

UNIVERSITY OF GHANA
COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH

**EARLY INFANT FEEDING MODALITY AND NUTRITIONAL
INDICATORS OF CHILDREN AGED 06-24 MONTHS IN THE
MAMPRUGU-MOAKDURI DISTRICT OF NORTHERN REGION,
GHANA**

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DECLARATION

I, Tiimob Gideon Likida hereby declare that with the exception of other people's works which have been duly acknowledged and appropriately referenced, this dissertation is my own work and has not been submitted elsewhere either in part or wholly for the award of any university degree.

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Date

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Dr. Amos Laar

(Academic Supervisor)

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Date



DEDICATION

I dedicate this work to God Almighty for granting me all the financial resources, knowledge, wisdom, guidance and good health all through the period of my study.



ACKNOWLEDGEMENTS

All praise and Glory be to God Almighty for his ever living presence that saw me through to the completion of this work.

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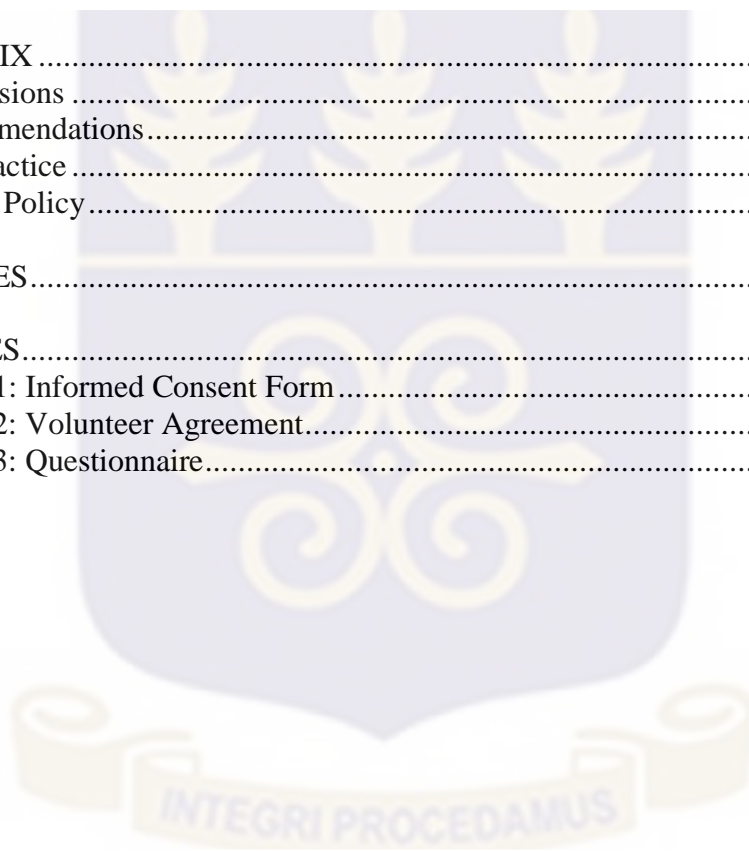


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ABSTRACT

Background: Good nutrition in the formative years is very important for optimal growth and development of children. Feeding practices in the early stages of a child's life are very critical as they set the pace for good growth if done optimally and could also affect the child negatively all through life if done sub-optimally.

Feeding practices are variables of a child that are determined by a number of factors including; exclusive breastfeeding, timing of introduction of solid foods to children, feeding challenges during the critical window period and the food preferences of children. However, there is no evidence of any study that has been done in the Mamprugu-Moakduri district to ascertain the association of these factors on the nutritional indicators of children aged 06-24 months in the Mamprugu-Moakduri district. This study was aimed at assessing early infant feeding modality and how it is associated with nutritional indicators of children aged 06-24 months in the district.

Methods: The study was community-based, and employed a cross sectional study design to gather quantitative data from study participants. Mothers and their children aged 06-24 months constituted the study population. Quantitative data was gathered using a structured questionnaire and analyzed using SPSS version 22 and the WHO epi info version 7.2. Bivariate analysis and logistic regression modeling were used to determine associations between outcome and predictor variables.

Results: Breastfeeding initiation within an hour of birth was practiced by 65.4% of the mothers, none of them practiced exclusive breastfeeding. About 2% of the mothers initiated solid foods before six months, and all of them practiced mixed feeding. Longer feeding time (59%), refusal of different textures of food (27.7%), fussiness or lack of attention during feeding (28.8%) were some of the feeding challenges reported by mothers.

Regression modeling showed significant association between early initiation of complementary feeding and excessive drooling, OR= 0.505, 95%CI, 0.205-1.250. About 40.3% of the children were stunted, 18.4% wasted and 35.7% underweight. Further analysis using regression modeling revealed that only stunting had statistical associations with chewing problems (aOR = 0.560, 95% CI, 0.336-0.933).

Conclusion: No woman practiced exclusive breastfeeding for the first six months and the timing for the initiation of solid foods by most of the mothers was wrong indicating that the infant and young child feeding recommendations are not followed in feeding infants and young children. The findings also revealed that there is high prevalence of child undernutrition in the district as 40.3%, 18.4% and 35.7% were stunted, wasted and underweight respectively.

Recommendation: More campaign about the need for exclusive breastfeeding during the first six months of a child's life should be done by the Ghana Health Service; critical attention should be paid to the "sensitive period" (6-9 months) in feeding infants.



LIST OF ACRONYMS

AOR	Adjusted Odds Ratio
BF	Breastfeeding
CI	Confidence Interval
DHMT	District Health Management Team
DHMIS	District Health Management Information System
DMR	District Mid-year Report
EBF	Exclusive Breastfeeding
ENA	Emergency Nutrition Assessment
GDHS	Ghana Demographic and Health Survey
GMP	Growth Monitoring and Promotion
GSS	Ghana Statistical Service
HAZ	Height-for-Age Z-score
ICCM	Integrated Community Case Management
IYCF	Infant and Young Child Feeding
JHS	Junior High School
NMCCSP	Nutrition and Malaria Control for Child Survival Project
O' level	Ordinary level
OR	Odds Ratio
P-value	Probability value
SD	Standard Deviation
SHS	Senior High School
UNICEF	United Nations Children's Fund

WAZ	Weight-for-Age Z-score
WHO	World Health Organization
WHZ	Weight-for-height Z-score



DEFINITIONS OF KEY TERMS

Complementary feeding: This refers to when breast milk alone or infant formula is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are added alongside the breast milk or infant formula in order to meet the nutritional requirements of the child. This usually starts on the sixth month.

Exclusive breastfeeding: This refers to the feeding practice of giving the infant only breast milk. No other liquids or solids are given, not even water with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines.

Feeding difficulties: These refer to feeding challenges in infancy or early childhood usually characterized by refusal to eat certain food groups, textures, solids or liquids for a period of at least one month, which causes the child to not gain enough weight, grow, thereby causing developmental delays.

Mixed feeding: This refers to the feeding practice whereby both breast milk and breast milk substitutes (commercial infant formula) are given to the child.

Stunting: Refers to low height-for-age Z-scores (HAZ). It reflects linear growth retardation used to describe long term nutritional status; stunting is when HAZ is equal to or less than minus 2 SD of the WHO reference point for children of same sex.

Underweight: Refers to low weight-for-age Z-scores (WAZ) and represents a global measure of under nutrition; underweight is when WAZ is equal to or less than minus 2 SD of the WHO reference point.

Wasting: Refers to low weight-for-height Z-scores (WHZ) that reflect current nutritional status and the degree of thinness in a child; wasting is when WHZ is equal to or less than minus 2 SD of the WHO reference point.

Z-score: this is also known as standard deviation score and it's defined as the deviation of the value of an individual child from the median value of the reference population expressed in standard value terms.



CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of Study

The critical time to focus on child's nutrition is from the time of conception until the point that they are 2 years of age (WHO, 2016). Referred to as the first 1000 days, optimal nutrition during this critical window is a determinant of good health throughout the lifecycle (Sultana, Hoque, & Saleh, 2014). According to the WHO, nutrition during this period is very essential for growth and development of children and influences their health outcomes in later life (WHO, 2016). Undernutrition, anemia, obesity and dental caries are some of the problems associated with poor diets and feeding during childhood (Hyter *et al.*, 2015).

