

Spring 5-2012

Working Toward Pragmatic and Sustainable Exclusive Breastfeeding Practices Among Somali Mothers in Lewiston, Maine

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Working Toward Pragmatic and Sustainable Exclusive Breastfeeding Practices
Among Somali Mothers in Lewiston, Maine

An Honors Thesis
Presented to
the Faculty of the Department of Biology
Bates College
in partial fulfillment of the requirements for the
Degree of Bachelors of Science

by
Mariah Marilyn Clarke Barstow
Lewiston, Maine
March 23, 2012

ACKNOWLEDGEMENTS

I would like to extend my gratitude to the following people for supporting me and guiding me through this endeavor:

Foremost, I would like to thank my advisor, Karen Palin, who never ceased to remind me to “just breathe” throughout this project. Her encouragement and unfailing support for this thesis helped me continue my work, even as I thought the challenges would exceed my limits.

Thank you to Azeb Hassan, my cultural broker, whose passion for this project helped me realize the gravity and importance of community-based work such as this.

Thank you to my community partners at Women’s Health Associates in Lewiston and WIC in Auburn. More directly, thank you to Jean Kahn, the nurse midwife who cares for these Somali women, and Ginny Andrews, the Nutrition Services Program Manager at WIC. Their enduring commitment to serving these women and promoting healthier lives prompted the initiation and guided the focus of this project.

I would like to extend a special thank you to the Somali women who participated in the conversation groups, home visit interviews, and breastfeeding workshop. They not only opened their homes to me but also gave their time and attention to this work. Their voices and insights are invaluable.

Without the funding from the Bates Student Research Fund and the Arthur Crafts Grant, this thesis would not have been possible. Thank you to the funding committees who believed in the value of this project as much as I did.

Thank you to my numerous sources of guidance throughout this project, notably Seri Lowell, Sonya Kahlenberg, and the writing specialists, who always answered my questions and aided me through the writing process.

A warm thank you to my friends in Biology 479, Biology in Community: Maggie Horvath, Deb Mack, Olivia Tawa, and Alix Vandeventer. Your joint enthusiasm and shared interest in working within the community provided a valuable network of support that pointed me in new directions.

Last, but not least, I am indebted to my family and friends who provided the emotional support that helped me through this yearlong thesis. In particular to my parents: thank you so much for your continual encouragement and advice and for your ardent interest in my project.

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GLOSSARY OF ABBREVIATIONS

AA	Arachidonic Acid
AAP	American Academy of Pediatrics
ALA	α -Linolenic Acid
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
DHA	Docosahexaenoic Acid
FSH	Follicle-Stimulating Hormone
GnRH	Gonadotropin-Releasing Hormone
hCG	Human Chorionic Gonadotropin
IgA	Immunoglobulin A
IgG	Immunoglobulin G
LA	Linolenic Acid
LH	Luteinizing Hormone
MDI	Mental Development Index
PDI	Psychomotor Development Index
PRAMS	Pregnancy Risk Assessment Monitoring System
PRH	Prolactin-Releasing Hormone
PRL	Prolactin
USDHHS	U.S. Department of Health and Human Services
WHO	World Health Organization
WIC	Women, Infants, and Children

ABSTRACT

Breastfeeding is the most complete form of infant nutrition and has numerous health benefits for both the mother and infant. The U.S. Department of Health and Human Services' *Healthy People Goals* aims for approximately half of mothers to breastfeed exclusively through three months and a quarter of mothers to breastfeed exclusively through six months. Women in Somalia and in refugee camps abroad routinely breastfeed their babies, but upon immigration to the U.S., these mothers often face novel barriers that make it harder to exclusively breastfeed for the recommended amount of time. In Lewiston, Maine, health care providers find that Somali mothers frequently supplement or replace breast milk with formula. In conversation groups with Somali women, this trend was confirmed and women expressed the belief that their breast milk was insufficient for their infants' nutritional needs. This thesis aims to understand breastfeeding knowledge and beliefs of local perinatal Somali women and how those beliefs translate to practice. Home visit interviews were conducted to collect data on breastfeeding practices and beliefs. This information was used along with public health recommendations concerning breastfeeding, to develop a culturally relevant educational workshop. By building upon Somali women's current knowledge of breastfeeding, the workshop aimed to encourage pragmatic and sustainable exclusive breastfeeding practices, which will in turn improve mother and infant health. Culturally sensitive programs such as this have the potential to effect real progress toward the lactation objectives set forth in the *Healthy People Goals* and to cultivate healthier practices in the community.

INTRODUCTION

“Breast is Best”: An Overview

Breast milk is widely recognized as the best and most complete form of nutrition for infants due to its nutritional, immunological, developmental, psychological, social, economic, and environmental benefits (Steinman et al., 2010). Furthermore, exclusive breastfeeding, which refers to feeding in which no other liquid or solid is given to the infant besides breast milk, is the optimal feeding practice for infants up to six months (Labbok and Krasovec, 1990). Despite the well-documented positive health outcomes conferred by breastfeeding, recent reports have demonstrated low breastfeeding rates in the U.S. This prompted the development of the *Healthy People Goals*, a set of national public health aims set forth by the Department of Health and Human Services (USDHHS), which include objectives addressing the duration of lactation and use of formula. The goals for 2020 are to increase the proportion of breastfeeding women to 60% at six months post-partum and to 34% at one year. For exclusive breastfeeding, the goals are 46.2% through three months and 25.5% through six months (U.S. Department of Health and Human Services, 2012).

Economic Implications of Breastfeeding

Breastfeeding, compared to formula-feeding, is associated with lower personal and health care costs (Pugh et al., 2002). Given the preventative health benefits conferred by breast milk, annual health care costs could be decreased by an estimated \$3.6 billion in the U.S. if recommended breastfeeding practices were

observed (American Academy of Pediatrics, 2005). Currently, nutrition and health programs such as Women, Infants, and Children (WIC) absorb much of the heavy cost of formula provision in the U.S.

WIC is the largest supplemental food program in the U.S., providing food, nutritional counseling, and health referrals to low-income pregnant and post-partum women, infants, and children up to five years old. Eligibility for WIC is determined by income and state residency requirements, and a diagnosis of a 'nutritional risk' status as determined by a health professional (Hurley et al., 2008). In 1991, the cost of formula through WIC was estimated at \$404 million and consequently, the costs to support breastfeeding mothers through WIC were about 55% that of formula-feeding mothers (Ball and Wright, 1999). The trend of lower costs to WIC associated with breastfeeding women compared to formula-feeding women is well documented and confirmed by Montgomery and Splett (1997) in an economic analysis of WIC costs. They found that compared with formula-feeding, breastfeeding saved \$478 in WIC costs and Medicaid expenditures for each infant enrolled throughout the first six months of life.

Furthermore, breastfeeding may lead to fewer health care visits that require diagnosis and treatment services (Ball and Bennett, 2001). Thus, promotion of breastfeeding will likely lead to reduced health care expenditures. While improving the rates of breastfeeding may require capital investment by certain sectors such as employers and health insurers, Ball and Bennett (2001) assert that improved breastfeeding promotion and practice can be sources of significant cost savings for the U.S. economy.

Exclusive Breastfeeding and its Primary Obstacle, Infant Formula

Exclusive breastfeeding is nutritionally sufficient to support optimal growth and development for approximately the first six months after birth. The American Academy of Pediatrics (AAP) defines exclusive breastfeeding as “the reference or normative model against which all alternative feeding methods must be measured with regard to growth, health, development, and all other short- and long-term outcomes” (American Academy of Pediatrics, 2005). In other words, it is the best form of feeding for the infant, against which alternative feeding practices should be measured. Water, juice, or other liquids meant for hydration are unnecessary during the first six months and may introduce contaminants or allergens. Around six months of age, complementary foods rich in iron should be introduced to the infant’s diet. After the initial six-month period, breast milk continues to provide protection against diarrhea and respiratory tract infection. Breastfeeding should be continued for at least the first year of life, and beyond for as long as mutually desired by mother and child (American Academy of Pediatrics, 2005).

While breastfeeding initiation rates have increased steadily since 1990, the rates of exclusive breastfeeding initiation have shown little or no growth over the same time interval (American Academy of Pediatrics, 2005). Obstacles to initiation and continuation of breastfeeding are common. Health system challenges include early hospital discharge, lack of timely routine follow-up care and postpartum home health visits, and lack of guidance and encouragement from health care professionals. Furthermore, supplementation with human milk substitutes or formula during the early post-partum period negatively affects the length of

lactation (Chezem et al., 2003). Significant challenges to exclusive breastfeeding result from media portrayal of bottle-feeding as normal or virtually equivalent to breastfeeding, and commercial promotion and availability of infant formula through distribution of hospital discharge packs, coupons for free or discounted formula, and television and magazine advertising (American Academy of Pediatrics, 2005).

Pacifiers, as substitutes for on-demand nursing, may also pose a barrier to breastfeeding initiation and continuation (Jones and Lopez, 2006: 336).

Supplementing an infant's feeding or replacing breast milk with formula is fairly common, especially when women have extra-infant responsibilities and time demands. However, many women are unaware of the differences between formula and breast milk and the consequences supplemental feeding has on their own mammary biology and ability to produce milk. Formula-feeding is not necessarily bad or unhealthy, but it does carry some health risks and physiological effects that new mothers need to be aware of. The next section will demonstrate how, head to head, formula pales in comparison to breast milk on multiple levels, where breastfeeding is not contraindicated. Furthermore, it will explore how supplementing or formula-feeding affects an infant's feeding preferences. In turn, this may lead some women to feel or believe they cannot make enough milk to support their infant's nutritional needs (Jones and Lopez, 2006: 336).

Biology Basics of Breast Milk Production and Health Benefits

Breast Physiology

Mammary glands, mammae or breasts evolved from sweat glands so milk may be seen as a modified form of sweat. Each breast contains approximately fifteen to twenty lobes of glandular tissue that are separated by fat and ligamentous tissue. Mammary lobes are composed of several lobules made up of clusters of mammary alveoli, the functional units of the mammary gland. The alveolus is a hollow sphere that contains milk-secreting cells and is linked to an extensive blood supply, which provides the necessary components for milk synthesis and transports the hormones that control the growth and function of the alveoli. Milk is produced and then secreted into the secondary mammary tubules. The secondary mammary tubules from each lobe join to form a mammary duct, which then empties into a wider mammary ampulla, where milk may be stored. The ampullae open into the lactiferous ducts, which then open into the nipple. While mammary gland development occurs over many years and accelerates during puberty, maximum development occurs during pregnancy as a woman's body prepares itself to nourish the infant (Jones and Lopez, 2006: 56-59).

Breast Changes During Pregnancy

Pregnancy places enormous physical demands on a mother's body as she not only maintains the growing fetus, but prepares herself for postpartum infant care. A pregnant woman is typically advised to gain about twenty-five pounds and her blood volume is expected to increase by about 45-50%. Growth and development of

the breasts are controlled by the hormones estrogen, progesterone, and some other extraovarian hormones (Jones and Lopez, 2006: 56-59). The corpus luteum that forms after ovulation persists in a woman who becomes pregnant and secretes some of the hormones that initiate mammary gland development. After about two months of pregnancy, the placenta takes over from the corpus luteum and, stimulated by the hormone hCG (human chorionic gonadotropin), begins to secrete estrogens and progesterone. In addition, both the placenta and the pituitary gland secrete prolactin (PRL), the hormone involved in milk secretion (Jones and Lopez, 2006: 285-289). Throughout pregnancy, estrogen and progesterone levels in the blood rise and act in concert with adrenal hormones and growth hormone to cause the mammary glandular tissue to enlarge and the ducts to branch (Jones and Lopez, 2006: 56-59).

During the last trimester of pregnancy the glandular tissue begins to secrete a thick yellowish fluid called colostrum, which is rich in protein and maternal antibodies. Colostrum is present in the breasts several days before and after birth and is secreted when high levels of estrogens and progesterone in the mother's blood begin to suppress prolactin secretion from the anterior pituitary gland. Following birth, and once the placenta is expelled, estrogen and progesterone levels decline dramatically, which allows for the release of prolactin. Prolactin then stimulates the alveoli of the mammary glands to secrete true milk. True milk usually does not come in however, until about two or three days postpartum (Jones and Lopez, 2006: 336).

Infant Health Benefits Derived from Colostrum and Breast Milk

In utero, immunological defenses are transmitted across the placenta from mother to fetus. Maternal antibodies of the IgG isotype begin to be transferred across the placenta around the third month of gestation. After birth, these defenses are imbibed from the mother's colostrum and milk, which contain IgA antibodies (Hanson and Korotkova, 2002). Colostrum serves as the initial nourishment provided for the infant before true milk is produced. It contains many nutrients and protective factors that guard against certain infections, especially those of the gastrointestinal tract (Jones and Lopez, 2006: 56-59). Across cultures, opinions surrounding colostrum are highly variable. While some cultures advocate for the value and nutritional benefits of colostrum, others believe that it is harmful and women are advised to express it rather than feed it to their newborns. Postponing breastfeeding until normal milk or true milk comes in, often results in substituting colostrum with formula or other forms of liquids or milks (Hrady, 1999: 121).

Human breast milk is at the right temperature for infant consumption, sterile, and replete with all the nutrients that the infant requires for optimal growth. It contains lactose and other sugars, fats and fat-soluble vitamins, proteins, and electrolytes such as sodium, calcium, chloride, and bicarbonate (Jones and Lopez, 2006: 336). Additionally, breast milk supplies both non-specific immune factors and specific antibodies that reflect the mother's immunologic experience. After four months of lactation, a mother may secrete up to half a gram of antibodies alone in her daily milk that get passed to the infant via passive immunity (Hrady, 1999: 121). Further, breast milk contains lactoferrin, a molecule that binds to iron and facilitates

iron absorption in the infant (Jones and Lopez, 2006: 56-59). Lactoferrin controls the growth of gut microflora that require iron, by making it less available to these microorganisms (Brock, 1980).

The antibodies and antimicrobial factors present in breast milk protect against many of the bacteria, viruses, and intestinal parasites that are common in an infant's environment. Epidemiological data support the benefits of breast-feeding in preventing gastrointestinal and respiratory infections (Field, 2005). Breast milk has also been shown to enhance an infant's response to vaccines by stimulating the development of the infant's active immune system. Thus, breast and formula-fed infants display salient differences in immune function and response to vaccination (Pabst et al., 1997).

In both developed and developing nations, breastfeeding is associated with lower rates of infant illness compared to other modes of infant feeding. It is also associated with healthier outcomes and lower rates of certain illnesses in children and adults who were breastfed as infants. These include atherosclerosis, hypertension, diarrhea, childhood diabetes mellitus, childhood lymphoma, and middle-ear and upper respiratory tract infections (Jones and Lopez, 2006: 56-59). Breastfeeding may also reduce the risk of asthma and allergy in children (Allen and Hector, 2005).

