ASSOCIATION BETWEEN BREASTFEEDING AND COMPLEMENTARY FEEDING PRACTICES AND INFANT GROWTH IN THE BUILSA DISTRICT

BY

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DECLARATION

I, Cordula Abang declare that this thesis is the result of my own research work, undertaken in the Department of Nutrition and Food Science, University of Ghana, under the supervision of Dr. Gloria Ethel Otoo and Prof. Ebenezer Asibey-Berko. All references made to other people's work have been duly acknowledged.

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DEDICATION

I humbly dedicate this work to my parents Mr. Abang Cletus and Madam Christina Abakisi, my siblings and Dr. George Akanlig-Pare. Thank you for all the love, support and encouragement throughout my stay in school.

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LIST OF ABBREVIATIONS

BCC	Behaviour Change Communication
BFHI	Baby Friendly Hospital Initiative
CHPS	Community Health Planning and Services
DALYs	Disability-Adjusted Life Years
EBF	Exclusive Breastfeeding
FAO	Food and Agricultural Organization
FGDs	Focus Group Discussions
GAIN	Global Alliance for Improved Nutrition
GDHS	Ghana Demographic Health Survey
GHS	Ghana Health Service
GLSS	Ghana Living Standard Survey
GOG	Government of Ghana
GPRS	Ghana Poverty Reduction Strategy
GSS	Ghana Statistical Service
HCZ	Head Circumference Z-score
LAZ	Length-for age Z-score
MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
MOST	Ministry of Science and Technology
MUAC	Mid Upper Arm Circumference
MUACZ	Mid Upper Arm Circumference Z-score
NEPAD	New Partnership for Africa's Development
UNICEF	United Nation's International Children Fund
USAID	United States Agency International Development
WAZ	Weight-for-age Z-score
WHO	World Health Organization
WLZ	Weight-for-length Z-score

ABSTRACT

Background: Exclusive breastfeeding (EBF) for six months confers several benefits to infants. It reduces infections and mortality and improves mental and motor development. The prevalence of EBF in Ghana is far from optimal having reduced from 63% in 2008 to 46% in 2011. Poor feeding practices during early childhood have been shown to contribute to stunting. The Upper East region of Ghana has 32% of its children under five stunted.

Objective: To assess breastfeeding and complementary feeding practices and the association between duration of EBF with the growth of infants at six months of age in the Builsa district in the Upper East region.

Methodology: The study was conducted in two parts. The first was a qualitative study utilizing focus group discussions (FGDs) with mothers with six months old infants recruited from six communities in the Builsa district. The second was a cross-sectional survey of 290 mother-child pairs recruited from six health facilities in the Builsa district. Semi-structured questionnaires were used to collect data on socio-demographic characteristics, infant and young child feeding practices, factors affecting feeding practices and child morbidity. Data on infant nutritional status were obtained through anthropometric measurements. Duration of EBF was collected through mothers' recall. Infants were grouped based on the duration of EBF; short (≤ 4 months) and long (5-6 months). Bivariate analyses were done to determine the relationship between the duration of EBF and infant growth, breastfeeding and complementary feeding practices and socio-demographic factors. Binary logistic regression was used to identify the predictors of long duration of EBF.

Results: Results showed that cultural beliefs underline most of the breastfeeding and complementary feeding practices. Early and late introduction of complementary food, water and traditional herbs/liquids to newborn babies are common. Grandmother's support for EBF, thickness of porridges and age of introduction of complementary food were significantly associated with duration of EBF (**p=0.007**; **p=0.004** and **p<0.001**, respectively). Prevalence of underweight, stunting and wasting in the total sample was 26%, 27% and 37% respectively. Mean weight was significantly higher for infants in the long duration than infants in the short duration of EBF (7.49 ± 1.00 Kg and 7.17 ± 0.90 Kg respectively) **p=0.004**. Mean WLZ was also significantly better for infants in the long duration than those in the short duration of EBF (-0.50 ± 1.11 and -0.86 ± 0.98 respectively) **p=0.004**. Mean LAZ was significantly better for infants in the short duration than those in the long duration of EBF (0.20 ± 1.04 and -0.13 ± 1.05 respectively) **p=0.007**. Duration of EBF was not associated with infant growth at 6 months of age. Predictors of long EBF were grandmother's support for EBF (OR: 2.03; 95% CI, 1.16, 3.57), having at least primary/JHS/middle school education (OR: 2.32; 95% CI, 1.25, 4.31) and being a salaried worker (OR: 4.72; 95% CI, 1.10, 20.29). Mothers who earned monthly incomes above GH¢100.00 were less likely to exclusively breastfeed for long duration compared to mothers who did not earn any monthly income (OR: 0.22; 95% CI, 0.06, 0.79).

Conclusion: There is the need to promote optimal feeding practices among mothers and other persons involved in child feeding and education programs to increase knowledge in nutrition so as to enhance good nutritional status of children.

CHAPTER 1

1.0 INTRODUCTION

1.1 Background Information

Globally, undernutrition still remains a public health problem. Worldwide, 171 million children are stunted, 60 million are wasted and well over 100 million are underweight (UNICEF, 2012; de Onis *et al.,* 2011). Even though some regions and countries in the world have achieved modest improvements in childhood undernutrition over the years, countries in sub-Saharan Africa including Ghana are still battling with high rates of undernutrition especially stunting (Save the children, 2012). According to the 2008 Lancet series Ghana was listed as one of the 36 countries contributing to 90% of stunting among children under five in the world (Black *et al.,* 2008). Currently, the MICS, 2011 shows a reduction in the levels of under five undernutrition in Ghana. Stunting reduced from 28% to 22.8% in 2008 to 2011, wasting reduced from 9% to 6.2% and underweight has also reduced from 14% to 13.4% in the same period (MICS, 2011). On a regional basis, there are disparities in the rates of undernutrition in the 10 regions of Ghana. The Upper East region has consistently recorded stunting levels above 30% in 2008 and 2011 (GDHS, 2008 and MICS, 2011).

This situation of childhood undernutrition in the country is a source of worry as it has consequences on child health, survival and national development. According to Save the Children (2012), undernutrition accounts for 2.6 million child deaths each year worldwide. For those children who are fortunate to survive, undernutrition increases the risk of morbidity, delayed mental development, impaired intellectual performance as well as work capacity later in life (Dewey, 2001). These consequences suggest the need to improve the nutritional status of children more especially as countries strive to achieve

the Millennium Development Goals (MDGs) of eradicating poverty, achieving universal primary education and reducing child mortality since improved nutrition plays a role in achieving these goals.

Undernutrition in infants particularly stunting is a consequence of inappropriate breastfeeding and complementary feeding practices during the first two years of life (GDHS, 2008). This puts infants within this age range at increased risk of undernutrition. EBF for the first six months of life with appropriate complementary feeding thereafter with continued breastfeeding up to 24 months is recommended for optimal infant and young child feeding and are essential to the growth of infants (WHO, 2010). EBF has been defined as the feeding of an infant for the first six months of life with only breast milk and no other foods or liquids except medicines or mineral/vitamin supplements (WHO, 2008).

Breast milk is safe and contains the energy, nutrients and protective factors an infant requires for the first six months of life. In Ghana, the EBF rate has reduced from 63% in 2008 to 46% in 2011 (GDHS, 2008 and MICS, 2011). Short duration of EBF and the subsequent early introduction of complementary foods, leads to the displacement of breast milk (Cohen *et al.*, 1994). This contributes to an infant receiving lesser amount of required nutrients, increasing the risk of illness and undernutrition. Kramer and Kakuma 2004, in their review on optimal duration of exclusive breastfeeding concluded that infant growth is not affected by longer duration (up to six months) of EBF and the risk of gastrointestinal infections reduces with EBF for six months than four months. A study in Turkey by Donma and Donma (1997), also revealed that head circumference-for age values were found to be higher among infants exclusively breastfed for six months (43.7± 0.1 cm for boys, 42.9 ± 0.1 cm for girls) than infant who were mixed fed (42.6 ±

0.1 cm for boys, 41.4 ± 0.1 cm for girls) and infants who were formula fed (42.5 ± 0.1 cm for boys, 41.5 ± 0.1 cm for girls).

After 6 months of EBF, transitioning to optimal complementary feeding poses a great challenge to many caregivers especially in developing countries as it does not only depend on what is fed but also on how, when, where and by whom the infant is fed (Pelto *et al.,* 2002). Complementary foods include any solid or liquid food with nutritional value other than breast milk given to breastfed infants and these foods are usually commercially available or can be prepared at home (Giuliani and Victora, 2000). To promote infant growth, complementary feeding should be timely (must be initiated at 6 months), adequate (foods should be given in the right amount, consistency and right nutritional value) and foods should be prepared and stored in a safe manner to prevent contamination. Adequacy of complementary foods depends on the availability of food as well as the caregiver feeding practices. In 2008, 37% of infants under six months of age in Ghana were introduced to non-breast milk liquids, water or other liquids and solid/mushy food in addition to breast milk (GDHS, 2008). Low dietary diversity contributes to nutrient deficiencies, poor growth and development in infants 6-23 months old (GDHS, 2003). A fermented maize porridge (koko) is the traditional complementary food and is low in energy and nutrient density (Lartey *et al.*, 1999).

To ensure optimal EBF and complementary feeding, it is essential that caregivers are provided the appropriate guidance regarding optimal feeding of infants and young children, taking into account the influences of cultural practices, maternal characteristics (age, level of education, occupation, and income), infant's sex and place of delivery (Dewey, 2001; Kimani-Murage *et al.*, 2011).

1.2 Rationale

Stunting occurs early in life and has many effects on the health of affected individuals. Poor feeding practices during early childhood contribute to stunting. The Upper East Region has 32% of its children under five stunted (MICS, 2011). However, there is limited information on breastfeeding and complementary feeding practices as well as factors associated with these practices in the area. There is the need therefore to assess feeding practices and the factors associated with these practices in the Builsa District in the region. EBF for the first six months of life has been shown to contribute to the health and survival of infants as breast milk contains the right energy and nutrients that an infant requires during the first six months of life. However the current rate of EBF nationally, has reduced drastically from 63% to 46% with a short duration, indicating that more infants are being introduced to complementary foods before six months. Early introduction of complementary food results in the displacement of breast milk thus reducing the intake of protective factors and contributing to nutrient deficiencies as complementary foods in Ghana tend to be low in energy and nutrient density which can affect optimal infant growth. Hence there is the need to investigate the implication of shorter duration over six months duration on the nutritional status of infants at six months of age and the factors that predict long duration of EBF to plan effective interventions that will improve the rate of EBF in the district.

1.3 Research Questions

- What are the breastfeeding and complementary feeding practices in the study area?
- What factors are associated with the duration of EBF in the study area?

- What is the relationship between the duration (short and long) of EBF and the growth of infants at six months?
- What are the predictors of long duration of EBF in the study area?

1.4 Objective of the Study

1.4.1 Main Objective

To assess breastfeeding and complementary feeding practices and the association of the duration of EBF with the growth of infants at 6 months of age in the Builsa District

1.4.2 Specific Objectives

- To determine the breastfeeding and complementary feeding practices in the study area
- To assess the factors associated with the duration of EBF in the study area
- To determine the relationship between the duration of EBF and the growth of infants at 6 months of age
- To determine the predictors of long duration of EBF in the study area

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 Global Prevalence of Malnutrition

Malnutrition includes both undernutrition and overnutrition. Undernutrition results when an individual's body requirements for nutrients are not met (Gulati, 2010). It manifests as stunting, wasting, underweight and deficiencies in micronutrients (Black *et al.*, 2008). Overnutrition on the other hand is the over-consumption of specific nutrients which can lead to obesity (Gulati, 2010). Although both overnutrition and undernutrition are public health problems, this work focuses mainly on undernutrition.

Stunting (low height-for-age), indicates a limitation of a child's potential growth, and reflects failure to receive adequate nutrition over an extended period and a sign of recurrent or chronic illness. Wasting (low weight-for-height) indicates acute weight loss resulting from inadequate nutrition following the period of measurement. The weight loss could also be due to recent episodes, particularly from diarrhoea or shortage in food supplies (GDHS, 2008). Underweight, a third indicator of undernutrition reflects the effects of both stunting and wasting (Black *et al.*, 2008).

Globally, the problems of stunting, wasting and underweight especially among children under five are still persistent. In 2011, it was estimated that for children under five worldwide, 26% were stunted, 16% were underweight and 8% were wasted (UNICEF, 2013). More recently, the worldwide prevalence of undernutrition was seen not to have improved as 171 (27%) million children are stunted, over 100 million are underweight (UNICEF, 2012) and well over 60 (10%) million children are wasted (de Onis *et al.*, 2011).

According to de Onis *et al.* (2000), the prevalence of stunting in developing countries reduced from 47% in 1980 to 33% in 2000 but this was shown not to have been improved in Sub-Saharan Africa as the region recorded the highest rates of stunted children in the world (FAO, 2008). Sub-Saharan Africa and South Asia recorded the highest rates of under five stunting 40% and 39% respectively, for underweight South Asia recorded the highest of 33% and sub-Saharan Africa recorded 21% and for wasting South Asia recorded the highest of 16% (UNICEF, 2013) making Sub-Saharan Africa and South Asia the two main regions in the world with the highest number of undernourished children. Even though reports have revealed improvements in the rates of stunting among children in some countries within the Sub-Saharan region, countries in West Africa, the Sahel and South East Africa are still battling persistent high rates of stunting (Teller and Alva, 2008).

2.2 Situation of Childhood Undernutrition in Ghana

Ghana is one of the countries in West Africa were childhood undernutrition is a common public health problem. Even though the government, with support from its development partners has committed substantial resources in the area of improving the nutritional status of especially children for some time now, undernutrition still persist in the country and is one of the contributing factors to childhood morbidity and mortality (Hong, 2007). According to the 2008 Lancet series Ghana was listed as one of the 36 countries contributing to 90% of stunting among children under five (Black *et al.*, 2008).

A report of the Multiple Indicator Cluster Survey (MICS) showed a reduction in the prevalence of stunting and underweight among children under age five from 2003 to 2008 (MICS, 2011) however, there was no change in the prevalence of wasting during that same period (MICS, 2011). Currently, in 2011, about 22.8% of children under age five in Ghana are stunted, 6.2% are wasted and 13.4% are underweight (MICS, 2011) compared to the

28% who were stunted, 9% who were wasted and 14% who were underweight in 2008 (GDHS, 2008) suggesting an improvement in the prevalence of under five undernutrition over the prevalence recorded in the 2008 GDHS.

Some disparities exist with regards to the prevalence of undernutrition in the country. Overall, stunting and underweight rates have been consistently higher in rural than in urban areas in the country (GDHS, 2008). While there are also marked regional variations in the prevalence, the Northern and Upper East regions of the country, have consistently experienced the highest levels of stunting in 2008 and 2011. This may reflect food shortages resulting from poor weather conditions (droughts and floods) and the high poverty prevalence experienced in these regions. According to the 2005/06 Ghana Living Standards Survey (GLSS) report, poverty is still high in the three northern regions where over 70% of the people are poor and this conforms to UNICEF (2013) which indicated that for all regions across the world, the prevalence of stunting is higher among children living in the poorest households and underweight is also common among children living in the poorest 20% of households than children in 20% of the richest households.

2.3 Consequences of Undernutrition

Undernutrition in all its forms has varied consequences for individuals, families and communities. It is known to contribute to morbidity, mortality and prevents children from attaining full growth and development. In the 2012 Save the Children report, 2.6 million children worldwide die as a result of undernutrition each year. It is estimated that stunting, severe wasting, and intrauterine growth restriction together are responsible for 2.2 million deaths and 21% of global disability-adjusted life-years (DALYs) for children under age five. Also, other undernutrition indicators such as vitamin A and zinc deficiencies together cause 1 million deaths and 9% of global childhood DALYs (Black *et al.*, 2008). For those

children who are fortunate to survive, they suffer physical and mental impairments, reduced school performance, increased risk for infectious diseases and poverty (Caulfield, 2013; Save the Children, 2012). Research has shown that adults who were undernourished as children earn 20% less than those who were not (Save the Children, 2012). Although views are mixed about the role of undernutrition on infection, studies have demonstrated that undernutrition exacerbates diarrhoea and respiratory infections and has a strong presence in areas where morbidity and mortality from malaria is high (Victora *et al.,* 1990, Rice *et al.*, 2000, Tomkins and Watson, 2003). According to Black *et al.* 2008 undernutrition was responsible for 35% of disease burden in children under age five. Grantham-McGregor *et al.* (2007), in their work on the developmental potential in the first five years for children in developing countries found that stunting is associated with poor mental and motor development in pre-school children, increased frequency of behavioural problems as well as poor school achievement in older children. According to Haddad and Bouis (1991) stunting in children contributes to reduced productivity later in life. This can have negative implications on national economic development. Childhood undernutrition can start from an unnourished mother. Maternal undernutrition may lead to intrauterine growth restriction, which in tend increases the risk of poor foetal growth and low birth weight, thus adult women who were undernourished as children are at a higher risk of giving birth to undernourished babies and the cycle of malnutrition continues especially when those babies are also girls (Black *et al.,* 2008). Thus, undernutrition does not affect only the individual but also society and the nation at large hence the need for every country to work at improving the nutritional status of its children for future economic development.

Evidence from the GDHS and MICS suggest that children under age five are most vulnerable to undernutrition. Also, experts suggest that deterioration in nutritional status of

children after six months, may be due to poor complementary feeding practices and incidence of infectious diseases such malaria and diarrhoeal diseases (WHO, 2003 and Kimani-Murage *et al.,* 2011). Unfortunately infant and young child feeding practices in Ghana are sub-optimal.

2.4 Infant and Young Child Feeding Practices

Infant and young child feeding practices include breastfeeding and complementary feeding. These feeding practices are important determinants of child nutritional status more especially children under the age of two (GDHS, 2008). However, according to Kimani-Murage *et al.* (2011), suboptimal breastfeeding and complementary feeding practices are common in developing countries. Similarly, findings from the GDHS 2008 and MICS 2011 revealed that breastfeeding and complementary feeding practices are suboptimal.