Globally, undernutrition is responsible for 45% of the deaths annually recorded among under-fives (UNICEF & WHO, 2013). Over 66% of these deaths, which are often associated with inappropriate feeding practices, occur within the first one year of life. Undernutrition and suboptimal breastfeeding practices jointly account for 2.2 billion deaths and 21% disabilities among children younger than 5 years (WHO, 2016; Black *et al.*, 2008). There has been a decline in child undernutrition globally, but Africa is experiencing an increase in childhood undernutrition over the past decade (Black *et al.*, 2011)

Exclusive breastfeeding is the feeding practice of giving the infant only breast milk as food with vitamin supplements and syrups as the only liquids and its recommended for infants for the first 6 months of life due to its numerous benefits (WHO, 2013).

Globally, less than 40% of infants below the ages of six months are breastfed exclusively WHO (2014). This predisposes infants to the risks of childhood illnesses and undernutrition. Continued breastfeeding coupled with optimal complementary feeding

practices is recommended for the first 24 months and beyond when the child is six months due to the increased demand for micronutrients for optimal growth and development (Sultana, Hoque, & Saleh, 2014).

Complementary feeding is the feeding modality starts when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk (Rao, Swathi, Unnikrishnan, & Hegde, 2011).

Complementary feeding begins either earlier (below 6 months) or too late (after 9 months), and the foods often given to infants are nutritionally inadequate and or unsafe, exposing them to the risk of undernutrition.

The most vulnerable period of infants and young children of becoming malnourished begins from age six months onwards, when breastmilk alone is no longer enough to meet *all* their nutritional requirements and hence the need for complementary feeding to be introduced to them.

Breastmilk is the only ideal food to start the life of an infant for healthy growth and development; it contain all the nutrients and energy an infant requires in the first 6 months of life (Thomas, 2016).

Timeliness of complementary feeding is important for good health and development during the period of rapid growth, physiological and maturation. Suboptimal feeding practices during this critical (6-9 months) period of development increases the risk of growth faltering (wasting and stunting) and the incidence of nutrient deficiencies and their adverse effects on health, cognitive development, and level of productivity in future (Black *et al.*, 2008).

Undernutrition in all its manifestations is a global problem despite the general improvement in the supply of food, health care, and the increased availability of sanitation and social

services. Over 174 million children aged 0-59 months in the developing world are malnourished, this is indicated by low weight for age (WAZ), and 230 million are stunted (HAZ). In sub-Saharan Africa (SSA), approximately 40% of all children under 5 years (56 million) are estimated to be stunted (United Nations Children's Fund *et al.*, 2012) and leads to poor physical and mental development as well as reduced resistance to diseases (UNICEF, 2013).

This study aimed at assessing early infant feeding modalities and the nutritional indicators of children aged 06-24 months, it also looked at infant feeding difficulties at ages 06 to 24 months, length of breastfeeding duration among mothers in the Mamprugu-Moakduri district, determined the age of introduction of solids to infants and explored the feeding difficulties and food preferences of children within the district and how they impact the nutritional indicators of children within the district.

1.20 Problem Statement

Nutrition in the first 1000 days of life is crucial for optimal child growth and development and influences health outcomes in later life (WHO, 2016). Undernutrition, anemia, obesity, and dental caries are some of the problems associated with poor diets during childhood and predisposes children to impaired physical and mental development, obesity, diabetes and other non-communicable diseases in adulthood (Black *et al.*, 2011; Hyter *et al.*, 2015; WHO, 2016). According to Black and his colleagues in 2011, children who are stunted, underweight and wasted have increased risk of mortality from diarrhea, measles, pneumonia and other infectious diseases.

Despite over two decades of research, policy initiatives and programmes on infant and young child feeding in the Sub-Saharan African region, the prevalence of infant undernutrition are still high especially among children under two years of age living in

rural communities across the globe (Black *et al.*, 2011). Even though there are several initiatives and interventions towards addressing the problem of child undernutrition in Ghana, there still remains a lot to be done in the area.

The World Health Organization recommends that mothers should exclusively breastfeed in first six months and thereafter, continued breastfeeding for two years or more, with safe, appropriate and adequate complementary foods starting the 6th month with feeding frequencies of: 2 times daily for 6 to 8 month olds and 3 times daily for 9 to 11 month olds (Black, Allen, Bhutta, Caulfield, de Onis, 2008b). However, only 52% of Ghanaian children less than six months are exclusively breastfed; this is a level lower than the recommendation according to WHO and UNICEF (GSS *et al.*, 2015)

Globally, it is estimated that 156 million under-fives are stunted and 50 million of them are wasted. (WHO, 2015). In sub-Saharan Africa, about 40% of children less than 5 years (56 million) are estimated to be stunted (United Nations Children's Fund *et al.*, 2012). Undernutrition among children under five is a major public health issue in Ghana especially in the north. In Ghana 19% of children under age five are stunted, 5% are wasted and 11% are underweight (GSS *et al.*, 2015). In northern region 33.1% of children under five are stunted (DHIMS, 2016).

The worse level of the problem of child undernutrition in the region is seen in the Mamprugu- Moakduri district as 46% of children under-five are stunted and another 33% are underweight (GSS *et al.*, 2015), and very little is known about the factors leading to the poor nutritional status of the children in the Mamprugu-Moakduri district. The detrimental consequences of child under nutrition in Ghana are quite severe as it can lead to physical and neurological growth impairment and development, lower Intelligence Quotient (IQ) and increased risk of disease susceptibility and death (Aheto, Keegan, Teylor

& Diggle, 2015). According to Aheto and colleagues (2015), about 40% under-five mortality is due to undernutrition as a mere 13% of children within the critical window period get to meet the three minimum core standards per the infant and young child feeding recommendations (IYCF) practices (GSS *et al.*, 2015), a level far below the 90% recommended level according to the WHO (Issaka *et al.*, 2015).

Inadequacy of maternal knowledge about appropriate feeding practices coupled with the issues of the cost involved and convenience are the major drivers of infant feeding determinants in Ghana (Oche, Umar & Ahmed, 2011; Hayter *et al.*, 2015). Further, the food security situation in Ghana also influences the choices of foods and the modalities of feeding employed by mothers/ care givers in feeding their children.

In Ghana however, there is very little literature on early infant feeding modality and the drivers of food preferences and feeding difficulties among children and how they impact their nutritional indicators. The findings of this study are the first in the study area, and will be very useful in making policy decisions in the areas of early infant feeding within the Ghanaian context and beyond