The immunoglobulins and growth factors in human milk are not present in commercial infant formula. Breast milk not only facilitates the development of the immunologic response in infants, but stimulates the growth of infant tissues such as the brain, promoting cognitive development and higher intelligence quotients (Ball

and Wright, 1999). The cognitive development of an infant is a complex process that results from multiple genetic and environmental factors that interact with one another, but experimental and epidemiological data reflect the positive association between breastfeeding and cognitive ability. According to a meta-analysis on the cognitive effects of breastfeeding compared to formula-feeding, breastfeeding was associated with significantly higher scores for cognitive development than was formula-feeding, even when other variables such as socioeconomic status were controlled for. In particular, pre-term infants derive significantly more cognitive benefits from breast milk than do full-term infants. The cognitive developmental benefits of breast milk increase with duration of breastfeeding (J.W. Anderson et al., 1999).

In a study that explored later development in preterm infants who were fed human milk or formula, the Bayley psychomotor and mental development indices (PDI and MDI respectively) were used to assess neurodevelopment in preterm infants at eighteen months post-partum. Where mothers chose not to express breast milk, infants were randomly assigned to receive mature donor breast milk from an unrelated woman or a preterm formula as their sole dietary source, as consented by the infant's mother. This study showed that infants fed solely on standard formula had significantly lower developmental scores than those fed on donor breast milk at eighteen months. Additionally, the standard formula had a higher nutrient content than the donor breast milk, but breast milk showed associations with advantages for later development despite its lower nutritional content. According to the findings of this study, breast milk promotes

neurodevelopment (Lucas et al., 1994).

Breast-fed infants score better on visual and developmental tests than do formula-fed infants. This is likely due to higher concentrations of specific fatty acids such as erythrocyte docosahexaenoic acid (DHA), in the brain cortex of breast-fed infants. Human breast milk contains polyunsaturated fatty acids including DHA and arachidonic acid (AA). Formula however, only contains the precursors of DHA and AA, α -linolenic acid (ALA) and linolenic acid (LA) respectively. Thus, formula-fed infants must synthesize their own DHA and AA. Additionally, ALA and LA have been shown to compete for the same enzymes in the pathway that lead to the formation of DHA and AA. Because formulas contain high proportions of LA, they may actually hinder the conversion of ALA to DHA in formula-fed infants. DHA status has been linked with visual acuity, and dietary deficiencies of fatty acids such as DHA have resulted in altered brain composition and function. Diets that provide DHA improve retinal physiology, visual acuity, and neural function (Makrides et al., 1994).

Breastfeeding is also associated with lower rates of obesity in later childhood. Obesity prevalence rates have climbed dramatically in the past twenty years with higher rates among low-income, ethnic minority, and immigrant groups. In 2004, the Seattle WIC program reported that one third of infants served by WIC were in the 90th percentile for weight-for-length ratios at six and twelve months (Steinman et al., 2010). In some immigrant populations, cultural beliefs that contribute to overweight infants can be compounded by structural and environmental factors such as lack of access to health services and education, socio-economic disadvantage, institutional racism, and policies that make unhealthy foods less expensive than

healthy foods. Thus, promoting exclusive breastfeeding and infant nutrition may help address obesity issues and lead to improvements in overall health. Exclusive breastfeeding, delayed introduction of solid foods, and early initiation of healthy feeding practices contribute to preventing infant overweight and subsequent childhood obesity. Appropriate food and nutrition during infancy lay the groundwork for essential physical growth, mental development, and strong immune function (Steinman et al., 2010).

Maternal Health Benefits Derived from Breastfeeding

Traditionally, the health benefits derived from breastfeeding are emphasized for the nursing infant, but the maternal health benefits must not be overlooked (American Academy of Pediatrics, 2005). Reasons for using formula are complex, but two factors play a significant role: the acceptance of formula-feeding as being virtually equivalent to breastfeeding and a lack of knowledge of the prolonged health benefits derived from exclusive breastfeeding for both the child *and* the mother (Dermer, 1998). In the immediate postpartum period, mothers who breastfeed are protected from the risk of hemorrhage through the release of oxytocin with every feeding. Breastfeeding mothers have a decreased risk of postpartum hemorrhage in the first 24-48 hours after birth compared to their bottle-feeding counterparts, even when these women are given intravenous pitocin, a synthetic form of oxytocin (Dermer, 1998).

Breastfeeding may have protective effects against certain types of female reproductive cancers, which is likely due to the suppression of the ovulatory cycle

during lactation (Dermer, 1998). Evidence also suggests that breastfeeding may be protective against the development of pre- and postmenopausal breast cancer. Furthermore, this protection is likely dose-dependent, with longer duration and more exclusive breastfeeding being more protective (Allen and Hector, 2005). Other potential maternal benefits from breastfeeding include a decreased risk of diabetes mellitus in mothers with a history of gestational diabetes and a reduced incidence of bone fractures, particularly hip fractures caused by osteoporosis (Dermer, 1998; Rea, 2004).

Exclusive breastfeeding is known to increase child spacing due to lactational amenorrhea (which will be discussed in more detail later). It is well established that increasing the length of a birth interval increases the survival chances of a subsequent child through the neonatal, infant, and under five years periods of life. In other words, increasing the time between births improves the health of the subsequent infant. Thus, exclusive breastfeeding and its effect of lactational amenorrhea is important to consider with regard to birth spacing. A study performed by Rutstein (2005) on the health effects of preceding birth interval in developing countries, found that a birth interval of thirty-six months, or three years, was the optimal birth spacing time in terms of decreasing mortality for children under five years old (Rutstein, 2005). Besides its contraceptive effect, lactational amenorrhea experienced by exclusively breastfeeding mothers reduces iron loss in the mother. At the same time, maternal iron absorption from the gut increases during lactation, resulting in a decreased risk of iron deficiency (Rutstein, 2005).

Breastfeeding may also have psychosocial effects for the mother, but these are often harder to quantify and separate from confounding factors. Psychosocial benefits include facilitated mother-infant bonding and stress reduction. Breastfeeding reduces the release of the stress response molecules, catecholamines. This stress-reducing effect however, could be counteracted by several socioenvironmental factors including lack of support (Dermer, 1998).

Breast Milk Production

Human infants are born with simple fixed action patterns such as clutching, grasping, and rooting for the nipple, which allow them to initiate breastfeeding shortly after birth. Introducing the newborn to the breast immediately following birth is a crucial step in establishing the nursing relationship between the mother and infant, and in promoting the production and release of breast milk (Hrdy, 1999: 410).

The suckling stimulus on the nipple maintains the secretion of prolactin, which is the hormone responsible for milk secretion in primed mammary tissue (Jones and Lopez, 2006: 56-59). A woman's milk production is contingent on the continued release of prolactin, and as the infant grows and requires different quantities of milk, breast milk supply is controlled in such a way as to match the demand (generally the infant's appetite) for milk (Daly and Hartmann, 1995).

Similarly, the milk-ejection reflex occurs when suckling of the breast during nursing stimulates sensory receptors in the nipples. Neural messages travel to the brain, causing the release of the hormone oxytocin from the posterior pituitary

gland (Jones and Lopez, 2006: 336). Throughout pregnancy, a mother's pituitary gland expands and extra oxytocin receptors are formed in both the brain and uterus. During the birth process, pulses of oxytocin set off contractions in the smooth muscles of the uterus. Later, breastfeeding, and more specifically, nipple stimulation, signals the pituitary to release oxytocin, which travels in the blood to the mammary glands. There, the hormone causes the myoepithelial cells around the alveoli to contract and push the milk out toward the nipple. As a mother becomes more conditioned to nursing, non-physical stimulation such as the sound of an infant cry may trigger the let-down reflex (Hrdy, 1999: 145).

Lactational Amenorrhea: A Natural Form of Contraception

Suckling promotes the release of prolactin-releasing hormone (PRH), which in turn increases prolactin secretion and milk production. In addition to initiating milk production, suckling sends nerve impulses to the hypothalamus to inhibit the pulsatile release of gonadotropin-releasing hormone (GnRH), a hormone involved in ovulation (McNeilly et al., 1994). Fig. 1 shows how the decreased levels of GnRH subsequently inhibit follicle-stimulating hormone (FSH) and luteinizing hormone (LH) secretion by the pituitary. Furthermore, prolactin may decrease the responsiveness of the ovaries to these gonadotropins and in these ways, nursing can inhibit ovulation (Jones and Lopez, 2006: 336). The specific mechanisms underlying prolactin effects on gonadotropin release and ovary responsiveness are still unresolved, but are thought to interact at the level of the hypothalamus and the pituitary (Henderson et al., 2008).

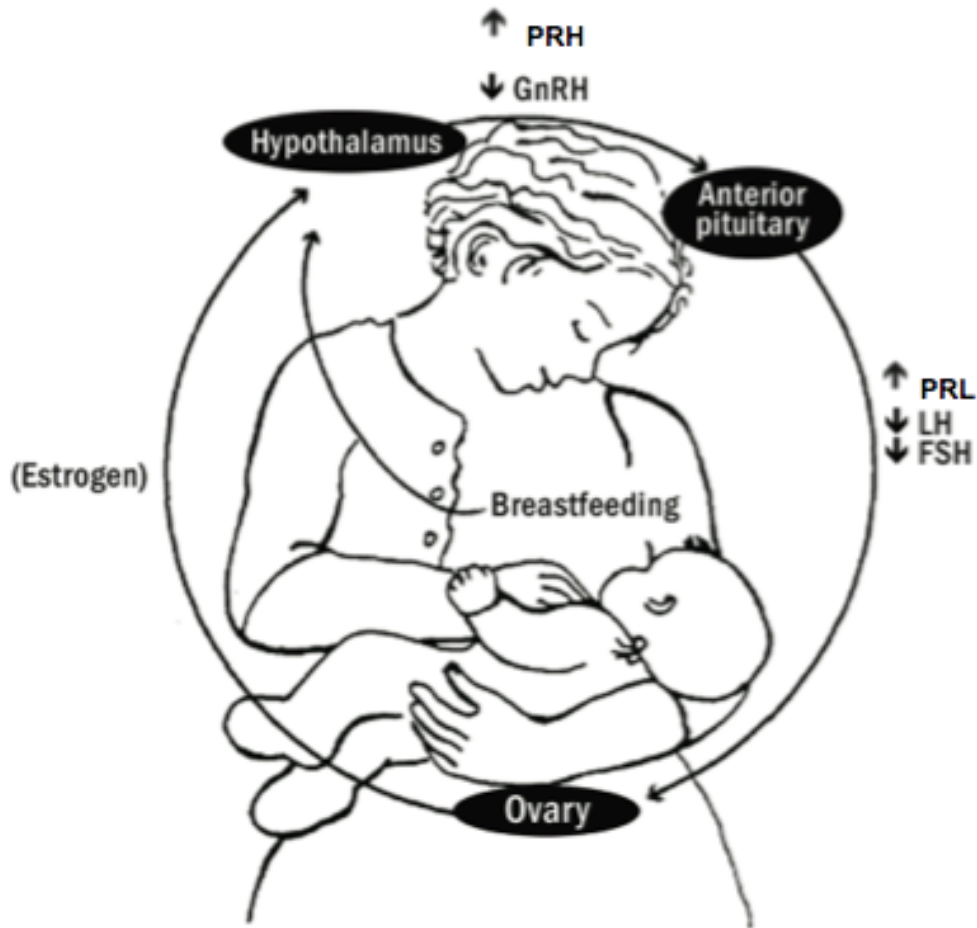


Figure 1. Hormonal control of lactational amenorrhea. Suckling stimuli send neural messages to the mother’s brain and trigger the release of PRH from the hypothalamus. PRH causes the anterior pituitary to secrete PRL. Suckling also inhibits the release of GnRH from the hypothalamus, which in turn decreases the secretion of LH and FSH, the hormones responsible for ovulation, by the anterior pituitary. Interactions between prolactin and GnRH are not shown, but elevated PRL levels may disrupt the normal pulsatile secretion of GnRH and decrease the responsiveness of the ovaries to gonadotropins. Adapted from Access Family Planning Initiative, 2009.

The amenorrheic effect of continuous and exclusive breastfeeding may allow women to space subsequent pregnancies. This prolonged period during which a breastfeeding mother is amenorrheic likely evolved to ensure that a current infant could be adequately nourished and safely weaned without competition for a mother’s breast milk (Hrды 1999: 409). Throughout human history, breastfeeding has been the most commonly used and effective contraceptive measure. While this technique can increase the average birth spacing in a population, there is a

relatively high failure rate of this measure at the individual level. However, a woman who nurses regularly and exclusively typically will not ovulate for up to six to nine months postpartum. Women who do not breastfeed at all begin to ovulate one to four months after the birth of their infants (Jones and Lopez, 2006: 336). The delayed resumption of ovulation in women who do not breastfeed at all demonstrates a time after birth during which the hypothalamic-pituitary-ovarian axis recovers from the effects of pregnancy. After this time, the continued suppression of ovarian activity depends on the suckling stimulus provided by the infant (Tay, 1991).

Pregnancy among exclusively breastfeeding women with lactational amenorrhea is rare (Kennedy and Visness, 1992). A consensus conference held in 1988 established lactational amenorrhea as an appropriate fertility control method. The Bellagio Conference suggested that complete or exclusive breastfeeding with postpartum amenorrhea for six months is 98% effective against the risk of unplanned pregnancy. In the years since, several studies have verified this figure (Tommaselli et al., 2000).

The effectiveness of this contraceptive measure depends on the breastfeeding practices of the mother. A study by Kennedy and Visness (1992) investigated the risk of ovulation and pregnancy as it related to amenorrhea and/or supplementation of the infant's diet among breastfeeding women from four continents. Overall, breastfeeding women showed rates of pregnancy of 7.6 and 17.2 per 100 women, at six months and twelve months respectively. Breastfeeding women who were amenorrheic and supplementing had pregnancy rates of 5.9 per

100 women at six months and furthermore, exclusively breastfeeding women (no supplementation) who were amenorrheic had pregnancy rates of only 0.7 per 100 women at 6 months (Kennedy and Visness, 1992). Thus, exclusive breastfeeding decreases the likelihood of getting pregnant shortly after birth, but any supplementation can quickly and markedly increase the risk of pregnancy.

Alternative Feeding Practices and the Effects on Milk Production

The sheer mechanics of breastfeeding make it an intimate event that promotes mother-infant bonding. While a mother may feel peaceful or even euphoric while breastfeeding, the milk can also act as a mild sedative for the nursing infant (Hrdy, 1999: 145). Once a mother begins nursing, her levels of prolactin and oxytocin increase and absence of the infant from the breast will inevitably cause her nipples to itch, tingle, and ache. Nursing provides an enormous amount of relief from the pressure of milk that builds up in her glands between nursing sessions (Hrdy, 1999: 536-538).

