until the breasts are no longer stimulated by infant suckling. This being said, a mother should have no reason to fear that her milk will run

out before the recommend year of breastfeeding comes to an end. However, it is important to note that breast milk is the most abundant in nutrients and antibodies during the first six months to a year. Therefore, a mother that continues to breastfeed her child after this period of time must supplement the child's intake with nutrients as well as iron from other resources such as solid foods in order to provide for the infants growing nutritional needs (Davidson et al., 2012).

Another benefit of breast-feeding is that breast milk provides the infant with passive immunity to several viruses and bacteria after birth. The most common kind of infection that newborns become less susceptible to upon breastfeeding are gastrointestinal (GI) related. Within the first couple of months newborns are very susceptible to illness and infection and therefore benefit greatly from passive immunity and probiotics that breastmilk provides. Passive immunity provided through breastmilk allows the infant to temporarily acquire the mother's immunity and therefore the ability to fight infections such as *Escherichia coli* and *Shigella* (Davidson et al. 2012). In addition, probiotics contribute greatly to GI specific. Probiotics are naturally made by the mother's body as part of the immune system. The mother can receive extra supplementation of these good bacteria through her diet or by taking a probiotic pill. Probiotics can be found mostly in dairy products such as cheese and yogurt. After the probiotics are ingested by the baby they travel to the gut of the infant where they reestablish and mature natural flora environments within the GI tract (Robinson, 2012). This temporary reinforcement allows the newborn's immune system and GI tract to develop and mature into a functional and effective system. By the sixth month, the infant will then be capable of sustaining an independent immunological defense system apart from the mother. Formula-fed infants

on the other hand develop GI infections more readily and are influenced by two main factors. Firstly, a newborn's gastrointestinal tract is not fully developed and therefore the body's natural flora or promotional bacteria have not been strongly established within the intestines enough to fight off invading bacteria. Secondly, formula-fed infants do not ingest the probiotics found in breast milk which makes them twice as likely to have bacteria infested stool as breast-fed infants and therefore more at risk for developing a normal flora disturbance (King, 1999).

Other immunoglobulins that are passed from mother to infant during the first six months postpartum include *Lactobacillus bifidus*, lysozymes, lactoperoxidase, lactoferrin, and transferrin (Davidson et al., 2012). These immunoglobulins temporarily enhance an infant's immune system and capacity to fight off foreign invaders. *L. bifidus* at times can make up 90 to 95 percent of the flora found in breast-fed infants and is beneficial in preventing opportunist bacteria from invading the GI tract (Weiss & Rettger, 1934). Lactoperoxidase is a natural bactericidal that is secreted from the mother's mammary glands into the milk, while lysozymes provide innate immunity by destroying the bacterial cell wall. Lactoferrin is a multifunctional protein that serves aids in the development of secretory fluids within an infant's body which include tears, saliva, and nasal secretions. These secretory fluids are essential in providing first line defense against foreign invaders to an infant's body and are therefore very practical in maintaining good health. Transferrin is a main transfer protein that binds to iron and carries it to various place throughout the body. Iron in turn binds to oxygen which enhances cell performance throughout an infant's body thereby positively influencing growth, development, and immune system functionality (Davidson et al., 2012). Immunoglobulin A is another



immunoglobulin that is passively transferred from mother to baby in breast milk and allows infants to become less susceptible to allergies and foreign agents until the sixth month postpartum. However, research suggests that breast milk's protection varies depending on the mother's allergies (Robinson, 2012).

Another benefit to breastmilk is that infants are able to digest breast milk more easily than formula. Breast milk is made up of "protein (whey and casein), fat and lactose" which are easily digested by a newborn's underdeveloped GI tract whereas the components of formula are not (Nemours, 2015, p.12). Formula takes longer to travel through the GI tract thereby increasing the occurrence of flatulence, vomiting, and constipation which will be discussed shortly. Formula contains products such as foreign proteins that are not readily absorbed by an infant's underdeveloped GI tract. It is suggested that newborns are not able to absorb foreign proteins that are found in products such as milk because a newborn's intestine is underdeveloped at birth. The absorption of these proteins require the formulation of fatty calcium fatty acid soaps that are readily available in early life. The result of under absorption may also result in either hard stools or diarrhea, foul smelling stools, and GI discomfort to the infant. Increased flatulence presents as air bubbles within the GI tract that can be very distressing to the infant and therefore may cause a formula fed infant to cry more often than a breast-fed infant (Han et al., 2011).

In addition to fortifying the infant's immune system and GI tract flora breastfeeding provides a newborn with all required supplemental vitamins the infant needs to grow healthy, besides vitamin D and iron, in adequate amounts throughout development because a healthy infant will naturally eat the correct amount nutrients by

eating when hungry and not eating when full (Walker, 2010). Some of the components that are essential to growth and development of the infant include supplemental vitamins, such as vitamin A, D, E, iron, and other trace minerals. With breast-feeding the nutritional intake required of a growing newborn can be met based on a supply and demand method (Davidson et al., 2012).