2.4.1 Exclusive Breastfeeding Practices

2.4.1.1 Situation of Exclusive Breastfeeding in Ghana

Breastfeeding is a universal practice in Ghana, nearly all children less than six months were being breastfed in 2008 (GDHS, 2008). The duration of breastfeeding in Ghana is long as 96% of Ghanaian children between the ages of 9-11 months were breastfed and the median duration of breastfeeding is 23 months (GDHS, 2008). Though there are regional differences in breastfeeding prevalence, these are minimal, with the northern regions recording the longest duration of 28 months and the Greater Accra region recording the lowest duration of 19 months (GDHS, 2003). Breastfeeding rates decline with the age of the child, reducing from 44% among children 20-23 months old to 10% in those 24-35 months old.

Despite research evidence surrounding the many benefits of EBF to both mother and infant including; protection against gastrointestinal infections and mortality, enhancement of mental and motor development in infants (Kramer and Kakuma, 2004; WHO, 2002), promotion of maternal weight reduction and prolongation of lactational amenorrhea in mothers (Dewey *et al.*, 2001), only 63% of children less than six months were exclusively breastfed (GDHS, 2008). In 2003, 53% of children less than six months were exclusively breastfed (GDHS, 2003). A study by Aidam *et al.* 2005 in Accra, Ghana found that 51.6% of mothers exclusively breastfed their infants. However, MICS 2011 reported a decline in the national rate of EBF from 63% to 46%, lower than the 53% and 54% recorded in 2003 and 2006 respectively.

As part of the EBF practice, it has been recommended that breastfeeding be initiated within one hour of birth (WHO, 2002). Early initiation of breastfeeding protects the baby since colostrum serves as the first immunization for the baby and it also stimulates breast milk production. Evidence from the GDHS and MICS has shown that the rate of initiation of breastfeeding within 1 hour after birth decreased from 52% in 2003 to 35% in 2006 and has remained constant at 46% both in 2008 and 2011 (GDHS, 2003, 2008 and MICS, 2006, 2011). This suggests that more efforts are needed to promote optimal breastfeeding practices in the country.

Poor water and sanitation are underlying causes of undernutrition (UNICEF, 1998). In Ghana, the Upper West, Northern and Upper East regions have the highest populations with no sanitary facilities (71%, 72% and 82% respectively) (MICS, 2011). The use of baby feeding bottle for infant feeding has been discouraged because of the possibility of contamination especially in places where clean sanitation and water are still a challenge. In Ghana, about 12% of young children were fed using baby feeding bottles (GDHS,

2003). However, there was a decline in 2008 as only 5% of babies under two months were fed with a bottle with a teat. It was also realized that the use of feeding bottles increased with the age of the child (GDHS, 2008).

2.4.1.2 Exclusive Breastfeeding Recommendations

Globally, enormous efforts have been made to improve exclusive breastfeeding owing to the crucial role it plays in child health and survival. The WHO (1995) recommended EBF for between 4-6 months before introduction of complementary foods. However, this recommendation was changed to six months EBF (without giving water, other liquids or solid foods) and introduction of complementary food thereafter following a systematic review by Kramer and Kakuma and an expert consultation considering the many benefits of EBF to both mother and infant (WHO, 2001). As part of this recommendation, mothers are recommended to initiate breastfeeding within one hour of birth as colostrums, the first breast milk serves as baby's first immunization for protection and achieving full development and good health (Kimani-Murage *et al.*, 2011). However, only 43% of newborns in developing countries are put to the breast within one hour of birth (Save the children, 2012). The Ministry of Health Ghana has recommended early initiation of breastfeeding especially in health facilities designated "baby friendly". A baseline survey on promotion of complementary feeding practices (USAID *et al.*, 2011) found high rate (62%) of early initiation of breastfeeding in health facilities that respondents delivered thus indicating that facilities are promoting early initiation of breastfeeding.

It is also recommended that mothers ensure that a baby is correctly positioned, attached and is being fed effectively on the breast. Incorrect positioning and attachment may lead to inadequate breast milk intake and breast problems (sore nipples). A study by Cernadas *et al.* (2003) showed an association between longer duration of EBF and absence of nipple problems and proper positioning of infant to the mother's breast. Santo *et al.* (2007) also

found that poor attachment of baby to the mother's breast at 30 days was associated with short duration of EBF (HR: 1.29; 95% CI, 1.06-1.58). The reasons they gave were that poor attachment could lead to less intake of breast milk by the baby resulting in less breast milk production and consequently the need to supplement the infant with other foods.

Prelacteal feeds (liquids or food) and water are not recommended for infants less than 6 months as this may reduce breast milk intake and production. Frequent, on-demand feeding is also important as it helps maintain a mother's milk supply and helps the mother avoid breast problems (breast engorgement). It is also recommended that infants be breastfed more frequently during and after illness. These optimal breastfeeding practices are therefore important and mothers need to adhere to them. According to Jones *et al.* (2003), adherence to the recommendations on optimal breastfeeding practices can prevent about 19% of deaths among children under five years of age.

2.4.1.3 Relationship between Duration of Exclusive Breastfeeding and Infant Growth

There are several benefits of EBF both to infant and the mother (Kramer and Kakuma, 2002; Kimani-Murage *et al.*, 2011). Raisler *et al.* (1999) indicated that the benefits of EBF are further enhanced by long duration. Implying that the longer a mother breastfeeds exclusively, the more she and her baby derives the benefits. Infancy is a stage in life that is characterized by rapid weight gain, with an infant doubling its birth weight in the first four to six months (Kalies *et al.*, 2005). Due to differences in feeding practices, one would however expect a difference in the weight of a child introduced to complementary food before four and one introduced to complementary food at six months. However, results from a systematic review of two controlled clinical trials from Honduras were women were randomized to either breastfeed exclusively for six months or introduce hygienic and nutritionally adequate complementary food at four months with continued breastfeeding demonstrated no significant benefit for growth for infants introduced early to

complementary food though there were some methodological problems (Kramer and Kakuma, 2002). The results from the studies also showed that weight-for-age, length-for-age and weight-for-length z-scores at six months were all non-significantly higher in the EBF group than the mixed breastfed group.

Studies elsewhere have shown that long duration of breastfeeding is associated with slower growth in the first year of life (6–8) months. Kramer and Kakuma (2002) concluded in their systematic review of controlled trails and observational studies on optimal duration of EBF that infants breastfed for six months or more showed no deficits in growth (weight and length). A study by Kalies *et al.* (2005) showed that children who were exclusively breastfed for a duration of less than six months had a greater risk of high weight gain at two years of age than children breastfed for a longer duration of six months (OR: 1.65; 95% CI, 1.17-2.30). This means that six months of EBF protects against elevated weight gain during infancy.

Donma and Donma (1997) in their study on the influence of feeding patterns on head circumference among Turkish infants during the first six months of life where they categorized infants into three groups ((exclusively breastfed, mixed fed or formula fed) found that at the end of the first month, exclusively breastfed infants had greater head circumference values than infants who were mixed fed or formula fed. At four months, they found that the values in each of the four groups were almost the same. However, at six months of age, head circumference values were found to be higher among infants exclusively breastfed for six months (43.7± 0.1 cm for boys, 42.9 ± 0.1 cm for girls) than infant who were mixed fed (42.6 ± 0.1 cm for boys, 41.4 ± 0.1 cm for girls) and infants who were formula fed (42.5 ± 0.1 cm for boys, 41.5 ± 0.1 cm for girls). This difference in head circumference values could be due to the availability of docosahexanoic acid in breast milk which is essential for brain growth and development (Georgieff, 2007).

Hence EBF for six months duration enhances better head circumference than EBF for shorter durations. Considering the problems of short duration of EBF and early initiation of complementary feeding in Ghana and the fact that complementary food in Ghana is of low energy and nutrient density (Eyeson *et al.*, 1975) and contributes to diarrhoea which in turn can result in undernutrition, there is the need to investigate the growth of infants at six months of age exclusively breastfed for longer versus shorter durations.

2.4.2 Complementary Feeding Practices

2.4.2.1 Situation of Complementary Feeding in Ghana

Complementary foods are introduced to an infant at a time when breast milk alone is not sufficient to meet the energy and nutrient requirements of the growing infant (WHO/UNICEF, 1998; WHO, 2003). Therefore the aim of introducing complementary foods is to serve as a complement to the breast milk so as to meet the infant's requirements. The total energy requirement for an infant at 6-8, 9-11 and 12-23 months in developing countries are 615 kcal/d, 686 kcal/d and 894 kcal/d respectively (Dewey and Brown, 2003). However, average breast milk energy intake for infants in developing countries is 413kcal/d, 379kcal/d and 346kcal/d at 6-8, 9-11 and 12-23 months respectively (WHO/UNICEF, 1998). Implying that, the energy intake from breast milk decreases as the infant age increases, therefore the deficit in energy of 200 kcal/d, 300 kcal/d and 550kcal/d at age 6-8, 9-11 and 12-23 months respectively are to be met from complementary food (WHO/UNICEF, 1998). In Ghana, the main complementary food is fermented maize porridge (koko), which is low in energy and nutrient density and therefore unable to meet the energy and nutrient requirements of an infant at age six months and beyond alone. The WHO 2003, has recommended that complementary feeding starts at 6 months, with continued breastfeeding for up to two years. Studies have shown

that early introduction of complementary food contributes to diarrhoea (Popkin *et al.*, 1990).

The GDHS 2003 reported suboptimal complementary feeding practices (late introduction of complementary food, low dietary diversity and few meals per day). Vaahtera *et al.* (2001) on the other hand reported early introduction of complementary foods to newborns in rural Malawi. Unlike breastfeeding, complementary feeding has not gained the necessary support, the 2002-2006 health sector review reports observed that programmes aimed at improving complementary feeding practices have not enjoyed the level of support from both national and international levels as has been given to breastfeeding especially EBF (Black *et al.*, 2008).

Also, there is limited information on complementary feeding practices at district levels in the country to allow for geographic assessment of the practices and to develop and implement appropriate interventions for each setting since according to Aidam *et al.* (2005) complementary feeding practices differ from one geographic area to the other.

2.4.2.2 Complementary Feeding Recommendations

The complementary feeding period is the most challenging when it comes to infant feeding as it has been widely recognized that optimal complementary feeding does not depend on only what is fed but also on how, when, where and by whom the child is fed (Pelto *et al.*, 2002). A study in India revealed that caregivers lack the awareness and knowledge of what and how often to feed their infants (Sharma, 2005). With regards to the challenges of what to feed, how and when to feed during the complementary feeding period, WHO/UNICEF in a review in 1998 on complementary feeding presented age-specific guidance on the nutritional requirements from complementary food in breastfed children. These guiding principles on complementary feeding were recommended to serve

as a guide for countries to develop locally appropriate feeding recommendations. It is recommended that complementary feeding starts at 6 months and breastfeeding continued on-demand until two years of age or beyond. The 2008 GDHS reported that 75% of children 6-9 months were consuming complementary foods implying that 25% of children in this age group did not meet the recommendation to start complementary feeding at 6 months.

Good hygiene and safe food handling are very essential since the peak incidence of diarrhoeal diseases occur during the complementary feeding period. It is recommended that caregivers and children wash their hands properly before food preparation and eating, storing food safely, using clean utensils, bowls and cups as well as avoid the use of feeding bottles as these bottles are sources of dangerous pathogenic organisms (PAHO/WHO, 2003). These practices are especially important in areas with poor access to safe water and sanitation as unhygienic practices and unsafe handling of food can contribute to diarrhoeal diseases and morbidity (Kramer and kakuma, 2002; Vaahtera *et al.*, 2001).

The amount of complementary food needed by a child increases as the child gets older since a child's energy requirements increases with age. It is recommended that children at 6-8 months, 9-11 months and 12-24 months receive 137-187 g/day, 206-281 g/day and 378-515 g/day amount of complementary food respectively. Due to the difficulty in measuring these amounts, the GHS has used common household measures to determine the amounts of food to be given. Hence it has recommended that children at six months consume one stew ladle, children 7-8 months consume one soup ladle, children 9-11 months consume one to two soup ladles and children 12-24 months consume two soup ladles of complementary food.

Just as the amount of food is important, dietary diversity of complementary foods is recommended to ensure that the nutrient needs of children are met. Consumption of meat, poultry, fish or egg as often as possible and intake of fruits and vegetables daily is recommended. It is important that food be given to infants based on their requirements and abilities. Food should be such that a child can easily eat. Infants at six months should eat pureed, mashed and semi-solid foods. Finger foods can be introduced at eight months and by 12 months of age children can be fed with family foods. It is therefore recommended that the consistency of the food be increased as the child gets older taking into the nutrient-density of the foods. For a healthy breastfed child at six to eight months, 9-11 months and 12-24 months it is recommended that they receive two to three meals/per day, three to four meals/per day and four to five meals/per day (including snacks, one to two times per day) respectively.

For sick children it is recommended that they be fed more frequently with varied and favorite foods, their fluid intake increased and they be encouraged to eat. After illness it is recommended that children be given more food than usual. Due to the low nutrient contents of unfortified plant-based complementary foods especially in developing countries (Kramer and Kakuma, 2002), it is recommended that they be fortified with animal source foods to ensure that children meet their nutrient needs when they consume these foods.

2.5 Factors Associated with Infant Feeding Practices

2.5.1 Maternal/Household Socio-demographic Characteristics

2.5.1.1 Maternal Age

Research has shown that maternal age is one of the factors influencing child feeding practices. A study by Santo *et al.* (2007) found that being an adolescent mother (mothers <20 years) was associated with early cessation of EBF (HR=1.48; 95% CI, 1.01-2.17) than mothers ≥20 years and indicated that the association of maternal age on duration of EBF varies with respect to culture and a mother's access to information. Similarly, Tarrant *et al.* (2010) found in their study that younger mothers (18-24 years) were more likely to wean their babies before one month (OR: 1.84; 95% CI, 1.05-3.21) than mothers who were ≥35 years. In contrary, Vieira *et al.* (2004) found that the duration of EBF between young and adult mothers was not different.

2.5.1.2 Maternal Level of Education

Adequate child care practices are crucial for child survival as inadequate care is one of the underlying causes of childhood undernutrition. According to Latham (1997), good child practices may be influenced by factors such as maternal level of education. Well educated women have well nourished children than their counterparts with no level of education. This is evident in the GDHS (2008) which reported that children born to mothers with the lowest level of education are more likely to be underweight or stunted compared to children born to mothers with higher levels of education. In Ghana, a study by Aidam *et al.* (2005) revealed that mothers with higher levels of education including a secondary school education were more likely to EBF than mothers with lower than secondary school education (OR: 1.79; 95% CI, 1.11-2.86) *($P< 0.05$).*A study in rural Malawi found an

association between increased maternal education and long duration of EBF (Coefficient B: 2; 95% CI, 1,3) *(p=0.001)* hence implying that highly educated mothers have an enhanced devotion to feed their children according to infant feeding recommendations (Vaahtera *et al.*, 2001). This is in agreement with the GDHS (2003) report which indicated that formal education helps individuals to make informed decisions that impact their health and well-being. Also, according to Save the Children Report (2012), a mother who is poorly educated is at a greater risk of not being able to feed her baby adequately. Studies have shown the association between maternal level of education and EBF. Martin *et al.* (2002) found maternal level of education to be associated with breastfeeding initiation, duration and EBF.

During the complementary feeding period a mother is not only concern with what to feed but also how to feed and when to feed. Lanigan *et al.* (2001) indicated that lower level of education is associated with early introduction of complementary foods. This consequently leads to shorter duration of EBF. To improve breastfeeding and complementary feeding practices as well save innocent children from undernutrition and mortality, and break the intergenerational cycle of malnutrition, we need to invest in girls' education. Improving maternal education reduces the rates of mortality in children (Save the Children, 2012). According to estimates from UNESCO, providing universal secondary education for girls could save the lives of 1.8 million children in Sub-Saharan Africa (Save the Children, 2012). Higher education, especially of women, has been reported to be associated with greater knowledge as well as good health and care practices (Guldan *et al.*, 1993).

2.5.1.3 Maternal Income

Poverty is one of the underlying causes of child undernutrition and the role it plays has been established by several studies. Studies including one in Ghana have shown that children in poorer households tend to be more malnourished than children in richer

households (Owor *et al.,* 2000; Shell-Duncan and Obiero, 2000; Black *et al.,* 2008). Hong's (2007) analysis of the 2003 Ghana Demographic and Health Survey (GDHS) revealed that children in the poorest 20% of households are more than twice as likely to suffer from stunting as compared to their counterparts in the richest 20% of households. Contrary to these findings, studies have also shown that household poverty is not a necessary condition for childhood undernutrition (Reyes *et al.,* 2004; Save the Children, 2012). A study in Ghana by Aidam *et al.* (2005) found higher maternal socio-economic status to be associated with EBF (OR: 4.23; 95% CI, 1.41-12.95) *($p< 0.05$).* In contrary, Pe´rez-Escamilla *et al.* (1995) found lower socio-economic status to be associated with EBF *($p\leq 0.10$)* in Honduras and Mexico.

As part of their coping strategies, poor households cut down on the quantity and quality of their food when food prices increase and tend to depend on cheaper foods which are of low nutrient content (Save the Children, 2012). This puts children especially during the complementary feeding period at the risk of chronic malnutrition. During the complementary feeding period, addition of animal source foods to unfortified complementary foods can improve the nutrient contents of these food however this increases the cost of feeding and mothers with the lowest incomes may not be able to afford (Dewey, 2001). This is in conformity with the Save the Children Report (2012) which indicated that children living in poor households have poor dietary quality. To improve appropriate complementary feeding, efforts must be made to empower women and create avenues for them to earn income as they are the primary caregivers. As Haddah *et al.* (2003) suggests that addressing poverty and inequity would result in a long term reduction in malnutrition.