Supplementing with formula interacts with the feedback mechanisms involved in milk production. Babies are eager to suck milk from wherever they learn to obtain it. While infants can recognize their own mother's breast, they are not specifically imprinted to it and seek nurture and nourishment wherever they are rewarded. For example, infants readily discover that rubber nipples on a bottle deliver milk faster than breasts do. Although substitute animal milk or formula is harder on their digestive systems, infants may learn to prefer bottle to breast (Hrdy, 1999: 501). As an infant comes to prefer non-breast feedings, the suckling

stimulation on the mother's nipples becomes less frequent. This sets off a cascade of events that causes an ebbing in the production of milk and its positive health effects for both the infant and mother.

Infant feeding practices lie at the nexus between culture and biology. Cultural beliefs inform the dialogue and customs surrounding breastfeeding and alternative infant feeding practices. For example, consumerism and commodification dominate the American cultural landscape and influence many health practices including infant feeding. However, other cultural systems esteem the practice of breastfeeding and may view it not as a chore or duty, but as a gift. Somali immigrant and refugee perinatal women residing in Lewiston, Maine offer glimpses into infant feeding practices that change across contexts as women relocate to the United States.

Study Population: Perinatal Somali Women in Lewiston, Maine

Somali immigrants and refugees started to arrive in the U.S. after the collapse of their government in 1991 and the beginning of the civil war (Steinman et al., 2010). Lewiston, Maine has been established as both a primary and secondary resettlement site for both ethnic Somalis and Somali Bantus since the early 2000's. The 2010 census for Lewiston, Maine reported 3,174 persons delineated under the category of black or African-American (U.S. Census Bureau, 2010). The category does not specify Somali ethnicity, but much of the black population in Lewiston consists of ethnic Somalis and Somali Bantus. This census figure is likely under-representative of the current Somali-identified population, and anecdotal estimates

from members of the Somali community place the actual population number at over 4,000, or even at 6,000 Somalis (Cullen, 2011).

In a study on employment patterns among immigrants in Lewiston, Maine, Rector (2008) found that over 66% of Somali immigrants were under the age of thirty-five years old and females comprised over half (55.9%) of the total Somali immigrant population (Rector, 2008). Therefore, a large portion of this population consists of women of reproductive age, whose needs may not be fully met within the current health care system. The majority of Somali women in Lewiston are WIC eligible, which is indicative of lower socioeconomic status. In fact, data from 2001 to 2006 suggests an employment rate of about 49% among Somali immigrants of working age and a mean yearly income per worker of less than \$10,000 (Rector, 2008). Thus, as both immigrants and women of lower socioeconomic status, Somali women may face major barriers to care that put them and those under their care at a marked disadvantage for health outcomes.

Many Somali women in Lewiston have given birth both in Somalia and the U.S. and thus, the processes of pregnancy, birth, and postpartum infant care are changing within a novel cultural and healthcare framework. In Somalia, women breastfeed their children for an average of 19.5 months or just under two years according to the findings from a health survey distributed by the Minnesota International Health Volunteers (2005). Animal milk and additional energy supplements, mainly composed of sugar and oil, are occasionally given during early infancy by some women, where such supplements are available (Narruhn, 2008; Minnesota International Health Volunteers, 2005).

Many Somali women have a tremendous amount of experience with breastfeeding and infant care due to the typical extensive kinship networks that comprise Somali culture. The communal culture facilitates learning about breastfeeding from a young age. Furthermore, families are large and mothers and daughters are commonly parous for overlapping time intervals. Family support and assistance are prevalent among Somali women and familial advice wields significant influence on Somali mothering practices, including breastfeeding. As women have begun to give birth in the U.S. and in hospitals, they are also receiving breastfeeding instructions from health care professionals. While many Somali women place a considerable amount of trust in these sources, compliance with providers' advice about breastfeeding often comes second to cultural perceptions of or prescriptions for breastfeeding practice (Minnesota International Health Volunteers, 2005).

According to the findings of the Minnesota International Health Volunteers (2005), a Somali immigrant population in Minnesota was well aware that breastfeeding is good, but discrepancies in facts about breastfeeding and breast milk pervade the breastfeeding discourse within female social groups. Somali women generally know that breastfeeding is healthy for the baby, facilitates closeness between mother and baby, and is recommended by the Qu'ran for two years, but despite these cultural and religious prescriptions for breastfeeding, post-naturalization trends of supplementation have been documented within Somali populations as they begin to build families in the U.S. (Steinman et al., 2010). In the Minnesota health survey, 65% of Somali women reported breastfeeding for more than six months and 40% of women gave their infants supplements such as plain

water, infant formula, or other types of milk. Thus, despite the high rates of breastfeeding, early supplementation is common and exclusive breastfeeding is extremely rare in this population (Minnesota International Health Volunteers, 2005).

Specific Challenges and Barriers to Exclusive Breastfeeding among Somali Populations in the U.S.

Several national and global health organizations, including the World Health Organization (WHO), deem the promotion of breastfeeding a crucial public health objective. However, several barriers to recommended breastfeeding practices exist and vary across populations. Specific challenges to exclusive breastfeeding within Somali populations in the U.S. include lack of information on proper breastfeeding practice and facts about breast milk, cultural pressures to use formula or supplemental nutrient supplies, breast problems such as painful nipples and engorgement associated with breastfeeding, family and time demands, concerns about breastfeeding in public in the U.S., and a lack of cultural experience with breast-pumping and milk storage (Minnesota International Health Volunteers, 2005).

In addition, common cultural beliefs about breast milk among Somali women include the notion that breast milk will spoil if it is in the breast for more than three hours and that colostrum has no value or may be detrimental to the newborn since it is in the breast before the baby is born (Graham et al., 2007). Formula may serve as the intervening nutrition in the time between colostrum dissipation and the commencement of breast milk production, but without nipple stimulation, breast milk production is reduced. Immigrant mothers such as the Somali women in this

study may not be equipped with the knowledge of the physiological feedback mechanism between supplementation and milk production. This is likely due to the fact that commercial supplements such as infant formula are not readily available to these women in their home countries, and fewer alternatives to exclusive breastfeeding exist.

Within Somali culture in the U.S., there simultaneously exists a strong cultural and religious support for breastfeeding, and an intense insecurity about breast milk adequacy in terms of supply and quality. It is unknown whether this anxiety initiates post-immigration or was present in Somalia as well, but a well noted trend among Somali mothers in the U.S. is anxiety over milk production and supply. A fear of inadequate weight gain in babies, which may stem from previous experiences or cultural conceptualizations of chubby children as healthy, coupled with the inability to visualize breast milk volume during feedings, may contribute to this intense focus on infant nutrition and subsequent concern of adequate milk production. Additionally, supplementation during breastfeeding may veritably inhibit breast milk production, which in turn may contribute to this anxiety as well. Thus, a complex web of interacting elements informs both perceptions and behaviors that make it difficult to distinguish a clear causal link with respect to formula use and perceived milk insufficiency. Fears of breast milk inadequacy, whether they result from subjective anxieties or a physical decrease in milk production, play an integral part in a woman's decision to supplement her infant's feeding with formula (Graham et al., 2007).

Project Aims and Objectives: Culturally Relevant Education

Recently, health care providers in Lewiston have reported frequent and extensive formula-feeding by Somali mothers coupled with a voiced anxiety about or perception of breast milk insufficiency. Perception of breast milk inadequacy can turn into a reality via supplementation, as formula-feeding interacts with the biological feedback mechanisms that control milk volume.

Infant feeding knowledge, beliefs, and practices among perinatal Somali immigrant women in Lewiston, Maine, were explored through conversation groups and home visit interviews using both scripted questions and breastfeeding-related questions abstracted from a Pregnancy Risk Assessment Monitoring System (PRAMS) survey. PRAMS is a surveillance project of the Centers for Disease Control and Prevention (CDC) and state health departments that collects state-specific, population-based data on maternal attitudes and experiences before, during, and shortly after pregnancy (PRAMS, 2009). Interviews provided both quantitative and qualitative information regarding infant feeding, which helped illustrate views on breastfeeding and formula use and how these beliefs translate to practice. The information provided by the women was analyzed in light of the AAP recommendations and the *Healthy People 2020 Goals* for breastfeeding.

The results of the conversation groups and home visit interviews were used along with public health recommendations concerning breastfeeding, to develop an educational workshop tailored to the needs and concerns of the local population. The workshop was designed to elucidate the differences between formula and breast milk and underscore the importance of breastfeeding for both infant and

maternal health. The curriculum was also designed to respond to the salient concerns regarding milk inadequacy and provide methods for increasing milk production (i.e. decrease formula use, increase fluid intake, etc.). Programs such as this have the potential to cultivate healthier lives in the immediate community, but mark only one step toward achieving the national *Healthy People* lactation goals.

MATERIALS AND METHODS

Approach

This study used a mixed methodology approach in which both qualitative and quantitative data were gathered. The methodology was flexible and revised as needed throughout the project. Literature, consultations with practitioners at Women's Health Associates at St. Mary's Hospital and WIC, and the expressed concerns and views of the participants themselves informed the research process and delineated the major areas of focus for this project.

Study Population

The participants for this study were pregnant, breastfeeding, and new mothers in the local Somali population of Lewiston, Maine. Many of these women are cared for by local midwives at St. Mary's Hospital and almost all were WIC eligible and using WIC services. As an immigrant and refugee population, this group faces various barriers to care that put them, and their children, at particular risk for certain adverse health outcomes such as anemia, vitamin D deficiency, diabetes, and poor eating or feeding practices. They also often lack information about healthy behaviors and choices during pregnancy and lactation because they may feel uncomfortable attending current education classes offered on these topics or not fully understand the medical advice. Additionally, in relation to breastfeeding, several barriers to and misinformation surrounding recommended practices have been identified among Somali refugee and immigrant women in other resettlement areas such as Minnesota (Minnesota International Health Volunteers, 2005). Some

of these same trends were identified in the local population during consultations with staff at health agencies prior to the initiation of this study.

Data Collection

This study employed the use of conversation groups and home visit interviews for data collection. Conversation groups allowed for underlying themes about breastfeeding beliefs, knowledge and practices to emerge and subsequent interviews to be structured according to initial findings. Conversation groups took place in the fall of 2011 as part of a research and seminar course, Biology 479, Biology in the Community. Home visit interviews took place in the winter of 2012 and the workshop took place in the spring of 2012.

Conversation Groups

Using the services of a cultural broker, Somali patients from Women's Health Associates at St. Mary's Hospital, identified as WIC clients, were asked to participate in one of the three conversation groups held at the WIC offices in Auburn, ME. Women were also invited to join ongoing conversation groups following their WIC appointments if they had time. The conversation groups focused on topics relating to women's health including breastfeeding. A conversation group guide was developed prior to the sessions using a literature review and salient topics of concern noted by local health care practitioners working with Somali perinatal women (See Appendix A for the Conversation Group Guide). Questions were open-ended and designed to elicit participants' own language, meaning, and concepts. The

conversation group guiding questions incorporated infant feeding beliefs, knowledge, and practice. Breastfeeding and formula-feeding were discussed. Field notes were recorded for reference during the conversation group sessions to capture major concepts that emerged. Each session lasted one hour and began with a brief introduction and description of the group's purpose. The cultural broker then translated the written informed consent form, which all participants signed and dated (See Appendix B for the Conversation Group Informed Consent). Each woman also received a copy of the consent form in a small gift bag given at the end of the session. The gift bag included gloves, hand lotion, chapstick, and a fragrance spray. Healthy refreshments were served during the session.

Home Visit Interviews

For the home visit interviews, Somali women participants were identified as described. The cultural broker arranged the meeting times and places on a day-to-day basis and translated during the interview. The broker identified sixteen perinatal and postpartum women to participate in the study. Introductions and a brief outline of the purpose of the study took place before beginning the consent and interview process. The written informed consent was translated by the cultural broker and subsequently signed and dated by all participants. A copy of the consent form including the researcher's and cultural broker's contact information was given to each woman (See Appendix C for the Home Visit Interview Informed Consent).

The home visit interviews had a two-fold purpose. The first was to explore the indicators for and barriers to recommended breastfeeding practices, and to

examine the general character, duration, and quality of feeding practices through the use of a survey. The second aim of the home visit interviews was to examine the beliefs, knowledge, and experience with breastfeeding and alternative feeding practices that could not be articulated via survey responses (See Appendix D for the Home Visit Interview Survey and Guiding Questions).

The interview was structured so that initial questions were introductory and allowed the interviewer to catch a glimpse of the participant's reproductive history and past experience (if any) with breastfeeding. Women were asked to tell a little bit about themselves and how many children they may have had in the U.S. and/or in Africa. The first part of the interview utilized selected PRAMS survey questions, which were identified as breastfeeding-related. All questions were designed to be answered by either "Yes" or "No" or a specific time interval and encapsulated duration, quality, and character of feeding practices, indicators and barriers for recommended breastfeeding behaviors, and usage of supplemental support programs such as WIC. For these questions, women were asked to speak in reference to their most recent live infant.

The second half of the interview was designed to draw out specific attitudes and beliefs surrounding breastfeeding, breast milk, and formula, and how those positions translated to feeding decisions and practices by the mothers. In particular, questions focused on "dhumber" (colostrum) and formula use. Women were asked where and from whom they learned about breastfeeding and in turn what advice they would give to a new mother or friend. Furthermore, the interview became a platform from which any concerns, questions, or any other information the women

wanted to give concerning infant feeding could be addressed. This information was later presented to the community health partner involved in the project. As the cultural broker translated the women's responses, notes were taken and salient translated remarks were recorded. Following the interviews, each woman received a \$10 gift card to Walmart as a small token for her participation.

Data Analysis

A content analysis was performed on data collected from the conversation groups and home visit interviews. Content analysis is a useful method for identifying patterns in participants' accounts to help elucidate salient themes and overall trends (Steinman et al., 2010).

Conversation Groups

Notes from the conversation groups were reviewed to determine the direction of focus for the project and inform the structure of the home visit interviews.

Home Visit Interviews

The PRAMS survey questions that involved hospital stay events were divided into two categories to reflect their relation to breastfeeding as either indicators for or barriers to recommended breastfeeding practice. For example, a positive response to the question, "Did you breastfeed your baby within the first hour after birth?" served as an indicator for recommended breastfeeding practice while a

positive response to “Did the hospital give you a gift pack with formula?” served as a barrier. These measures are consistent with the AAP policy statement on breastfeeding (Policy Statement AAP, 2005). For questions related to the duration of breastfeeding and timing of introduction of other liquids and solids, responses were compared with the AAP recommended practices.

The second part of the interview was far less structured and involved open-ended questions. Prominent and recurring themes were identified and responses were categorized and analyzed within each theme.

Workshop

Development

Results from the home visit interviews were used to develop the workshop curriculum. Educational material for the workshop was tailored to address the immediate concerns and educational needs of the study population. Continued consultations with community partners from Women’s Health Associates and WIC informed the development of the workshop as well (See Appendix E for the Outline for Workshop Curriculum and Appendix F for the Workshop Educational Materials).