Breastfed babies are therefore at a decreased risk for developing diabetes because their stomachs are not ritualistically overstretched. Breastfed infants ingest the correct amount of breast milk in proportion to the size of their stomachs and although it is produced in lesser amounts the quantity of breast milk consumed by the infant adequately provides the correct amount of nutrients and fats needed for effective growth and development. The amount of breast milk available to an infant will also change in order to meet the nutritional needs of the infant. For example, immediately before and a few days after birth a mother's breasts will produce a substance called colostrum. The average amount of colostrum a newly postpartum woman produces by the first day postpartum would fill a medicine cup, about 25 to 56mL, which is more than enough to meet a newborn's dietary needs at that stage of development. Within the first 24 hours postpartum an exclusively breastfed infant will only consume an average of 11 to 15 grams (g) of breast milk. A newborn's stomach typically has capacity to hold five to seven mL of milk so it is likely that the infant's stomach will need to expand to fit such an amount. A newborn's stomach at birth can be compared to the size of a small glass marble, thimble, or large acorn nut. By the second day the breasts will produce 113 to 185mL which may then increase exponentially by the third day to produce about 500mL upon frequent sucking or stimulation throughout the first two days. As the infant grows

an increasing amount of energy is required and therefore an increased amount of breastmilk is consumed (Santoro, Martinez, Ricco & Jorge, 2010).

Breastfeeding also prevents excessive vomiting and burping of infants because breastfed healthy infants cannot be overfed when an infant decides how much it will drink, starting at birth. When a breastfeeding infant's stomach is full the infant will stop drinking. Whereas formula fed newborn infants in the hospital are regularly prescribed to eat three to four ounces of formula every three hours directly after birth. This is because studies have shown that the amount of breast milk in relation to the amount of formula that equals in nutritional value is disproportionate with formula being of quality.

However, strict feeding schedules for formula fed infants can be a problem because a newborn's stomach is not accustomed to retaining a greater quantity of milk or formula more than a few mouthfuls immediately postpartum and frequently thereafter. The result of a constant overabundance of formula ingested by the newborn is an overstretched stomach and an increased amount of regurgitation. Studies have shown that babies who have overstretched stomachs early in life are more at risk for developing diabetes later in life (Bartz & Freemark, 2012). A peer-reviewed research study of 517 children, 249 girls and 268 boys, from Sweden and 286 children, 153 girls and 133 boys, from Lithuania who between the ages of 0 and 15, was completed in order to "determine whether early nutrition was an independent risk factor for diabetes despite other life events" (Sadauskaitė-Kuehne et al., 2004, p. 2). The hypothesis of this study was based on the recently increasing diagnoses of Diabetes Type 1 among children along with the decreasing numbers of women that breast-fed their children. The study was used to compare groups of children that had been breast-fed with those whom had been fed a

commercial formula or a formula substitute that was commonly used throughout that part of the world. The breast milk substitute was called *c-milk* which was a home-made combination of corn water—rice-, barley-, wheat- or buckwheat water—and was mixed with a two to one ratio with cow’s milk. Specifically, the children that were ages five through nine years old within the study who were exclusively breast-fed for the first two months of life demonstrated a protective trend against developing diabetes. Although, it was concluded that “an extended duration of both exclusive and total breastfeeding, up to the age of 12 months, showed a protective trend” against the development of diabetes (Sadauskaitė-Kuehne, et al., 2004, p. 3). In addition to providing evidence that breast milk was protective against diabetes type 1 the study also demonstrated that commercial formula put children at an increased risk for developing diabetes. This means that the commercial formulas that were used during the study was not only based on cow’s milk but also contained wheat and soya germ (Sadauskaitė-Kuehne, et al., 2004).

It is important to consider that the risk factors that were a part of this particular study consisted of the same risk factors from other similar studies. The factors that may have influenced the study’s results was prematurity, neonatal illness, infection or stress within six months of diagnosis, living within an urban area, and maternal education. A few of the cases of this study in which stressful events and the age of the mother seemed to present a great risk they were eliminated from the analysis. Although overall the study reports that no one factor interfered continuously with the protection that breastfeeding provided. When all of the factors were adjusted for, the study still provided strong

evidence that breastfeeding was much more protective against diabetes than breast milk substitute (Sadauskaitė-Kuehne et al., 2004).

Breastfeeding prevents permanent stretching of the stomach and therefore prevents excessive vomiting, risk for aspiration, and choking, and heart burn. Overconsumption of breastmilk is not required largely due to the rich nutritional make-up of breast milk (Sadauskaitė-Kuehne et al., 2004). For example, colostrum, although not great in quantity is of incomparable quality. The nutrients, electrolytes, and immunity properties of colostrum are so complex that its artificial equal has not yet been developed among the formula enterprises. Manufacturers continue to enhance the composition of formula products with little success. It is true that commercial formulas provide the safest alternative to breast milk while offering “complex combination of proteins, sugars, fats, and vitamins,” that would be almost impossible to duplicate at home, but continues to lack several of the benefits that breast milk provides (Nemours Foundation, 2015, p.4). The colostrum and later the breast milk that is produced by the mother is naturally tailored to the newborn’s physical needs while its components are influenced by the culture and dietary habits of the mother. This means that the make-up of breast milk can change. This can prove beneficial in transitioning the infant to go from milk to solid foods later in development. Flavors and smells of food that the mother consumed while breastfeeding are recognized by the infant when the infant is fed the solid form of the food. Upon recognition of a particular flavor or smell that was present in breast milk the infant will more willingly accept what they are eating and in some cases the flavor even provides a sense of security and comfort to the infant. This is because the infant

associates the flavor with security and comfort that was provided while the infant drank breastmilk from the mother's bosom (Beauchamp & Mennella, 2009).

There is a mechanism within a woman's breasts that utilizes something called the *let-down reflex* to produce breast milk as the newborn demands. These demands by the newborn are recognized by mother's breasts and body in the form suckling of the breasts by the newborn. As the infant suckles on the breasts sensors within the breasts are triggered to send messages to the brain. The brain interprets these messages as a demand for more milk to be released and so the brain sends hormones to the breasts which trigger the lobules or breast milk producing centers to produce more milk. The more often the newborn suckles on the mother's breasts the greater the amount of milk that the breasts will produce (La Leche League, 2014).