2.5.1.4 Place of Residence

Area of residence (urban or rural) is associated with breastfeeding initiation, duration and EBF (Martin *et al.*, 2002) however; the degree of the associations varies from one geographic area to the other (Aidam *et al.*, 2005). Area of residence is also a determinant of childhood undernutrition. The GDHS (2008) reported that 16% of children living in rural areas are underweight compared to the 11% of underweight children in urban areas. Tan (2011) found area of residence to be associated with EBF ($p< 0.05$) as mothers who lived in rural were more likely to exclusively breastfeed than mothers who lived in urban (OR: 1.16; 95% CI, 1.03-1.89). Similarly results from a study in Malawi by Vaahtera *et al.* (2001) showed that EBF was rare and complementary foods were introduced early to newborns among families in rural areas.

2.5.2 Infant characteristics

2.5.2.1 Sex

Child sex has been associated with early introduction of complementary food. In some communities it is believed that boys breastfeed more frequently than girls hence it is perceived that they eat more than girls therefore require more food. This contributes to the early introduction of complementary foods to boys (Kimani-Murage *et al.*, 2011).

2.5.2.2 Place of Delivery

In Ghana, women deliver at health facilities, private maternity homes, with Traditional Birth Attendants (TBAs) or at home. Women who attend antenatal clinics and deliver at health facilities are likely to receive information on EBF and complementary feeding practices since health education takes place in the health facilities. A study by Aidam *et al.* (2005) in Ghana found a positive association between EBF and delivery at a health facility (OR= 1.96; 95% CI, 1.08-3.54). The reasons they gave for this finding were that some

health facilities in Ghana are baby friendly and so provide prenatal and postnatal health education on breastfeeding and this could have resulted in the exposure of mothers attending these facilities to optimal breastfeeding practices. Similarly, Pe´rez-Escamilla *et al.* (1995) found a positive association between delivery at a health facility promoting EBF and EBF. Dearden *et al.* (2002) also found that place of delivery influences the time of initiation of breastfeeding. Similarly a baseline survey on promotion of complementary feeding practices in Ghana revealed that majority (62%) of participants who delivered in a health facility initiated breastfeeding within one hour of birth as recommended (USAID *et al.*, 2011). This goes to emphasize that place of delivery influences the kind of feeding practice a mother will choose.

2.5.3 Cultural Factors

Culture is an integral part of every society. The way we eat and the type of food we eat is guided by our cultural beliefs and practices. In the same light, the way infant and young children are fed vary from one geographic area to the other (Aidam *et al.,* 2005). According to the report by Save the Children (2012) cultural beliefs contribute to suboptimal breastfeeding practices. For instance, the practice of giving water/herbs to newborns is a sign of welcome into the human world. However this practice strongly conflicts with the international recommendation by WHO on EBF for duration of six months (WHO, 2003).

2.5.4 Other Factors

Even though some mothers are able to practice EBF as recommended, others introduce other liquids or solid foods before six months. One factor contributing to this is the mother's perception that her breast milk alone is not enough to satisfy her infant (Otoo *et al.*, 2009; Frewtrell *et al.*, 2007; Caulfield *et al.*, 1999). Similarly, Kimani-Murage and colleagues (2011) indicated that mothers introduced liquids other than breast milk within

three days of birth to infants who were experiencing stomach upsets or mother produced inadequate breast milk. Maternal marital status and ethnicity have also been found to be associated with cessation of breastfeeding and early introduction of complementary foods (Kimani-Murage *et al.,* 2011).

Child care is a collective issue. All family members including external family members are concerned and involved in child care practices. Several studies in Africa have demonstrated the roles grandmothers play with regards to decision making in early child feeding practices (Aubel *et al.,* 2004; Davies-Adetugbo, 1997). Kerr *et al.* (2008) indicated that paternal grandmothers have an upper hand in deciding how a young mother should feed her infant. This study also revealed that young mothers who did not want to follow the decisions by grandmothers regarding the feeding of their infants were often frustrated by these old women. Apart from these, the study also found that decisions concerning the appropriate time to introduce other foods other than breast milk were taken by grandmothers. Similarly, a study involving African-American adolescent mothers that used in-depth interviews revealed that grandmothers dominated in decision making regarding the time to introduce solid foods and also made decisions on what food an infant would eat even though the generalizabilty of this study is limited due to small sample size (Bentley *et al.,* 1999). A study, in Ghana, by Otoo *et al.* (2009) using FGDs revealed that pressure from grandmothers as a factor hindering EBF. Evidence from studies have shown that living in the same house with grandmothers is associated with an early cessation of EBF ($p \leq 0.20$) (Santo *et al.,* 2007), since grandmothers use their infant feeding knowledge and experiences to influence a mother's decision on the kind of feeding practice she will do (McLorg and Bryant, 1989).

Providing a mother the necessary support and encouragement can help her gain confidence to exclusively breastfeed for six months. According to Save the Children (2012), support

from mother-in-laws, fathers and peers can help a woman exclusively breastfeed. This is in conformity with the study by Cernadas and colleagues (2003) which found longer duration of EBF to be significantly associated with family support. Kerr *et al.* (2008) suggested that child feeding practices could be improved by extending education on optimal infant and young child feeding practices to external family members since they influence a mothers feeding choice.

Research evidence has also shown that in some settings, suboptimal breastfeeding and complementary feeding practices are influenced by maternal occupation, health education, media exposure, infant birth weight and method of delivery. Tan (2011) found that unemployed mothers were more likely to exclusively breastfeed compared to employed mothers (OR: 3.66; 95% CI, 2.45-5.46) *($p< 0.05$).* The reason given for this finding was the short maternity leave for working mothers and the fact that some workplaces do not support EBF. Similarly, FGDs with women in Ghana revealed that the employment status of a mother influences her ability to exclusively breastfeed as mothers employed in the formal sector have less time to exclusively breastfeed due to the short duration of maternity leave and mothers employed in the informal sector may not also find suitable places to breastfeed during working hours (Otoo *et al.,* 2009). Thrulier and Mercer (2009) indicated that the consistency of association of these factors with suboptimal feeding practices are conflicting and differ from one setting to the other. A study in Ethiopia by Setegn *et al.* (2012) found that unemployed mothers were more likely to breastfeed exclusively than mothers who were employed (OR: 10.4; 95% CI, 1.51-71.50) *($P< 0.05$).* The reason they also gave was that mothers who are employed may not have close proximity with their infants because they may have to return to work considering the short duration of maternity leave.

2.6 Current Approaches to Address Undernutrition among Infants and Young Children in Ghana

As the causes of undernutrition are multiple and it has varied consequences on the health of the individual as well a nation, the government of Ghana and international organizations are making firm efforts to improve the situation of child undernutrition. The Ghana Poverty Reduction Strategy (GPRS II); New Partnership for Africa's Development (NEPAD) (GOG, 2005); the Accelerated Agricultural Growth and Development Strategy; Integrated strategy for the control of anemia in Ghana (GHS, USAID and MOST, 2003) have been developed to address poverty, improve food security and income which are some of the cause of undernutrition.

The current plan of action in Ghana that directly addresses undernutrition is the Imagine Ghana Free of Malnutrition Strategy (2007-2011). The Nutrition Unit of the Ministry of Health (MOH) is responsible for the implementation of the plan. The strategy's main focus is on the Baby Friendly Hospital Initiative (BFHI); the Community based nutrition behaviour change communication (BCC); mother-to-mother support groups for promoting optimal breastfeeding and complementary feeding practices and the Community-based growth promotion projects.

Interventions such as promotion of breastfeeding, appropriate complementary feeding, zinc and vitamin A supplementation and appropriate management of severe acute malnutrition have also been put in place to address the immediate causes of child undernutrition. According to Bhutta and colleagues (2008), effective implementation of these interventions could prevent about 25% of child deaths under 36 months of age and reduce the prevalence of stunting at 36 months of age by 36%. Under the promotion of breastfeeding, the WHO (2002) and the MOH, recommends EBF for six months. A combination of interventions including health education, lay support, Baby Friendly

Hospitals (BFH) and media campaigns have been promoted to support this recommendation on EBF.

A key program in Ghana that has contributed to the improvement in EBF is the USAID-funded LINKAGES project in collaboration with the Ghana Health Service (GHS) and other partners. The project implemented a national BCC program that promoted early initiation and EBF using a variety of interventions including mass media, interpersonal counseling, community events and peer support. During the duration of the project, the rate of EBF among children less than six months increased from 68% in 2000 to 78% in 2004. Economic evaluation showed that the project cost $16 per child, and an estimated 883 deaths were averted or US$203 per death averted (Chee *et al.*, 2002).

The Community based nutrition BCC strategy on appropriate complementary feeding and breastfeeding practices is a strategy aimed at increasing knowledge, changing cultural norms, attitudes and behaviour relating to breastfeeding and complementary feeding practices of caregivers of children under age three through group interactions with community health workers and volunteers. Currently, the MOH and the GHS use BCC through the mass media to promote EBF and complementary feeding practices. Due to the cultural diversity in Ghana, infant feeding practices may differ from region to region and from district to district. According to Gunnarsdottir and colleagues (2010), infant and young child feeding practices are different across geographical areas. Knowledge about these practices in the various districts in Ghana is therefore important as this will help implement interventions that will benefit each district according to their needs. However, in Ghana there is limited information on infant and young child feeding practices at the districts level.

Supplementation and food fortification programs are also carried out in Ghana to prevent micronutrient deficiencies especially among children. Routine supplementation of vitamin A is carried out in the country. According to the Global Alliance for Improved Nutrition (GAIN), Ghana launched a national food fortification program. The main aim of the programme is to fortify vegetable oil with vitamin A; wheat flour with vitamins A and B, iron and folic acid.

CHAPTER 3

3.0 METHODOLOGY

3.1 Description of Study Area

3.1.1 Builsa District

The Builsa district is one of the nine districts in the Upper East Region of Ghana. Even though it has been currently divided into the Builsa north and south districts, administrative work has not started in the Builsa south and these districts are still regarded as the Builsa district. It lies between longitudes 1^0 05' West and 1^0 35' West and latitudes 10^0 20' North and 10^0 50' North. It is bounded to the North and East by the Kassena-Nankana East and West Districts respectively and to the West by the Sissala East and Kassena-Nankana West Districts and to the South by West Mampruisi and Kassena-Nankana East Districts respectively (www.ghanadistrict.com).

The total land area of the district is 2,220sq km constituting 25.1% of the total land area of the Upper East Region (www.ghanadistrict.com). There is only one rainy season, which starts gradually from little rains in April to a maximum in August to September and comes to a complete halt in mid-October when the dry season sets in which is characterized by dry harmattan winds. The highest temperatures in the district are usually recorded in March and this can rise to 45^0 C (Builsa District Assembly, 2010).

The vegetation is predominantly savannah woodland. Trees of economic value like baobab, acacia, sheanut and dawadawa are mostly found in the area. The main occupation in the district is farming. The total land available for food cultivation is 37,000has (Builsa District Assembly, 2010). Major food crops cultivated are cereals (maize, rice, sorghum, millet) and pulses (cowpea, groundnuts, and soybean). Farmers along river bodies and dams also engage

in vegetable and maize production during the dry season. The people are also engaged in livestock rearing (sheep, goats, cattle, pigs) and poultry production (local fowls, exotic fowls, guinea fowls, ducks).

The population in the district stands at 92, 991 (www.ghanadistrict.com). The district can be described as purely rural as there is no settlement with urban status. The major ethnic group is the Builsa; minor groups include Kassenas, Frafras and Mamprusis. There are 155 communities in the district. These communities are grouped into eight major zones; Chuchuliga, Sandema, Wiaga, Siniensi/Doninga/Bachonsa, Kadema, Gbedema/Kanjarga, Chansa and Fumbisi. The district has only one bank (Builsa Community Bank), a magistrate court and 3 senior high schools. The capital of the district is Sandema. There is a high incidence of poverty in the district with about 79.6% of the population living in extreme poverty (Builsa District Assembly, 2010).

In terms of ethnic composition the Builsa's constitute about 83% of the entire population. The remaining 17% is made up of minority groups comprising the Kantosi, Mamprusi, Sissala, Nankani and Mossi. The dominant mode of worship is the Traditional African Religion (Builsa District Assembly, 2010).

Currently only a few communities in the district are served with electricity from the national grid. Sandema and Chuchuliga are the only towns supplied with treated and purified pipe water from the Ghana water Company. The rest of the Communities use boreholes, streams, rivers, open wells, dams and dugouts as their main sources of drinking water. Waste disposal is a major problem in the district. About 15.2% of the population use private home latrines; 6.3% use public toilet facilities. The majority of the population, about 78.5% on the other hand has no access to sanitary toilet facilities and resort to indiscriminate defecation in surrounding bushes (Builsa District Assembly, 2010). This prompted the district assembly in

the year 2012 to launch a campaign on "promoting an open defecation free district" considering the health implications it has on the people.

Presently the district has one hospital, four health centres, two clinics, 11 functional Community Health Planning and Services (CHPS) centres and two supplementary feeding centres. The main health problems the district has been battling with are maternal mortality and child undernutrition. Six zones in the district (Sandema, Chuchuliga, Siniensi, Wiaga, Gbedema and Fumbisi), which were also the main sub-districts under the district health directorate, were used for this study (Figure 3.1).

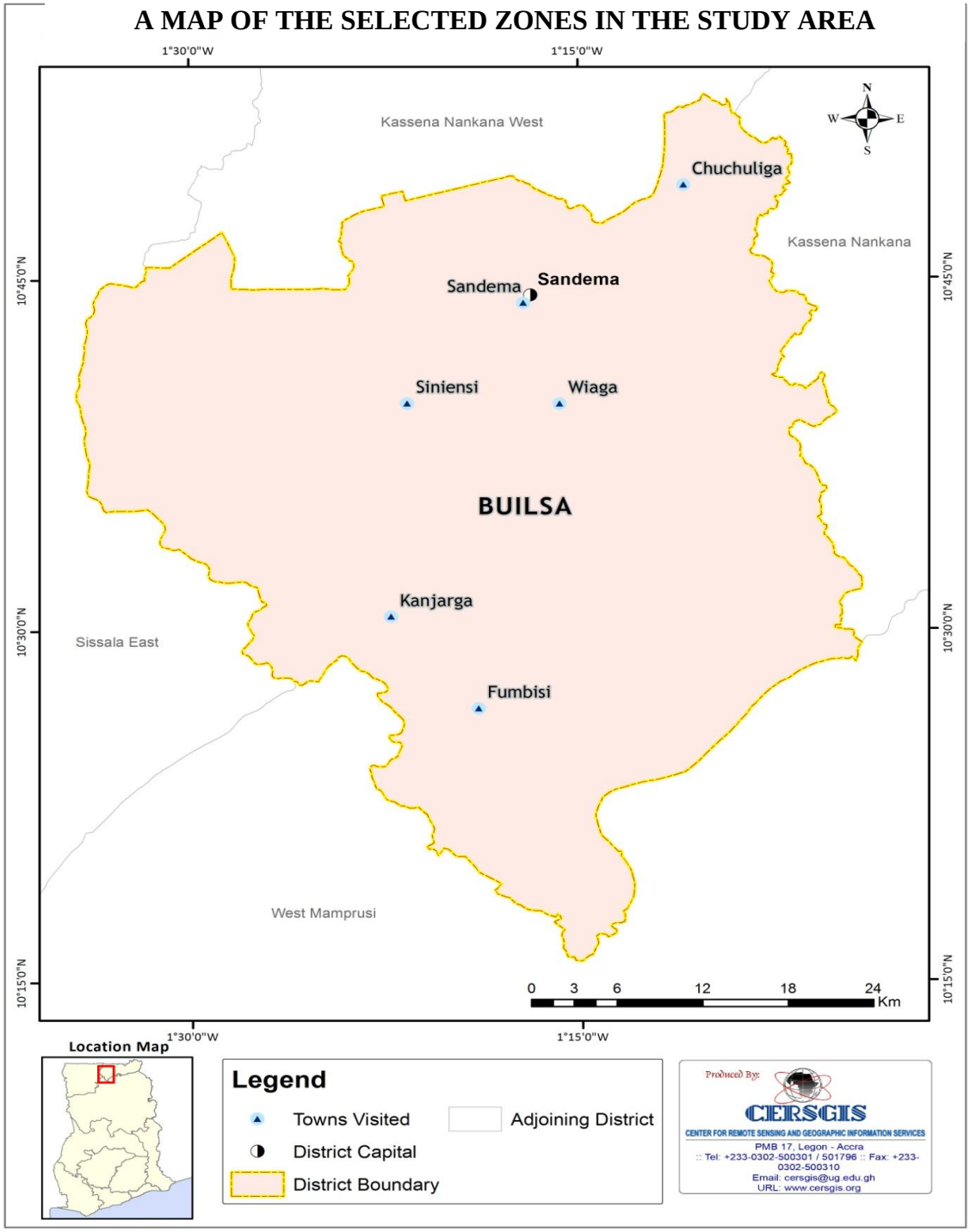

Figure 3.1: Map of Builsa district

3.2 Study Design

The study was conducted in two parts. The first part was a qualitative study utilizing FGDs of mothers with six months old infants to determine the breastfeeding and complementary feeding practices in the district. The second, which was the main study, was a cross-sectional survey of mother-child pairs with mothers who were not part of the FGDs. All questionnaires for the face-to-face interviews were administered to the mothers individually. Data collection started in December 2012 and ended in March 2013.

3.3 Focus Group Discussions (FGDs)

3.3.1 Study population

Participants were biological mothers of infants 6 months old.

3.3.2 Sample Size and Sampling Procedure

A total number of 52 mothers participated in six FGDs. Each group discussion included 8-10 participants. Six communities in the six zones selected for the study were randomly selected for each FGD. In recruiting the participants, announcements were made by community health volunteers in the selected communities inviting mothers with six months old infants for the FGDs. Interested participants were asked to converge at an easily accessible location in their respective communities for recruitment. Recruitment took place on different days in the six communities. Prior to recruitment eligible caregivers were identified, the study was explained to them in their local language (Buli) and verbal consent was sought before they were assigned and invited for the discussions. Where more than 10 participants were available, simple random sampling through balloting was used to select the required number of participants. The Table 3.1 shows selected communities and number of participants.