Implementation

Following the conclusion of the home visit interviews, the cultural broker identified five young Somali mothers or future mothers and invited them to take part in a workshop on breastfeeding. The workshop took place in an educational room at Women’s Health Associates at St. Mary’s during the spring of 2012 and

lasted about seventy-five minutes. Karen Palin, Ph.D., of Bates College, Jean Kahn, C.N.M, of Women's Health Associates in Lewiston, and two other Bates students were invited to attend as well. As per the conversation groups and home visit interviews, the purpose of the project was presented, the written informed consent form was translated by the cultural broker, and signed and dated by all participants. A copy of the consent form including the researcher's and cultural broker's contact information was given to each woman (See Appendix G for the Workshop Informed Consent).

The workshop was interactive and involved discussion, an educational game, and addressing specific questions that the women raised. Each woman received a prize of her choice as part of the game and a gift bag at the end of the workshop. The prizes included baby blankets, fortified cereal, and a bag with personal items such as lotion, chapstick, gloves, and fragrance. The gift bag contained healthy food items, including bananas, spinach, baby carrots, brown rice, and fortified cereal, and baby powder and a baby blanket. At the end of the workshop, women were asked to share something new that they learned and asked whether they thought the information presented would result in changes in infant feeding practices within the Somali community. Topics of particular concern that arose during the workshops were noted as potential areas for further study.

IRB Approval and Grant Support

All parts of the study (conversation groups, home visit interviews, and workshops) were approved by the Bates College Institutional Review Board (IRB).

Funding for this project was provided by a Bates College Student Research Grant, a Crafts Service Grant, and the Department of Biology at Bates College.

RESULTS

Conversation Groups

A total of nine women took part in the conversation groups and seven of the participants were Somali. Conversation groups ranged in size from two to four women. Somali women discussed their pregnancies and postpartum experiences both in the U.S. and in Africa. Themes pertaining to breastfeeding identified during the discussions included cultural and religious affirmations of breastfeeding, changes in breast milk production and duration of breastfeeding with time in the U.S., sentiments of breast milk insufficiency, and supplementation with formula.

Home Visit Interviews

Characteristics of the Interview Population

Sixteen women were interviewed in either an educational conference room adjacent to the waiting room at Women's Health Associates at St. Mary's Hospital or at the women's homes. Five women were pregnant at the time of the interview and of those women, only one was a primigravida (a woman experiencing her first pregnancy) (Narayan et al., 2005). None of the pregnant women were breastfeeding during their pregnancies, but a total of seven mothers (44%) were currently breastfeeding at the time of the study (n=16). Women ranged in age and maternal experience, but largely, the women were confident in their maternal skill sets and knowledge, particularly in relation to breastfeeding. The primigravida and an older mother who had only given birth in Africa were excluded from particular questions in the first part of the interview as those questions did not pertain to their

experiences. These women were asked only the questions from the survey that applied to them.

PRAMS Breastfeeding Survey Results

All the women who had received prenatal care in the U.S. were using WIC services during their most recent pregnancies and all but one woman (93%) recalled having a doctor, nurse, or other health care worker speak with them about breastfeeding during any prenatal care visit (n=15). All women except for the primigravida and older mother had given birth in a hospital (n=14) and all women, excluding the primigravida, breastfed their babies at some point after delivery, even if only for a short period of time (n=15).

Hospital stay events that contribute to breastfeeding initiation and practice can be seen in Table 1. These events represent either indicators for or barriers to recommended breastfeeding practice. The majority of women noted that breastfeeding information and advice were disseminated by health care workers in the hospital. Hospital staff offered instruction on technique, breast pumps to facilitate continued breastfeeding, and contact information for post-discharge support. While most of the women indicated that their babies stayed in the same room as them, were breastfed, and breastfed within the first hour after birth in the hospital, several events occurred that may have contravened recommended breastfeeding practice. None of the women fed their infants only breast milk in the hospital and consequently, formula initiation was extremely early and occurred within the first week after birth for most women. According to health care

providers, many Somali women request formula from the hospital staff. The majority of women said that their babies used a pacifier in the hospital and that pacifiers were offered to the mothers by hospital staff. Lastly, all women received formula in the hospital and a hospital discharge pack containing formula.

Table 1. Hospital-stay events that contribute to infant feeding practices. Events occurred at the hospital where the women’s babies were born and data were collected using the PRAMS survey during home visit interviews. Events are classified according to their relation to recommended breastfeeding practice (indicators or barriers); percentages (%) reflect the proportion of women affirming the occurrence of the given event. N=14.

Indicators	%	Barriers	%
Mother given information about breastfeeding	93	Mother given gift pack with formula	100
Baby stayed in same room as mother	93	Baby used pacifier	93
Baby breastfed	100	Formula use within first week after birth	100
Baby breastfed within first hour after birth	71		
Baby fed only breast milk	0		
Staff helped mother learn how to breastfeed	79		
Staff told mother to breastfeed whenever baby wanted to	100		
Mother given a breast pump to use	64		
Mother given a telephone number to call for help with breastfeeding	71		

All participants, excluding the primigravida and the older mother, received postpartum WIC services for both the mother and infant. The mothers indicated receiving services for six months postpartum (n=14). Fig. 2 shows that duration of breastfeeding varied among mothers who were not currently breastfeeding, but 25% noted breastfeeding for less than a year while 75% breastfed for one year or longer (n=8). Two women (25%) breastfed for two years. Among women with infants who had been fed solid foods (n=10), solid foods were introduced at four months by 20% of women, at six months by 60% of women and at seven months by

20% of women. The average age of the infant at the introduction of solid foods was 5.8 months (Fig. 3).

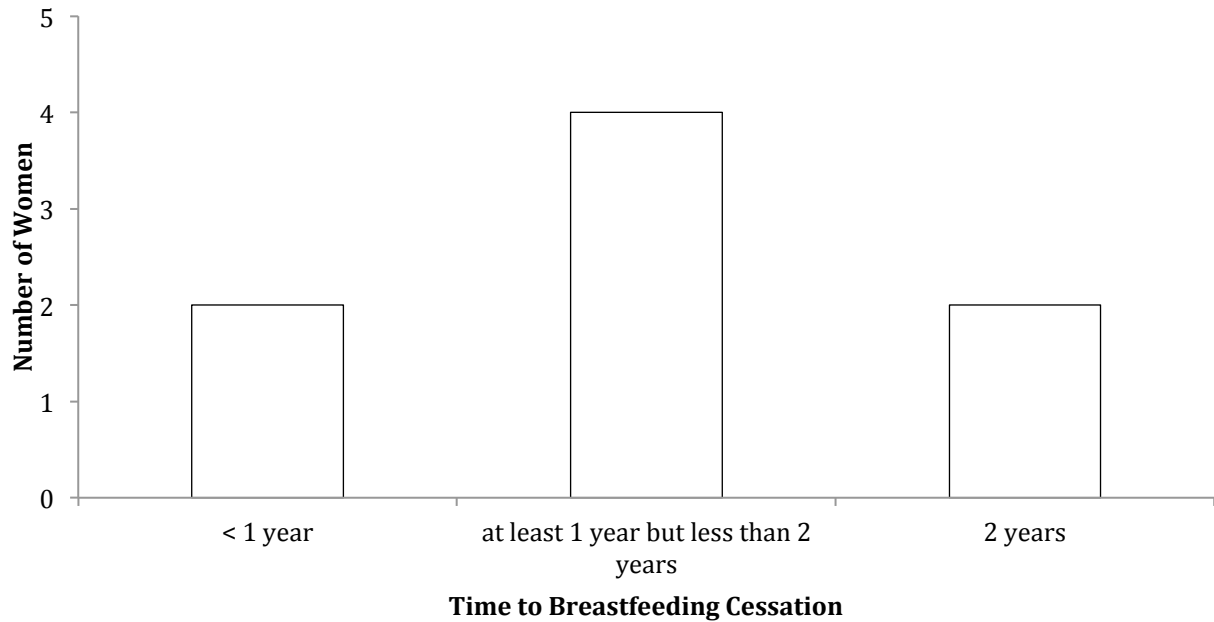


Figure 2. Approximation of breastfeeding duration (in years) noted by Somali mothers in the PRAMS survey during home visit interviews. Time until breastfeeding cessation was indicated by all of the women who were not currently breastfeeding (excluding the primigravida). N=8.

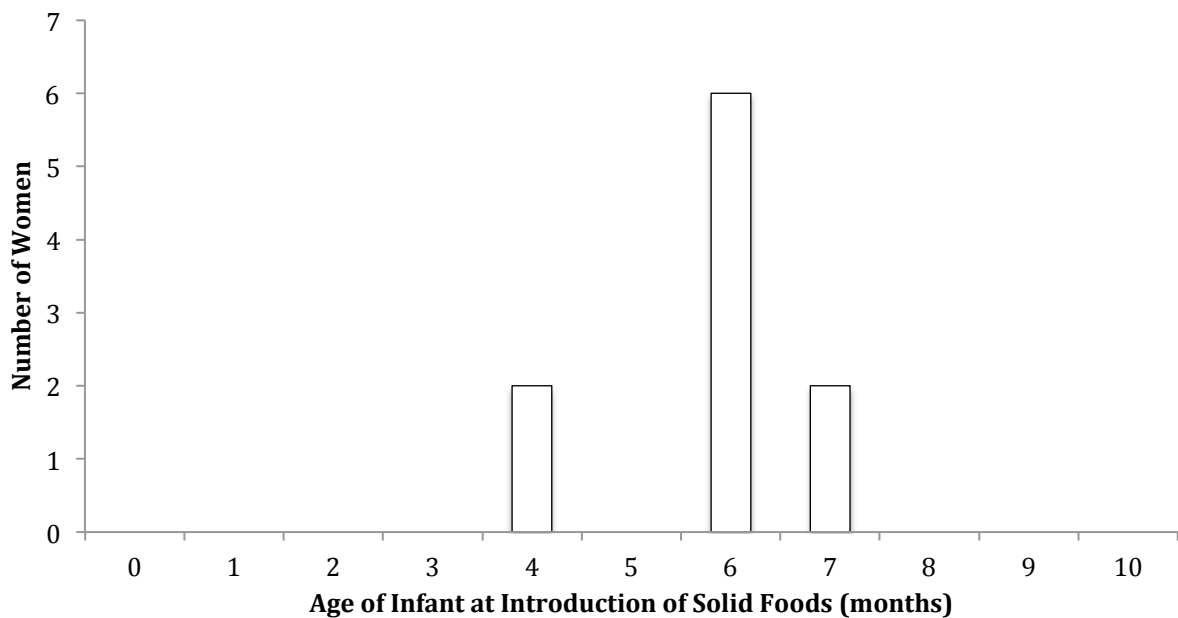


Figure 3. Timing of introduction of solid foods into infant's diet. Ages (in months) were noted by mothers during home visit interviews in the PRAMS survey. N=10.

Themes and Findings from Discussion Based Questions

The primary topics discussed during the interviews were the women's sources of breastfeeding knowledge, ideas about colostrum ("dhumber") and breastfeeding benefits, breastfeeding problems or issues, feelings of milk insufficiency, reasons for formula-feeding, and perceived differences between formula and breast milk. Not all women gave responses for each area of discussion, and some gave more than one answer in reference to a particular topic.

The majority of women indicated learning about breastfeeding or learning how to breastfeed from a close female relative. A few women indicated more than one knowledge source, but the most common answer to this question was, "mother" with seven responses. Aunts, grandmothers, and stepmothers were also identified as knowledge sources and two women named the hospital where their baby/babies were born as a source of knowledge.

Perceptions of dhumber were highly varied, and discussions about dhumber took place with all but three respondents (n=13). Of those who spoke about dhumber, 62% believed it to be good for the baby's health, 31% believed it to be bad for the baby's health, and 7% were unsure, but had heard both sides. Breastfeeding was generally regarded as being healthy, but protection from disease for the baby, making a baby strong, and pregnancy spacing were also considered (Fig. 4). Of the fifteen women who had experience with breastfeeding, only one woman spoke about some pain associated with breastfeeding. The rest of the women (n=14) responded that they experienced no problems or issues.

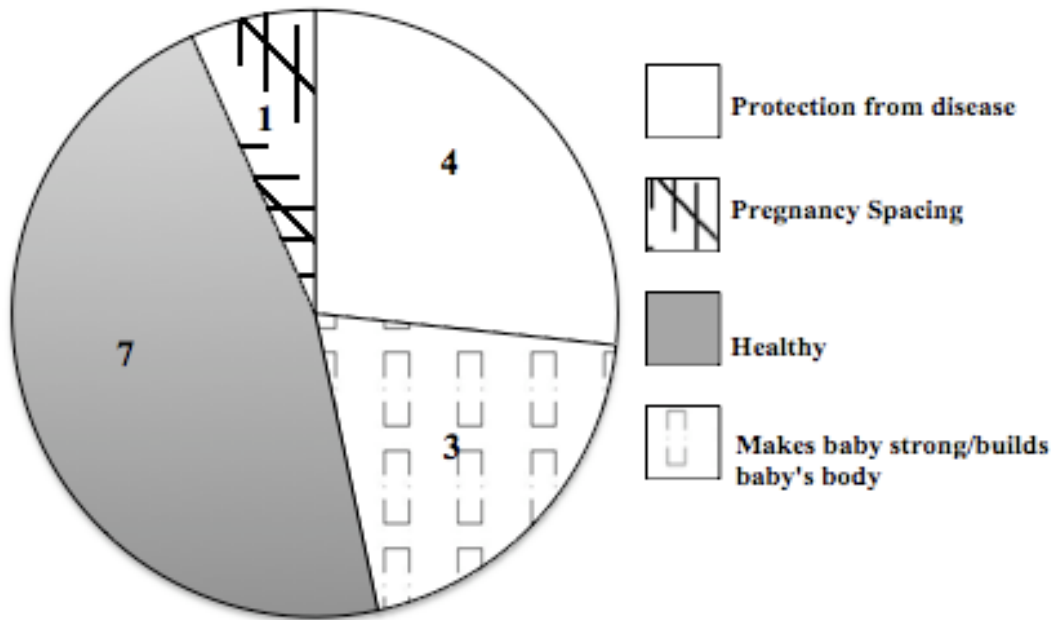


Figure 4. Breastfeeding benefits noted by Somali mothers. Some women gave no response and some gave more than one. The numbers within the figure indicate the number of responses. N=15 responses.