Another benefit of breastfeeding for the infant is that breast milk prevents against excessive visits to the dentist. Although breast milk and formula have a virtually equal role in association to influencing the development of dental caries in infants, recent research suggest breastfeeding is more preventative against the development of malocclusions stemming from the unique sucking motion the is exhibited by breastfeeding and bottle-feeding infants while nursing. The sucking motion and pressure exhibited by breastfeeding infants not only helps to line up the teeth correctly, but also plays a major role in preventing ear infection (Bilenko, Ghosh, Levy, Deckelbaum, & Fraser, 2008) and promoting mandibular muscle strength (Beall, 2010).

Breastfeeding also promotes the use of kangaroo care, which is the time in which the mother and baby's skin come into contact for a specified period of time. "Skin-to-skin contact" between mother and infant creates an emotional and spiritual bond (Nemours,

2015, p.2). The concept of kangaroo care, began in 1979, in Bogota, Columbia, as a means to keep infants warm and to promote optimal growth. Kangaroo care is a very successful and noninvasive way to improve lactation and breastfeeding success (Bagby & Bowen, 2012). Physical contact has shown to be very successful in promoting psychological and emotional stability for both mother and infant. Upon contact with the mother's skin during breastfeeding infants have been known to stop crying and immediately become peaceful in appearance. This manifestation represents an intuition of trust and a healthy form of attachment between infant and mother (Burkhammer, Anderson, & Chiu, 2004). In combination with kangaroo care research had shown that bonding between mother and child is strengthened upon secretion of a certain oily substance from the Montgomery glands. These glands not only protect the skin of the areola and nipple during lactation but also release an individual scent that is characteristic of the mother (National Center for Biotechnology Information, 2009).

### **1. Warnings and Contraindications to Breastfeeding**

A few factors that may prevent women from breastfeeding are medication regimens and the prevalence of sexually transmitted diseases that are present within the body of the mother. Medications vary upon infiltration of the breast milk and its affects upon the nursing infant and should therefore be discussed with a physician before attempting to breastfeed. In relation to sexually transmitted diseases, the only true contraindications to breastfeeding is if the infant has classic galactosemia (galactose 1-phosphate uridylyltransferase deficiency) or the mother has the Human Immunodeficiency Virus or is HIV positive (American Academy of Pediatrics, 2015).

Breast milk becomes unsafe to drink under specific circumstances. Such circumstances may develop if pesticides, organic pollutants (POPs), heavy metals, and other contaminants accumulate substantially within the breast milk in which case parents and researchers may begin to ask whether the benefits of human milk would truly outweigh the risks in such circumstances. Mainly mothers who are more advanced in age are more likely to produce increased amounts of a harmful chemical via breast milk because she would have been exposed to the chemical for a longer period of time. Age is therefore a factor when considering to breastfeed (Mead, 2008).

Mother's should not attempt to breastfeed upon consumption of excessive amounts of alcohol, intake of harmful medications that are able to enter breast milk, if the mother has certain sexually transmitted diseases, severe malnutrition, and when the infant has severe allergies to breast milk. These factors can be detrimental to an infant's health and development and therefore should be avoided if at all possible. Unlike during pregnancy, alcohol is not absolutely contraindicated while breastfeeding. Typically, if a lactating woman chooses to consume alcohol she should limit her intake to one serving—one glass of wine or one cup of beer—and then she should not breastfeed her infant for at least two to three hours so that no harm will come to her infant. Newborns whom have immature livers are more likely be affected by alcohol because their liver is not developed enough to excrete the alcohol from their bodies therefore a mother who chooses to drink during lactation must do so sparingly. Although alcohol consumption can be tolerated during lactation the safest option for the infant is to abstain from alcohol completely until no longer breastfeeding (La Leche League, 2014).



Finally, malnutrition of a lactating mother may pose a risk to a breastfed infant as well as to the mother and therefore must be considered before deciding to breastfeed. Although malnutrition in infants and children is one of the World Health Organization's (WHO) main reasons for supporting breastfeeding, milk from the mother could potentially be more harmful to the infant and also to the mother than beneficial if the mother is the one suffering from severe malnutrition. Severely malnourished mothers who choose to breastfeed risk further malnutrition in order to produce milk that is most likely insufficient to meet a growing baby's growth and development needs. The diet and nutritional status of a mother does not affect the macronutrient content—carbohydrates, proteins, and fat—of breast milk as much as the micronutrient content. Zinc, iron, and vitamins K, D, and B12 are all micronutrients that are essential components of human milk. Vitamin B12 deficiency may result in neurological damage while a lack of vitamin D may lead to rickets, or bone malformation (Mead 2008).

In the cases listed above it may be wise for these individuals to formula feed. However, for most other reproductive women, generally between the ages of 15 and 50 years of age, it is a wise to become more familiar with the benefits and drawbacks that breastfeeding can provide in the mother's life, the baby's life, and society as a whole. This will allow women to make well informed decisions related to the physical and emotional wellbeing of their family, themselves, and their community as it relates to the infant's nutrition (Mead 2008).