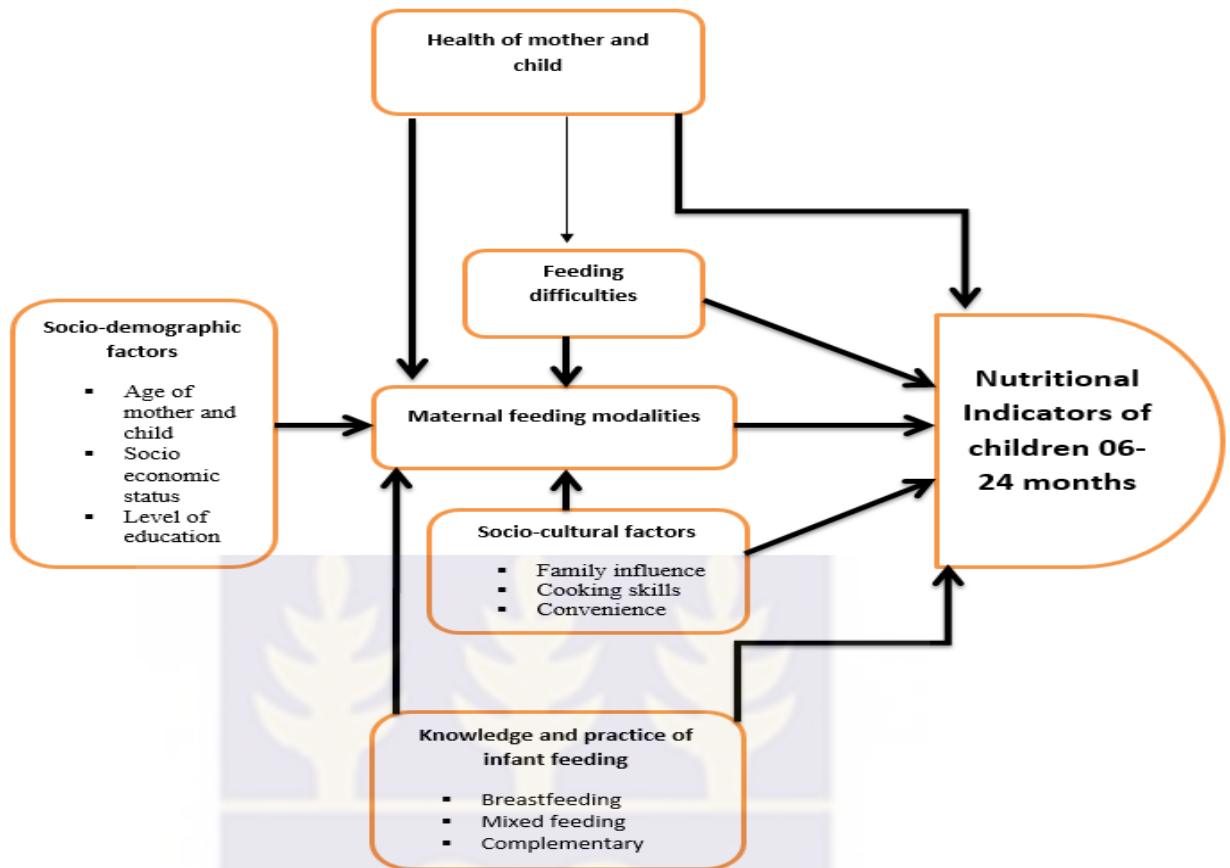


Figure 1: Conceptual framework on early infant feeding modality and the nutritional indicators of children aged 06-24 months

Source: Investigator (based on literature)

Feeding modalities among children 06-24 months can be influenced by socio demographic factors, maternal and child health, feeding difficulties and food preferences, cultural factors and knowledge and practice of infant feeding by mothers (Vereek *et al.*, 2011). Studies according to Bauer *et al.*, 2012 found maternal educational level, ethnicity and employment status to be very influential in how mothers choose to feed their infants. A study according to Cribbs and colleagues (2011), also found that low maternal education was associated with less healthy feeding practices as most of the unhygienic mothers are usually those without or with very little education.

Maternal cooking skills and abilities also determine what they cook at home and consequently what they feed their children and how they do it (Hayter *et al.*, 2015). The health of mother and child also affect the modalities they employ in feeding their infants (Ohly *et al.*, 2012). The knowledge and practices of infant feeding by mothers of breastfeeding and complementary feeding also affect the nutritional indicators of children (Agunbiade & Ogunleye, 2012). These factors together, work to influence early infant feeding modalities and consequently the nutritional indicators of children aged 06-24 months.

1.4 Justification Of The Study

Nutrition in the first 1000 days of life is very crucial for good child growth and development and greatly influences health outcomes in later life (WHO, 2016). Undernutrition, anemia, obesity, and dental caries have been found to be some of the problems associated with poor diets and feeding during childhood and turn to predispose children to impaired physical and mental development, obesity, diabetes and other non-communicable diseases in adulthood (Black *et al.*, 2011; Hyter *et al.*, 2015; WHO, 2016). Undernutrition is the major determinant of morbidities and mortality among children within this critical window period (Black *et al.*, 2008). A study by Abdollahi and his colleagues in 2011 revealed that food choices and feeding modalities for children under age 2 years could negatively impact their health and development.

Further, a study by Kabir and Khanam in 2012 also revealed that inappropriate complementary feeding practices have been shown to have negative implications on the health and growth of children in their first 24 months of life. Also, research has revealed that exclusive breastfeeding practices substantially, decrease the risk of diarrhea and mortality among infants (Lamberti *et al.*, 2011).

When breastfeeding is initiated within the first 24 hours of birth, it helps reduce neonatal mortality by 44-45% (Bhutta *et al.*, 2013). Studies in Ghana have shown that initiation of breastfeeding within the first hour of birth could reduce infant mortality by 22% and 16% if done within 24 hours of birth (Edmond, Zandoh, Quigley, Ameyya-etege & Li, 2007). The GDHS report for 2014 shows that the prevalence of exclusive breastfeeding and complementary feeding are far below the recommended coverage according to the WHO (GSS *et al.*, 2015) and this is due to the inadequacy of knowledge on appropriate early infant feeding approaches by mothers (Umar & Ahmed, 2011), causing them to base their decisions on feeding their infants on cost and convenience instead of health and nutritional benefits (Hayter *et al.*, 2015).

Suboptimal infant/ child feeding practices, coupled with high rates of infectious diseases, are the main causes of malnutrition during the first two years of life (PAHO/WHO, 2008).

Research has shown that additional 6% infant deaths can be prevented through appropriate infant feeding practices (UNICEF, 2008).

The Mamprugu-Moakduri district has several nutrition related intervention programmes which include: Routine Growth Monitoring and Promotion (GMP), Nutrition and Malaria Control for Child Survival Project (NMCCSP), Integrated Community Case Management (ICCM), Community Based Management of Acute Malnutrition Out Patient Care (CMAM-OPC) and Integrated-Sanitation, Hygiene and Nutrition for Education (I-SHAINE) which are currently on going, and it was expected that the impact of these programmes will cause a reduction in the current prevalence of undernutrition in the district but this actually was not the case.

This study specifically looked at exclusive breastfeeding prevalence, ages of introduction of solids to infants, feeding challenges at 06-24 months and the associations between early feeding modalities and feeding difficulties in the Mamprugu-Moakduri district. The study provides relevant information that will guide the design, implementation, monitoring and evaluation of nutrition-specific programs that could impact the lives of children positively.

1.5 General and Specific Objectives

1.5.1 General Objective

The main objective of this research was to assess early infant feeding modalities and the nutritional indicators of children aged 06 – 24 months in the Mamprugu–Moakduri district.

1.5.2 Specific Objectives

Specifically, the study;

1. Determined the prevalence of exclusive breastfeeding in the Mamprugu-Moakduri district.
2. Determined the age of introduction of solids to infants.
3. Identified child feeding difficulties at ages 06 to 24 months.
4. Determined the association between early feeding modalities and feeding difficulties

1.6 Research Questions

1. What is the prevalence of exclusive breastfeeding in the Mamprugu-Moakduri district?
2. What times do caregivers introduce solids to infants?
3. What are the infant/ child feeding difficulties at ages 06 to 24 months?
4. Are early feeding modalities associated with feeding difficulties?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction to review of relevant literature

In this chapter, literature on works done that are relevant to this topic are reviewed. Recommendations on current infant and young child feeding practices, knowledge, attitudes, beliefs and practices of mothers on infant feeding was examined as well as the current state of breastfeeding and nutritional indicators among children.

2.2 Review of relevant literature

2.2.1 Exclusive breastfeeding

This refers to the feeding practice whereby infants are only given breastmilk from their mothers or wet nurses, no other liquids or solids, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines (WHO, 2016).

Globally, from 2007 through 2014, 36% of infants were exclusively breastfed, the global prevalence appreciated to 43% in 2015 and dropped to 38% in 2016 (WHO, 2016).

In Africa, Asia and Latin America, 47-57% of children below 2 months are exclusively breastfed (Black *et al.*, 2008). Ghana has a long duration of breastfeeding as 98% of children at ages 9-11 months are being breastfed, 50% at ages 20-23 months and 52% are exclusively breastfed (GSS *et al.*, 2015).

There is a sudden decrease in exclusive breastfeeding from 65% at age 2 to 3 months to 39% at age 4 to 5 months. Nearly 6 percent of children aged 2 to 3 months and 32% of children aged 4 to 5 months are receiving complementary foods in addition to breast milk. This indicates that there are many infants who are at a higher risk of being exposed to

bacterial infection and poor quality foods, even if they started well with early initiation of breastfeeding (GSS *et al.*, 2009).

Children breastfed exclusively are still likely to become stunted if they do not receive adequate complementary feeding after the 6th months. After the period of exclusive breastfeeding, the demand for micronutrients to facilitate good and optimal growth and development increases and when good and optimal feeding practices are not done, the risk of undernutrition increases (Black *et al.*, 2008).