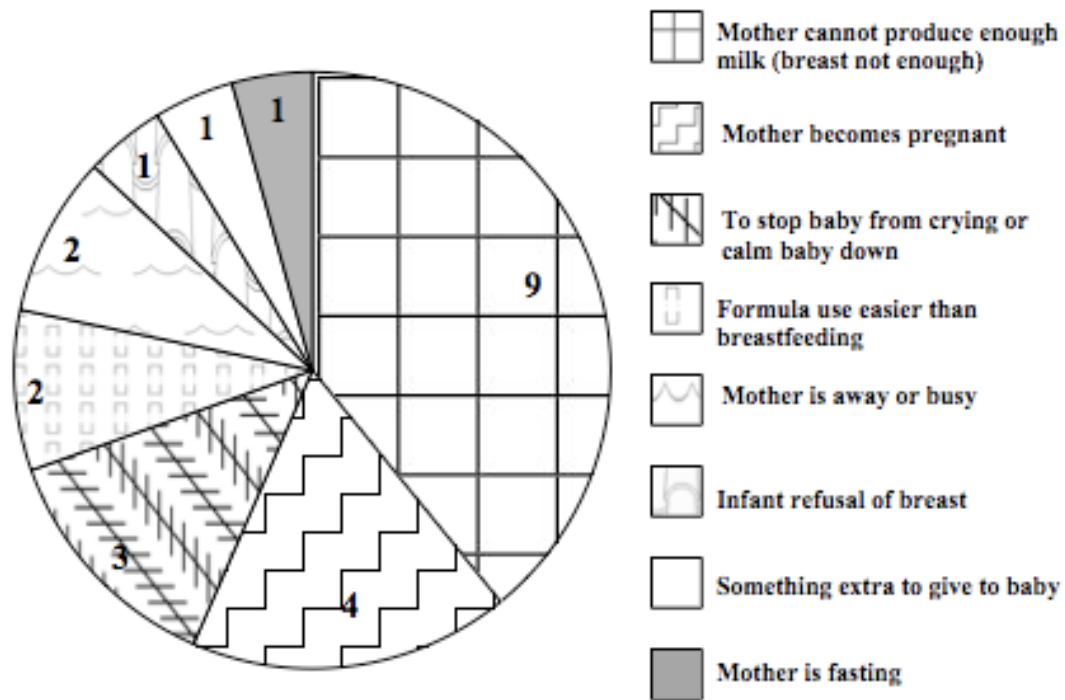


Figure 5. Reasons for supplementing breastfeeding with formula as voiced by Somali women. Some women gave no response and some gave more than one. The numbers within the figure indicate the number of responses. N=23 responses.

Twelve of the women interviewed (75%) expressed some form of perceived milk insufficiency, and the one primigravida was worried about not being able to produce enough milk once her baby was born. Three women (19%) felt that they had enough milk, but two of these mothers gave formula despite their perceived milk adequacy. The other mother who felt as though she had enough milk was the older mother who had only given birth and nursed in Africa. All of the women who were asked if they would breastfeed exclusively if they had enough milk responded that they would (n=11).

Several reasons for formula-feeding were expressed, but the most common reason, referred to by nine women, was a mother could not produce enough milk or the breast milk was seen as insufficient. The second most common response, given by four women, was a mother becomes pregnant while nursing. The third most common reason, stated by three women, was that formula may stop a baby from crying or calm the baby down. Other reasons given were that formula-feeding is easier than breastfeeding, could be given as something extra for the baby, and that formula could be used if the mother is busy or away from home, if the infant refuses the breast, or if the mother is fasting, such as during religious holidays (Fig. 5).

Responses to questions comparing formula and breast milk were variable. While 46% of respondents believed that breast milk was better than formula, 40% of the women who responded to the question were unsure of the differences. Only one woman believed formula and breast milk to be compositionally the same, and one woman noted that breast milk is important, but did not specify any differences (Fig. 6, n=15).

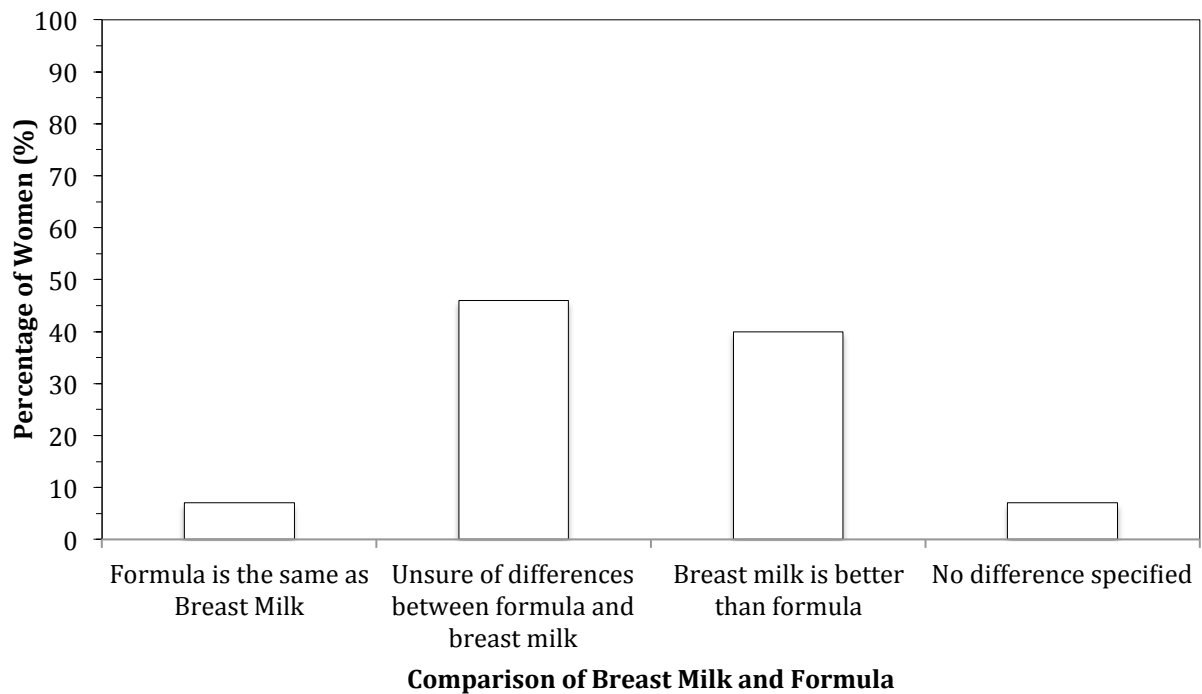


Figure 6. Comparison of breast milk and formula. Responses elicited by the question: “Are there any differences between breast milk and formula?” N=15.

Workshops

The main educational topics discussed in the workshops were breastfeeding benefits for both the infant and mother, the importance of feeding dhumber for the newborn’s health and for maternal milk production, the differences between formula and breast milk, and the effects of formula supplementation on milk production. Furthermore, breastfeeding recommendations were presented and ways to improve infant feeding practices were discussed.

The women were able to identify differences between formula and breast milk in the interactive game. However, women raised specific questions about dhumber, and whether it should be fed to the baby, and breastfeeding decisions during Ramadan. All women noted that they learned a lot from the materials

presented and in discussions with the women following the workshop, one woman declared that she wished she had known some of the information before she had given birth and was going to pass the information that she learned along to other women in the community.

DISCUSSION

Breastfeeding in the Context of Geographic and Sociocultural Upheaval

Several cultural practices surrounding the events of pregnancy, birth, and breastfeeding have shifted with the complete geographic and cultural upheaval experienced by Somalis as they are resettled to the U.S. As communal support systems change and women's health becomes immersed within the biomedical realm, Somali immigrant women face novel challenges to breastfeeding that alter their traditional feeding beliefs and practices. For the Somali women in this study, decisions to feed formula were complex, multidimensional, and embedded within a framework of acculturation.

The majority of Somali women who participated in this project had extensive experience with childbearing, breastfeeding, and childrearing. In addition, many women had reproductive and post-reproductive experiences in both Africa and the U.S. and provided insights into how that geographic and cultural transition changed their beliefs and/or practices regarding infant feeding. Confidence in parenting and breastfeeding among these Somali mothers was notable. Breastfeeding was indicated as being "part of Somali culture" and a recurring theme in the lives of Somali women, who gain much of their social position from their ability to produce and raise children.

Childbearing and rearing are expected of women within Somali culture and physical discomforts associated with reproduction and post-reproductive practices become normalized by Somali women. In fact, enduring pains without complaint may be seen as a sign of strength (Finnstrom and Soderhamn, 2006). Pains and

issues with breastfeeding were often glossed over and elicited responses such as, “It is my baby,” “I am experienced,” or “It [breastfeeding] is God’s gift.” These types of responses indicate a reformulation of the framework around this topic. Any pains that are experienced by mothers are noted as “normal” and become subsumed by the overall experience of breastfeeding that is perceived as a mother’s duty and a divine gift.

In Somalia, a strong network of women benefits pregnant and newly-delivered Somali women and their infants. Following birth, Somali mothers practice *afatanbah/ Umol bah*, a period of forty days over which the new mother and baby remain indoors at home. Postpartum support systems, such as *afatanbah* in Somalia, serve to increase postpartum maternal survival in societies where resources are scarce or postpartum healthcare for the mother and infant are effectively absent (Pak-Gorstein et al., 2009). A postpartum woman is not expected to have sexual intercourse during *afatanbah* so that she may heal, but more importantly, *afatanbah* serves as a time during which the new mother’s community and family take care of her, her infant, and the rest of her family. This period is meant in part to foster bonding between the mother and infant and help the mother focus on breastfeeding. During this time, female relatives and friends visit the family and provide both emotional and substantive support (Lewis, 1996).

Many immigrant women from low-income countries of origin experience significant sociocultural and economic transitions when they move to the U.S. A traditional setting with parenting and family support is often left behind, which may leave immigrant women feeling isolated in the U.S. (Pak-Gorstein et al., 2009). In the

U.S., this traditional system of postpartum support may be curtailed since communal support is neither institutionalized nor expected (Lewis, 1996). Thus, immigration or resettlement to the U.S. disrupts and abbreviates the Somali tradition of *afatanbah*. The women are not given forty days to recuperate at home, but two days at the hospital when their infants are born. This shortened time interval may shift the focus away from exclusive breastfeeding toward a different pragmatic solution by which a mother focuses on resting and sleeping to prepare herself for her regular pre-delivery responsibilities as well as caring for her new infant when she returns home.

Along with the sociocultural and economic changes experienced upon immigration to the U.S., nutritional changes may play a role in women's infant feeding decisions. As Somali women adjust to the novel nutritional culture of the U.S., they are often faced with the wide availability of foods, particularly those that are cheap, high in calories, and low in nutritional value. It is well documented that immigrants to the U.S. often experience weight gain, and in some cases, excessive weight gain as their time in the U.S. increases (Venters and Gany, 2011). In a study of Somali immigrant women in Australia, many women reported gaining weight within the first five years (Burns, 2004). Furthermore, rates of overweight and obesity are increasing worldwide among women of reproductive age. This has particular consequences for maternal and fetal health during pregnancy, and for lactational performance following birth. There are associations between high maternal pre-pregnant body mass index (BMI) and unsuccessful initiation and shortened durations of breastfeeding (Baker et al., 2004). Thus, proper nutrition

before, during, and after pregnancy is important to ensuring optimal breastfeeding outcomes.

Decisions about what and how to feed are complex and often the result of multifaceted interactions between mothers' cultural perceptions, education level, economic and social resources, and their children's nutritional status (Steinman et al., 2010). Furthermore, religion may be a factor, involving prescriptions for breastfeeding practice. Muslim faith is an integral part of Somali culture and the Qu'ran contains references that recommend breastfeeding for two years: "The mothers shall give suck to their offspring for two whole years for those who desire to complete the term (2:233)" (Pak-Gorstein et al., 2009). This prescription however, does not contain references to exclusive breastfeeding and thus, supplemental feeding does not directly transgress divine law. The interplay of both beliefs and pragmatism cause women to negotiate infant feeding practices within their social and environmental circumstances.

Foreign-born mothers, particularly those from low-income countries, typically demonstrate greater breastfeeding initiation and longer duration than U.S.-born mothers. This trend holds across racial and ethnic lines and socioeconomic statuses (Singh et al., 2007). All of the Somali women interviewed in this study who had given birth, initiated breastfeeding following delivery. This is a higher initiation rate than seen among other low-income groups in the U.S. A study conducted by Hurley et al. (2008), found that among WIC clients, Hispanic mothers (91%) were more likely to initiate feeding than African American (65%) or white (61%) mothers. Furthermore, the majority of Somali women in this study were found to breastfeed

longer than reported for these other groups. Seventy-five percent of Somali participants reported breastfeeding for over one year, whereas Hurley et al. (2008) reported mean times to breastfeeding cessation of five months, three and a half months, and three months for Hispanic, African-American, and white mothers respectively. Thus, initiation and duration of breastfeeding among this group of Somali women are in line with the *Healthy People 2020* goals; it is the lack of exclusivity of breastfeeding that is of concern.

Indicators For and Barriers to Recommended Breastfeeding

Certain health care policies and practices emerged as discordant in their promotion of breastfeeding initiation, continuation, and exclusivity. While Somali mothers were educated and given many of the tools to carry out recommended breastfeeding practices, the availability and distribution of formula in the hospital directly counteracts these initiatives. All but one woman who had received prenatal care in the U.S. recalled conversations with a health care worker about breastfeeding during at least one prenatal care visit, indicating efforts by health care providers to educate about and promote breastfeeding among their prenatal patients. Health providers have been constant advocates for breastfeeding, but cutbacks in the duration of hospital stay post-partum may affect breastfeeding success of women and infants due to reduced opportunities for education, observation, and practical instruction on correct breastfeeding technique (Kuan et al., 1999). In addition, without incorporating understanding or recognition of these women's cultural and personal beliefs, educational directives may fall on deaf ears.

The AAP has explicitly defined several health policy indicators for and barriers to recommended breastfeeding practice. The AAP recommendations include increased pre and postnatal education and support for mothers, and improved hospital conditions that increase a mother's ability to breastfeed immediately after delivery. Until the first feeding is accomplished, healthy infants should be placed and remain in direct skin-to-skin contact with their mothers. Healthy newborns are capable of latching on to a breast without specific assistance within the first hour after birth. In this study, the majority of women noted breastfeeding within the first hour, indicating adherence to this recommendation. However, while the AAP states that supplements to breast milk such as water, glucose water, formula, and other fluids should not be given to breastfeeding newborn infants unless ordered by a physician when a medical indication exists, all Somali mothers reported formula-feeding within the first week after birth. Additionally, pacifier use, which should be avoided during the initiation of breastfeeding and until breastfeeding has been well established, was indicated by the vast majority of mothers in this study. For some infants, early pacifier use may interfere with the establishment of healthy breastfeeding practices (American Academy of Pediatrics, 2005).

The disconnect between the promotion of breastfeeding by hospital staff and some hospital policies and practices make the prospects of exclusive breastfeeding unattainable for many women. Conflicting health messages and policies do little to bolster the confidence of the breastfeeding mother, and present opportunities to use alternative feeding methods that would not have been available without the gratuities of formula and pacifiers, distributed as part of hospital policy. Health

institutions and policies play an essential part in creating a supportive environment for breastfeeding, but as I will explore next, belief is a cogent instrument that informs practice. Discordant messages regarding breastfeeding contribute heavily to formula supplementation, but belief systems represent a second important factor that carry substantial weight and inform infant feeding practices.