Table 3.1: Number of participants recruited in each community for focus group discussions

Community	Number of participants
Nanjupiung	8
Azunyeri	9
Gong	8
Tiedema	8
Yerinsa	9
Dabomsa	10
Total	52

3.3.3 Data Collection

A FGD guide (Appendix 1) was used to obtain information on infant and young child feeding practices breastfeeding practices (timely initiation of breastfeeding, feeding on demand, foods/liquids given within the first 6 months, duration of EBF, types of complementary foods given, age of introduction of complementary food, meal frequency, food diversity, food safety and hygiene, responsive feeding, maintenance of breastfeeding, and feeding during and after illness). Information was also gathered on the consequences of poor feeding practices, the barriers to optimal infant and young child feeding practices as well as suggestions for improving infant and young child feeding practices.

All FGDs were held in comfortable and easily accessible locations in the six communities. To confirm attendance, days and time for the discussions in each community were communicated to the participants prior to the discussions.

A moderator led each group discussion in the local Ghanaian language (Buli) which was the preferred language of the participants. Notes and observations were taken in a systematic way according to the questions asked by the moderator. Each discussion was audio-recorded and lasted approximately two hours.

At the end of each discussion, debriefing forms were completed by the moderator and observer and compared. This was done to improve subsequent discussions.

3.3.4 Data Analysis

Tape records from the six FGDs were translated verbatim and these in addition to the observer's notes and focus group debriefing forms were used for the analysis. Responses from the participants were coded. Similar codes were then grouped to form the main themes and sub-themes. Relevant quotes from the transcriptions were selected and used to support the description of the themes and presented in the results.

3.4 Cross-sectional Survey

3.4.1 Study Population

Six months old infants and their biological mothers.

3.4.2 Sample Size and Sampling Procedure

A total sample size of 290 mothers with their six months old infants participated in the cross-sectional survey. Sample size calculation was based on;

$n = Z^2 * P\ (1-P)/d^2$ (Daniel, 1999)

Where n = sample size

Z = confidence level at 95% (1.96)

P = prevalence of undernourished infants in the study area; 25%. (Kumar et al, 2006)

d = precision (5%)

The six months old infants were categorized into two groups based on the duration of EBF; duration of ≤ 4 months (short) and duration of five to six months (long). At the end of the study, complete data were available on 151 participants in the short duration of EBF group and 139 in the long duration of EBF group.

In recruiting the participants, visits were paid to health facilities in each of the six randomly selected zones (including outreach points and CHPS centres available in each zone) during child welfare clinics. Mothers with six months old infants present at the clinics were identified. The study was explained to them in their local language and all mothers who agreed to participate were recruited. All facilities were visited over a period of time until the sample size of 290 participants was achieved. Table 3.2 shows facilities visited in the selected zones.

Table 3.2: Selected zones and facilities visited (N=290)

Zone	Facility	n (%)
Chuchuliga	Health centre, CHPS	52 (18)
Sandema	Hospital, CHPS	54 (18.6)
Wiaga	Clinic, CHPS	12 (4.1)
Siniensi	Clinic, CHPS	38 (13.1)
Gbedema	Health centre	13 (4.5)
Fumbisi	Health centre, CHPS	121 (41.7)

3.4.3 Inclusion and Exclusion Criteria

Biological mothers of six months old infants, living in the selected zones, and did not participate in the FGDs and who signed or thumb printed on the informed consent forms were included in the survey. Mothers of infants older than six months and of twin birth were excluded.

3.4.4 Data Collection

3.4.4.1 Interviews

Face-to-face interviews with the mothers were conducted by three trained field assistants. A Screening questionnaire (Appendix 2) was first administered to confirm a mother's eligibility to participate in the study. Data on child's sex and age (confirmed by date of birth from health record book) were collected. The questionnaire was also used to collect duration of EBF and the foods given to the infants during the first six months of life. This enabled the identification of infants exclusively breastfed for six months and those exclusively breastfed for less than six months. A semi-structured questionnaire (Appendix 3) was then used to collect information on maternal/household characteristics, infant and young child feeding

practices, factors affecting feeding practices. Morbidity and anthropometric data were also collected on each child.

3.4.4.2 Maternal/Household Data

Questionnaire was used to collect information on maternal characteristics (age, marital status, level of education, ethnicity, religion and occupation) and monthly income. Data were also collected on household amenities (house ownership, number of rooms occupied by the household, type of toilet facility, water facility), household items (radio, television, refrigerator, air conditioner, internet and computer) and mode of transport.

3.4.4.3 Infant and Young Child Feeding Practices

Information was collected on mother's current breastfeeding and complementary feeding practices. Data on the following were obtained; place of delivery, time of initiation of breastfeeding, feeding on demand, number of day time and night feeds, feeding from one or both breast, maintenance of breastfeeding after six months, age of introduction of complementary food, common foods given to infants, food consistency, meal frequency, amount of food fed, foods consumed by infants 24 hours prior to the interview, responsive feeding, feeding during and after illness, hygienic practices, safe food preparation and storage and food diversity.

Mothers were asked about their source of infant and young child feeding information and whether they got support from spouse and infants grandmothers for EBF. Information was also collected on traditional practices/factors that hinder EBF, foods in the community considered good and those not considered good for infants, whether there are disparities in feeding with regards to the sex of a child and the main problem encountered with regards to child feeding.

3.4.4.4 Child Morbidity Information

Information was obtained through a mother's recall on if child had been sick in the past one week preceding the interview. Common illnesses or symptoms that a child may have had including cold, cough runny nose, fever, vomiting, diarrhoea, malaria, difficulty/fast breathing, lethargy and child not eating were collected.

3.4.4.5 Child Anthropometry

Anthropometric measurements of weight, recumbent length, head circumference and Mid Upper Arm Circumference (MUAC) were taken of all study infants to determine their nutritional status. All measurements were taken in duplicate and recorded. Length was measured to the nearest 0.1 cm using an infantometer and weight to the nearest 0.1 kg using an infant weighing scale. MUAC was taken using a MUAC tape (Shakir strip) and head circumference taken with a tape measure. Infants were measured using standardized measurement techniques (WHO, 1995). The presence of oedema was also determined by physical examination.

3.4.5 Statistical Analysis

Data from the cross-sectional survey were entered, cleaned and analyzed using SPSS version 20.0. Means, medians and standard deviations were used to summarize continuous data such as age, income, weight, length, MUAC and head circumferences. Frequencies and proportions were used to summarize categorical data such as sex, occupation, level of education, breastfeeding and complementary feeding practices.

Using the WHO Anthropometric Software version 3.2.2, anthropometric measurements for weight, length, MUAC and head circumference were converted into weight-for-age, weight-for-length, length-for-age. MUAC-for-age and head circumference-for-age Z-scores. The infants Z-scores on weight-for-age, weight-for-length and length-for-age were used as

indicators to determine their nutritional status. Infants with Z-scores below −2 standard deviation of the median reference weight-for-age (WAZ), length-for-age (LAZ) and weight-for-length (WLZ) were classified as either underweight, stunted or wasted, respectively.

Bivariate analysis was done to determine the relationship between the duration of EBF (long versus short) and infant nutritional status, breastfeeding and complementary feeding practices and socio-demographic characteristics.

Binary logistic regression was used to determine the predictors of long duration of EBF. Table 3.3 shows the dependent and independent variables used in the regression analysis.

A p-value of less than 0.05 was considered significant.

Table 3.3: Variables included in the logistic regression model to determine the predictors of long duration of exclusive breastfeeding

Category	Variable	Coding
Dependent variable	**Long duration of EBF**	No=0, Yes=1
Independent variable		
	Grandmother's support for EBF	No=0, Yes=1
Maternal characteristics	Maternal age	15-29=0, 30-49=1
	Marital status	No partner=0, Partner=1
	Level of education	[1]Others=0, No formal education=1
	Occupation	[2]Others=0, Unemployed=1
	Monthly income	[3]Others=0, No income=1
Infant characteristics	Infant sex	Female=0, Male=1
	Place of delivery	[4]Others=0, Health facility=1,

[1]Others include; primary/JHS/middle school, secondary/vocational school and tertiary
[2] Includes; farming, trading, artisan and salaried worker
[3] Includes; <GH¢ 50.00, GH¢50-100.00 and > GH¢100.00
[4] Includes; private midwife, traditional birth attendant and home delivery
EBF: Exclusive Breastfeeding
Long duration of EBF: five to six months EBF

3.5 Quality Control

Two field assistants fluent in English and Buli were recruited from the district for the FGDs and trained in note taking and how to complete the debriefing forms. Questions in the interview guide were translated into Buli and pre-tested in the Belinsa community which was not selected as one of the communities for the FGDs.

Three field assistants were also trained in informed consent, questionnaire administration, and standard procedures for measuring weight, length, head circumference, MUAC and

identification of the presence of oedema. The training lasted for five days. Questionnaire were translated into Buli and pre-tested in the Abeli-yeri community which was not selected for the FGDs. Weighing scales were checked before use and all measurements were done using standardized techniques (WHO, 1995).

3.6 Ethical Consideration

The study obtained ethical clearance from the Institutional Review Board of the Noguchi Memorial Institute of Medical Research. Participants were recruited to take part in the cross-sectional survey after they had signed or thumb printed on the informed consent form (Appendix 4). Verbal consent was sought from focus group participants before they were selected to take part in the discussions.

CHAPTER 4

4.0 RESULTS

4.1 Introduction

This section presents the results of the study in two parts. The first part presents the findings obtained from the FGDs and the second part is on the findings from the cross-sectional survey.

4.2 Focus Group Discussions on Breastfeeding and Complementary Feeding Practices of Mothers in the Builsa District

4.2.1 Characteristics of the Focus Groups and Participants

Each focus group (FG) comprised about 8-10 participants. A total of 52 mothers took part in the discussions and the mean age of the mothers was 27 years. Table 4.1 below shows the number of participants from each focus group and the mean age of the participants.

Table 4.1 Characteristics of the focus groups and participants (N=52)

Characteristic	n(%)
Community	
Nanjupiug	8(15.4)
Azunyeri	9(17.3)
Gong	8(15.4)
Kori	8(15.4)
Yerinsa	9(17.3)
Dabomsa	10(9.2)
Total	52
Age (Mean ± SD)	26.5 ± 6.0

SD: Standard Deviation

4.2.2 Major Themes

In all the six FGDs, five major themes emerged and these are (1) appropriate breastfeeding practices, (2) complementary feeding practices, (3) consequences of poor feeding

practices, (4) barriers to optimal infant and young child feeding and (5) suggestions on improving infant and young child feeding practices.

4.2.2.1 Breastfeeding Practices

It was a consensus across all the six FGDs that all infants be breastfed. Almost all participants emphasized that breast milk is the best food for babies and is readily available. Participants mentioned the kind of practices they do to ensure that their babies get enough breast milk and grow well. However, these practices differed within and across the six focus groups. The practices were grouped under six areas as follows:

4.2.2.1.1 Correct Positioning/Attachment

Almost all participants from all the six FGDs said that they correctly position and attach their babies to their breast when breastfeeding. According to the participants, correct positioning enables the baby to suckle well and get enough breast milk. They also believed that it helps prevent the baby from sucking in air which can cause stomach upsets.

"We position and hold the child so that the nipple will get to the child's mouth and the child's lips must cover the "dark part [meaning areolar]" of the breast so that the child will not suck in air which will cause stomach problems" (FG-1).

4.2.2.1.2 Time of Initiation of Breastfeeding

All participants agreed that it is important that babies start breastfeeding after delivery. However, they exhibited diverse views with regards to the time to initiate breastfeeding. In two FGDs, most of the mothers said that breastfeeding can be initiated within 30 minutes of birth. A mother in FG-1 stated that; ***"When you give birth without any complications, the nurses after cleaning the baby will give it to you to breastfeed within 30 minutes".***

Some participants in three other FGDs were of the view that there is no specified time for initiating breastfeeding and highlighted that the time of initiation depends on the health of the mother after delivery and the time the breast milk starts flowing. Some participants in one FGD also mentioned that initiation of breastfeeding can start within 30 minutes while others also emphasized that time of initiation depends on the when breast milk starts flowing.

"The way breast milk is, when you deliver, it does not flow immediately. If your baby is a boy, it takes 3 days for the breast milk to flow. For a baby girl it takes 4 days for the milk to start flowing so we start breastfeeding after 3 days or 4 days depending on the sex of your child" (FG-2).

4.2.2.1.3 Breastfeeding On-demand

In all the six FGDs, almost all the participants strongly agreed that they allow their children to breastfeed whenever they want since breast milk is the only food for them. As stated by a mother in FG-3; ***"A child is supposed to breastfeed the way and number of times he or she wants. Even when a mother has work, one still ensures that the child breastfeeds enough. You cannot allow the child to starve because of your work" (FG-3).*** However, 2 participants expressed concern about their workload and argued that a mother cannot be readily available at all times to breastfeed her baby the way the baby wants, as highlighted by a mother in FG-1: ***"…if you want to sit and allow the child to breastfeed for long as he or she wants, your work will spoil"***. However this argument was not supported by some participants as they strongly emphasized the need to breastfeed on-demand as this protects the child against illness and makes the baby strong:

"No, no, no. Breast milk is the only food for a baby so you have to allow the baby breastfeed the number of times he or she wants. If you don't do this, the child may fall

sick and you would have to sell the things you have laboured for to take care of the child" (FG-1).

4.2.2.1.4 Exclusive Breastfeeding

Interestingly, most of the participants said that in addition to breast milk they give their infants other liquids (water and traditional herbs) and semi-solid food (koko) during the first 6 months. According to the participants the traditional herbs/liquids "biik-nyam" and "Kognamuning" are commonly given to babies because it makes them grow stronger and relief stomach upsets. A FG-1 participant emphasized; ***"it is true that we give traditional herbs because it helps the child to grow strong and get a healthy body. For a girl you give the herbs for 4 days and 3 days for a boy".***

Participants in five FGDS mentioned that koko is also given during the first 6 months. The use of infant formula was not common as participants said that most mothers could not afford it.

"We have not seen or heard anyone giving heavy food to a child at 3 months. Koko can rather be given" (FG-1).

"In this district most women cannot afford infant formula for their infants…" (FG-5).

Almost all the participants from all FGDs had heard about EBF. Participants argued and emotionally expressed concerns about EBF for six months. They discussed EBF based on its benefits and expressed concerns about the difficulties/problems associated with complying with the current recommendation. Most participants in three FGDs strongly emphasized that EBF is beneficial to the health of children. According to them, EBF promotes better growth and helps prevent frequent illnesses especially diarrhoea. The

participants highlighted that exclusively breastfed children grow better than non-exclusively breastfed children:

"We see that this recommendation has more benefits than those days when we use to give water immediately after birth. We have not seen children who receive only breast milk for six months falling sick frequently" (FG-3).

Participants in the three other focus groups however complained about the recommendation, highlighting that newborn babies have sores in their stomachs which causes stomach pains, therefore traditional liquids/herbs are given to relief children of these pains since breast milk alone cannot do that and so the recommendation is not very helpful since it does not allow any other thing apart from breast milk to be given to babies:

"Some say that giving only breast milk for six months helps a child, but children are not the same. Some children are born naturally as "sicklers [meaning someone who falls sick frequently]". So if the child has problems the traditional herbs are given to save the child. Because of the child's condition, even if you give breast to the child he or she cannot suckle well and this will not help the child. So you have to prepare the traditional herbs for the baby so that he or she can become strong and suckle well. Therefore I don't think breast milk alone can help" (FG-1).

4.2.2.1.4.1 Factors Hindering Exclusive Breastfeeding

In all the FGDs, participants expressed deep concern about the difficulties associated with EBF. They mentioned that most mothers are not able to practice EBF for the following reasons; interference from grandmothers, practices of giving babies traditional herbs/liquids and dry and hot weather condition.

4.2.2.1.4.2 Interference from Mother-in laws/Grandmothers

Most participants in all the six FGDs said they live with their babies' paternal grandmothers and they give mothers advice and information on how to feed their infants. Most of the information they provide is based on their own past infant feeding experiences and traditional beliefs. According to the participants, most grandmothers believed that breast milk alone dries up a baby's chest and causes the baby to cry so there is the need to give water. Even though mothers receive education on EBF, they cannot practice it because the baby's grandmothers pressure them to give water and other foods:

"We have our husband's mothers living with us and what we have been taught by the nurses we cannot easily practice that in the house. They say the breast milk alone dries up the baby's chest and they tell us to give water" (FG-3).

One participant in one focus group persistently mentioned interference from grandmothers as the major reason why most women in the district cannot do EBF and that staying with them in the same house increases the intensity of the interference which sometimes brings about misunderstanding:

"…once you are living with your mother-in law and she says she is giving water and you refuse she will remove her hands from you and your child's affairs. This will scare you and you will finally give in to what she wants, if not when there is any problem in future, they will say since your "eyes are opened [someone who is wise, knowledgeable and knows the difference between right and wrong]" handle your own problems. So that is why we give in to what the old ladies say" (FG-1).

4.2.2.1.4.3 Practice of Giving Traditional Herbs/liquids

Traditional herbs/liquids are usually prepared for newborn babies. The liquids are given to babies to drink and are also used to bathe them. According to participants in all the six

FGDs, the herbs make the baby strong; relief stomach upsets and heal the sore in the baby's stomach. Participants agreed that the practice is still common:

"If you give birth to a newborn baby there is usually a sore in the baby's stomach just like there is a sore in the mother's stomach after delivery. The traditional herbs are given to the baby to take till he or she is six months and then you stop. If you don't give the child this, the child may suffer stomach problems throughout childhood years. So the essence of the traditional herbs is to kill the sore in the baby's stomach" (FG-1).

4.2.2.1.4.4 Weather Condition

In all the six FGDs, participants mentioned that the dry and hot weather especially during the dry season prevent some women from exclusively breastfeeding their children. According to some of the mothers, the dry and hot weather causes dehydration and thirst in the babies which makes them cry a lot and the babies stop crying when water is given:

"This recommendation does not help [we] those in this part of the country with hot and dry weather during the dry season. You see, the thing is that the white man who gave this recommendation does not experience hot and dry weather so their infants do not suffer but our babies throats get dry and they cry and when you give them water they stop crying" (FG-4).