### **Benefits for Mother**

One benefit that breastfeeding provides to the lactating mother is a non-pharmacological method of contraception while decreasing a woman's risk for developing female cancers related to estrogen proliferation of the uterus, ovaries, and breasts. Progesterone, also known as the *hormone to pregnancy*, and progestin are hormones that are released upon breast stimulation and are triggered by mammary gland stimulation upon infant suckling. Progesterone and progestin increase breastfeeding duration resulting in the minimization of the cancerous effects of estrogen (Davidson et al., 2012). Progesterone and progestin decrease a woman's risk for developing endometrial, ovarian, and breast cancer by preventing or counteracting the excessive tissue production that is initiated by estrogen without inhibiting the positive effects of estrogen (Risch, 1998).

Cancer is mainly described as the uncontrolled growth or proliferation of abnormal cells within the body. Estrogen is main contributor for tissue growth and repair within a women's body. Estrogen is a hormone that works hand in hand with progesterone and progestin mainly during a women's monthly period to repair the lining of the uterus that is destroyed when the ovulated egg has not been fertilized. The estrogen hormone is an extremely important component of the human body but it is also known to be a main contributor to cancer when it is not unaccompanied by other hormones such as progesterone and progestin. The longer a woman has been exposed to increased levels of the estrogen hormone without these other two hormones the higher her risk becomes to developing cancer. A few risk factors include early onset of menarche, late onset of menopause, intake of estrogen supplements without progestin or progesterone during

hormone replacement therapy, and nulliparity (Lewis, Dirksen, Heitkemper, Bucher, & Camera, 2011). According to medical researchers, Pechlivani and Vivilaki (2012), results from research teams located in multiple countries worldwide (including the United States, Sweden, the United Kingdom, Israel, Norway, and China) have demonstrated an inverse correlation between the length of time that a woman breastfeeds and the risk of breast cancer (Davidson et al., 2012).

In addition to acting prophylactically against cancer, high levels of sustained progesterone can act as a natural contraceptive by delaying ovulation, the release of the egg by the ovule into the fallopian tube. Ovulation is triggered by a shift in hormone concentration within the woman's body which is most often characterized by a decrease in progesterone levels. During pregnancy, ovulation is prevented while the amniotic sac releases a constant amount of progesterone. Normally this process during pregnancy allows the body to remain in a state in which is conducive to fetus growth and so the body will not reject the growing fetus. Although, breastfeeding can serve as an effective form of contraception it is not 100% fail proof. Additionally, there are particular guidelines a lactating mother must strictly follow in order for this particular method of contraception to be successful (Davidson et al., 2012).

The two main guidelines that a woman must follow for effective contraception while breastfeeding are that the woman must breastfeed on demand and at intervals of less than three hours between feedings during the desired contraceptive period. If the woman is not able to breastfeed her child after two to three hours she must provoke let-down and expression of milk herself by gently stroking her breasts and squeezing slightly above and below the nipples. However, when manually excreting breast milk a mother

must also be careful not to excrete too much milk at one time because an excessive amount of breast stimulation may put her at risk for breast engorgement. Breast engorgement can be painful and can occur when there is an expansion and increased pressure within the mammary glands as breast milk is produced and stored. In summary, engorgement most often occurs when breast milk that is synthesized is not conjointly being expressed in equal amounts (Davidson et al., 2012).

In addition to being a potential form of contraception and a preventative method against cancer, the oxytocin that is released from the pituitary gland during let down upon infant suckling also protects the mother from postpartum hemorrhaging. Oxytocin that is released naturally contracts the uterus and prevents bogging. Contraction of the uterine muscle prevents bleeding by constricting the vessels leading to the now vacant uterus after childbirth. This hormone continues to be produced even after leaving the hospital so that after intravenous synthetic oxytocin no longer becomes available the mother may continue to be at much less of a risk. Contraction of the uterus as a result of oxytocin release while breastfeeding can also be beneficial to the mother in encouraging faster uterine involution in that the uterus returns to its non-pregnancy state. This action decreases the mother's risk of developing uterine prolapse in which the uterus protrudes through the vagina. When breastfeeding is implemented correctly and menstrual periods are inhibited, which normally return between six to eight weeks postpartum, the mother is at lesser risk for becoming anemic. This benefit allows the mother to conserve iron which can be beneficial in conserving energy and thereby be influential in promoting a mother's happiness (Dermer, 2001).

Considering the short-term benefits mothers may also benefit long-term from choosing to breastfeed. Mothers have reported relieved anxiety and a deeper connection with their child upon breastfeeding. Mothers whom have provided kangaroo care several times while breastfeeding sometimes even find it more difficult to wean their child six months later in reference to the attachment that was form between mother and baby while breastfeeding (Burkhammer et al., 2004).

Not only does breastfeed prove to be very therapeutic to the mother during kangaroo care through close body contact but breastfeeding mothers also benefit from weight loss more often than mothers that do not choose to breastfeed. Breastfeeding require 200 to 500 extra calories which the body must produce from energy stores or from glucose. This fact can be very beneficial to mothers with type one diabetes because the extra glucose that the body uses to produce breast milk requires a decreased insulin treatment. Additionally, for women who are not diagnosed but are at increased risk for developing diabetes, weight loss while breastfeeding may lessen or eliminate the mother's future risk for developing diabetes.

Weight loss, improved blood sugar control, and good cholesterol profile from breastfeeding further benefits the nursing mother by decreasing her overall risk of heart problems. Also, breastfeeding decreases a woman's risk for developing osteoporosis, hip fractures, and menopause in relation to calcium. Normally, calcium is used to produce milk but studies show that after weaning the bone density of women who breastfeed return to a pre-pregnancy state and many times become thicker and therefore stronger than before pregnancy (Dermer, 2001).