The immense benefits of exclusive breastfeeding prompted the UNICEF and WHO in 1992 to institute the Baby Friendly Hospital Initiative (BFHI) to reinforce maternal practices in supporting breastfeeding and currently setting a goal of reaching a worldwide target of 50% in exclusive breastfeeding within the first 6 months of life by 2025 (WHO, 2016).

2.3 Breastfeeding

The first natural food for babies is breast milk, it provides them with all the nutrients and energy they require for the first 6 months of life. It provides almost half of their energy and nutrient requirements after the first 6 months and up to a third of their energy and nutrient requirements in the second year (WHO, 2016).

Breast milk protects infants against infections and morbidities. It also reduces infant mortality, helps in quick recovery during illness. More so, it enhances sensory and cognitive development, adds to wellbeing and health of the mother, helps in spacing births, reduces the risk of ovarian and breast cancer among mothers and helps increase the family and national resources (WHO, 2016).

In Ghana, malnutrition (under nutrition) is manifested very early (0-59 months). Much of this problem can be associated with poor infant and child feeding practices, particularly, late initiation of breastfeeding (GSS *et al.*, 2015).

Suboptimal breastfeeding contributes to 800000 infant deaths globally, every year (WHO, 2016)

2.4 Exclusive breastfeeding trends in Ghana from 1988 to 2014.

Data from the GDHS indicate that in 1993, 2% of Ghanaian children aged 4-6 months were exclusively breastfed, this increased to 36% in 1998 and 53% in 2003. In 2008, the prevalence of exclusive breastfeeding stood at 63% and this was attributed to the Baby Friendly Hospital initiative that was being implemented within the country, but there was a drop in prevalence from 63% in 2008 to 52% in 2014. Averagely, the prevalence of breastfeeding among Ghanaian mothers has always been above 97% since 1988 to 2014 (GSS *et al.*, 1988, 1993, 1998, 2003 and 2015)

2.5 Age of introduction of solids to infants

Studies have shown that infants have ease of acceptance to solids at some specific stages in their growth and development (Harris, 1993), these are usually called the “sensitive periods” of development (Cashdan, 1994). During such periods, their experiences with certain foods usually turn to impact very strongly, lasting impacts, and may turn to determine the development of their food preferences/ choices later in life. Existing literature has not exhaustively with the “sensitive periods”, but finds of recent studies are beginning to shed more light on that. For instance, the introduction of textured foods by 6 months turns to affect dietary choices and food fussiness in later life (Coulthard, Harris, & Emmett, 2009, 2010). A study by Coulthard and his colleagues in 2009 revealed that infants who were offered solid foods after 9 months turned to consume less fruits and vegetables and developed feeding problems at 7 years compared to those who were fed with those foods at 6 to 9 months (Coulthard *et al.*, 2009).

Another body of literature reveals that babies appear to accept novel flavours early in life, thus exposure to a protein hydrolysate formula (characterized by a relatively bitter taste) improves acceptance if offered before 3.5 months when there appears to be a “window” after which this taste is rejected (Mennella, Lukasewycz, Castor, & Beauchamp, 2011).

As a result of the dynamics that come with the physiological and/or psychological development of infants, one or more specific windows periods may lead to easier acceptance of solid foods, and eventually more sustained food preferences (Beauchamp & Mennella, 1998). However, the consequences of the timing of onset of solids on eating behaviours and acceptance are not well documented (Przyrembel, 2012) since most investigations turn to focus attention on the nutritional consequences of the cessation of breastfeeding.

The timing for the introduction of solids to infants is very crucial in a child’s life because of the opportunity it offers for them to be able to accept and manage other foods in later life and also the significant impact it has on their nutritional indicators. The ages below six months, 6-9 months and after 10 months are the age categorizations within which solid food introduction are critical.

A study by Northstone and his colleagues in 2011 revealed that infants who were introduced to solids earlier turned to consume a greater variety of family foods at 6 months, while those who were introduced to solids at 10 months or older, were given fewer solids of all types by 6 months of age and those introduced at 15 months had a less likelihood of consuming family foods compared to those that were introduced at 6 to 9 months. At each age, those introduced late (10 months and above) to solids turn to have more difficulty feeding and usually turn to have definite likes and dislikes.

2.6 Complementary feeding

This is the feeding modality of giving other foods alongside with breastmilk, when breastmilk is no longer sufficient to meet the nutritional requirements of the child. The addition of family foods to exclusive breastfeeding is referred to as complementary feeding and starts at six (6) months through twenty-four (24) months of a child's life.

Childhood malnutrition rates rise significantly at the 6th month when complementary foods are being introduced in most parts of the developing countries (Dewey, 2006). Complementary feeding should be introduced at the right time; infants ought to receive other foods in addition to breastmilk from six months onwards, which should be adequate, i.e. the nutritional value of the foods should parallel at least that of breastmilk. Foods should be prepared and given in a safe manner to reduce the risk of pathogenic infections. Therefore, the foods should be given in an appropriate texture and in sufficient quantity (WHO, 2010). The adequacy of complementary feeding is not only dependent on the availability of a variety of foods in households, but also on the feeding practices of care givers (UNICEF, 2008).

A combination of active care and stimulation is required to feed children. Thus, care givers should be responsive to the child's cues of hunger and encourage the child to eat. This is termed active or responsive feeding.

WHO recommends that infants start receiving complementary foods at six months in addition to breastmilk with feeding frequencies of 2 to 3 times a day for 6 to 8 month olds and increasing to 3 to 4 times daily for 9 to 11 and 12 – 24 month olds, with additional nutritious snacks offered at least once in a day.

2.6.1 Benefits of optimal complementary feeding

Optimal feeding during the critical window period is very crucial as it fosters good health outcomes and promotes improved development predominantly in the first 2 years of a child's life. The Global IYCF Strategy is intended to protect, promote, and support appropriate infant and young child feeding. Ghana has adapted and implemented this comprehensive strategy as it consists of actions to increase awareness through counseling and promote adequate complementary feeding.

The complementary foods commonly used in Ghana include foods from grains and cereals, fortified baby foods, fruits and vegetables rich in vitamin A and roots and tubers. Protein-rich foods such as legumes and meat, fish, nuts and poultry enhance better health outcomes and turn to reduce growth faltering and intermittent sickness among children (GSS *et al.*, 2015).

2.6.2 Timeliness of complementary feeding

There are public health concerns about the low rates and early cessation of breastfeeding even though exclusive breastfeeding and appropriate complementary feeding are recommended (WHO,2007). The pervasive effect of giving water to infants alongside breast milk begins on the day of birth in most Ghanaian settings (Davis *et al.*,2006). This has subsequent adverse implications on health, economic and social well-being of women and their children, the society and the environment at large. It also results in higher cost for attaining health care thereby widening the inequality gap. There are usually issues on pre-lacteal foods/drinks, early weaning, early introduction of complementary foods, low nutrient quality and quantity of foods, and unhygienic practices all associated with child feeding. It was also reported in the GDHS study (GSS *et al.*,2004) that some mothers believed they were

unable to produce adequate breast milk for their babies. For such mothers, the immediate solution was early introduction of complementary foods and drinks before the 6 months which is the recommended duration for exclusive breastfeeding. In addition, mothers/caregivers who are engaged in economic activities do practice early weaning in order to increase their productivity level and to secure their positions at job (Davis *et al*, 2006).

Cultural barriers are also common in most societies. For instance, water/herbs are given to the new born as a sign of welcome into the human world. This practice is strongly in conflict with the international recommendations on exclusive breastfeeding and complementary feeding guidelines. Notwithstanding this challenge, there is significant improvement over the years with respect to breastfeeding and complementary feeding even though, the achievements in this line varies across different countries, regions and communities. A body of knowledge reviews that the optimal early infant feeding is not only dependent on what is fed, but also on how, where, when and by whom the child is fed. In a study, 62.0% of the children were given complementary foods before the age of 6 months (Gupta *et al*, 2007), 16% were classified as having wasting and 20% were stunted. Data from the 2008 Ghana Demographic and Health Survey show that at the age of 6-9 months, more than 70.0% of the breastfeeding infants received solid foods in the 24 hours before the survey. The majority (53.0%) consumed food made from grains, 29.0% received fruits and vegetables, and 21.0% received animal products. Foods rich in vitamin A were consumed by only 24.0% of breastfeeding infants' 6-9 months, and fats by only 8.0%. In the same study, children aged 20-23 months old consumed grains, fruits and vegetables and foods rich in vitamin A at proportions of 84.0%, 62.0%, 53.0% respectively by the majority of breastfeeding children (GSS *et al.*, 2004). Overall, 63

percent of children under 6 months are exclusively breastfed, which is far less than the 100 percent recommended. In alongside breastmilk, 3 percent of children under 6 months are given other (non-breast) milk, 17 percent are given water, less than 1 percent are given non-dairy liquids products, and 17 percent are given complementary food in the form of solid or mash food. Again, majority (75.0%) of the infant's age 6-9 months were fed solid foods in addition to breast milk, and 1.0% of infants were completely weaned (GSS *et al.*, 2009; MDHS, 2004).