“Dhumber” Discourse: A Highly Controversial Motif

Whereas Somali cultural beliefs on the importance of breastfeeding are fairly homogenous, when it comes to dhumber, there exists more diversity. Beliefs and knowledge pertaining to “dhumber” or colostrum were highly variable among interview participants, exemplifying the confusion that surrounds this topic. There exists no singular Somali belief or practice pertaining to dhumber and responses were generally polarized; dhumber is good or dhumber is bad. The majority of women who spoke about colostrum believed colostrum to be good or healthy, but about a third of women believed it to be bad and some were unsure of its value. Typical responses in support of colostrum were: “dhumber is healthy, clean, good for the baby and baby’s stomach. [It] will clean out anything in the baby’s stomach [from the womb],” or “You must feed dhumber to get the milk to come in.” Alternatively, the dangers of colostrum were described as follows: “[Colostrum is] bad for the baby, makes the baby’s stomach upset, causes diarrhea, vomiting and fever,” or “[Colostrum is] dangerous when a woman is pregnant and breastfeeding at the same time. It will make both babies sick.” These responses demonstrate two

competing ideologies that are likely formed as a complex of past experiences, cultural and familial advice, and lay knowledge.

Educating about the benefits of colostrum is crucial to promoting exclusive breastfeeding as women substitute formula for colostrum in the immediate postpartum period until true milk comes in. It is well understood that resistance to colostrum feeding may lead to delayed breastfeeding and requests for formula to feed the newborn. Both of these consequences of colostrum avoidance disrupt the hormonal feedback mechanisms that stimulate milk production in the mother, effectively setting the mother up for inadequate milk production from the birth of the infant (Pak-Gorstein et al., 2009).

As supplementation affects the endocrine pathways for milk production, it also has marked consequences on the hormonal feedback mechanisms that give rise to lactational amenorrhea. Since many Somali women rely on breastfeeding as a method to space pregnancies, the effects of formula supplementation on this contraceptive measure should be underscored in future education. In addition, information on the safety of breastfeeding after the onset of a new pregnancy should be discussed.

Continued Breastfeeding During Pregnancy

Only two of the women interviewed were pregnant and had infants of nursing age, but they unveiled a significant issue that cannot go unmentioned in this study. Both of the women were not currently breastfeeding their infants of nursing age and when asked why they had stopped breastfeeding, both indicated that their

current pregnancy was the sole reason. In addition, both women vocalized serious concern over the prospect of breastfeeding during pregnancy. They believed that it would harm both the growing fetus and the nursing infant, and that it was in fact, physiologically impossible.

Conception during lactation can occur when the mother supplements breastfeeding with formula or other forms of liquids or solids. The cultural responses to continued breastfeeding during pregnancy are highly variable and range from overt condemnation of the practice to high regard for it. Some cultures prescribe immediate weaning of the nursing infant following conception due to the belief that the pregnancy will harm the nursing infant by spoiling the mother's milk, or deprive the fetus of nutrition and cause detrimental effects in the unborn baby (Moscone and Moore, 1993). This notion manifested among the two pregnant mothers in the study and led them to completely replace breastfeeding with formula-feeding.

There are no risks that specifically contraindicate continued breastfeeding during pregnancy (Moscone and Moore, 1993). It has been noted though, that some health care providers are concerned that the suckling stimulation during breastfeeding may produce uterine contractions that carry potential risks for the fetus. In addition, breastfeeding following conception may pose a double burden for the mother as she copes with the physical and emotional consequences of both carrying a pregnancy and nursing an infant (Moscone and Moore, 1993). Despite these beliefs by some, most health care providers find no reason why a woman could not or should not continue breastfeeding during pregnancy if she feels

comfortable doing so.

For women who choose to continue nursing into their pregnancies, Moscone and Moore (1993) have reported several factors that influence the timing and decision to wean. These include reports of changes in milk production during pregnancy, symptoms associated with concurrent pregnancy and breastfeeding, and social or cultural attitudes of others toward breastfeeding post-conception. These authors found that 70% of nursing and pregnant women in their study reported sharp declines in milk production or breast milk volume during the first and second trimesters, but for exclusively breastfed infants, there was an increase in the frequency and duration of feedings that compensated for the decreased milk supply.

While women may use breastfeeding as a method to space pregnancies, it is important to note that any supplementation changes the feedback mechanisms that induce amenorrhea in a lactating woman. Thus, if a woman gets pregnant while nursing, it is beneficial for the mother to maintain a nursing relationship with her infant. In Somalia, women are often told to stop breastfeeding when they become pregnant, but it is important to inform them that pregnancy does not preclude breastfeeding so that they may make more informed decisions about when and why to supplement.

“I don’t have enough milk”: a Phenomenological Perception of Milk Insufficiency and Reasons for Formula Supplementation

The choice to supplement or replace breast milk with formula is multifaceted and cannot completely be explained by a lack of knowledge of the benefits of breastfeeding. In fact, the women in this study were fairly well versed on the health

benefits of breast milk for the infant. A study by Zimmerman and Guttman (2001) on the knowledge and practice of infant feeding found that while women who formula-fed their babies knew of the nutritional, protective, and psychosocial health benefits of breastfeeding, other life factors prevailed in the decision-making process. For the Somali mothers in this study, factors such as cultural ideals of infant weight and religious fasting during Ramadan were integrated into feeding decisions, but perceived milk insufficiency was voiced as the dominant factor in the decision to formula feed.

In a 1999 study that explored perceived breast milk inadequacy, Dykes and Williams (1999) defined perceived breast milk inadequacy as a lactating woman's perception that her breast milk supply and/or quality is insufficient to exclusively nourish her baby. This belief diminishes the breastfeeding mother's confidence in her ability to breastfeed exclusively. It is estimated however, that at most, only about 1-5% of exclusively breastfeeding women are physiologically unable to produce sufficient milk (Ahluwalia et al., 2005). Perceived milk insufficiency may be in part culturally patterned as women become socialized to lack confidence in their ability to lactate. However, the early introduction of formula to the infant's diet poses a significant barrier to the feasibility of continued, adequate milk production.

Almost all of the women in the study (81%) noted some form of perceived milk insufficiency or worry about not being able to produce enough milk for their infants. The lack of enough milk was sometimes referred to as an innate quality in the woman herself, but women also speculated about other factors that could contribute to inadequate milk production. For example, perceived causes of decreased milk

production included the cold weather and the idea that food here is “unnatural” or infused with chemicals. Many women however, were unsure of the reason or reasons for a change in milk production after coming to the U.S., but none suggested formula supplementation as a potential factor.

In considering milk production throughout social and geographic upheaval, it may be important to note the physiological effects of stress on milk production. While Somalis recognize a broad category of mental illness characterized by a lack of well-being related to social issues, stress is not a specifically defined category for Somalis, according to findings by Guerin et al. (2004). However, without an entrenched social support system following immigration and subsequent resettlement, some form of stress may be experienced by Somali refugees and immigrants. Oxytocin release is very sensitive to inhibition, particularly by stress. Little attention has been paid to the importance of oxytocin in lactation, but without the release of oxytocin, milk volume may decrease by up to 80% in lactating women (McNeilly et al., 1994). This finding may be relevant to the women in this study who face novel responsibilities in the U.S. and often lack the social supports they had for breastfeeding in Somalia, which could potentially affect their milk production.

Some women with breastfeeding experience in both the U.S. and Africa noted that despite the increased availability of food in the U.S., they still experienced troubles with producing enough milk. Common responses included, “[My] milk is dried up,” “There is more food here in the U.S., but still my breast becomes dry.” One woman explained, “When there is milk, you feel a tenderness and your breast is full and heavy. Here [in the U.S.], I don’t get that feeling. It’s empty.” Many women

who believed they could not produce enough milk were acutely aware of their own breast physiology and the symptoms of milk production, noting an emptiness or “dryness” to indicate the absence of milk. One woman voiced her frustration with her attempts to breastfeed: “I try [to only breastfeed], but the baby cries because it doesn’t get enough. I don’t have enough milk.” A crying baby was a prominent indicator used as a cue for infant satiety (or lack thereof).

Feelings of insufficient milk predominate in cultures where breast milk is biomedically defined as a product and reduced to its nutritional components. Where emphasis is placed upon breastfeeding as a more holistic process, perceived milk inadequacy is far less frequent (Dykes and Williams, 1999). In the U.S., substitutes for breast milk, which are intended to mimic breast milk in terms of its nutritional content, are commodified. Furthermore, public health messages that proclaim “breast is best” may focus the dialogue exclusively on the nutritional and immunological benefits of breast milk, rather than supporting the entire experience of breastfeeding. Thus, the reductive culture in which breastfeeding is embedded in the U.S., may contribute to maternal anxieties surrounding breast milk production.

Possibly the most egregious barrier to exclusive breastfeeding is a bottle-feeding or formula-feeding culture promoted among family and friends. Substituting breast milk feedings with formula feedings, even occasionally, will inevitably hinder breast milk production and give rise to subsequent perceptions of insufficient milk supply (Steinman et al., 2010). The promotion of artificial forms of breast milk undermines the practice of breastfeeding because with the introduction of milk or formula by the bottle, the mother begins to receive inadequate

stimulation to her nipples, which slows or decreases breast milk production (Dykes and Williams, 1999). Since many women in this study experienced symptoms of decreased milk production and articulated the sensation of an empty breast, fears of inadequate milk production may be well grounded if they are combination feeding (breastfeeding and formula-feeding). These fears however, will likely lead to further supplementation with formula and may even contribute to the termination of breastfeeding altogether.

Ensuring adequate nutrition of the infant was a salient concern for many of the women in this study. Most women explained using formula because, “the breast is not enough,” but also because formula was something extra to give the infant. Fears derived from previous experiences with infant undernutrition may drive supplemental feeding practices in the new setting of the U.S. where food and formula are more readily available. In fact, positive attitudes toward an overweight or chubby baby likely stem from traditions in Somalia where a fat baby is considered healthy and a skinny baby is considered sick. In a focus group with Somali mothers, Steinman et al. (2010) discussed beliefs about infant health and weight. Somali women stated that infant chubbiness was particularly important for health, strength, and protecting the baby against sickness (which frequently involves weight loss).

As women move to the U.S., food for the breastfeeding mother is more widely available, which may aid milk production, but commercial formula is also present as an accommodating and accessible option to help address fears of infant undernourishment. According to Pak-Gorstein et al. (2009), these fears of

undernourishment may be so strong that they lead to infant overfeeding and subsequent gastrointestinal reflux, oral aversion, failure to thrive and even obesity in later childhood. Despite the advocacy for breastfeeding within the Somali culture, some community and family members may encourage a new mother to supplement breast milk with formula in the U.S. to produce a chubby baby. This pressure placed on a new mother may consequently foster a formula-feeding culture.

Religious fasting was another factor contributing to the decision to feed formula by women in this study. Practicing Muslims observe the month of Ramadan by abstaining from eating and drinking from sunrise to sunset. Islamic law is clear about the exemption from fasting for the sick, menstruating, traveling, elderly, breastfeeding, pregnant, and those too young to understand the values of self-discipline and body purification. Breastfeeding women are generally considered exempt from observing Ramadan, but are expected to fast alone at a later time (Kridli, 2011).

The decision to take part in the fasting during Ramadan is not a simple one though. Despite the sanctioned exemption, many Muslim women, including the Somali women in this study, choose to fast during Ramadan even when they are breastfeeding. The month of Ramadan is celebratory and the rituals associated with the holiday cultivate a sense of solidarity and community among those observing the fast. Thus, decisions to observe the fast at the normal time may be due to spiritual reasons or because women may find it hard to fast alone at some later point (Kridli, 2011). Another reason women fasted during breastfeeding was the availability of infant formula. Formula allows women to observe the fast and

sustain their infants' nutrition. Little is known about the actual consequences to the infant if its mother fasts while breastfeeding, but fasting results in physiological changes in the mother including lethargy, lack of concentration, weakness, irritability, nervousness, and aggressiveness. The effects of these changes on a woman's milk production however, require further investigation (Kridli, 2011).

The timing of weaning or the duration of breastfeeding is often a conscious decision made by the mother based on traditional beliefs, the perceived nutritional status of the infant, and/or perceived health effects of continued breastfeeding (Jakobsen et al., 1996). Perceived milk insufficiency has been found to be a major factor in not only exclusive breastfeeding termination but cessation of any breastfeeding altogether. In the U.S., Ahluwalia et al. (2005) explored reasons for breastfeeding cessation using pooled 2000 to 2001 PRAMS data from 10 states including Maine. They found that during the early postnatal period, the most common reasons that women chose to stop breastfeeding pertained to the physical discomforts of breastfeeding and women's uncertainty about or perceived inadequacy of their milk production. Later cessation of breastfeeding was more likely to be because of the perceived breast milk inadequacy (Ahluwalia et al., 2005). Somali women are becoming integrated into a culture where perceived milk insufficiency, which is a significant barrier to increasing exclusive breastfeeding rates, is pervasive.

Ambiguity Surrounding Formula Composition

In this study, formula was used by all mothers who had given birth in the U.S. While the benefits of breastfeeding were well understood, the perceived differences between formula and breast milk were more ambiguous. A substantial portion of women interviewed (40%) was unsure of the differences and one woman (6.5%) believed formula and breast milk to be compositionally equivalent. This finding indicates an important area where knowledge can be increased through educational initiatives. Forty-seven percent of women believed breast milk to be better and one woman commented on breast milk's importance, but as another commented, "For health and digestion, breast milk is easiest, but still I don't have enough milk." Because the concerns with milk production lie at the crux of formula supplementation, attempting to understand and elucidate these anxieties is crucial to creating culturally relevant educational material to address these barriers and promote exclusive breastfeeding.

Applications of this Study's Findings: a Culturally Relevant Breastfeeding Workshop

Written material, health promotional videos, or brief prenatal counseling sessions on breastfeeding alone may not improve breastfeeding initiation and duration. Rather, discussions with women regarding their individual and cultural beliefs or experiences help tailor the information to their own needs (Pak-Gorstein et al., 2009). The workshop designed as part of this study was consistent with this idea and aimed to promote dialogue on breastfeeding and provide information about particular topics of concern voiced by Somali women. The workshop was

intended to build upon current knowledge and beliefs and emphasize the current practices that serve to promote healthy breastfeeding practices within Somali culture. At the same time, new information and clarification of some biological processes such as milk production were incorporated into the workshop curriculum. The findings of this study suggest that Somali mothers are likely to breastfeed and supplement with formula as well. Negotiating delayed supplementation and educating about the effects of supplementation on milk production were the primary objectives for this culturally informed health education program.

Women moving from Somalia undergo a process of acculturation, which is the process during which individuals learn about aspects of a new culture and modify aspects of their culture of origin (Dharod et al., 2011). Acculturation to the U.S. negatively affects breastfeeding rates, and for the Somali women in this study, exclusive breastfeeding practice. The factors involved in acculturation may include longer residency and birth of the mother in the U.S., and a decrease in the use of native language. The process of acculturation may reduce traditional infant feeding beliefs within the first generation of residence in the U.S. (Pak-Gorstein et al., 2009). Thus, as Somali women become acculturated to the U.S. they may be losing healthy breastfeeding practices, and may not be fully knowledgeable about the ramifications of alternative feeding practices.