Mothers also benefit psychologically from breastfeeding in spite of living in an unsupportive society. With suckling the mother experiences a hormonal milieu while prolactin creates a calmness within the mother. Mothers have also shown that their reactions to adrenaline becomes less while breastfeeding. In summary, breastfeeding creates a sense of peace, tranquility, and an innate sense of well-being within the mother. This can be very therapeutic to a mother's psyche when confronted with a busy schedule and stresses of life. However, the full measure of these psychological and emotional benefits can be hard to measure in a society, such as the United States, that is largely unsupportive of breastfeeding. Within this country it is often uncommon and unexpected for an infant to be breast fed for longer than the first couple of weeks after birth. Women often find themselves encountering physical and emotional problems if there is a lack of social support or there is no one in their life in which to model their breastfeeding experience. A women may be confronted with negative comments, find it difficult to breastfeed within the work environment, or even become harassed for breastfeeding in public (Dermer, 2001). A few reasons behind the negative view of breastfeeding in public is mainly because breastfeeding has become unfamiliar to many people since women began to work during the world wars and since bottle-feeding began to become the norm. Another factor that affected this change was the increased marketing of the human body and especially the use of breasts as a marketing tool among manufactures of certain products. Therefore, society began to see breasts within publicly not for their biological use but for their sexual association related to beer and car marketing. However, despite conflicting views, laws tend to air on the side of the mother and therefore one may be

hopeful that the public awkwardness experienced related to breastfeeding in the current day will precipitate in time (McCall, 2014).

Breastfeeding is also ecofriendly, cost-friendly, and time efficient. Researchers have speculated that one of the most widely stated reasons mothers do not continue breastfeeding longer than two months or because they do not attempt to breastfeed immediately after birth is the mother's lack of confidence that she will not be able to provide a sufficient supply of breast milk to her infant. Many women have reported that their lack of confidence originated from negative experiences that sisters or acquaintances had with breastfeeding. It is true that some women may have more difficulty breastfeeding than others, but under the correct instruction by a lactation consultant and with sufficient support from friends and family, many breastfeeding advocates believe that the majority of women can be successful with breastfeeding. If a mother breastfeeds according to a supply and demand method—in which the mother breastfeeds her child every time the child is hungry or otherwise consistently induces lactation at least every three hours—it is less likely that a lactating mother's milk supply will not become insufficient (Riordan, 2005). This means that a woman's mammary glands and ducts will more likely produce an adequate and cost free supply of food for her baby.

Contrarily, some individuals may argue that breastfeeding is more costly as well as physically and emotionally draining on the mother and her family—and therefore indirectly on society—because some believe that breastfeeding requires mothers to miss work (Noonan & Rippeyoung, 2011). Certain individuals believe that increased time and energy that is spent keeping up with the variant breastfeeding schedule the mother will

inevitably spend less time at work. Missing work can be both financially and emotionally burdening. However, mothers who are employed, can avoid the financial cost of missing work in order to breastfeed, by using a breast pump throughout the work day to collect the breast milk her baby will need for the future (Davidson et al., 2012). However, if mothers are opposed to or are for some reason unable to use a breast pump most companies are legally required to provide breastfeeding mothers an allotted amount of time and private location, void of repercussions, to breastfeed their infant. If the mother has difficulty lactating due to her stressful environment she may find it helpful to seek a peaceful and private area away from the work area, such as in her car, where her and her baby will be undisturbed during the allotted breastfeeding time.

### **1. Risks and Complications to Breastfeeding Mother**

Mastitis is a common complication while breastfeeding. Symptoms of mastitis may include redness, heat, tenderness, fever, malaise, and occasional nausea and vomiting. Mastitis and engorgement can often times complement one another with one complication influencing or provoking the development of the other. For example, pressure within the mammary ducts during engorgement provokes the occurrence of mastitis by inhibiting breast milk from leaving the breast through the nipple. After a period of time the stationary milk may encourage the growth of bacteria and therefore develop into mastitis, a breast infection, which can be uncomfortable and painful. On the other hand, if a lactating mother develops mastitis by a means other than engorgement, such as from cracked nipples which can serve as an entrance point by which an infectious organism can gain access to the breast tissue, the inflammation caused by the infection



may also inhibit the expression of milk from the breasts and therefore hasten the development of engorgement (Tilson, 1993).

“Cellulitis and adenitis are two main types of mastitis” (Tilson, 1993, p.3).

Cellulitis usually affects the connective tissue of the breast while adenitis typically affects the milk duct of either one breast or the other. Often times engorgement and mastitis may be prevented by allowing the infant to breastfeed for long periods of time, even though sometimes temporarily painful, on the effected breast first then the unaffected breast because the suckling force created by the infant’s mouth and continuous replenishing of the milk supply through the milk ducts of the mother’s breasts prevents the growth of bacteria. Suckling from the infant also maintains patency of the mammary ducts so that pressure from increased amount of stored milk in the ducts during engorgement is relieved via expression of the stored milk. Normally, mastitis and engorgement may be corrected naturally by allowing the infant to continue to nurse from the infected breast (Tilson, 1993).