A good proportion of Ghanaian mothers would prepare foods for their children eat while a few will delegate childcare responsibilities. Complementary feeding when delayed within the second half of infancy could be problematic as was reported in a study in Ethiopia.

2.6.3 Knowledge, beliefs and practices on complementary feeding.

Knowledge and perceptions and sociocultural beliefs influence food behaviors to varying extents, except for severely constraint economic circumstances. The nutritional status of mothers and infants to a large extent is determined by, the socio-cultural factors of their communities particularly the knowledge, attitudes, beliefs, norms and customs (Awumbilla, 2003).

Aside the fact that beliefs and practices regarding infant feeding vary from society to society, literature on this aspect of infant feeding is little.

2.7 Feeding challenges associated with infant/ young child feeding

Feeding challenges refer to conditions that turn to negatively affect the feeding of infants or young children which in the long run affect their growth and development negatively and also their nutritional status. Feeding challenges are usually prevalent at two different levels which include the maternal level and the child level. At the maternal level sore

nipples, mastitis, breast engorgement mothers state of health (HIV status) are some of the factors that turn to pose challenges to infant feeding (WHO, 2009). Feeding difficulties at the level of the child which turn to affect infant/ child feeding also include health of the child; whether child has cleft lip or palate, tied-tongue, muscular weakness or congenital heart disease (WHO, 2009). Longer feeding time (over 30 minutes), excessive drooling, allergies to certain food substances, vomiting, spitting, chewing problems, refusing food and water, refusing different textures of foods, fussiness or lack of attention and picky eating among others are also some of the feeding challenges that turn to affect infant or young child feeding (UNICEF, 2013).

2.8 Early infant feeding modalities

2.8.1 Exclusive breastfeeding

Exclusive breastfeeding is the feeding modality whereby the infant is given nothing in addition to breast milk except drops/ syrups, vitamin, minerals or medicines. Exclusive breastfeeding is recommended for the first six months of life for optimal growth, development and good health (WHO, 2016).

A systematic review of current scientific evidence of exclusive breastfeeding duration revealed that exclusive breastfeeding for the first six months is protective against gastrointestinal infection and hence can help protect against diarrheal infections in resource poor settings (WHO, 2001). A body of knowledge from reviewed evidence has also shown that exclusive breastfeeding for the first six months is the optimal way to feeding infants on a population basis (WHO, 2016). The UNICEF and WHO recommend that babies should be initiated to the breast within the first hour of birth, to enable mothers establish and sustain exclusive breastfeeding.

Globally, an estimated 40% of children are breastfed exclusively for the first six months of life and this has since some increase from 33% in 1995 through 2015(WHO, 2016). Exclusive breastfeeding rate in Ghana stands at 52% and this has also seen a very significant appreciation from 2% in 1993 through 2014 (GSS *et al.*, 2015)

2.8.2 Mixed feeding

This is a feeding modality whereby the baby is fed with breast milk and other liquids; this feeding modality usually turns to affect the production of breast milk since the frequency of suckling which determines the level of production is usually interrupted by the other liquids. Mothers usually mix fed for reasons such as; distresses about baby's weight gain, breast milk supply and concerns about breastfeeding in the open and pressure from work. Small percentages (about 5%) of mothers are unable to produce enough milk to exclusively breastfeed their babies for the first six months of life (National Health and Medical Research Council, 2012). Research has revealed that introducing formula during the first six weeks when the mother's body is still establishing its milk supply can cause the supply of breast milk to decrease even to the point of weaning, open the baby's system and gastrointestinal tract to inflammation, illness and diseases and cause babies to turn to prefer the bottle teat to the breast (UNICEF, 2013).

2.9 Childhood underweight, stunting and wasting

In 2005, 20.0% of children younger than 5 years of age in low and middle income countries were underweight. The prevalence was highest in south-central Asia and eastern Africa where 33.0% and 28.0%, respectively, were underweight. An estimated 32.0% of children younger than 5 years of age in low and middle income countries were stunted. Eastern and middle Africa has the highest prevalence estimates where 50.0% and 42.0%, respectively,

were stunted. Globally, 55 million (10.0%) children under 5 years are wasted (low weight-for-height).

The highest prevalence is found in south-central Asia where 29 million children are wasted. An additional 19 million children in the world are severely wasted, a description often used to determine the need for urgent lifesaving actions, including therapeutic feeding (THE LANCET

1001UN Press Release issued by Tony Kirby, 17/01/2008). Together, stunting, severe wasting and IUGR are responsible for 7.0% of the total disease burden for any age group, making these conditions the highest of any risk factor for overall global disease burden. Among micronutrient deficiencies, vitamin A and zinc are the greatest contributors to disease burden because of their direct effects on child health.

2.10 Care for maternal and child health

Across the developing world, women play key roles in maintaining household food security and in caring for children on a day-to-day basis, both of which are extremely important factors influencing a child's nutritional status. Women in Ghana, depending on the region, are often highly involved in food production and acquisition, thus boosting food security in the household and nation as a whole. Right from childbirth, breastfeeding can only be carried out by women; they are naturally the primary caregivers at the beginning of a child's life. Women are those who most often feed, bathe children, seek health care when they are sick, protect them from exposure to danger, and support their cognitive and social development. Given these key roles, women's knowledge and abilities and their own physical well-being and decision-making power are crucial to children's nutrition. In many communities, majority of women are not part of the decision-making process including

things which affect their own lives such as seeking of medical care, food intake and control of property.

These and other discriminations against women predispose them to inadequate access and control of the available household and community resources. The quality of the health environment, such as water cleanliness, sanitation, and access to health services, is also known to be a prime determinant of children's nutrition (UNICEF, 2011).

2.11 Maternal education

Maternal education is related to knowledge of good child care practices. This is also translated to household wealth. The majority of women globally have limited access to formal education which accounts for high prevalence of illiteracy. It then means that they are unable to compete for certain jobs and their productivity is low generally. The Ghana Statistical Service and others in 2008 reported that 21% of women have never been to school, 15 percent have some primary education, 6 percent completed primary education, 45 percent have some secondary education, 10 percent completed secondary school, and 4 percent have attained more than secondary education. Stunting and underweight were low in children whose mothers had some level of education. Nonetheless, there is no difference in the level of wasting between children of mothers with no education compared with children of mothers with primary education and secondary or higher education (Malawi Demographic and Health Survey, 2004).

However, the percentage of malnourished children decreases with increasing level of mothers' education. About a third of children whose mothers have no education are stunted or underweight (Ghana Statistical Service *et al.*, 2003). The findings of a study in Malawi, 2004, found no relationship between mother's educational status and maternal under nutrition. Malnutrition among mothers is likely to have a major impact on their ability to

care for themselves and their children. The MDHS 2004 survey documented that 8% of the women with children less than five years of age were undernourished with BMI<18.50kg/m². The results of another study (Arimond *et al.*, 2002) showed the following prevalence of mother's education: never attended school (76.0%), had some primary education (15.0%) and had some secondary education (9.0%). Differences in maternal education are particularly relevant to childcare and feeding: 38.0% of urban women reported no education as compared to 84.0% of rural women. Use of baby bottles - a practice known to dramatically increase the risk of infectious diseases among infants and young children in developing countries - is high among both urban 38.0%, and rural 15.0% infants 6 months or younger (Arimond *et al.*, 2002).

2.12 Summary of literature review

Suboptimal feeding practices and inadequate nutrient intake are the basic factors that turn to determine the nutritional status of infants (Kerack, 2007).