Other participants shared the following experiences on exclusive breastfeeding:

"When I gave birth to my first born I was by then living with my husband's mother. So we gave the child traditional herbs before six months. The child was always falling sick. We took this child to many clinics and chemical shops for treatment but the child's condition was the same. The child's body size was also still the same even though he was getting older. But as for my second child, I gave only breast milk for six months and

he did not fall sick like the first one. He was also growing very fast. So for me I see a difference in children who are exclusively breastfed for six months and a child who is not" (FG-2).

"For me, I had my first child and gave only breast milk for six months and I had no problems especially with the child's health. The child was healthy. But for my second child I had him through "operation [meaning caesarean section]" so I had to go and live with my mother. The child was always with my mother so she gave traditional herbs and since then my second born is not like my first. This child is always falling sick" (FG-1).

4.2.2.2 Complementary Feeding Practices

In four of the FGDs, some participants said that most mothers do not have formal education and sometimes do not know the age of their infants and this causes them to start feeding their infants with complementary foods based on the observation of certain signs the infant shows which tells the mother that the child is ready to start eating other foods.

"We have not been to school before so sometimes we don't know the age of the child. A child that is ready to start eating will watch the mother any time she is eating and try to pull the food to his or her mouth. When you see a child do this, it means the child is ready to eat" (FG-4)

4.2.2.2.1 Types of Complementary Food

Participants in all the FGDs said they feed their children with koko, weanimix, Tuozaafi (T.Z) with vegetable soup, rice, banku, beans with sheabutter, mashed baobab tree fruit, oranges and eggs. Koko was consistently mentioned by almost all participants in the 6 FGDs. Weanimix, oranges and eggs were mentioned by some mothers in two FGDs and T.Z with vegetable soup, rice, banku, beans with sheabutter and mashed baobab tree fruit

were also mentioned in four FGDs. Some other participants in five FGDs said they feed their children with any food that is available in the household:

"…whatever you have in your cooking pot is the same food the child will eat. Whatever we eat is what the child will also eat" (FG-1).

Infant formula was not mentioned as one of the complementary foods by participants. Some mothers said infant formula is not affordable and is also not healthy for babies:

"In this district most women cannot afford infant formula for their babies at 6 months. So it is only the porridge that we give our babies" (FG-1).

"Infant formula is not good for babies. It can give them health problems. So koko is the best" (FG-1).

4.2.2.2.2 Safe Food Preparation and Storage

Almost all participants mentioned that most of the time, they prepare food at home rather than buying. Some participants in two FGDs said that the food is prepared specifically for the child. However, most participants in four FGDs mentioned that it is only koko that can be prepared for the child alone but the child eats other foods from the family pot. According to the participants, preparing food for the child alone sometimes creates misunderstanding in the household:

"Hmmm...You have to prepare the food for the whole family. If you prepare for only your child, people in the household will think you have used the ingredients and prepared food for just you and your child and they will not be happy. So the child eats from the family pot" (FG-1).

Almost all the participants in the 6 FGDs emphasized that a mother has to wash her hands and all cooking utensils before food preparations and observe personal hygiene. According

to the participants this will ensure that the child's food is safe and will not cause diarrhoea. They also highlighted that left-over food for a child is stored in a bowl with a lid, cooking pot or food flask and emphasized that left-over food is heated before feeding the child:

"You have to wash your hands and all utensils before preparing child's food. If child can eat by himself then you wash his/her hands with soap and water before he or she eats" (FG-2).

"We mostly store our children foods in food flaks or in the cooking pot" (FG-5).

"Set fire and reheat the food before feeding it to the child" (FG-2).

4.2.2.2.3 Enrichment of Complementary Food

Most participants in five FGDs said they do not have special ingredients they use to enrich foods for their infants however koko is usually enriched with milk powder, sugar or salt. It is only mothers who can afford the milk powder who use it. Some mothers also mentioned that they do not add anything to the koko before feeding it to the child:

"For koko we add a little salt and sugar" (FG-3)

"You prepare the koko without sugar and give it like that" (FG-2).

On the other hand, participants in all six FGDs said they enrich soups and other family foods with mainly dawadawa and anchovies.

4.2.2.2.4 Responsive Feeding

Participants in four focus groups said to get a child who refuses food, the mother has to play with the child, change the food, feed slowly and patiently and encourage the child to eat. Some participants also mentioned that the mother can force-feed the child with foods like koko or millet flour water. In contrary, some other participants mentioned that the

mother has to stop feeding and she herself has to eat well so that the child would breastfeed.

"If child refuses to eat food, you leave him that way. If the time comes for the child to eat, he or she will eat. You the mother will have to cook and eat well so that the child will get enough breast milk to suck" (FG-1).

4.2.2.2.5 Maintenance of Breastfeeding

In all the six FGDs, participants mentioned different ages at which they would finally stop breastfeeding their children. Ages 24, 30 and 36 months were consistently mentioned by the most of the participants in the six FGDs. They highlighted various reasons for the ages they plan to stop breastfeeding. According to some participants in three FGDs, some women stop breastfeeding once they become pregnant. As a mother in FG-1 indicated; ***"Some women stop breastfeeding at two or three years. Other women may get pregnant while the child is 1 year so they are compelled to stop breastfeeding".*** Most mothers in four FGDs also said that due to the nature of their work on farms, in the forest and markets, they carry their children along anytime they are going to work and so they breastfeed for as long as 30 months. Some participants in two FGDs mentioned that by the time the child is two years, he or she would have sucked all the milk from the mother's breast milk and so some mothers stop breastfeeding at two years (24 months):

"Once the child is two years you have to stop breastfeeding because the child has sucked all the milk from the breast and whatever the child is sucking is blood and sicknesses from the mother which can affect his or her health. So it is best to give food and stop breastfeeding at two years" (FG-1).

4.2.2.3 Consequences of Poor Feeding Practices

All participants knew that poor breastfeeding and complementary feeding practices affects the health of children. According to most participants in the six FGDs, poor feeding practices may result in poor growth, weight loss, brain ineffectiveness and diarrhoea. They agreed that feeding a child with a less balanced diet contributes to weight loss and poor growth.

"Your child may suffer brain ineffectiveness" (FG-3).

4.2.2.4 Barriers to Optimal Infant and Young Child Feeding

Barriers to optimal feeding that emerged from the six FGDs are presented on Table 4.2 below.

Table 4.2: Barriers to optimal feeding of infants and young children

Barriers to optimal feeding of infants and young children
1. Interference from grandmothers
2. Poverty
3. Cultural beliefs and practices
4. Work load
5. Inadequate financial support from husbands

Barriers are presented in order of decreasing importance

4.2.2.4.1 Interference from Grandmothers

A most important barrier identified in all the six FGDs was the influence of paternal grandmothers in the feeding of children. According to the participants grandmothers hold so much power in the house and their views are respected by everyone. They are particularly concerned about how their grandchildren are fed and so they teach mothers

how to feed infants based on their own past experiences and beliefs and expect mothers to feed the infants accordingly. Participants mentioned that what the grandmothers teach most of the time contradicts what they learn from the nurses but mothers have to abandon what they learn from the nurses and adopt what the grandmothers teach because of the pressure they encounter from grandmothers in the house which sometimes brings about misunderstanding.

"The mother-in laws have so much power in the house and if you don't comply with what she tells you and want to go by what the nurses say, you will have problems in your marital home. That is why we do what they teach us" (FG-3).

4.2.2.4.2 Poverty

Participants in five FGDs said that poverty contributes to mothers not being able to feed their children well. According to them, sometimes they cannot afford nutritious foods for their children and lack of nutritious food can affect the growth of a child. Also, they have to engage in extra work to earn a little more money and this does not give them adequate time to care and feed their children well and they sometimes leave their children in the care of grandmothers or older siblings who may not feed them well. A mother from FG-4 stated that; ***"If you don't have money, you cannot do anything good".***

"We don't have enough money to start a trade so we sell firewood or help other people on their farms for small amount of money. This does not allow us to take care of our children well because we cannot even afford good food every time for our children"

4.2.2.4.3 Cultural Beliefs and Practices

Participants in all four FGDs complained about cultural beliefs that interfere with the feeding of children. According to them it is a belief that newborn babies have sores in their stomachs which cause stomach upsets and to cure the sore, the child has to be given

traditional herbs/liquids to drink. This belief causes most mothers to prepare the traditional herbs for the children and so cannot practice EBF. It is also believed that children should not be given foods like eggs and mangoes as the eggs will cause their teeth to rot and the mangoes will cause stomach upsets.

"***Children who are still breastfeeding are not allowed to eat fruits like mangoes and pawpaw because it is believed that they will cause stomach problems. Eggs are sometimes not allowed because it is believed that a child who takes eggs will become a thief in future and his or her teeth will rot" (FG-4).***

4.2.2.4.4 Work Load

Participants in three FGDs complained that apart from performing their traditional duties of fetching water, cooking, going to the market and farm, they engage in extra work mostly "by day work" and this does not give them enough time to feed and care for their children well:

"Our work load does not also give us enough time to take care of our children. Most of the time we leave them with their grandmothers or older siblings who may not feed them well" (FG-4).

4.2.2.4.5 Inadequate Financial Support from Husbands

Some participants in three FGDs also complained that their spouses do not support them financially in taking care of their children:

"In this world today, you will not get a man who will remove enough money for you to take care of the family so it is left to the woman to plan and really take care of the family by engaging in extra work" (FG-1).

4.2.2.5 Suggestions on Improving Infant and Young Child Feeding Practices

To improve feeding practices, participants highlighted that women must be empowered, taken out of poverty, assisted with microfinance to start businesses and be able to get support from their husbands. As suggested by a participant in FG-3: ***"a woman can encourage herself and get support from the husband"***. However another participant in FG-3 emphasized that: ***"a man and a woman are generally enemies and these days men will not give you money to do anything because they do not want a woman to make it in life".***

"We should be assisted to start petty trading" FG-3.

Participants also highlighted that grandmothers also need to be educated on current feeding recommendations:

"The old ladies also need to learn from the nurses so that there will be no misunderstanding in the house" (FG-4).

4.3 Main Study: Relationship between EBF Duration and Infant Growth at 6 Months of Age

A total of 290 infants participated in the study, 151 (52.1%) of them exclusively breastfed for ≤ 4 months (short duration) and 139 (47.9%) of them exclusively breastfed for 5-6 months (long duration).

4.3.1 Socio-demographic Characteristics of Mothers and Infants

The mean age of the mothers was 27.1 ± 5.4 years and mean household size was about 6. Mothers were predominantly Builsas (92%) and over 80% of them had partners. In terms of educational level, majority (48%) of the mothers had primary/JHS/middle school education, 27% of them had no formal education and only 10% of them had tertiary education. About 37% of them were engaged in farming, 27% of them were unemployed and only 6% were salaried workers. About 37% of the mothers earned monthly incomes below GH¢50.00, 24% earned incomes above GH¢100.00 while 20% of them earned no monthly incomes (Table 4.3). The dominant religion was Christianity (68%) followed by the Traditional African religion (23%). About (54%) of the infants involved in the study were boys. No significant differences were found in the socio-demographic characteristics among short and long duration of EBF mothers and infants with respect to maternal age, household size, ethnicity, marital status, occupation, monthly income, religion and infant sex except level of education **(p=0.025)** in relation to short and long duration of EBF. About 33% of mothers in the short duration of EBF had no formal education while 19% of mothers in the long duration had no formal education. About 42% and 13% of mothers in the short duration had primary/JHS/middle school and secondary/vocational school education respectively while 54% and 19% of mothers in the long duration had primary/JHS/middle school and secondary/vocational school education (Table 4.3).

Table 4.3: Socio-demographic characteristics of mothers and infants by duration of EBF (N=290)

Variable	Total	Duration of EBF		P-value[1]
		Short (n=151)	Long (n=139)	
	Mean ± SD	**Mean ± SD**	**Mean ± SD**	
Maternal age	27.1 ± 5.4	26.6 ± 5.7	27.6 ± 5.2	0.122
Household size	5.8 ± 2.7	5.8 ± 2.7	5.7 ± 2.8	0.671
	n(%)	**n(%)**	**n(%)**	**P-value[2]**
Ethnicity				
Builsa	266 (91.7)	137(90.7)	129 (92.8)	0.521
Others[a]	24 (8.3)	14(9.3)	10 (7.2)	
Marital status[b]				
Partner	255 (87.9)	129 (85.4)	126 (90.6)	0.173
No partner	35 (12.1)	22 (14.6)	13 (9.4)	
Level of education				
No formal education	77 (26.6)	50 (33.1)	27 (19.4)	**0.025**
Primary/JHS/Middle	139 (47.9)	64 (42.4)	75 (54.0)	
Secondary/Vocational	46 (15.9)	20 (13.2)	26 (18.7)	
Tertiary	28 (9.7)	17 (11.3)	11 (7.9)	
Occupation				
Unemployed	77 (26.6)	46 (30.5)	31 (22.3)	0.574
Farming	106 (36.6)	51 (33.8)	55 (39.6)	
Trading	54 (18.6)	28 (18.5)	26 (18.7)	
Artisan	35 (12.0)	18 (11.9)	17 (12.2)	
Salaried worker	18 (6.2)	8 (5.3)	10 (7.2)	
Monthly income				
No income	58 (20.0)	32 (21.2)	26 (18.7)	0.101
<GH¢50	99 (34.1)	42 (27.8)	57 (41.0)	
GH¢50 - 100	64 (22.1)	35 (23.2)	29 (20.9)	
>GH¢100	69 (23.8)	42 (27.8)	27 (19.4)	
Religion				
Christian	197 (67.9)	96 (63.6)	101 (72.7)	0.252
Muslim	25 (8.6)	15 (9.9)	10 (7.2)	
Traditional	68 (23.4)	40 (26.5)	28 (20.1)	
Infant sex				
Male	157 (54.1)	76 (50.3)	81 (58.3)	0.108
Female	133 (45.9)	75 (49.7)	58 (41.7)	

P-value[1] (Independent-Sample t-test for continuous variables)
P-value[2] (Pearson's Chi-square for categorical variables)
Others[a] include; Kassena, Frafra and Mamprusi
Marital status[b]: Partner (married and cohabiting) and no partner (single, divorced and widowed)
Duration of EBF: Short (≤ 4 months), Long (5 to 6 months). Statistical significance at $p < 0.05$

4.3.2 Factors Associated with Duration of EBF

4.3.2.1 Breastfeeding Practices of Mothers

In Table 4.4 below, 40% of the mothers breastfed their infants 5-8 times during the day and over a third breastfed 1-4 times at night. Almost all the mothers (96%) breastfed their infants on-demand and about 70% of them received support from their infants grandmothers for EBF. No significant differences were found in the number of day time breastfeeds, number of night breastfeeds and breastfeeding on-demand between the short and long durations of EBF except grandmother's support for EBF ***(p=0.007)***. Majority (70%) of mothers in the total sample received grandmother's support for EBF while 20% of them did not receive support and 10% did not know if grandmother supports EBF or not. For mothers who received grandmother's support for EBF, majority (79%) of them were in the long duration of EBF while 62% of them were in the short duration, for those who did not receive support for EBF, 14% of them were in the long duration and 25% of them in the short duration.

Table 4.4: Breastfeeding practices of mothers by duration of EBF (N=290)

Variable	Total	Duration of EBF		P-value
		Short (n=151)	Long (n=139)	
	n(%)	n(%)	n(%)	
Number of day time Breastfeeds				
1-4	18 (6.2)	11 (7.3)	7 (5.0)	0.177
5-8	117 (40.3)	59 (39.1)	58 (41.7)	
9-12	61 (21.0)	27 (17.9)	34 (24.5)	
>12	9 (3.1)	4 (2.6)	5 (3.6)	
Cannot remember	85 (29.3)	50 (33.1)	35 (25.2)	
Number of night time breastfeeds				
1-4	100 (34.5)	60 (39.7)	40 (28.8)	0.294
5-8	88 (30.3)	39 (25.8)	49 (35.3)	
9-15	16 (5.5)	6 (4.0)	10 (7.2)	
Cannot remember	86 (29.7)	46 (30.5)	40 (28.8)	
Breastfeeding on-demand				
Yes	278 (95.9)	144 (95.4)	134 (96.4)	0.657
No	12 (4.1)	7 (4.6)	5 (3.6)	
Grandmother's support for EBF				
Yes	204 (70.3)	94 (62.3)	110 (79.1)	**0.007**
No	57 (19.7)	38 (25.2)	19 (13.7)	
Don't know	29 (10.0)	19 (12.6)	10 (7.2)	

P-value (Pearson's Chi-square for categorical variables). Statistical significance at $p < 0.05$

4.3.2.1.1 Time of Initiation of Breastfeeding by Mothers

Figure 4.1 below shows the time mothers initiated breastfeeding. Fourty four percent of mothers in the short duration and about 42% of mothers in the long duration of EBF initiated breastfeeding within 30 minutes, 35% and 40% of mothers from short and long durations respectively initiated breastfeeding within 1 hour. Significant differences were

not found in the time of initiation of breastfeeding between short and long durations of EBF.