Other factors that may influence the increased occurrence of mastitis and should therefore be avoided include restrictive clothing, the use of artificial nipples, and a low resistance to infection. Restrictive clothing such as a bra, shirt, bathing suit, diaper bag, baby carrier, purses and breast pads that are too tight may restrict flow of milk through the breasts. Nipple shields may negatively affect the flow of milk through the breasts while using pacifiers or bottles to supplement an infant’s sucking needs between feedings may change the way an infant sucks and therefore may inhibit the effectiveness of the infant’s sucking pattern while nursing from the breasts. Other changeable risk factors that lowers a mother’s resistance to infection are fatigue, anemia, malnutrition and stress;

while cigarette smoking negatively affects the functionality of the milk ejection reflex. Discomfort while breastfeeding may be treated with manual expression of milk from the breasts or implementation of a breast pump. Correct latch on technique of the infant while breastfeeding is also essential in preventing. Mothers who require extra teaching should seek the advice of a lactation consultant. Abnormalities within the breasts such as “biopsy, breast reduction, breast augmentation, tumor or cyst removal, the resulting scar tissue” and fibrocystic breasts may also increase risk for impaired lactation (Tilson, 1993, p. 20).

In some cases a mother may experience frequent recurrences of either mastitis or engorgement or less frequently both mastitis and engorgement. In such cases the cause and type of recurrent mastitis should be determined by samples that are taken from the mouth of the infant and also from the milk of the effected breast. In more serious cases of mastitis long-term antibiotic prophylaxis, low doses of antibiotic once a day for two to three months, may prove useful for relief and prevention of chronic inflammation. For chronic mastitis lactating mother’s may also try changing their diet by limiting their intake of saturated fats or by adding one tablespoon of lecithin to their diet every day to help reduce their risk of developing reoccurring plugged ducts. Another useful tip that may be useful for mothers experiencing unrelenting engorgement is too stimulate expression of small amounts of milk manually rather than ceasing to breastfeed altogether. Abrupt cessation of breastfeeding as well as over expression of breast milk may lead to worsening symptoms of engorgement rather than provide relief. An engorged mother should express milk manually but in moderation (Tilson, 1993).

Other basic methods that may be used to treat mastitis includes gently massaging the infected breast while applying a warm compress and resting in bed whenever possible for at least 10 to 15 minutes at a time. Riordan and Nichols (1990) discussed a survey that conveyed that stress and fatigue were the two factors most often reported by lactating mothers that preceded an episode of mastitis. Based on these results, resting in bed may serve as a beneficial way to relieve both stress and fatigue and thereby help decrease the occurrence of mastitis. Painful engorgement accompanied by mastitis are two common complications that may arise while breastfeeding and are also two main excuses that new mothers may use to justify cessation or avoidance of allowing their child to nurse from the breast. However, mastitis and engorgement should not be reasons by which a mother decides to stop breastfeeding (Tilson, 1993).

### **Benefits to Society**

Breastfeeding is beneficial to the family, employees, and economy (United States Breastfeeding Committee, 2013). The benefits of breastfeeding for society, include that breastfeeding is ecofriendly, time-saving and cost-efficient because the infant feeds exclusively from the breast. The mother will not need to buy bottles, formula, nipples, or breast pumps in order to feed her baby. Also artificial formula preparation involves expenditures in several other areas. Depending on the brand, formula alone can cost between \$58 and \$198 per month (American Pregnancy Association, 2014). In a developing world, where formula is considered a luxury, some families spend almost half or 45% of their monthly income of \$300 on formula alone. For an infant that is strictly bottle fed formula alone would add an extra annual financial strain of between \$750 and \$2500 to a family's budget within the United States. In comparison, breastfeeding

mothers only require 500 extra kilocalories extra per day to breastfeed their child. These extra 500 kilocalories can be easily supplied with a daily peanut butter sandwich and an 8oz glass of milk (O'Conner, 1998).

The additional 500 daily calories that a mother requires while breastfeeding would cost an average of \$1.25 per day. Therefore, breastfeeding not only meets an infant's nutritional and immunological needs but it is also unbelievably more cost-efficient for the first six months to a year postpartum. However, it is important to note that after six months an exclusively breastfed infant should begin to be gradually introduced to baby food or food that is ground in a blender to supplement breast milk. After six months the added cost to meet an infant's dietary needs will vary depending on the age of the infant, the nutritional make-up of the mother's milk, and the speed of which the infant is growing.

Breastfeeding being ecofriendly means that no non-degradable resources, bottles or other preparation materials are required for a mother to breastfeed her child when the child nurses directly from the breasts. On the other hand, most artificial formula products stem from cow's milk. Cows require a large measure of upkeep. They consume large amounts of water, grain, feed, and energy. Every year, large quantities of paper, cardboard, aluminum, plastic, steel and tin must be supplied by manufactures to meet the demand of nipples, bottles, formula cans, and other feeding supplies that are necessary for formula feeding. Contrarily, all that is necessary for breastfeeding is the mother and the baby (Ecofriendlyfoods, 2011).

Employees benefit from breastfeeding as an investment. Employees who provide lactation support benefit in the long run from lower health care costs, absenteeism,

improved morale, turnover rates, job satisfaction, and productivity. Additionally, employee who support breastfeeding have a 94 percent retention rate while the national average was 59 percent (United States Breastfeeding Committee, 2013).