The practice of giving local herbs to children during the tender age is an act that was revealed during the course of the research, and this is done under the pretext that, it performs medicinal roles in the life of the infant during its formative ages. There is little or no literature on this subject, but this research has unearthed that this practice is actually in existence.

Literature reviewed to support this work; particularly the study objectives and variables have helped in streamlining the focus of the study and contributed immensely to the attainment of the results/findings of this work. Hygienic practices of mothers on infant feeding was not an objective of the study, but a study was done into it to ascertain the level to which hygiene is practiced at home to offset the incidence of diseases during the vulnerable ages of the infant (0-59 months). In a nut shell, the literature reviewed to

support the work took an in-depth look into the issues surrounding infant feeding right from birth through to the time complementary foods are introduced and how all these influence the nutritional status of the infant.



CHAPTER THREE

3.0 METHODOLOGY

3.1 Introduction

This section of the study presents the study design, subjects used for the study, techniques for sampling subjects, sample size, methods for data collection and tools and the analysis of the data. The ethical issues/considerations and quality control issues regarding the study are also highlighted in this section.

3.2 Study site

The Mamprugu Moakduri District was carved out from the West Mamprusi District, and inaugurated on 28th June, 2012 with Yagaba as its district capital. The district lies within longitudes 0°35'W and 1°45'W and Latitude 9°55'N and 10°35'N. It is bounded by Upper East and Upper West Regions. It shares boundaries with North Gonja District in the West, Kunbungu District in the South, Sisala East in Upper West Region, Builsa South in Upper East Region and West Mamprusi District in the Northern Region.

The District lies within the savannah climatic belt with single maximal rainfall regime, average annual rainfall is between 1000mm and 1400mm. The rains occur between May and October. July to September is normally the peak period. Floods occur during the peak period, after which there is a prolonged dry season from November to April. Temperatures are generally high all year round with the hottest month being March. Average monthly temperature is around 25.50 degree Celsius. Whiles in the rainy season there is high humidity, sunshine with heavy thunder storms, the dry season is characterized by dry harmattan winds from November- February and high sunshine from March-May.

The district has a total of 46 communities, about 99% rural and 1% urban. The district is made up of mostly dispersed settlement pattern and few nucleated and linear patterns in the towns.

The district has an estimated population of 153,329 with an annual growth rate of 3.1% (CWSA, 2014) report. This is made up of 73,598 males (48%) and 79,731 females (52%).

The main ethnic groups in the district include Mamprusi, Kantonsi, Komma and the Builsa. Fulanis are also resident in the district. Farming is the main occupation of the people, providing about 80% employment for the work force. The district has 26-day care centres, 33 primary schools, 12 Junior High Schools and 1 Senior High School located at Yagaba. The senior high school is an infant one with serious infrastructural problems.

The district also has 5 health centers all of which are public, 7 CHPS compounds and 4 demarcated CHPS zones with a very high people to a health center ratio of over 22,000.

3.3 Study design

The study was community based and used cross-sectional study design which collected data from participants using a structured questionnaire.

3.4 Study population

Mothers who had children aged 06-24 months and living in the Mamprugu-Moakduri district were the subjects of study. The mothers were interviewed and anthropometric data of their children taken.

3.5 Inclusion criteria

All mothers with children aged 06-24 months in the Mamprugu-Moakduri district were eligible for study.

3.6 Exclusion criteria

Children aged 06-24 months in the district who were sick at the time of the study with diseases that could affect nutritional status were excluded from the study. Also, children who were not permanent residents of the district but were living in the district at the time of the study were excluded from the study.

3.7 Sampling

Multistage sampling technique was used. One of the sub-districts was randomly selected from the four sub-districts in the district. One community (Kunkwa) from within the selected sub-district was randomly selected.

All houses in the selected community were assigned numbers and out of the assigned numbers a random number generator was used to generate 422 numbers from the total number of houses in the selected community. The randomly selected houses were visited for prospective study participants. In cases where there was more than one eligible child in a compound, one of them was randomly selected by a yes/no balloting. If a selected household did not have an eligible participant, the next household was visited.

3.8 Sample size determination

In Ghana, just about 13% of children within the age brackets of 06-24 months meet the minimum standards of three core infant and young child feeding (IYCF) practices (GSS *et al.*, 2015). Also, only 52% of children younger than 6 months of age are exclusively breastfed (GSS *et al.*, 2015). Using the 52% prevalence of exclusive breastfeeding with 5% margin of error, the sample size is calculated as follows:

$$\text{Sample size, } n = z^2 pq/d^2$$

$$Z = z\text{-score of the confidence level (95\%)} = 1.96$$

$$\text{Desired precision} = 0.05$$

N (calculated sample size using prevalence of exclusive breastfeeding, $p = 0.52$)

$$N = (1.96)^2(0.52)(0.48) / (0.05)^2$$

$$N = 383.5$$

This gives a sample size of 383.5

Adjusting for 10% recording errors and non-response to specific questions gave a sample size of 422. Therefore 422 mothers / care givers were interviewed and the anthropometric measurements of their children taken.

3.9 Data collection

Quantitative data were collected by administering structured questionnaire to mothers/care givers to ascertain information on the prevalence of exclusive breastfeeding, complementary, early infant feeding challenges at age 06-24 months, breastfeeding duration, ages of introduction of solids to infants either too early (before 6 months) on time (6-9 months) or too late (10 months and after) and feeding difficulties at ages 06 to 24 months. Anthropometric measurements were taken using the UNICEF electronic scales and infantometers to measure weight and height/lengths respectively to compute the nutritional indicators of the children. Weights were measured by hanging the children in weighing pants and taking the readings in kilograms and correct to one decimal place. Height/ lengths were measured by putting the children on the infantometers and ensuring that their backs, buttocks and heels touch the board, their heads were made to touch the head board and the leg board pushed to touch the feet of the child and the readings taken with the Frankfort being positioned at 90 degrees. The readings were done in centimeters.

3.9.1 Questionnaire

Structured questionnaires were administered to 422 participants. The questionnaire was made up of both open and close ended questions some of which were adopted from the GDHS 2015 children's questionnaire and the MICS 4 children's questionnaire.

Questions on the questionnaire were under the following heading; background/demographic characteristics, knowledge and practice of exclusive breastfeeding, feeding challenges at age 06-24 months, and timing of complementary feeding.

Demographic/ background characteristics of mother

The age, ethnicity, educational level, religion, employment status, monthly income and marital status of mothers were recorded.

Anthropometric measurements

The ages, weights and heights of children were recorded. Age was recorded in months, heights in centimeters (cm) and weight in kilograms (kg). The UNICEF electronic weighing scales were used to measure the weights of the children and recorded to two decimal places and the UNICEF infantometers were also used to measure the lengths of the children and recorded to one decimal place.

Breastfeeding practices

Mothers were asked if their children received any items aside from breastmilk during the first 6 months of life. This question attracted a "yes or no" answer. This was done to assess the knowledge of mothers on exclusive breastfeeding. Their views on exclusive breastfeeding were assessed by asking them questions on how long after birth the child was introduced to the breast, how often a child breastfeeds during the day light hours and also during the night and also when they (mothers) think a child should be given other foods

aside from breastmilk and for how long a child should be made to breastfeed before it is weaned.

The prevalence of exclusive breastfeeding was determined by asking mothers/caregivers when they introduced other foods to their children soon after birth. Responses to this question ranged from before 6 months to “I don’t know”.

Mothers’ views about optimum breastfeeding were also sought. Responses to this question also range from less than 6 months, 6 months, 6-12 months, 12-18 months and 18 months and over. Frequency of feeding ascertained by asking mothers how often they breast feed their children during the day and during the night. Responses were either “on demand or I don’t know”.

Age of introduction of solids

Mothers were asked when during the life of the infant/ child solid foods were first given to the infant or child. This question had answers which were ages of children put into month categorizations of less than six months, between 6-9 months and after 10 months.

The ages when solids were introduced to the infants/children were then determined by running frequencies of the responses that were given by the mothers.

Feeding challenges

Feeding challenges were assessed by asking mothers if they encountered the following challenges feeding their children;

- ✓ Excessively longer feeding times (operationally defined as 30 minutes and beyond).
- ✓ Chewing problems.
- ✓ Refusing different textures of foods.
- ✓ Fussiness or lack of alertness during feeding.