As the local Somali population becomes larger, second-generation immigrants and those with no prior reproductive experience are forming a substantial group in need of prenatal and postpartum education. The primigravida in this study demonstrated little knowledge on breastfeeding practice and benefits,

but already expressed concern about adequate milk production, underscoring the educational needs for this younger reproductive population. Narayan et al. (2005) found that primigravida status was a factor that adversely affects breastfeeding rates, but in addition, older women may pass on advice regarding their own experiences with inadequate milk production to these first time mothers, before the initiation of breastfeeding. For these reasons, primigravidas and younger mothers became the target population for the workshop.

Breastfeeding Benefits for Mother

Although Somali mothers were quite knowledgeable about the benefits of breastfeeding for the infant, little import was placed on beneficial effects for the mother. Therefore, the workshop emphasized not only the positive effects for the infant, but the health benefits of breastfeeding for the mother as well. These include the role of breastfeeding in decreasing the risk of postpartum hemorrhage, facilitating weight loss, and functioning as a natural contraceptive or birth spacing method if done exclusively (Dermer, 1998; Rutstein, 2005). Underscoring the importance of breastfeeding for *both* the infant and mother will equip women with relevant information as they make their infant feeding decisions (Young and Kaufman, 1988).

Culturally Relevant Education

All the women who received prenatal care in the U.S. also received some form of breastfeeding education from a health care provider in the time prior to

their infants' births. Despite this education and the affirmation of the health benefits of breastfeeding, all of the women who gave birth in the U.S. were combination feeders (breast milk and formula). This finding indicates the need for a change in prenatal breastfeeding education, which could enhance its practice and the health of newborns.

For this population, prenatal education should focus on the importance of colostrum for both the infant's health and for the initiation of milk production. Additionally, while breastfeeding should be promoted over formula-feeding, the effects of supplementation on milk production must be clearly defined. The workshop curriculum provides a model for the type of breastfeeding education that may promote healthier breastfeeding practices and help alleviate some of the concerns held by these women.

Chiefly, educational programs should focus on the affirmation of colostrum and its benefits. Since about a third of women in this study believed colostrum to be bad for the infant's health, the value of colostrum warrants further discussion. In the workshop, colostrum was discussed as the first fluid designed by God to help the new baby adjust to the world. In their work with Somali mothers, Graham et al. (2007), have suggested that framing breastfeeding education in terms of Somali cultural and religious beliefs may help impart knowledge to these women. Furthermore, promoting the feeding of colostrum with respect to initiating milk production may help mitigate breast milk anxieties and consequently, reduce formula supplementation.

The workshop attempted to provide responses to Somali mothers' fears of inadequate breast milk and present methods to help increase breast milk supply. Affirming mothers' fears and needs may help educators and providers connect with them at an emotional level and build their trust (Graham et al., 2007). Education on the production of breast milk could help ease some of the concerns surrounding quality or quantity. The workshop provided women with information to recognize evidence of sufficient breast milk and strategies to increase breast milk production (e.g. reduce formula supplementation, increase fluid intake, pumping).

Although it was not a major point of discussion in this workshop, Graham et al. (2007), have recommended further education for Somali women on cues for recognizing infant satiety. These cues include pulling off the breast, slowing down suckling, looking around, and a change in cry. Additionally, presenting ways a mother can calm her crying baby, besides feeding, may be effective. For example, changing the infant's diaper, burping the baby, or comforting the baby may be effective ways of soothing the infant (Graham et al., 2007). Since some of the women in this study gave formula as a means to quiet a crying baby or because they feared their breast milk was not sufficient, knowledge of these signs of infant satiety may prevent overfeeding by mothers who have concerns about undernutrition, and may decrease ancillary formula-feeding.

Building and Reinforcing Networks of Support Among Breastfeeding Women

Of particular note during the workshop was a reference to wet-nursing. The cultural broker provided a personal account of wet-nursing her nieces and nephews

in Somalia. Her decisions to wet-nurse stemmed from the fact the infants' own mothers were either absent or away for some period of time during which the infants were in the cultural broker's care. In the U.S., bottle-feeding allows others, besides the mother, to feed the baby. This bottle-feeding culture provides an alternative to wet-nursing, but is not conducive to exclusive breastfeeding.

The issue of Ramadan and fasting while breastfeeding was a significant point of discussion during the workshop. Women were aware of the exemption granted to breastfeeding women by the Qu'ran, but at least one woman admitted to choosing to fast and giving her baby formula during Ramadan. Since the exemption requires a woman to fast at a later time, she will likely do it alone. This was a major point of distress for some women, indicating a need for further exploration. One way to help encourage women to continue to breastfeed and defer their fast to a later time, is to foster group support among breastfeeding women. For example, if women are breastfeeding at the same time over a fast, they may fast together at a later juncture to help ease some of the difficulties of fasting alone. Building this support system could help ensure continued promotion of exclusive breastfeeding practice.

Lastly, emphasizing the supports available to these women through WIC, was an important part of the workshop. Many of the women were unaware of the additional benefits and incentives provided to a mother who exclusively breastfeeds. These include larger quantities and greater variety of foods for the mother, and at six months, larger quantities and greater variety of foods for the infant. Thus, future work with WIC could focus on clarifying the differences between food support packages depending on the mother's feeding method. WIC can also provide women

with breast pumps so the concept of breast pumping and breast milk storage may be discussed as an alternative to formula-feeding. As a woman returns to her pre-delivery responsibilities, putting exclusive breastfeeding in jeopardy, breast milk pumping and storage are good options that help facilitate continued breastfeeding exclusivity.

The workshop developed for Somali perinatal women exemplified a tailored educational initiative that responded directly to Somali women's beliefs; this may have the potential to be more effective at promoting exclusive breastfeeding than general prenatal care counseling alone. The women who participated in the workshop were very receptive to the information provided to them and engaged in the workshop activities. Furthermore, all of the women acknowledged learning something new and a few women believed they would pass on that information to other women in their community. Continuing community health programs and workshops such as the one developed as part of this project, have the potential to bring about sustainable exclusive breastfeeding practices among Somali women in this community.

Implications for Future Work

The workshop implemented during this project presents only one possible method for effecting real change in exclusive breastfeeding rates. While the workshop was intended as a form of prenatal education, postpartum programs should also be considered as integral to the continuation of recommended breastfeeding practice. Repeated contact with professional support systems such as

nurses and other health care providers, affects the duration and exclusivity of breastfeeding practice immediately postpartum, according to Pugh et al. (2002). Clinicians have the opportunity to foster and encourage healthy breastfeeding practices among their patients, but their efforts may be limited by time constraints and cease as soon as the mother is discharged from the hospital. Thus, community-based programs involving peer counseling or support may be crucial to the continuity of breastfeeding promotion.

Due to the breakdown in traditional Somali postpartum support systems within the U.S., Somali women may require comprehensive and culturally relevant breastfeeding support in the hospital postpartum and repeated and continual support in the home. It has been suggested that community-based breastfeeding programs that rely on peer counselors or doulas and other traditional birth attendants from the immediate Somali community, may be highly effective at reaching these mothers and promoting breastfeeding initiation, negotiating delayed supplementation, and encouraging breastfeeding continuation (Pak-Gorstein et al., 2009).

According to Dennis et al. (2002), peer volunteers who work to promote breastfeeding may serve as effective mediating links between mothers in the community and health care professionals. Programs that include these types of middle agents may be particularly beneficial for socially disadvantaged mothers and immigrant mothers. A study by A.K. Anderson et al. (2005), explored the effects of community-based peer counseling of mothers on exclusive breastfeeding rates. In A.K. Anderson's study, trained peer counselors conducted prenatal home visits, in-

hospital visits prior to discharge, and postpartum home visits to provide information as well as support. Women receiving the peer counseling were fifteen times more likely than their control group counterparts, who only received the standard breastfeeding support and education, to exclusively breastfeed throughout the study (A.K. Anderson et al., 2005).

Additionally, a Somali doula support program was recently established at a major Midwestern teaching hospital, and although the program was not specifically focused on breastfeeding, it has shown tremendous promise in serving the female Somali population and improving their quality of care (Dundek, 2006). A similar program implemented in the local community, that puts particular emphasis on breastfeeding support, could be a powerful tool in creating sustainable exclusive breastfeeding practices.

Lastly, the topic of wet-nursing was only briefly mentioned in the workshop, but warrants further investigation as it may be an important avenue for decreasing formula supplementation. Perceptions of wet-nursing could be assessed and compared among women who recently immigrated to the U.S. and those who have been in the U.S. for an extended period of time. In this way, the effects of acculturation on the beliefs surrounding and practice of wet-nursing, could be explored. Wet-nursing could be promoted in relation to improving exclusive breastfeeding rates if deemed culturally acceptable or relevant.

Study Limitations

The primary limitation of this study was the small sample size for the conversation groups (n=9), and the home visit interviews (n=16). Due to this limited number of participants, the findings cannot be generalized to the broader Somali population of Lewiston, ME, but should be received as reflections of the infant feeding beliefs and practices among this specific study population. In addition, the selection of women who participated in the study was not random. Women invited to participate were identified by both Jean Kahn, C.N.M., of Women's Health Associates, and Azeb Hassan, the cultural broker involved in the project. Many of the women may have participated largely due to encouragement from the cultural broker.

The nature of the study was dynamic and initial findings and conversations with health care providers informed which research questions to pursue further. The findings from the conversation groups and home visit interviews were assessed using a content analysis methodology. This methodology was practical for the specific research content of this study, but while the study was intended to be driven by the concerns and beliefs voiced by the study population, this type of methodology could lead to researcher bias and in particular, biased interpretation and extrapolation of findings.

All of the information gathered as part of the PRAMS questionnaire was retrospective and unconfirmed by medical or hospital records, with potential for recall bias by some women. However, health care providers at St. Mary's confirmed the majority of the institutional policies that the women referenced. Furthermore,

timing and duration of breastfeeding given by the women were approximate and only broadly reflect the patterns of initiation, introduction of other liquids and solids, and weaning.

As with all translation processes, some meanings, from both the interviewer-end and the interviewee-end, were potentially lost, mistranslated, or misconstrued. Some of the open-ended interview questions, which were designed to elicit participant beliefs and knowledge, may have been too broad and caused the interpreter to try to explain the question, thus, influencing the participants' responses.

For specific questions involving reasons for formula supplementation, the majority of women voiced some form of perceived milk insufficiency. However, other factors out of awareness, which could contribute to formula supplementation, may remain obscured if women did not articulate them. A future prospective study could assess the impacts of the workshop curriculum on decisions to supplement with formula to help elucidate a clearer relation between milk production anxieties and formula use.

Ultimately, time was the major constraint in the implementation of a second workshop. Continued implementation of the workshop and its curriculum within the Somali community has the potential to reach many women and initiate movement toward improving rates of exclusive breastfeeding.

CONCLUSION

Infant feeding decisions lie within a complex network of interacting factors that are sensitive to time and place. The Somali women in this study demonstrated that through the processes of acculturation, beliefs and practices regarding breastfeeding change, and in a novel cultural, nutritional, and economic environment, supplemental feeding becomes normalized. There is no singular solution to addressing low exclusive breastfeeding rates within the U.S., but it is clear that promotional breastfeeding programs should be implemented at multiple levels and incorporate an understanding of cultural beliefs and practices, especially among immigrant groups. Therefore, the “solution” to increasing breastfeeding rates exists as a culmination of clinical and communal support and promotion, culturally sensitive educational programs, and a woman’s own willingness to undertake the responsibility of breastfeeding, even as other feeding methods such as formula become available.

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APPENDIX A. Conversation Group Guide.

Breast feeding practices, preferences, and behaviors

- I'm interested in what you can tell me about breastfeeding and your own experiences with breastfeeding.
- What would you tell me, or a pregnant friend about breastfeeding or breast milk? What advice would you give or what would you like them to know about it?
- If you do give your baby formula, why did you decide to give them formula?
- How do you feel about a woman who only breastfeeds and does not give her baby formula?

Barriers to exclusive breastfeeding

- Breastfeeding only may be hard for moms. Can you tell me about any concerns you have with breastfeeding or any problems you face or faced?
- Are you ever worried that you don't have enough milk?

Breastfeeding Supports

- Do you have any questions about breastfeeding, breast milk, or formula? Is there any more information you would like to know about breastfeeding?

APPENDIX B. Informed Consent Form: Conversation Groups.

I, _____, will be in the conversation group at WIC.

The conversation group is about having a healthy pregnancy, a healthy baby and healthy children.

Karen Palin, Ph.D., Jean Kahn, CNM, from Women’s Health Associates in Lewiston, WIC, and Karen’s students are having the conversation groups to learn about ways to help women in our community be more healthy during pregnancy and while they are breastfeeding. This can help everyone be healthier.

Anything I say in the conversation group will be kept private and my name will not be used.

This project will not identify me or any other people.

I do not have to be in this project or answer any questions if I do not want to.

I know I can use WIC if I am in this project or not.

I know my health care will not change if I am in this project or not.

When this project is over, I can find out the results of the project.

If I have any questions about this project, I can call Karen Palin at Bates College, 786-6439, Jean Kahn, 207-415-8881, or WIC for more information.

My signature here means I will be part of this project.

Signature of participant

Date

Witness

APPENDIX C. Informed Consent Form: Home Visit Interviews.

I, _____, will talk with the researcher (Mariah Barstow) for a home visit interview.

This project is about having a healthy pregnancy, a healthy baby and healthy children. We will talk about breastfeeding and other ways of feeding my baby.

Karen Palin, Ph.D., from Bates College, Jean Kahn, CNM, from Women’s Health Associates in Lewiston, and Mariah Barstow, from Bates College, are having the home visit interviews to learn about ways to help women in our community be more healthy during pregnancy and while they are breastfeeding. This can help everyone be healthier.

Anything I say in the home visit interview and/or following workshop will be kept private and my name will not be used.

This project will not identify me or any other people.

I do not have to be in this project or answer any questions if I do not want to.

If I want to stop or end this interview at any time, I can do so.

I know I can use WIC if I am in this project or not.

I know my health care will not change if I am in this project or not.

When this project is over, I can find out the results of the project.

If I have any questions about this project, I can call Karen Palin at Bates College, 207-786-6439, Jean Kahn, 207-415-8881, or Mariah Barstow, 215-870-2056 for more information.

My signature here means I will be part of this project.

Signature of participant

Date

Witness

APPENDIX D. Home Visit Interview Survey and Guiding Questions.

Number:

Date:

Introductory comments: (name, number of children in U.S., in Africa)

Selected PRAMS Questions

22. During any of your prenatal care visits, did a doctor, nurse, or other health care worker talk with you about breastfeeding? Please count only discussions, not reading materials or videos.