Research has also shown that when newborns are breastfed the mother will spend less time and money on health care. In a study from the United States and Scotland it was estimated that \$330 to \$475 was saved on costs within the first year of an infant's life if the infant was exclusively breastfed for the first three months postpartum. It has been speculated that less visits to the doctor or in search of healthcare was the result of passive immunity (O'Conner, 1998). Breast milk is very complex in the sense that there are many components to breast milk that are yet to be discovered (The College of Physicians of Philadelphia, 2014). Owing to passive immunity and immunoglobulins passed through breast milk breastfed babies are less likely to become sick; therefore they require less time at healthcare settings for check-ups, vaccinations, illnesses, and prescriptions in 2002 (Pugh, Milligan, Frick, Spatz, & Bronner, 2002). This also means breastfeeding will decrease dependence on taxpayer dollars by mothers who are uninsured. This will therefore lessen the strain on society as well as out-of-pocket spenders. In 2013 it was speculated that if 90 percent of mothers had decided to breast feed their infants exclusively for six months it would have saved the United States about \$13 billion and prevented the death of 911 individuals annually. About \$733.7 million was spent on direct health care that year while \$126.1 million was spent on indirect costs (United States Breastfeeding Committee, 2013).

In conclusion, breastfeeding has many benefits for both the mother and the infant's physical and emotional wellbeing. Formula breast-feeding is helpful for those

who are unable to breastfeed for various reasons, but it is clear by evidence and research that breastfeeding is more successful in the prevention of harm and the promotion of health. This paper provides references and information about breastfeeding that may encourage more women to choose to breastfeed their children, and thereby slowly increase the nutritional health and quality of life of citizens of future generations.

### References

- American Academy of Pediatrics. (2015). *AAP policy on breastfeeding and use of human milk*. Retrieved from <https://www2.aap.org/breastfeeding/policyOnBreastfeedingAndUseOfHumanMilk.html>
- American Pregnancy Association. (2014). *Breastfeeding vs bottle feeding*. Retrieved from <http://americanpregnancy.org/firstyearoflife/breastfeedingandbottle.html>
- Bagby, K. & Bowen, S. (2012). Kangaroo care increases breastfeeding rates. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 41: S49. doi: 10.1111/j.1552-6909.2012.01360\_31.x
- Bartz, S., & Freemark, M. (2012). Pathogenesis and prevention of type 2 diabetes: Parental determinants, breastfeeding, and early childhood nutrition. *Current Diabetes Reports*. 12(1), 82-87. Retrieved from <http://link.springer.com.ezproxy.liberty.edu:2048/article/10.1007%2Fs11892-011-0246-3>
- Beall, A. (2010). The breastfeeding-oral health relationship. *Access*, 24(2), 20+. Retrieved from [http://go.galegroup.com.ezproxy.liberty.edu:2048/ps/i.do?id=GALE%7CA220013264&v=2.1&u=vic\\_liberty&it=r&p=AONE&sw=w&asid=1714a5256ea4805da20f7751afc316b0](http://go.galegroup.com.ezproxy.liberty.edu:2048/ps/i.do?id=GALE%7CA220013264&v=2.1&u=vic_liberty&it=r&p=AONE&sw=w&asid=1714a5256ea4805da20f7751afc316b0)
- Beauchamp, G. & Mennella, J. (2009). Early flavor learning and its impact on later feeding behavior. *Journal of Pediatric Gastroenterology & Nutrition*, 48: 25-30. doi: 10.1097/MPG.0b013e31819774a5

- Bilenko, N., Ghosh, R., Levy, A., Deckelbaum, R., & Fraser, D. (2008). Partial breastfeeding protects bedouin infants from infection and morbidity: Prospective cohort study. *Asia Pacific Journal of Clinical Nutrition*, *17*(2): 243-9. Retrieved from <http://apjcn.org/update%5Cpdf%5C2008%5C2%5C243-249%5C243.pdf>
- Burkhammer, M., Anderson, G., & Chiu, S. (2004). Grief, anxiety, stillbirth, and perinatal problems: Healing with kangaroo care. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *33*: 774–782. doi: 10.1177/0884217504270594
- Davidson, M., London, M., & Ladewig, P. (2012). *Olds' maternal-newborn nursing and women's health*. New Jersey: Pearson Education Incorporated. Print.
- Dermer, A. (2001). A well-kept secret: Breastfeeding's benefits to mothers. *La Leche League*. *18*(4), 124-127. Retrieved from <http://www.llli.org/nb/nbjulaug01p124.html>
- Ecofriendlyfoods. (2011). *Why breastfeeding is the best choice for the environment*. Retrieved from [http://www.ecofriendlyfood.org.au/breastfeeding\\_and\\_the\\_environment](http://www.ecofriendlyfood.org.au/breastfeeding_and_the_environment)
- Han, Y., Chang, E., Kim, J., Ahn, K., Kim, H., Hwang, E., et al. (2011) Association of infant feeding practices in the general population with infant growth and stool characteristics *5*(4), 308–312 doi: 10.4162/nrp.2011.5.4.308
- King, D. (1999, 06). Statistics: Breastfeeding. *International Journal of Childbirth Education*, *14*, 8-9. Retrieved from <http://search.proquest.com/docview/212860220?accountid=12085>



La Leche League. (2014). *What about drinking alcohol and breastfeeding?* Retrieved from <http://www.lalecheleague.org/faq/alcohol.html>

Lewis, S. L., Dirksen, S. R., Heitkemper, M. M., Bucher, L., & Camera, I. M. (2011). Breast disorders. In D. Hamolsky (Ed.), *Medical surgical nursing*. (pp. 1306–1327). Missouri: Elsevier Mosby.

Mathur, N. & Dhingra, D. (2013). Breastfeeding. *The Indian Journal of Pediatrics*. doi: 10.1007/s12098-013-1153-1

McCall, S. (2014). Nursing in public: What US mothers faced from colonial times until today. *Breastfeeding USA*. Retrieved from <https://breastfeedingusa.org/content/article/nursing-public-what-us-mothers-faced-colonial-times-until>

Mead, M., N. (2008). Contaminants in human milk: Weighing the risks against the benefits of breastfeeding. *Environmental Health Perspectives*, 116(10), A426–A434.