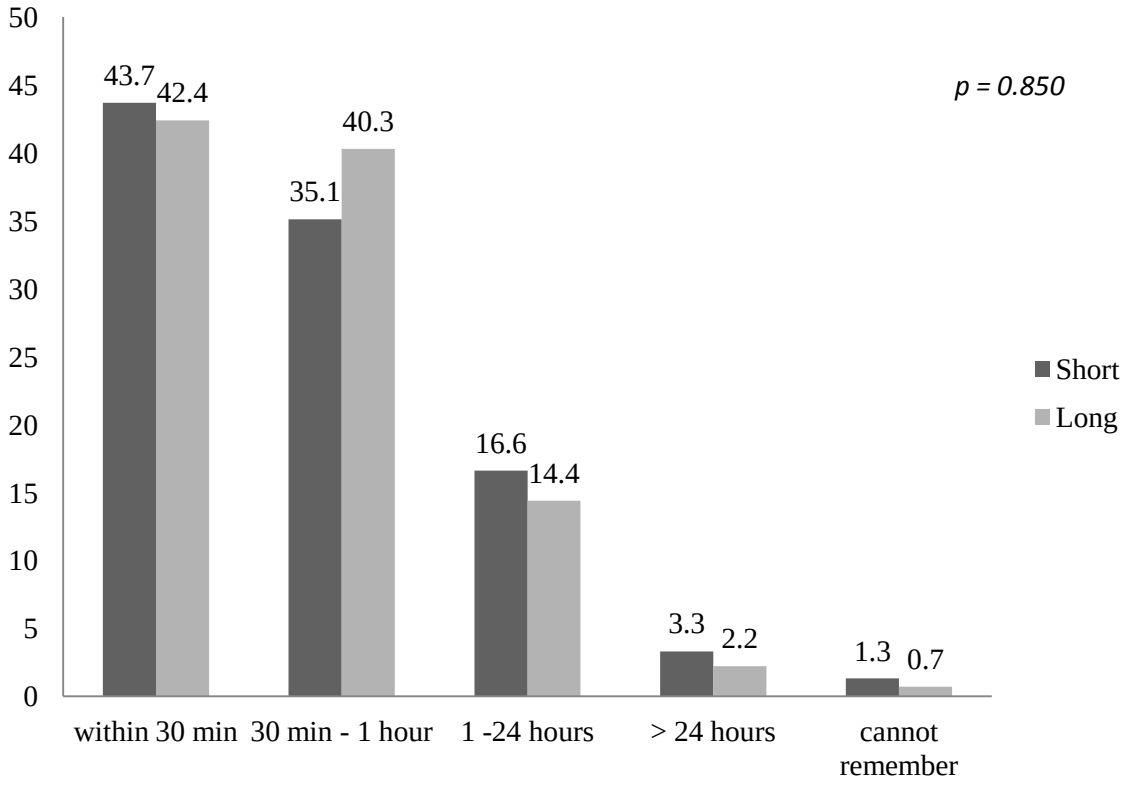

Figure 4.1: Initiation of breastfeeding by duration of EBF

4.3.2.2 Complementary Feeding Practices of Mothers

About 45% of mothers reported that they would stop breastfeeding their infants at 24 months of age and 41% also reported they would stop at 36 months of age. Over 80% of mothers fed their infants with thick porridges. About 48% fed their infants with complementary food 2 times per day, 38% fed 3 times per day, 10% and 5% of the mothers also fed 4 times and once per day. Except for the thickness of porridges which was significantly different between short and long duration of EBF ***(p=0.004)*** with more mothers (89%) in the long duration feeding thick porridges to their infants than mothers (76%) in the short duration of EBF, no significant differences were found in age to stop

breastfeeding and frequency of feeding between short and long durations of EBF (Table 4.5).

Table 4.5: Complementary feeding practices of mothers by duration of EBF (N=290)

Variable	Total	Duration of EBF		P-value
		Short (n=151)	Long (n=139)	
	n(%)	n(%)	n(%)	
Age to stop breastfeeding				
I8 months	5 (1.7)	5 (3.3)	0 (0.0)	0.115
24 months	131 (45.2)	68 (45.0)	63 (45.3)	
30 months	26 (9.0)	10 (6.6)	16 (11.5)	
36 months	120 (41.4)	65 (43.0)	55 (39.6)	
42 months	8 (2.8)	3 (2.0)	5 (3.6)	
Thickness of porridge				
Thick	239 (82.4)	115 (76.2)	124 (89.2)	**0.004**
Very thin/runny	51 (17.6)	36 (23.8)	15 (10.8)	
Frequency of feeding				
Once per day	13 (4.5)	9 (5.9)	4 (2.9)	0.077
2 times per day	138 (47.6)	66 (43.7)	72 (51.8)	
3 times per day	111 (38.3)	56 (37.1)	55 (39.6)	
4 times per day	28 (9.7)	20 (13.2)	8 (5.8)	

P-value ((Pearson's Chi-square for categorical variables)
Thickness of porridge was determined by showing mothers actual samples of thick and very thin/runny porridges
Statistical significance at p< 0.05

4.3.2.2.1 Age of Introduction of Complementary Food

About 47% of the mothers in the short duration of EBF introduced complementary food to their infants at 2-4 months. About half of the mothers in the long duration of EBF also introduced complementary food at 6 months. However, 21% of the mothers in the long duration of EBF had not yet introduced complementary food to their infants even though the infants were 6 months old. Significant differences were found in the age at which mothers introduced complementary foods to their infants with respect to the duration of EBF ***(p < 0.001)*** (Figure 4.2).

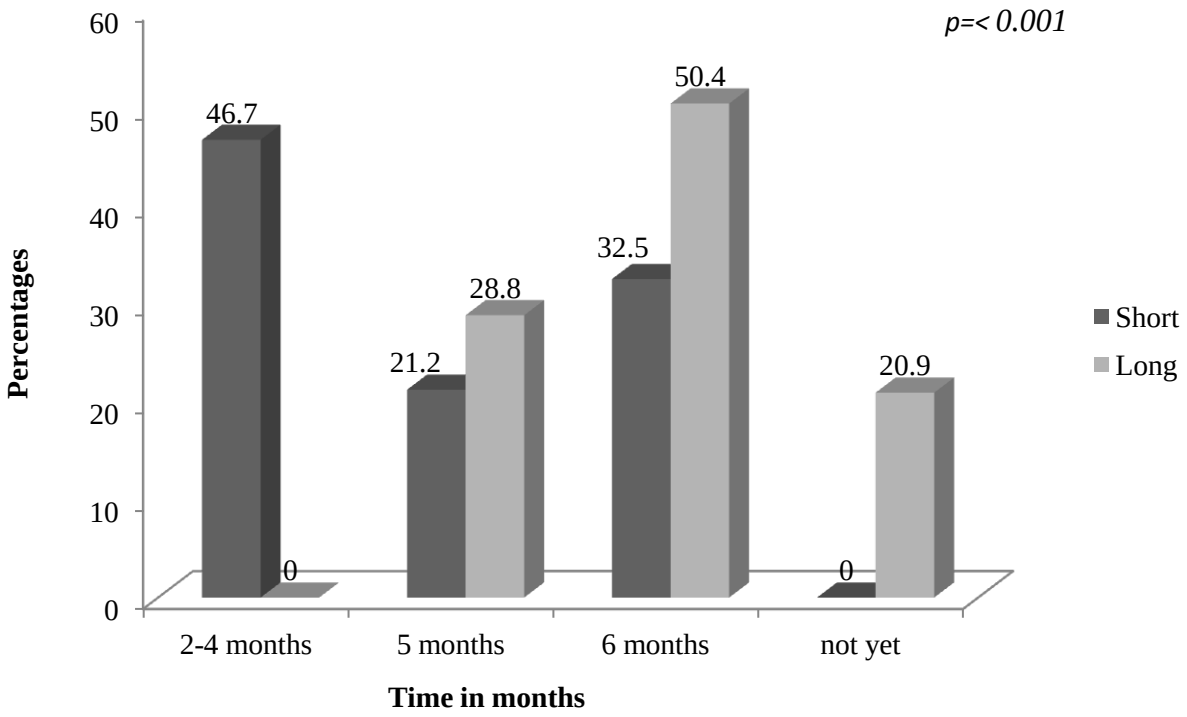

Fig. 4.2: Age of introduction of complementary food by duration of EBF

4.3.3 Nutritional Status of the 6 Months old Infants

Infants who were breastfed for long duration had significantly higher mean weight values than infants breastfed for short duration ***(p=0.004)***). Generally, no significant difference were found in the mean values for length, MUAC and head circumference between infants exclusively breastfed for short and long durations (Table 4.6).

On the other hand significant differences were found in the LAZ and WLZ between infants in relation to the two durations of EBF (LAZ: ***p=0.007*** and WLZ: ***p=0.004***). Infants who breastfed for a short duration had better mean length-for-age Z-score value than infants who breastfed for a long duration (0.20 ± 1.04 for short duration and -0.13 ± 1.05 for long duration). On the other hand infants who breastfed for long duration had better mean weight-for-length Z-score value than those who breastfed for a short duration (-0.50 ± 1.11 for long duration and -0.86 ± 0.98 for short duration) (Table 4.6).

Table 4.6: Nutritional status of infants by duration of EBF

Variable	Short duration (Mean ± SD)	Long duration (Mean ± SD)	P-value
Weight	7.17 ± 0.90	7.49 ± 1.00	**0.004**
Length	65.78 ± 5.00	65.44 ± 5.00	0.597
Mid Upper Arm Circumference	13.79 ± 1.11	13.97 ± 1.13	0.167
Head Circumference	43.02 ± 1.52	43.18 ± 1.58	0.392
Growth indices (Z-scores)			
WAZ	-0.52 ± 0.92	-0.44 ± 0.95	0.485
LAZ	0.20 ± 1.04	-0.13 ± 1.05	**0.007**
WLZ	-0.86 ± 0.98	-0.50 ± 1.11	**0.004**
MUACZ	-0.32 ± 0.95	-0.15± 0.93	0.110
HCZ	0.11 ± 1.11	0.10 ± 1.14	0.953

WAZ: Weight-for-age Z-score, LAZ: Length-for-age Z-score, WLZ: Weight-for-length Z-score
MUACZ: Mid Upper Arm Circumference-for-age Z-scores, HCZ: Head Circumference-for-age Z-scores
P-value (Independent-Sample t-test for continuous variables)
SD: Standard deviation
Statistical significance at $p< 0.05$

4.3.4 Relationship between Duration of EBF and Infant Growth at 6 Months of Age

Table 4.7 showed no significant differences in the rates of underweight, stunting and wasting between infants' breastfed for a short duration and those breastfed for a long duration. The prevalence of underweight, stunting and wasting in the total sample was 26%, 27% and 37% respectively.

Table 4.7: Relationship between duration of EBF and infant nutritional status

Nutritional status	Total n (%)	Duration of EBF		P-value
		Short n (%)	Long n (%)	
Underweight	79 (25.9)	40 (26.5)	35 (25.2)	0.884
Stunting	79 (27.2)	36 (23.8)	43 (30.9)	0.320
Wasting	108 (37.2)	60 (39.7)	48 (34.5)	0.253

Underweight (WAZ < -2 SD), Stunting (LAZ < -2 SD), Wasting (WLZ < -2 SD)
P-value (Independent-Sample t-test for continuous variables), Statistical significance at p< 0.05

4.3.5 Predictors of Long Duration of EBF

From Table 4.8 maternal age, marital status, infant sex and place of delivery did not predict long duration of EBF. Grandmother's support for EBF, level of education, occupation and monthly income were significantly predictors of long duration of EBF.

Mothers who receive grandmother's support for EBF were 2 times more likely to exclusively breastfeed for a long duration than mothers who did not receive grandmother's support for EBF (OR: 2.03; 95% CI, 1.16, 3.57).

Also, compared to mothers who had no formal education, mothers who had primary/JHS/middle school education were twice as likely (OR: 2.32; 95% CI, 1.25, 4.31) and mothers with secondary/vocational/tertiary school education were almost 3 times more likely to exclusively breastfeed for a long duration (OR: 2.80; 95% CI, 1.26, 6.22). Generally, an increase in the level of education resulted in an increase in the odds to exclusively breastfeed for a long duration. Mothers who were salaried workers were more likely to exclusively breastfeed for a long duration than mothers who were unemployed (OR: 4.72; 95% CI, 1.10, 20.29). Mothers who earned monthly incomes above GH¢100.00 were less likely to exclusively breastfeed for a long duration compared to mothers who did not earn any monthly income (OR: 0.22; 95% CI, 0.06, 0.79).

Table 4.8: Binary logistic regression of long duration of exclusive breastfeeding

Variable	(n)	OR	95% CI	P-value
Grandmother's support for EBF				
Yes	204	2.03	1.16, 3.57	**0.014**
No	86	1.00	(Ref)	
Maternal age				
15-29	194	1.10	0.64, 1.91	0.723
30-49	96	1.00	(Ref)	
Marital status				
No Partner	35	0.68	0.31, 1.49	0.333
Partner	255	1.00	(Ref)	
Level of education				
Primary/JHS/middle school	139	2.32	1.25, 4.31	**0.008**
Secondary/vocational/Tertiary	74	2.80	1.26, 6.22	**0.011**
No formal education	77	1.00	(Ref)	
Occupation				
Farming	106	2.82	0.87, 9.16	0.084
Trading	54	3.20	0.94, 10.91	0.063
Artisan	35	2.81	0.78, 10.05	0.113
Salaried worker	18	4.72	1.10, 20.29	**0.037**
Unemployed	77	1.00	(Ref)	
Monthly income				
GH¢<50	99	0.63	0.19, 2.17	0.465
GH¢50-100	64	0.37	0.10, 1.38	0.138
>GH¢100	69	0.22	0.06, 0.79	**0.020**
No income	58	1.00	(Ref)	
Infant sex				
Female	133	0.73	0.44, 1.21	0.220
Male	157	1.00	(Ref)	
Place of delivery				
Others	47	0.95	0.48, 1.90	0.891
Health facility	243	1.00	(Ref)	

Others include; private midwife, traditional birth attendant and home delivery
Partner (married and cohabiting) and no partner (single, divorced and widowed)
OR: Odds Ratio. Statistically significant at p< 0.05

CHAPTER 5

5.0 DISCUSSION

5.1 Breastfeeding Practices

This study showed that all mothers breastfed their children. This is consistent with findings from the GDHS (2008) which reports that breastfeeding is a universal practice. It was also found that mothers practice correct positioning/attachment techniques which is one of the optimal breastfeeding practices.

Despite the universality of breastfeeding, the study found that EBF practice is not acceptable to all mothers. While some mothers believed it is helpful since it promotes better growth and prevents frequent illnesses in children, others believed that it does not help since babies need water in addition to breast milk. It was also clear from the study that apart from breast milk, mothers also give their babies water, traditional herbs/liquids (Kognamuning", "Zaung and Biik-nyam") and porridge during the first six months of life. This finding is consistent with the Ghana Baseline Survey report on promotion of optimal complementary feeding practices (USAID *et al.*, 2011) which found that apart from breast milk, mothers gave other foods to their infants during the first six months of life. Similarly, a study by Kimani-Murage and colleagues (2011) showed that mothers introduced liquids other than breast milk within three days of birth to infants who were experiencing stomach upsets. This finding by the present study could have been as a result of cultural beliefs. Cultural beliefs and practices were identified as one of the factors hindering EBF in the study area. One of such beliefs identified is the cultural belief that newborn babies have sores in their stomachs and need to drink traditional herbs to help heal the sores as these can cause stomach upsets when left untreated. Most mothers prepare traditional herbs/liquids (Kognamuning", "Zaung" and "Biik-nyam") for their

babies because of this belief. This practice however strongly conflicts with the international recommendation by WHO on exclusive breastfeeding for duration of six months (WHO, 2003) and could have contributed to most mothers exclusively breastfeeding for a short duration. The study also identified another long standing belief that feeding breast milk alone causes dehydration in babies especially during the dry season when the weather becomes hot and dry and so babies need water during these times. The findings in this study conform to the report by Save the Children (2012) which indicated that cultural beliefs contribute to suboptimal breastfeeding practices.

The study identified interference from grandmothers as another hindrance to EBF. Studies elsewhere and in Ghana have also identified interference from grandmothers as a barrier to EBF (Kerr *et al.,* 2008; Otoo *et al.,* 2009). Child care is a collective issue. All family members including external family members are concerned and involved in child care practices. Studies in Africa have demonstrated the roles grandmothers play with regards to decision making in early child feeding practices (Aubel *et al.,* 2004; Davies-Adetugbo, 1997). Kerr *et al.* (2008) indicated that paternal grandmothers have strong influence on child feeding in the household. Paternal grandmothers are a major hindrance to EBF in the Builsa district. Similarly, a study by Otoo *et al.* (2009) in Ghana also reported similar observation. The study discovered that paternal grandmothers have so much power in the house and every one respect their views. They pressure mothers to adopt their advice on feeding practices which most of the time contradict current feeding recommendations that mothers learn from the hospital. Living in the same house with a grandmother makes it more difficult to practice EBF since most grandmothers believe that breast milk alone can dehydrate the baby and thus the need for water. McLorg and Bryant (1989) also reported that grandmothers use their infant feeding knowledge and experiences to influence a mother's decision on the kind of feeding practice to do. The study also found a significant

association between grandmother's support for EBF and duration of EBF. This finding indicates that if a grandmother understands the benefits of EBF and supports the practice she can influence a mother to exclusively breastfeed for a long duration. This could have accounted for mothers in the long duration of EBF group who received grandmother's support for EBF to exclusively breastfeed for a longer duration. The support that grandmothers provided could have been as a result of their understanding of the benefits of EBF following radio campaigns on promotion of EBF in the district by the district health directorate. Education on infant feeding practices should target both caregivers and grandmothers.

Initiation of breastfeeding within one hour is very essential as colostrums (the first milk), provides protection (Kimani-Murage *et al.,* 2011). It was evident from this study that there was inadequate knowledge about the recommended time to initiate breastfeeding. Many of the mothers believed that the time for initiation depends on the health of the mother after delivery and time breast milk starts flowing. Only a few mothers knew the time of initiation of within 30 minutes. In practice, majority of the mothers initiated breastfeeding within 30 minutes to one hour of birth. This is probably because majority (84%) of mothers delivered in health facilities and most of the health facilities in the study area are baby friendly hence promote good breastfeeding practices. This finding suggest the need for education of mothers on the benefits of early initiation of breastfeeding since some women deliver at home or with Traditional birth attendants.

This study also showed that breastfeeding on-demand was a common practice in the area. This is consistent in both the group interviews and individual interviews with mothers. The number of day time breastfeeds and number of night breastfeeds varied, with most mothers breastfeeding 5-8 times during the day and most mothers also breastfeeding 1-4

times at night. This practice should be encouraged as it enables the child to obtain maximum milk intake.