Yes

No

26. During your most recent pregnancy, were you on WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children)?

Yes

No

59. Did you ever breastfeed or pump breast milk to feed your new baby after delivery, even for a short period of time?

Yes

No (Go to question 63b)

60. Are you currently breastfeeding or feeding pumped milk to your new baby?

Yes (Go to question 62)

No

61. How many weeks or months did you breastfeed or pump milk to feed your baby?

_____ Weeks OR _____ Months

Less than 1 week

If your baby was not born in a hospital, go to Question

62. This question asks about things that may have happened at the hospital where your new baby was born. For each item, check Yes if it happened or No if it did not happen.

- a. Hospital staff gave me information about breastfeeding Yes No
- b. My baby stayed in the same room with me at the hospital Yes No
- c. I breastfed my baby in the hospital Yes No
- d. I breastfed in the first hour after my baby was born Yes No
- e. Hospital staff helped me learn how to breastfeed
No Yes
- f. My baby was fed only breast milk in the hospital Yes No
- g. Hospital staff told me to breastfeed whenever my baby wanted Yes No
- h. The hospital gave me a breast pump to use Yes No
- i. The hospital gave me a gift pack with formula Yes No
- j. The hospital gave me a telephone number to call for help with
breastfeeding Yes No
- k. My baby used a pacifier in the hospital Yes No

63a. How old was your new baby the first time he or she drank liquids other than breast milk (such as formula, water, juice, tea, or cow's milk)?

____ Weeks OR ____ Months

- My baby was less than 1 week old
- My baby has had any other liquids

63b. How old was your new baby the first time he or she ate food (such as baby cereal, baby food, or any other food)?

____ Weeks OR ____ Months

- My baby was less than 1 week old
- My baby has not eaten any foods

77. Since your new baby was born, have you used WIC services for yourself or your new baby?

- Yes, both my new baby and I use WIC services
- Yes, only my new baby uses WIC services
- Yes, only I am using WIC services (Go to question 78)
- No (Go to question 78)

78. Why wasn't your new baby enrolled in WIC? Check all that apply.

- I didn't think my baby would be eligible

I was told that my baby didn't qualify for WIC

I'm not sure what WIC is

WIC hours did not fit my schedule

The WIC office was too far away

I can't get to the WIC office

I would go to WIC if it were closer.

Yes No

I don't need the services that WIC offers

Other → Please tell us:

Discussion Based Questions

Breast feeding practices, preferences, and behaviors

- I am interested in what you think about dhumber? Did you feed it to your baby? Why or why not?
 - I'm interested in how you feed your baby. Can you tell me a little bit about these feeding practices?
 - Breastfeed
 - Formula/ bottle
 - Solid food (like cereal)
 - Other animal milks (goat, camel)
 - How often do you feed your baby each day?
 - What would you tell me, or a pregnant friend about breastfeeding or breast milk? What advice would you give or what would you like them to know about it?
 - How did you learn about breastfeeding?
 - Doctor/ provider
 - Family/ friends
 - Internet
 - Other
 - If you breastfed your baby, how long did you only breastfeed? (Breastfeed without also giving formula)
 - If you do give your baby formula, why did you decide to give them formula?
-

Barriers to exclusive breastfeeding

- Breastfeeding only may be hard for moms. Can you tell me about any concerns you have with breastfeeding or any problems you face or faced?
- Did anyone ever talk to you about the differences between formula and breast milk? What did they say?

- Do you remember when or why you stopped breastfeeding your baby?
 - If you are worried you do not have enough milk, what could make a woman make more milk?
 - If you had enough milk, would you only breastfeed your baby rather than give them formula?
-

Breastfeeding Supports

- What would help you the most in supporting breastfeeding?
 - What do you think would help promote exclusive breastfeeding in your community or among your friends?
 - Do you have any questions about breastfeeding, breast milk, or formula? Is there any more information you would like to know about breastfeeding?
 - If you are still breastfeeding, how long will you continue?
-

APPENDIX E. Outline for Workshop Curriculum.

Introductions

- Who I am, what I've been working on this year
- Working with Jean Kahn who wants to help women have healthier babies.
- Why this is an important topic: breast milk is the best gift you can give to your baby
- Some concerns I've come across in talking with women: dhumber and the feeling of not having enough milk.

Educational Topics

- 1) Breastfeeding Benefits (start with discussion: what women know then confirm these beliefs in presentation)
 - a. For Infant
 - b. For Mother
- 2) Colostrum/ Dhumber (what have you heard, what do people in your community tell you?)
 - a. Importance for Infant's Health
 - b. Importance for Promoting Milk Production
- 3) Formula vs. Breast Milk (GAME: Comparing Formula and Breast Milk)
 - a. Immunological Differences
 - b. Positive health benefits for infants fed on breast milk
 - c. Effects of formula supplementation:
 - i. Decreased milk production in mother (address feelings of milk insufficiency)
 1. How to increase milk production (delay supplementation, drink more liquids (water, DECAF tea, milk), eat more healthy foods (WIC services and goods)
 - ii. Decreased reliability on breastfeeding as a contraceptive/ birth spacing measure
- 4) What can we do to have healthier babies?
 - a. Present recommendations from AAP in conjunction with Qu'ran recommendations: exclusive breastfeeding duration, introduction of solid foods, time of weaning
 - b. Negotiate delayed formula supplementation (first 40 days even in hospital NO formula)
 - c. Warn mothers that they might feel pressured to give formula, but it's important to wait to give formula for the baby's health
 - d. Present breast pumping and storage as options when mother is busy.
- 5) What did we learn?
 - a. Share one new bit of information we learned from this workshop.

APPENDIX F. Workshop Educational Materials.

BREASTFEEDING BENEFITS

For **BABY**

- Is easily digested by the baby (easy on the baby's stomach) and contains ALL of the nutrients and vitamins that a baby needs to grow and develop for the first 6 months of life **meaning no other liquids or solids are needed in addition to breast milk**
 - Proteins
 - Carbohydrates
 - Fat
 - Iron
 - Calcium
- Gives baby protection against many diseases including:
 - Ear infections
 - Diarrhea
 - Respiratory (lung/airway) infections
 - Some viruses
- Helps baby develop their own defense systems to fight off disease
- Good for brain development
- May protect the baby later on in life by decreasing their risk to:
 - Allergies
 - Asthma
 - Obesity
 - Diabetes

For **MOTHER**

- Right after giving birth, breastfeeding may help mother heal faster and decrease bleeding
- Breastfeeding may have protective effects for the mother that continue after she has finished breastfeeding
 - Decrease risk of certain cancers (ovarian cancer, breast cancer)
 - Decrease risk of diabetes mellitus for mothers who had gestational diabetes
 - Decreased risk of bone fractures such as hip fractures
- May help mother space pregnancies if she is exclusively breastfeeding
 - Spacing pregnancies (2-3 years between births) is healthy for both the mother and the next baby
- Can help mother feel emotionally and physically closer to her baby

- May be able to help reduce stress
-

COLOSTRUM/DHUMBER

Dhumber is the thick yellowish liquid that forms in the breasts before birth and continues to be produced for several days after birth.

Importance for Infant's Health

- Right after birth, the baby's stomach is VERY sensitive because it has never had any food before.
- Dhumber is easy on the baby's stomach and lets the baby adjust to its new world.
- We (women) are designed to make this type of liquid because it is the BEST thing we can give a baby right after birth (pretty smart!)
- It contains the perfect amount of nutrients and also has protective factors that are REALLY IMPORTANT to the new baby right after birth.
- These help protect the baby against germs that it comes into contact with in the new world.

Importance for Breast Milk Production

- Putting your baby to breast right after birth (within the first hour) is important and healthy for both you and your baby.
- As your baby begins to nurse immediately after birth, your body recognizes that it needs to make the ingredients to feed your baby.
- Within a few days, the milk in your breasts begins to change because as your baby grows, it needs different things.
- The suckling from the infant's mouth helps send signals to your body to make just the right amount of milk with the perfect ingredients for your baby.
- The more frequently you nurse, the more able you are to produce plenty of milk for your baby.
- If your baby is nursing, your body will know exactly how much milk it needs to produce.

PICTURE GAME

Breast Milk



1

Breast Milk Factors:



2

**Protection from
disease that helps
create happy and
healthy babies**



3

**Puts mom and baby
in close contact**



4

**Helps development
of the BRAIN**

Formula



5,6

Formula Factors:



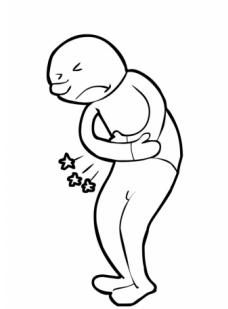
7

May cost money



8

Must add water



9

Harder for Infant to Digest

Image Sources

1. <http://www.bornfreemumanddad.co.uk/wp-content/uploads/2010/10/breastfeeding-icon.jpg>
 2. http://3.bp.blogspot.com/-dYDbRI8_zo/TfvDmTabuDI/AAAAAAAAADk/AK_I_mdsb8E/s1600/smallbabysmilinghealthyblack.jpg
 3. http://www.myfamilyhealth.org/Images/baby_black.jpg
 4. <http://www.worldpress.org/images/20070220-yemen.jpg>
 5. <http://www.miasdomain.com/2011/11/infant-formula-companies-milk-us-food.html>
 6. http://drugster.info/img/term/infant-formula-7788_3.jpg
 7. <http://wpc.1772.edgecastcdn.net/001772/sites/cdn.earn-extra-money.commissionsiphon.com/earn-extra-money-commissionsiphon-com-4.jpeg>
 8. <http://www.jonco48.com/blog/water.jpg>
 9. <http://www.edupics.com/coloring-page-stomach-ache-i14815.html>
-

BREAST MILK vs. FORMULA

Breast Milk

Breast milk is the perfect food for baby, with many advantages over baby formula especially in the first six months or so. Here's why:

- As the baby grows, breast milk changes according to what the baby needs.
- It's free. It doesn't cost anything.
- It has special ingredients that protect a baby against getting sick from many diseases such as
 - Ear infections
 - Diarrhea
 - Respiratory infections (infections in the lungs/airways)
 - Some viruses
- It can help prevent SIDS, sudden infant death syndrome.
- It contains the perfect balance of nutrients that your baby needs, including proteins, carbohydrates, fat, and calcium.
- It also contains minerals and vitamins that your baby needs to grow.
- It is easily digestible. Easy for the baby's stomach.
- It may protect against allergies and asthma in the future.
- It may decrease a baby's risk of becoming obese or diabetic in the future.
- It contains some factors that promote brain development.
- Breastfeeding can help a mother lose weight more easily after giving birth

Formula

Many infant formula brands have been fortified (made stronger) with minerals and vitamins for the baby, but breast milk contains more than 100 ingredients that formula does not have.

- Must be mixed with water before using (can boil water first to get rid of some germs in water)

- Does NOT contain protective factors found in breast milk that help defend baby against illness and disease.
- Does NOT contain factors that help the baby's defense systems get stronger.
- Formula may be expensive if you are not receiving it from WIC or other food programs.
- Harder to digest by infants, especially at younger ages, which may cause gas, constipation, and upset stomach in the baby
- Formula may have more proteins and iron than breast milk, but the proteins are harder to digest and the iron is harder to absorb for the baby compared to breast milk.

HOW DOES USING FORMULA AFFECT BREAST MILK PRODUCTION?

Some women breastfeed AND formula feed. A mother may mostly breastfeed, but also give her baby a bottle a few times a day if she is busy or thinks her baby is not getting enough milk from her breast alone.

- Giving formula to a baby changes the mother's ability to produce milk.
- If the baby is given a bottle, this means that it is not suckling from the mother's breast.
- This will cause the mother to produce less milk because the baby is not at the mother's breast demanding it.
- Also, the rubber nipples on bottles let baby's suck in formula faster than a real nipple, so the baby may learn to like bottle feeding BETTER than breastfeeding, even if the formula is harder on their stomachs/ harder to digest.
- Giving formula also increases a mother's chance of getting pregnant while she is breastfeeding.
- This is because the same parts of the body that control milk production control a woman's menstrual cycle.
- Supplementing breastfeeding with formula may decrease the time following birth when a woman doesn't get her period.

How to Increase Milk Production:

- (1) Put off (delay) giving formula for the first time after birth or don't give infant formula at all
- (2) Drink more liquids like water, milk, decaffeinated tea
- (3) Eat more healthy foods with lots of vitamins (Vitamin D, iron, etc.)
- (4) Increase number of times and the length you breastfeed

- a. When breastfeeding, let baby completely empty the breasts because within one breastfeeding sitting, the milk that the baby gets changes from lower fat to higher fat.
 - b. The higher fat present in the breast milk at the end of a sitting helps a baby feel full, relaxed, and sleepy.
-

RECOMMENDATIONS

All over the world, breastfeeding is recommended over formula-feeding because of its many benefits for BOTH the baby and mother.

What does the Qu'ran say?

- The Qu'ran recommends that a mother breastfeed for two whole years.
- During Ramadan or other times of fasting, a breastfeeding mother is allowed to eat and continue to breastfeed her baby. She can make up the days she missed and fast at a later time.

What do doctors say?

- A woman should ONLY breastfeed (give no formula, food or other liquids) for the first six months of a baby's life.
 - After six months a mother should introduce solid foods into the baby's diet to make sure the baby gets enough nutrients to continue to grow and develop.
 - A mother should continue to breastfeed for at least one year, even after she starts giving solid foods.
 - Breastfeeding for up to 2 years or until the mother decides it is time to stop is also healthy and good for the baby.
-

WIC SERVICES

WIC Benefits (for mothers who only breastfeed and do not give formula)

- For women who ONLY breastfeed, WIC provides the largest quantity and variety of foods for the nursing mother.
- When their infants reach six months of age, they receive the largest quantity and variety of infant foods.
- Basically, if you decide to only breastfeed, you will receive more foods of all different types to help you continue to feed your baby

Breast Pumps

- If you are worried about breastfeeding because you have other duties such as a job, school, or if you plan to travel without your baby, breast pumps allow you to store and give you baby your breast milk rather than formula.
- If you are interested, talk with your counselor the next time you go to WIC and ask them about breast pumps.
- WIC can give you a free breast pump.

APPENDIX G. Informed Consent Form: Workshop.

I, _____, will talk take part in this workshop.

This project is about having a healthy pregnancy, a healthy baby and healthy children. We will talk about breastfeeding and other ways of feeding my baby.

Karen Palin, Ph.D., from Bates College, Jean Kahn, CNM, from Women’s Health Associates in Lewiston, and Mariah Barstow, from Bates College, are having the workshops to help women in our community be more healthy during pregnancy and while they are breastfeeding. This can help everyone be healthier.

Anything I say in the workshop will be kept private and my name will not be used.

This project will not identify me or any other people.

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I know my health care will not change if I am in this project or not.

When this project is over, I can find out the results of the project.

If I have any questions about this project, I can call Karen Palin at Bates College, 207-786-6439, Jean Kahn, 207-415-8881, or Mariah Barstow, 215-870-2056 for more information.

My signature here means I will be part of this project.

Signature of participant

Date

Witness