National Center for Biotechnology Information. (2009). The physiological basis for breastfeeding. *U.S. National Library for Medicine*. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK148970/>

Noonan, M. & Rippeyoung, P. (2011). The economic costs of breastfeeding for women. *Breastfeeding Medicine*, 6(5), 325+. Retrieved from [http://go.galegroup.com.ezproxy.liberty.edu:2048/ps/i.do?id=GALE%7CA27250848&v=2.1&u=vic\\_liberty&it=r&p=AONE&sw=w&asid=ffe00cde539beae4a90b90ad7b48b0ab](http://go.galegroup.com.ezproxy.liberty.edu:2048/ps/i.do?id=GALE%7CA27250848&v=2.1&u=vic_liberty&it=r&p=AONE&sw=w&asid=ffe00cde539beae4a90b90ad7b48b0ab)

Nemours Foundation. (2015). *Breastfeeding vs. formula feeding*. KidsHealth. Retrieved from [http://kidshealth.org/parent/growth/feeding/breast\\_bottle\\_feeding.html#](http://kidshealth.org/parent/growth/feeding/breast_bottle_feeding.html#)

O'Conner, E. M. (1998). Breastfeeding basics. *Breastfeeding benefits & barriers*.

Retrieved from <http://breastfeedingbasics.org/cgi-bin/deliver.cgi/content/Introduction/history.html>

Pechlivani, F., & Vivilaki, V. (2012). Breastfeeding and breast cancer. *Health Science*

*Journal*, 6(4), 610-617. Retrieved from <http://search.proquest.com/docview/1223853214?accountid=12085>

Pugh, L., Milligan, R., Frick, K., Spatz, D., & Bronner, Y. (2002). Breastfeeding

duration, costs, and benefits of a support program for low-income breastfeeding women. *Birth: Issues In Perinatal Care*, 29(2), 95-100. Retrieved from <http://www.tandfonline.com.ezproxy.liberty.edu:2048/loi/rfec20>

Riordan, J. (2005). *Breastfeeding and Human Lactation*. Sudbury, Mass: Jones and

Bartlett. Retrieved from [http://books.google.com/books?hl=en&lr=&id=eNHQA7VZLvcC&oi=fnd&pg=PP2&dq=Riordan,+J.+\(2005\).+Breastfeeding+and+Human+Lactation.+Sudbury,+Mass:+Jones+and+Bartlett.+Retrieved+from&ots=gHQ7XaWvBn&sig=ka1ZTR2R5Y\\_x8CztfbrNCMCppOs#v=onepage&q&f=false](http://books.google.com/books?hl=en&lr=&id=eNHQA7VZLvcC&oi=fnd&pg=PP2&dq=Riordan,+J.+(2005).+Breastfeeding+and+Human+Lactation.+Sudbury,+Mass:+Jones+and+Bartlett.+Retrieved+from&ots=gHQ7XaWvBn&sig=ka1ZTR2R5Y_x8CztfbrNCMCppOs#v=onepage&q&f=false)

Risch, H. (1998). Hormonal etiology of epithelial ovarian cancer, with a hypothesis

concerning the role of androgens and progesterone. *Journal of National Cancer Institute*, 90(23), 1774-1786. Retrieved from <http://jnci.oxfordjournals.org/content/90/23/1774>

Robinson, S. (2012). Breast milk effect on allergy varies. *GP*. 12. Retrieved from

<http://search.proquest.com/docview/1024785301?accountid=12085>

- Sadauskaitė-Kuehne, V., Ludvigsson, J., Padaiga, Ž., Jašinskienė, E., & Samuelsson, U. (2004). Longer breastfeeding is an independent protective factor against development of type 1 diabetes mellitus in childhood. *Diabetes/Metabolism Research and Reviews*. 20(2), 150-157. doi: 10.1002/dmrr.425
- Santoro, W., Martinez, F., Ricco, R. & Jorge, S. (2010). Colostrum ingested during the first day of life by exclusively breastfed healthy newborn infants. *Journal of Pediatrics*. 156(1):29-32. doi: 10.1016/j.jpeds.2009.07.009.
- The College of Physicians of Philadelphia. (2014). *Passive immunity*. Retrieved from <http://www.historyofvaccines.org/content/articles/passive-immunization>
- Tilson, B. (1993). Mastitis—plugged ducts and breast infection. *La Leche League*. 29(2), 19-21, 26. Retrieved from <http://www.lalecheleague.org/llleaderweb/lv/lvmarapr93p19.html>
- United States Breastfeeding Committee. (2013). *Breastfeeding saves dollars and makes sense: Help "make change" for our nation's families*. Retrieved from <http://www.usbreastfeeding.org/LegislationPolicy/BreastfeedingAdvocacyHQ/BreastfeedingSavesDollarsandMakesSense/tabid/339/Default.aspx>
- Walker, A. (2010). Breast milk as the gold standard for protective nutrients. *The Journal of Pediatrics*. 156 (2), S3-S7. doi: <http://dx.doi.org/10.1016/j.jpeds.2009.11.021>
- Weiss, J. & Rettger, L. (1934). *Lactobacillus bifidus*. *Journal of Bacteriology*, 28(5), 501–521. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC533696/>
- White, V. (2008). Breastfeeding and the risk of early childhood caries. *Evidence - Based Dentistry*, 9(3), 86-8. doi: <http://dx.doi.org/10.1038/sj.ebd.6400603>