5.2 Complementary Feeding Practices

The WHO (2003) recommends that complementary feeding starts at six months of age. The study found that most mothers start complementary feeding not based on the age of the child but on signs the child may show to indicate that he or she is ready to start eating. This is likely to result in early or late introduction of complementary food. About 50% of mothers who exclusively breastfed for a long duration introduced complementary food to their infants at the recommended six months of age where as only 33% of mothers who exclusively breastfed for a short duration introduced complementary food at six months. The findings show both early and late introduction of complementary food with those mothers who exclusively breastfed for a short duration introducing food as early as 2-4 months and those who exclusively breastfed for a long duration not started complementary feeding. The GDHS (2008) also reported late introduction of complementary food. Vaahtera *et al.* (2001) reported early introduction of complementary foods to newborns in rural Malawi. Early introduction of complementary food results in the displacement of breast milk intake, less protective factors and energy and nutrient deficiencies which can contribute to poor growth (Cohen *et al.*, 1994; Dewey *et al.*, 1999). Early complementary feeding has also been shown to increase the risk of diarrhoeal diseases ((Popkin *et al.*, 1990; GDHS, 2008). No doubt grandmothers could have contributed to the early introduction of complementary food as they influence child feeding (Kerr *et al.* 2008). Grandmothers are key decision makers with regards to the time of introduction of complementary food. Lower levels of maternal education have also been shown to contribute to early introduction of complementary food (Lanigan *et al.*, 2001). About 33%

of mothers in the short duration of EBF had no formal education compared to 19% of mothers in the long duration with no formal education and this could have contributed to most mothers in the short duration introducing foods at 2-4 months.

The use of infant formula was not common among mothers in this study. Participants reported that infant formula is expensive and most mothers cannot afford it. This finding is crucial as the use of infant formula during the first six months is one of the factors hindering EBF and thus promotion of EBF in the area taking into account other factors hindering the practice in the area is likely to result in higher rates of EBF in the district. The study found that most mothers reported practicing good hygiene. Good hygienic practices during the complementary feeding period are important as it helps prevent contamination of foods which can result in diarrhoea.

The duration of breastfeeding in the area was long. This is consistent with findings from the GDHS (2003 and 2008) reports which indicated that breastfeeding duration in Ghana is long (median duration of 23 months with the 3 Northern regions having duration of 28 months). In this study the duration of breastfeeding ranged from 24 to 36 months. This practice should be encouraged as it is according to the recommendation to continue breastfeeding for up to 2 years and beyond (WHO, 2003). The proximity of mothers to their children every day could be one of the reasons accounting for mothers being able to breastfeed for long durations. Also, most of the mothers (67%) were employed in the informal sector and others (27%) were also unemployed thus mothers have the opportunity to always be around their children since they can even take the children to their work places.

Another good complementary feeding practice the study discovered was that mothers fed their infants with thick porridges. Thickness of porridge contributes to energy density

which is an essential requirement during the complementary feeding period. Majority (89%) of those who exclusively breastfed for a long duration fed thick porridges while 76% of those who exclusively breastfed for a short duration fed thick porridges. The reason accounting for this difference could have been as a result of the fact that there were more educated mothers (81%) in the long duration of EBF than short duration (67%). Maternal education has been shown to increase understanding about optimal care practices and benefits of optimal feeding practices (Guldan *et al.,* 1993), thus indicating the importance of female education.

5.3 Factors Associated with Duration of EBF

In this study, number of day time breastfeeds, breastfeeding on-demand, number of night breastfeeds and time of initiation of breastfeeding were not associated with the duration of EBF. However, statistically significant associations between these factors and duration of EBF have been reported by other studies (Setegn *et al.,* 2012; Radwan 2013).

The association of grandmother's support for EBF with duration of EBF is not surprising as it has been shown that they are key decision makers with regards to the time of introduction of complementary food. There is limited information on the association between grandmother's support for EBF and duration of EBF in Ghana. This study thus is unique in identifying this association even though information was not collected on the type of support provided. More mothers (79%) in the long duration of EBF received grandmother's support than mothers (62%) from the short duration and this could probably have contributed to mothers in the long duration of EBF exclusively breastfeeding for a long duration than mothers from the short duration of EBF. Results from this study also revealed that grandmothers are a major interference with regards to infant feeding hence if they support a particular practice they can influence mothers to

adopt that practice. This finding reiterates that grandmothers play a significant role in child feeding in the Builsa district and therefore suggest the need for interventions promoting optimal feeding practices to target them.

Age of introduction of complementary food also showed a significant association with duration of EBF. The study revealed that 47% of mothers who exclusively breastfed for short duration introduced complementary food at 2-4 months while 50% of mothers who exclusively breastfed for a long duration introduced complementary food at six months. This finding shows that once the duration of EBF is long (6 months), complementary feeding is likely to start at six months as recommended. However, some mothers who exclusively breastfed for long duration had not yet introduced complementary food even though infants were six months. The study therefore identified both early and late introduction of complementary food. These findings are consistent with the GDHS (2003), which also reported early and late introduction of complementary foods. The consistency of the finding in this study with that of the GDHS demonstrates that sub-optimal complementary feeding is a challenge. Of more concern is the fact that mothers introduced complementary foods as early as two months. This finding calls for promotion of optimal complementary feeding practices in the area. Early introduction of complementary food contributes to displacement of breast milk, less protective factors energy and nutrient deficiencies especially when complementary foods are low in energy and nutrient density, which can contribute to poor growth (Cohen *et al.*, 1994; Dewey *et al.*, 1999). The lower levels of education among the mothers could have contributed to the early and late introduction of complementary foods. Mothers who have no formal education may not know the age of their children and may introduce food before or after six months. Higher education among women has been shown to increase their understanding about the benefits of optimal care practices (Guldan *et al.*, 1993).

The first complementary food in Ghana is koko (maize porridge) which is low in energy and nutrient density. The Ghana Health Service (GHS) recommends that caregivers feed their infants with porridges that are nutrient dense and thick enough to stay on a spoon as thin/runny porridges contribute to low energy and nutrient density. The study found that majority (82%) of the mothers fed their infants with thick porridges with more mothers (89%) in the long duration of EBF giving thick porridges than mothers (76%) in the short duration of EBF. This is however not consistent with findings from the Ghana baseline report on promotion of complementary feeding practices (UNICEF *et al.*, 2011), which found majority of mothers (46%) fed their infants with thin porridges at 6 months of age. The fact that majority of mothers fed thick porridges to their infants could probably be due to the education mothers receive on optimal feeding practices during child welfare clinics. There may be several other reasons accounting for the difference in the short and long duration of EBF that have not been captured by this study.

5.4 Nutritional Status of Infants at 6 Months of Age

The mean weight was significantly higher for infants in the long duration of EBF than infants in the short duration of EBF. A systematic review of controlled trials and observational studies found that infants exclusively breastfed for six months showed no deficits in weight (Kramer and Kakuma, 2002). The lower mean weight for infants exclusively breastfed for short duration could have been as a result of early introduction of complementary food to these infants (2-4 months) which may have been deficient in energy and other essential nutrients required for growth. The higher mean weight for infants in the long duration of EBF could have been as a result of the benefits of EBF for a long duration since breast milk is an essential source of energy, fatty acids and

micronutrients (Dewey, 2001) which could have contributed to the weight of the infants in the long duration of EBF.

This study found no significant differences in the mean length, Mid Upper Arm Circumference and Head Circumference among infants exclusively breastfed for short duration and long duration. In contrary, a study by Donma and Donma (1997) found that head circumference values at six months of age were higher among infants exclusively breastfed for 6 months (43.7± 0.1 cm for boys, 42.9 ± 0.1 cm for girls) than infant who were mixed fed (42.6 ± 0.1 cm for boys, 41.4 ± 0.1 cm for girls) and formula fed (42.5 ± 0.1 cm for boys, 41.5 ± 0.1 cm for girls). The reason accounting for the finding in this study is not well known but could have been as a result of the sample size that was used.

This study also found that mean LAZ and WLZ values were significantly different among infants exclusively breastfed for short duration and long duration. The mean LAZ value was higher for infants exclusively breastfed for a short duration than infants exclusively breastfed for a long duration. This is contrary to findings by Cohen *et al.* (1995) which showed no significant difference in the mean LAZ among infants exclusively breastfed for six months and infants who were mixed breastfed. The significant difference found in this study is not well understood but could have been due to the sample size that was used. However, factors such as short maternal stature, low pregnancy weight gain and maternal pregnancy BMI could have contributed to the LAZ values that were found (Branca and Ferrari, 2002) though data were not collected on them.

The mean WLZ was better for infants exclusively breastfed for long duration than infants exclusively breastfed for short duration. This is contrary to findings by Kramer and Kakuma (2002) which revealed no significant difference in WLZ at six months between infants who were exclusively breastfed for six months and infants who were mixed

breastfed with hygienic and nutritious supplementary food introduced at four months. The reason for the significant difference in this study could have been due to the fact that infants in the short duration were introduced to complementary food at 2-4 months and complementary foods may have been deficient in energy and essential nutrients required for growth and this could have contributed to the mean WLZ of the infants that was found. The better mean WLZ for infants exclusively breastfed for a long duration could have been due to the sufficiency of breast milk in meeting the energy and nutrient needs of infants during the first six months of life therefore the need to promote EBF for the recommended 6 months duration.

5.5 Relationship between Duration of EBF and Growth of Infants at 6 Months of Age

In this study, despite some (48%) infants were exclusively breastfed for long duration and 52% of infants were exclusively breastfed for a short duration, there was no association between duration of EBF and infant nutritional status as the levels of wasting, stunting and underweight were all non-significantly different among infants exclusively breastfed for short and long durations. This results is consistent with findings from a secondary analysis of data from randomized controlled trials from Ghana, India and Peru by Vesel *et al.* (2010) which revealed that duration of EBF was not significantly associated with nutritional status indicators, stunting (p=0.481), wasting (p=0.268) and underweight (p=0.057) after adjusting for confounding factors for data from Ghana using the WHO child growth standards. Reasons accounting for this finding in this present study are not well known. However, the low level of education among the mothers in the study could have contributed to the poor nutritional status of the infants as they may have inadequate nutritional knowledge on proper child feeding and this conforms to Save the Children Report (2012), which indicated that a poorly educated mother is at a greater risk of not

being able to feed her baby adequately. The results of this present study in a rural setting in Ghana adds to existing evidence on the relationship between duration of EBF and infant growth at six months of age. However the prevalence of underweight, stunting and wasting for infants in the total study sample was 26%, 27% and 37% respectively and according to the WHO (2013) classification for assessing the severity of undernutrition for children under five, the severity of underweight was high, stunting was medium and wasting was very high. This therefore calls for quick interventions as the prevalence of these nutritional status indicators confirm that undernutrition for infants at six months of age is a public health problem in the district. Undernutrition has been shown to cause physical and mental impairments, reduce school performance, increase the risk of infectious diseases and contribute to poverty (Caulfield *et al.*, 2013; Save the Children, 2012). It is therefore necessary to promote female education and optimal complementary feeding emphasizing on improving the energy and nutrient density of local complementary foods.

5.6 Predictors of Long Duration of EBF

The identification of factors associated with long duration of EBF is vital for planning intervention strategies for the promotion of EBF. Maternal age, marital status, infant sex and place of delivery did not predict long duration of EBF in this study. Even though research evidence has shown an association between these factors and EBF, Aidam *et al.* (2005) indicated that the extent of the associations differs from one cultural setting to another. This could have accounted for these factors not significantly predicting long duration of EBF in this study population.

Grandmother's support for EBF significantly predicted long duration of EBF (p=0.014) in this study. Others have reported similar results with grandmothers and child feeding

(Bentley *et al.*, 1999; Kerr *et al.*, 2008) and support from mother-in-laws, fathers and peers can help a woman exclusively breastfeed (Save the Children, 2012). Even though the association between grandmother's support for EBF and long duration of EBF has not been widely reported in Ghana, evidence from studies elsewhere have shown that living in the same house with grandmothers is associated with an early cessation of EBF (Andrade and Taddei, 2002; Santo *et al.*, 2007). This current study demonstrates that the presence of grandmothers in the home could actually contribute to long duration of EBF provided the grandmother supports the mother to exclusively breastfeed. The support that grandmothers provided to mothers in this study could have been as a result of their understanding of the benefits of EBF following the radio campaigns on promotion of EBF in the study area by the District Health Directorate. Educating grandmothers on the benefits of EBF is likely to contribute to mothers exclusively breastfeeding their infants for a long duration. With the current reduction in the rate of EBF (from 63% to 46%) in Ghana (MICS, 2011), targeting grandmothers in interventions promoting EBF could lead to improvements in the rate of EBF considering the role they play in child feeding (Aubel *et al.*, 2004; Davies-Adetugbo, 1997). This conforms to suggestions by Kerr *et al.* (2008) that child feeding practices could be improved by extending education on optimal infant and young child feeding practices to external family members since they influence a mother's feeding choice.

In this study maternal education significantly predicted long duration of EBF. This finding is consistent with Vaahtera *et al.* (2001), who found a significant association between increased maternal education and prolonged duration of EBF *(p=0.001)* (Coefficient B: 2; 95% CI, 1,4. P=0.001) using a multivariate linear regression. In contrary, a study by Chudasama *et al.* (2008) on factors associated with EBF found that illiterate mothers had higher median duration of EBF (7 months) than literate mothers (6 months) ($p< 0.05$). Maternal level of education has also been identified by some studies to be associated with

EBF (Martin *et al.*, 2002; Aidam *et al.*, 2005) though its association with regards to the duration of EBF was not considered in these studies. Educated mothers understand optimal feeding practices better and so are able to make informed decisions that contribute to good health and wellbeing (GDHS, 2003). With the majority (73.4%) of mothers in this study having some level of formal education and the promotion of EBF in health facilities in the study area could have contributed to their understanding of the benefits of EBF better and adherence to the practice. The fact that the odds to exclusively breastfeed for a long duration increased with an increase in level of education raises critical issues on the importance of girl child education especially to the higher levels. The finding also raises concern about the need to promote EBF especially among the less educated placing emphasis on the benefits both to mother and infant especially in settings where there are high female illiteracy rates.

In this study, salaried workers were more likely to EBF for a long duration than unemployed mothers. This is not consistent with findings from other studies which showed that unemployed mothers were more likely to EBF than employed mothers even though these studies did not report with regards to duration of EBF (Tan, 2011; Setegn *et al.*, 2012). This finding could also be due to cultural characteristics of the study area as Aidam *et al.* (2005) indicated that the association of factors including that of maternal occupation with EBF differs from one cultural setting to the other. The reason that may be accounting for the findings in this study is the fact that this study setting is rural and unemployed mothers are not usually found sitting ideal but are engaged in their usual daily traditional duties of fetching water and firewood, walking long distances to market and they also engage in minor income generating activities including picking of sheanut fruits from the forest for sale. In carrying out these activities they sometimes leave their children in the care of grandmothers or older siblings who are likely to introduce water or semi-

solid foods especially when the baby cries a lot but the mother is not around. Another reason for this finding is that the salaried workers were likely to have some form of formal education and so understand the benefits of EBF better than unemployed mothers who were likely not to have any formal education. This reiterate the importance of formal education on adherence to optimal feeding practices. This conforms to Vaahtera *et al.* (2001) who indicated that increased level of maternal education is associated with enhanced adherence to infant feeding recommendation. Thus EBF should be promoted among the unemployed.

Higher monthly income significantly predicted long duration of EBF. This finding is comparable to a study by Giashuddin and Kabir (2004) which showed that children in high economic status families had higher risk of stopping EBF than children in low economic status families. This study thus provide evidence that in rural communities in Ghana, mothers with higher monthly incomes are likely not to exclusively breastfeed for a long duration. There may be several reasons accounting for this finding that have not been captured by this study considering the inability of most women in the area to purchase infant formula as the study found which is a positive influence on EBF.

CHAPTER 6

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Mothers were aware of optimal breastfeeding and complementary feeding practices however; their actual practices were based mostly on traditional beliefs.

Breastfeeding practices of mothers that were done according to the WHO recommendations included on-demand breastfeeding and early initiation of breastfeeding within one hour. Areas of concern with regards to breastfeeding practices that need intervention include the introduction of traditional herbs/liquids to newborn babies during the first six months of life and the fact that EBF is not acceptable to all mothers.

For complementary feeding practices the study found that the duration of breastfeeding is long, mothers fed their infants with thick porridges at six months, frequency of feeding was also good and mothers reported practicing good hygiene. However, the practices that were of much concern were early or late introduction of complementary food.

Interference by grandmothers, poverty, traditional beliefs and practices, women's work load and inadequate financial support from husbands were identified as the barriers to optimal infant and young feeding in the area.

Grandmother's support for EBF, thickness of porridges and age of introduction of complementary food were significantly associated with duration of EBF. Programs promoting EBF should take into account these factors as they can influence short or long duration of EBF.

There was a high prevalence of undernutrition among the six months old infants in the study.

The duration of EBF was not associated with infant growth at 6 months of age. However, this finding does not undermine the well documented benefits of EBF for 6 months.

Grandmother's support for EBF, maternal education, being a salaried worker and monthly income above GH¢100.00 significantly predicted long duration of EBF. Improving the situation of these factors will lead to an improvement in the rate of EBF for a long duration of six months.

6.2 Limitation of the Study

Individual interviews with mothers were conducted in health facilities during child welfare clinics; this could have contributed to information bias with regards to the duration of EBF since these facilities are baby friendly and are seen to promote EBF.

Also, a recall of how long mothers did EBF for a period of 6 months may have lead to recall bias among the mothers and this could have contributed to the rate of EBF that was estimated in the in the study.

6.3 Recommendations

In order to improve breastfeeding and complementary feeding practices in the Builsa district, the following recommendations are suggested;

- Intervention on optimal breastfeeding and complementary feeding practices in the district should focus on promoting EBF, discouraging the introduction of traditional herb/liquids during the first 6 months of life and promoting timely introduction of complementary food at 6 months of age.
- The GHS should develop key education messages on current recommendations for optimal infant and young child feeding taking into account the cultural beliefs of

the people and explaining the rationale for the recommendations as well as the benefits to both mother and child.