- ✓ Refusing to eat and drink food and water.
- ✓ Spitting up.
- ✓ Food allergies.
- ✓ Vomiting.
- ✓ Excessive drooling.

Each of the above quires attracted a “yes or no” answer.

Complementary feeding practices

Complementary feeding was assessed by asking mothers how soon after birth they gave solid foods to their children. Responses will range from “between 3-5 months”, “on the 6th month” and “7-8 months”.

Mothers were made to mention the types of foods they started giving to their infants as complementary foods and this ranged from porridge, fruit juices, rice, banku, Tou Zaafi (T.Z) to yam and other hard foods.

The 24-hour dietary recall approach was done to ascertain the types of foods, feeding frequency and nutrient density of foods given to infants and the preferred foods infants choose to feed on.

Adequately fed children were defined as children aged 06-24 months meeting three basic feeding adequacy thresholds:

- ✓ Was fed complementary foods, at least three times in the last 24 hours,
- ✓ Was fed from at least three food groups, and
- ✓ Received breast milk in the last 24 hours.

The food groups that were considered in the above definition included:

1. Animal source foods
2. Beans and nuts

3. Fats and oils
4. Milk and milk products
5. Tubers
6. Cereals, and grain-based foods
7. Fruits and vegetables.

3.10 Training of enumerators and supervisors

The training of enumerators and supervisors was done over a four-day period. They were retrained on how to use the UNICEF's infantometers to measure the lengths of children and also how to measure weights using the UNICEF's electronic scale and how to read and record anthropometric data. This was over a three-day period including lectures, translation of questions into (Mampruli, Kantonsi, Komma and Builsa), and equipment demonstrations. This was concluded with a day of practical exercise in the measurement of height and weight of infants and children. Eight (8) community health nurses and two nutrition officers were recruited and trained as field enumerators and supervisors for the study.

3.11 Pre-testing

The tools for data collection were pre-tested in Sakogu, a community that shares similar characteristics with almost all the communities in the study district. It is located in the East Mamprusi district, northern region, Ghana. It is a multitribal community of Mamprusi, Dagomba, Hauza and several other ethnic groups that can be found in the Mamprugu-Moakduri district. This afforded the opportunity for any necessary corrections in the questionnaire and other data collection tools to be made before the actual study was conducted.

3.12 Quality assurance

The following measures were put in place to ensure data quality and validity of finding from the study:

- ✓ Community health nurses and nutrition officers were used for the data collection since they had good and essential background in child health and nutrition.
- ✓ Field enumerators were made to review each questionnaire after every single interview before leaving the household or compound where it was administered.
- ✓ At the end of each day of fieldwork, the supervisors reviewed each questionnaire for accuracy and legibility.
- ✓ Field enumerators were made to return to survey households in cases where missing data or other problems were observed to correct any errors.
- ✓ Questionnaires with errors were excluded from the study.
- ✓ Questionnaires were numbered (e.g. 1, 2, 3...) to prevent double entry of data during data processing.

3.13 Variables

The main dependent variables of the study were nutritional indicators of children aged 0-24 months. The nutritional indicators of children were assessed using anthropometric measurements of height-for-age (stunting), weight-for-age (underweight) and weight-for-height (wasting). These were done using the World Health Organization (WHO) child growth reference standards. A child was considered stunted, wasted or underweight if their respective heights-for-ages; weights-for-heights and weights-for-ages were less than -2 standard deviations from the median of the reference sample and severely stunted, wasted or underweight if their respective heights-for-ages; weights-for-heights and weights-for-ages were further than -3 standard deviations from the median of the reference sample.

The independent variables included;

- ✓ socio-demographic factors e.g. age, ethnicity, employment status of mother, educational level of mother and socio-economic status
- ✓ Breastfeeding e.g. Exclusive breastfeeding.
- ✓ Breastfeeding duration e.g. Less than 6 months, 6-9 months, 10-18 months or more.
- ✓ Feeding challenges e.g. longer feeding time, excessive drooling, chewing problems etc.
- ✓ Timing of complementary feeding e.g. (too early/ before 6 months) on time (6th months) too late (7-8 months).

3.14 Data processing and analysis

Data gathered from interviews were entered into MS excel 2010 and exported into SPSS version 22.

The data were cleaned by running frequencies for all variables to identify errors and missing values. The quantitative data was analyzed using SPSS version 22. Key variables in the data were transformed into categorical or dichotomous variables.

Variables that were categorized included; age, religion, educational level, ethnicity, marital status, occupation and income.

Nutritional status of children was measured using HAZ, WHZ and WAZ and was calculated using the WHO Emergency Nutrition Assessment (ENA) software. HAZ, WHZ and WAZ are continuous variables and were categorized into normal height-for-age, stunted or severely stunted, normal weight-for-height, wasted or severely wasted and normal weight-for-age, underweight or severely wasted.

A child whose HAZ was below minus two standard deviation (-2 SD) from the median of the reference population was considered stunted. A child whose z-score was below minus three standard deviation (-3 SD) was considered to be severely stunted.

A child whose WHZ was below minus two standard deviation (-2 SD) from the median of the reference population was considered wasted. A child whose z-score is below minus three standard deviation (-3 SD) was considered to be severely wasted.

A child whose WAZ was below minus two standard deviation (-2 SD) from the median of the reference population was considered underweight. A child whose z-score was below minus three standard deviation (-3 SD) was considered to be severely underweight.

HAZ was further dichotomized into normal and stunted height-for-age, WAZ into underweight and normal and WHZ into normal and wasted.

Univariate analysis was done to generate descriptive tables for socio-demographic characteristics of respondents, food choices for children, feeding practices, knowledge on breastfeeding, feeding difficulties and nutritional indicators of children.

Bivariate analysis was done to determine associations between outcome variables and selected independent variables. The key outcome variables, feeding practices (exclusive breastfeeding, mixed feeding, nutritional indicators) were assessed independently against background characteristics and the factors that influenced food choices.

Nutritional indicators (stunting, wasting and underweight) were assessed with feeding practices. Pearson chi-square statistic was used to determine explanatory variables that are statistically significant that is those with $p < 0.05$.

Simple and multiple logistic regression modeling were used to determine crude and adjusted associations between the outcome variable and the independent variables. Odds ratios with accompanying 95% CI were used to assess the strength of relationships.

A multiple logistic regression model was developed for selecting variables that showed significance at $p < 0.25$. All variables that showed significant association with the outcome variables were entered into this model to generate a full model in a single step.

3.14 Ethical considerations

To conform to local and international research ethics standards, ethical clearance was obtained from the Ghana Health Service Ethical Review Committee. A Letter was sent to the opinion leaders of the selected community explaining in detail the objectives of the research with attachment of a copy of the letters of clearance from Ghana Health Service Ethical Review Committee before conducting the study. Detailed explanations of the objectives of the research were read to respondents for them to understand before choosing to partake in the study or otherwise before data were collected from them. Informed consent of participants was sought by orally communicating to them in their local dialects the intent of the study and if they agree to participate, they were made to sign or thumbprint on the consent form before they were interviewed.

3.14.1 Study Procedures

The aim of the study was explained to all study participants. Individual written consent was sought from each participant before they took part in the study.

3.14.2 Confidentiality

Participants were assured of confidentiality and data security throughout the study with regard to all information taken from them. All information pertaining to participants remained anonymous and confidential. Data collected were protected and secured and only assessable to the Principal Investigator and the supervisor.

3.14.3 Conflict of interest

The Principal investigator had no conflict of interest in the study and hence no compensation of any form was given to study participants.

3.14.4 Right to refuse

Participants were informed that participating in the study was voluntary and they reserved the right to decline or withdraw from the study if they wished.

3.14.5 Potential risks and benefits

Participants were not given any material benefits but will be educated on the relevance of the study and how it will help in developing and implementing good nutrition interventions to promote child nutrition and health in the district. There were minimal risks associated with the study. The study might have posed some inconveniences to participants especially in terms of the time spent in answering questions and invasion of privacy. Participants were however not obliged to answer all questions provided they felt uncomfortable with a question.

3.14.6 Informed consent

Informed consent was sought from participants before they took part in the study. The study procedures were explained to them in languages they understood. They were informed participation is optional and they reserved the discretion to participate or not and could also decline question they were uncomfortable with. Participants were required to sign or thumbprint the consent form to indicate willingness to participate.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This chapter presents the key findings of the study in the Mamprugu-Moakduri district. The results include; the background characteristics of respondents, breastfeeding practices, timing of initiation of solids to infants/ children, complementary feeding practices, feeding challenges at age 06-24, food preferences of children at 06-24 months and their nutritional indicators.