- Further studies should be carried out to further explore the influence of culture on breastfeeding and complementary feeding practices in the district.
- Programmes or interventions promoting optimal feeding practices should target grandmothers as they play a significant role in child feeding in the district.
- Age of introduction of complementary food and grandmother's support for EBF has shown an association with EBF duration hence these factors need to be considered when planning interventions on optimal feeding practices in the district
- The duration of EBF has no benefit for infant growth in this population. Infant nutritional status can be improved by promoting the use of energy and nutrient dense complementary foods through simple fortification of local foods.

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APPENDICES

APPENDIX 1: FOCUS GROUP DISCUSSION GUIDE

A STUDY ON ASSOCIATION BETWEEN BREASTFEEDING AND COMPLEMENTARY FEEDING PRACTICES AND INFANT GROWTH IN THE BUILSA DISTRICT

DEPARTMENT OF NUTRITION AND FOOD SCIENCE, UNIVERSITY OF GHANA

A. Infant and young child feeding practices

1.0 What are the infant and young child feeding practices in this community?

Probe: a. Exclusive breastfeeding

b. Complementary feeding

2.0 How do you breastfeed babies in your community?

Probe: a**.** Time of initiation of breastfeeding

b. Number of day time and night feeds

c. Feeding on demand

3.0 What foods did you give to your child within the first 6 months?

Probe: a. Traditional liquids, Infant formula, other semi-solid foods

4.0 What is your opinion about the recommendation not to give water to a baby for the first 6 months?

Probe: a. When did you give water for the first time?

b. Is breast milk alone enough for the first 6 months? Why?

c. Why do some women practice it and others do not?

5.0 What kind of foods do you give to your children in addition to breast milk after 6 months?

Probe: a. Semi-solid and solid foods

b. Type of food given to a child who is 6-9, 9-12 or 12-24 months

c. Thickness of semi-solid foods

d. How often do you give the food to your child (6-9, 9-12 and 12-24 months?)

e. How much of the food do you give a child (6-9, 9-12 and 12-24 months?)

d. At what age do you start feeding these foods?

e. When do you finally stop breastfeeding your child who is on other foods?

6.0. What do you do to ensure that your child's food is safe?

Probe: a. Hygienic practices,

b. Storage of left-over food

c. How left-over food is treated before fed to the child

7.0 How do you help your child to eat enough food?

Probe: a. When he/she refuses to eat

b. When he/she is sick

c. When the child is recovering from illness

8.0 How do you prepare food for your child?

Probe: a. Specially prepared for the child or for the whole family?

b. Nutrient density and enriching the food

B. Consequences of poor feeding practices

9.0 What are some of the health problems a child can suffer that you believe are associated with poor feeding practices?

Probe: a. Effects on nutritional status

C. Barriers to optimal infant and young child feeding practices

10.0 What are the challenges you face in feeding your children well?

Probe: a. cultural barriers, family interference, financial problem and work load

D. Ideas on improving infant and young feeding practices

11.0 What do you think can be done to help you feed your infants and young children optimally?

Probes: a. How can women be encouraged? Who should be involve

APPENDIX 2: SCREENING QUESTIONNAIRE FOR MOTHERS

A STUDY ON ASSOCIATION BETWEEN BREASTFEEDING AND COMPLEMENTARY FEEDING PRACTICES AND THE GROWTH OF INFANTS IN BUILSA DISTRICT

DEPARTMENT OF NUTRITION AND FOOD SCIENCE, UNIVERSITY OF GHANA

Screening Questions for Mothers

Date---------- **Interviewer----------**

1. What is the name of your child? ……..

2. Child's sex CHDSX ☐

1=Male 2=Female

3. Are you the biological mother of (child's name)? BIOM ☐
1=Yes 2=No

4. Is your child 6 months? HOCHD ☐
1=Yes 2= No

5. Have you ever given your child any of the following since birth? DGCHDF
(***Mention list of items and circle 1 if Yes or 2 if No***)

Food item	**Response**
Infant formula	1=Yes 2=No
Fresh cow's milk	1=Yes 2=No
Water	1=Yes 2=No
Teas	1=Yes 2=No
Others	
Others	

6. How long did you give your child only breast milk? ONLBM ☐
1=1 week 2=1-2 months 3= 3 months 4= 4 months 5=5 months
6=6 months 7= > 6 months

7. Is mother eligible to participate? ELIMODA ☐
1=Yes 2=No

APPENDIX 3: MOTHER'S QUESTIONNAIRE

A STUDY ON ASSOCIATION BETWEEN BREASTFEEDING AND COMPLEMENTARY FEEDING PRACTICES AND THE GROWTH OF INFANTS IN BUILSA DISTRICT

DEPARTMENT OF NUTRITION AND FOOD SCIENCE, UNIVERSITY OF GHANA

Mother's Questionnaire

Date---------- **Interviewer: ----------**

Section 1: Maternal/Household characteristics

1. How old are you? (***Completed age in years***) ---------- HOLD ☐

2. What is your marital status? MSTAT ☐
   1=Single 2=Cohabiting 3=Married 4=Widowed
   5=Divorced

3. What is your highest level of education? HLEDU ☐
   0=No formal education 1=Primary 2=JHS/Middle Sch
   3=Secondary 4=Vocational 5=Tertiary

4. Which ethnic group do you belong? ETHGRP ☐

   1=Builsa 2=kassena 3=Frafra
   4=Mamprusi 5= other (***specify***…….)

5. Which community do you live?.....

6. Which religion do you belong to? WREL ☐

   1=Christian 2=Islamic 3=Traditional 4=others (***specify***…….)

7. What is your main occupation?
   0=Unemployed 1=Farming 2=Trader 3=Seamstress MOCC ☐
   4=Hair dresser 5=Other (***specify***……..)

8. What is your monthly income?
   1= < GH¢50 2=GH¢ 50- 100 3=GH¢100-200 4=GH¢ 200-500 INCOM ☐
   5= GH¢500 6= > GH¢500
9. What type of house do you stay in? TYHOU ☐
   1=Own house 2=Rented apartment 3=Government estate
   4=Other ***(specify***)……..)

10. How many rooms are available to you in the house? …… MROMS

11. How many people are in your household? …….. HPLE

12. Do you have any of the following items in your home? (***Answer 0 = No or 1= Yes***) GFFI

ITEM	YES/NO	QUANTITY
Radio		
Television		
Fridge/Freezer		
Telephone		
Air conditioner/ Fan		
Internet facility		
Computer (Desktop/Laptop)		
Others		

13. What is your main mode of transport? MOTRP
1=Car 2=Motor bike 3=Public transport 4=Bicycle

14. What toilet facility is available to you? TOLFTY

1=Own WC 2=Own KVIP 3=Public WC 4=Public KVIP

5= Others (***Specify***……)

15. What water facility do you use? WAFTY

1= Own pipe borne water 2= Public pipe borne 3= Own well 4=Public well

5= Own borehole 6=Public borehole 7=River/stream

Section 2: Infant and young child feeding practices

Now let us discuss how you feed your child

16. Where did you deliver your child? DCHD
1= Health facility 2=Private midwife 3=TBA
4=Other (***specify***……)

17. When was the first time you put your child to your breast? PCHDB

1=Within 30 min 2=30 min – 1 hour 3=1 – 24 hours 4= >24 hours

18. Did you breastfeed your child whenever he/she wanted or on a fixed schedule? BFSCHD
1= whenever the child wants 2= On a fixed schedule

98= Cannot remember

19. Averagely, how many times do you breastfeed during the day for the first 6 months? AVED ☐
98=Cannot remember ***specify***……

20. Averagely, how many times do you breastfeed during the night for the first 6 months? TBFE ☐
98=Cannot remember ***specify***……

21. Each time you breastfeed your child do you feed from one breast or both? BFWB ☐
1=One breast 2= Both breasts

22. Are you currently breastfeeding? **(If No, go to 24a)** CUBFED ☐
1=Yes 2=No

23. At what age do you plan to finally stop breastfeeding your child? AGESTP ☐
(***Age in months***)……

24a. At what age did you give milk/semi-solid food to your child for the first time? WASFOD ☐
(***Age in months***)……...

24b. What food do you give to your child? ***(Select all that apply 1=Yes; 2=No)*** WATFOD ☐

Food Item	**Response**
Koko	
Weanimix	
Canned baby food	
Tom-brown	
Mpotompoto	
Mashed yam	
Banku with soup/stew	
Touzaafi with soup	
Rice with soup/stew	
Others	
Others	

Food consistency and frequency of feeding

25. What is the thickness of the porridge you give your child? TICPOG ☐
1=Thick 2=Very thin/runny

26. How many times in a day do you feed your child with food in addition to breast milk? HTFC ☐
1=Once a day 2=2 times 3=3 times 4=4 times 5= ≥5 times

Amount of food

27. How much porridge do you give your child? HMUCH ☐
1=One small stew ladle 2= One big stew ladle 3=One soup ladle (**100ml**)
4=Two soup ladles 5=Three soup ladles
6=Other (specify……)

28. Please list all the foods you gave your child from yesterday morning to this morning.

Read out the list. Write the "1" for Yes and "2" for No in the Response code column

Food item	**Response**	**Response Code**	**Quantity**
Breast milk	1=Yes, 2=No		
Water	1=Yes, 2=No		
Infant formula	1=Yes, 2=No		
Porridge	1=Yes, 2=No		
Tinned, powdered or fresh animal milk	1=Yes, 2=No		
Traditional medicines (herbs)	1=Yes, 2=No		
Fruit juice	1=Yes, 2=No		
Coffee, tea, minerals	1=Yes, 2=No		
Bread, foods made from grains(rice, millet, maize, sorghum)	1=Yes, 2=No		
Foods made from roots/tubers (yam, potatoes, cassava)	1=Yes, 2=No		
Carrots or yellow sweet potatoes	1=Yes, 2=No		
Dark green leafy vegetable (kenaf)	1=Yes, 2=No		
Ripe mango, pawpaw	1=Yes, 2=No		
Any other fruit (banana, orange)	1=Yes, 2=No		
Any organ meats (liver, kidney)	1=Yes, 2=No		
Any meat (beef, pork, chicken, duck)	1=Yes, 2=No		
Fresh or dried fish	1=Yes, 2=No		
Eggs	1=Yes, 2=No		
Foods made from beans	1=Yes, 2=No		
Foods made with oils, fats or butter	1=Yes, 2=No		
Groundnuts or any other nuts	1=Yes, 2=No		
Chocolate, sweets, candies biscuits	1=Yes, 2=No		
Others			
Others			

Responsive feeding and feeding during and after illness

29. Who is the main person that feeds your child? FEDCHD ☐

1=Mother 2=Older child/sibling

3=Father 4=Grandmother

30. What do you do when your child refuses to eat a meal? CHDREFUS ☐

1=Change the food 2=Talk to the child 3=Sing to the child
4= Force-feed the child 5=Breastfeed and give solid food 6=Stop feeding

31. What do you do when your child is sick? LOSAPP ☐
1=Breastfeed more often 2=Feed slowly and patiently 3= Feed favorite food
4=Feed favorite food 5= Stop feeding 6=Force-feed child 7=Put child to sleep

32. When your child is recovering from illness, how do you feed? RECOV ☐
1=Give an additional meal each day for 2 weeks 2=Give more food per meal
3=Force-feed child 4=Feed the usual way

Hygienic practices and food preparation and storage

33. When do you usually wash your hands? ***(Select all that apply)*** WASHD ☐
1=Before food preparation 2=Before feeding children 3=After cleaning baby
4=After handling garbage 5=Before eating 6=After using the toilet
7=After returning from outside

34. What do you use to wash your hands? DUWH ☐
1=Water and soap 2= Water only

35. What do you do to the water used in your child's food? WACHDF ☐
1=Boil 2=Boil and filter 3=Chlorinate 4=Use as it is

36. Do you prepare child's food at home or you buy already prepared food from the food seller? PREFOD ☐
1=Prepare at home 2=Buy from food seller

37. If food is bought, do you modify it? MODFOD ☐
1=Yes 2=No

38. If prepared at home is the food specifically for the child or the whole household? SPECHD ☐
1=Yes 2=No

39. Do you feed your child with left-over food? FPEAR ☐
1=Yes 2=No ***(if No go to 40)***

40. What do you do to the food before serving it again? DBSFO ☐
1=Heat it 2= Serve as it is 3= Adds hot water
5=Other (***specify***……)

41. Where do you store your child's food? STORFOD ☐
1=Baby bowl 2=Food flask 3= Cooking pot 4=Fridge 5=Don't store

Food quality and Diversity

Now, let us discuss all the food groups from which your child's food is prepared

42. What ingredients do you usually use in preparing child's food? INGRED ☐

For each food item write 1 for daily use, 2 for 1-2 times/week** and **3 for 3 times or more/week

(Let mother mention foods, prompt for items in the list not mentioned)

Type of food	**How often do you use**
Cereals (millet, maize, rice and sorghum)	
Carrots, yellow sweet potatoes	
Roots/tubers (yam, cassava, potatoes)	
Dark green leafy vegetables (bean leaf or kenaf)	
Ripe mango, pawpaw or any local fruit	
Other vegetables (carrots, tomatoes, onions)	
Meat (beef, chicken)	
Fish	
Eggs	
Liver	
Palm oil	
Sheabutter	
Others	

Section 3: Factors affecting feeding practices

43. What is your source of infant and young child feeding information? SOUIFO ☐
1=Health facility 2=Mass media 3=Mother in-law
4=Other (Specify……)

44. Does your spouse support exclusive breastfeeding for 6 months? SPBF ☐
1=Yes 2=No 99=Don't know

45. Does your child's grandmother support exclusive breastfeeding for 6 months? GSEXBF ☐
1=Yes 2=No 99=Don't know

46. Do you get support from your spouse to acquire the necessary ingredients to prepare your child's food? AQINGRE ☐
1=Yes 2= No 3= Sometimes

47. Are there any traditional practices in this community that hinder the practice of breastfeeding? TPHEXBF ☐
……
……
……

48. Are there any foods that are considered not good for young children in this community? FCNGD ☐

(a).....

(b).....

c).....

d).....

49. Why are they not considered good for children? YNGOOD

(a)……

(b)……

c)……

d)……..

50. With regards to feeding, are male children fed differently from females in this community?

1=Yes 2=No 99= Don't know FEDSPE ☐

51. If yes, what special food or care is given them? SPEFMC

.....

.....

.....

52. What is the main problem you encounter with regards to feeding your child? PROENC

.....

.....

Section 4. Child Morbidity

53a. In the past week, has your child been sick? SICCHD ☐

1=Yes 2=No

53b. If yes, what illnesses or symptoms did the child have? ILSYM ☐

Symptom	**Yes= 1**	**No= 2**	**Don't know= 99**	**Treatment Given**
Cold				
Cough				
Runny Nose				
Fever				
Vomiting				
Malaria				
Difficulty/fast breathing				
Lethargy				
Not eating				
Others				
others				
others				

Section 5. Child Anthropometry

54. Age of child in months…….

55. Presence of oedema 1=Yes 2=No PREED ☐

Weight of child (Kg)	---- ----- · -----	----- ----- · -----
Length of child (Cm)	----- ----- · -----	----- ----- · -----
Mid Upper Arm Circumference (Cm)	----- ----- · -----	----- ----- · -----
Head circumference (Cm)	----- ----- · -----	----- ----- · -----

APPENDIX 4: INFORMED CONSENT FORM

UNIVERSITY OF GHANA

DEPARTMENT OF NUTRITION AND FOOD SCIENCE

ASSOCIATION BETWEEN BREASTFEEDING AND COMPLEMENTARY FEEDING PRACTICES AND INFANT GROWTH IN THE BUILSA DISTRICT

INFORMED CONSENT FORM

Title: Association between breastfeeding and complementary feeding practices and infant growth in the Builsa District

Principal Investigator: Cordula Abang

Address: Department of Nutrition and Food Science, University of Ghana, Legon, Accra.

General Information about Research

You and your child are being invited to participate in this research study that aims to determine breastfeeding and complementary feeding practices and the implication of the duration of exclusive breastfeeding on infant growth. This is essential to know as the information gathered from this study will be used to improve infant and young child feeding practices.

If you agree to take part in this study, you will be asked some personal questions such as your age, level of education, marital status, where you live, your ethnicity and monthly income. You will also be asked questioned about your child (age, sex, place of delivery). Your breastfeeding and complementary feeding practices, morbidity data on your child and factors that hinder feeding practices will also be asked. This will last about 30-45 minutes. Your child will be weighed in minimal clothing or naked. The length of your child will also be taken with the child lying in minimal clothing. Both the weight and

length measurements will be taken twice on your child. Your child's head circumference and his/her mid upper arm circumference will also be measured.

Possible Risks and Discomforts

There are no risks to you or your child. However, you may be inconvenienced as result of the time you will be spending during the interview. Your child may feel some discomfort as measurements will be taken with the child in minimal clothing.

Possible Benefits

There may be no direct benefit to you and your child for taking part in this study. However, the information gained in this study will help improve infant and young child feeding practices in your community and other communities.

Confidentiality

All information about you and your child will be kept confidential. Only the researcher will have access to your records. You or your child's name will never be used in any presentation, paper or report. However, the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your record for auditing programmes.

Compensation

You will receive a half bar of key soap as a thank you gift at the end of the study for making time to participate.

Voluntary participation and Right to Leave the Research

Participating in this study is voluntary. You have the right to decide to take part in this study or refuse to take part. You are also free to withdraw at any stage without any penalty.

Contacts for Additional Information

If you have any questions or concerns about this study, you can contact Cordula Abang on (Tel: 0242569173; abancord@yahoo.com). Dr. Gloria Otoo, the main supervisor for this study on (0248689464; geotoo@yahoo.com).

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.mimcom.org or HBaidoo@noguchi.mimcom.org.

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title, **Association between breastfeeding and complementary feeding practices on infant growth in the Builsa District** has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer

…… ….…..……..

Date Name and signature or mark of Volunteer

If volunteers cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered to the volunteer's satisfaction and the volunteer has agreed to take part in the research.

…… ….…..……

Date Name and Signature of Witness

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this study have been explained to the above individual.

…… ……..

Date Name/ Signature of Person Who Obtained Consent