4.2 Background and socio-demographic characteristics of respondents

A total of 422 women with their children were interviewed during the survey. The mean age of mothers was 27.5 years within the age range of 15 to 44 years. Majority of the respondents were in the age ranges of 25 to 29 years constituting 30.6% of the total respondents. This was closely followed by the age group 30 to 34 years (107, 25.4 %). 14 (3.3%) of the respondents were within the age ranges of 40- 44 years.

Majority of the respondents were Muslims as 85.3% belonged to the Islamic religion, this is followed by Christians (14.2%) and traditionalists (0.5%).

About 93.6% of the respondents were married, 0.9% were widowed, separated or divorced and 5.5% were single or never married.

42.9% had completed attained basic education (primary school, JHS or middle school)

Majority of the respondents were unemployed (96.7%). The main occupation of the people is farming with 58.1% of the people being farmers, 18.2 % being traders, 3.3% being service workers, 2.8% being sheabutter extractors, 1.7% being rice processors, 4.5% being craft workers and 11.4% not doing any form of work at all.

The dominant ethnic group was Mamprusi (80.1%) followed by Builsa (12.6%), followed by Kantonsi (4.5%). Fulanis constituted 1.9%, Komma constituted 0.2% and the other minority tribes like Dagomba, Gonja and Bimobas (1.9%)

The monthly income of respondents ranged from 20 cedis to over 500 cedis. Most of the respondents were within the range of more than 50 cedis to 100 cedis (163, 38.6%).

The mean age of the children who were involved in the study is 12.8 months within the age ranges of 6 to 24 months. Majority of the children were in the age ranges of 6 to 8 months constituting 31.8% of the total respondents. This was closely followed by the age group 12 to 17 months (122, 28.9 %) with 15% being the least within the age ranges of 9- 11 months as seen in table 1 below from the field survey.

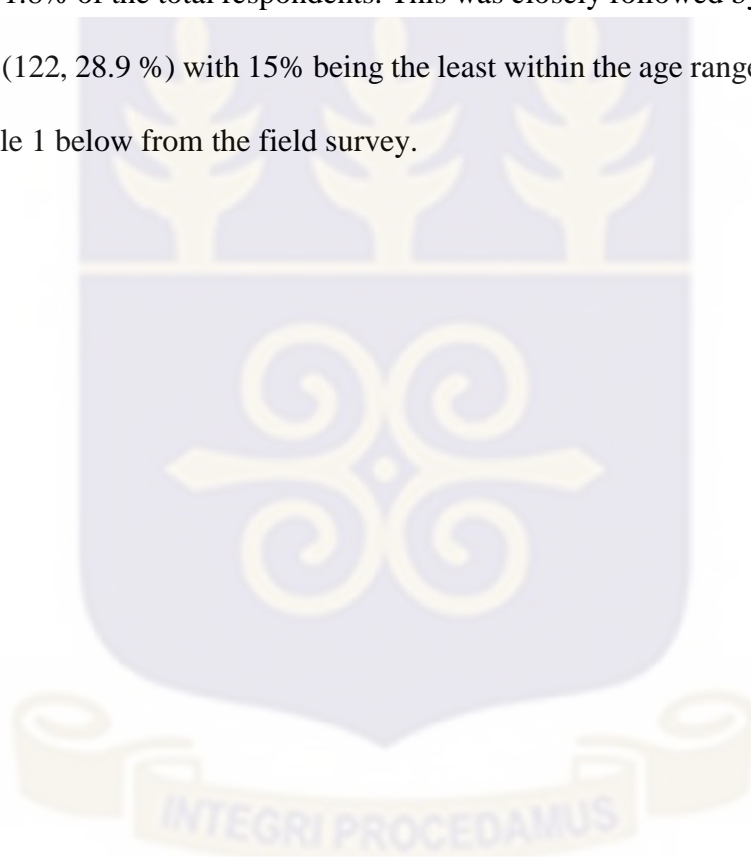


Table 1: Background and socio-demographic characteristics (n=422)

Background characteristics	Frequency	Percent
Age of respondent		
15-19	29	6.9
20-24	105	24.9
25-29	129	30.6
30-34	107	25.4
35-39	38	9.0
40-44	14	3.3
Marital status		
Single	23	5.5
Married	395	93.6
Widowed	4	0.9
Religion		
Christian	60	14.2
Islam	360	85.3
Traditional	2	0.5
Educational level		
Primary	78	18.5
JHS/ Middle school	70	16.6
SHS/O' level	26	6.2
Tertiary	4	0.9
None	244	57.8
Occupation		
Salary worker	14	3.3
Sheabutter extraction	12	2.8
Rice processing	7	1.7
Farming	245	58.1
Craft working	19	4.5
Petty trading	77	18.2
Not working	48	11.4
Ethnicity		
Mamprusi	338	80.1
Builsa	53	12.6
Komma	1	0.2
Kantonsi	19	4.5
Fulani	3	0.7
Others	8	1.9
Monthly income		
20-50 cedis	99	23.5
>50-100 cedis	163	38.6
>100-500 cedis	154	36.5
>500 cedis	6	1.4
Age of child		
6-8	134	31.8
9-11	64	15.2
	39	

12-17	122	28.9
18-24	102	24.2

4.3 Breastfeeding practices

This section presents data on the responses of the 422 mothers on breastfeeding with children aged 06-24 months who were involved in the study. These are as shown in Table 2 below.

A little over 65% of the mothers initiated breastfeeding within the first one hour of birth, 19.7% initiated breastfeeding within 2-6 hours after birth and 14.9% initiated breastfeeding the next day after birth. Almost all 98.6% of the mothers who participated in the study were still breastfeeding.

Mothers could not tell how often they breastfed during the day light hours and during the night. During the day, 78.7% of the mothers reported breastfeeding on demand and 21.3% did not know the number of times they breastfed.

During the night, 88.9% of the mothers also reported breastfeeding on demand while 11.1% did not know how many times they breastfed during the previous night.

All mothers who took part in the study had breastfed their children before 422 (100%).

The study revealed that none of the mothers who took part in the study practiced exclusive breastfeeding.

Average, mothers in the district breastfed their babies for 27 months before weaning them. This could be seen as presented in table 2 below.

Table 2: Breastfeeding practices (n=422)

Variable	Frequency	Percent
Breastfeeding status	422	100.0
Initiation of breastfeeding		
Within 1 hour after birth	276	65.4
Between 3-6 hours after birth	83	19.7
After sixth hour of birth	63	14.9
Still breastfeeding	416	98.6
Breastfeeding frequency during the day		
On demand	332	78.7
Breastfeeding frequency during the night		
On demand	375	88.9
Breastfeeding duration		
<18 months	15	3.6
18-24 months	19	4.5
Over 24 months	388	91.9
Exclusive breastfeeding	0	0.0

4.4 Times when infants were introduced to solids

Findings from the field survey indicate that majority of the mothers (63.7%) initiated solids to their infants on the sixth month, this was followed by those who initiated earlier (before 6 months), 23.0% and just about 13% initiated solids when the infants were between 6-9 months. None of the mothers initiated their infants to solids after the tenth month. These are as shown in table 3.

Table 3: Times when infants were introduced to solids (n=422)

Time of initiation	Frequency	Percent
Before 6 months	97	23.0
On the 6 th month	269	63.7
Between 6-9 months)	56	13.3
10 months and after	0	0.0

4.5 Complementary feeding practices

Table 4 below presents the findings on complementary feeding practices in the Mamprugu-Moakduri district.

From the study, it was revealed that 1.9% of mothers initiated complementary feeding before six months, 11.1% initiated complementary feeding on the sixth month after birth and 88.9% initiated complementary feeding soon after the sixth month of birth.

On the views of mothers about complementary feeding introduction time, 69(16.4%) of the mothers were of the view that complementary foods should be introduced before the child turns six months. 58.3% of the mothers said it should be introduced on the sixth month, 0.5% were of the view that it should be introduced soon after the sixth month, 19.7% said it should be introduced anytime, 3.6% did not know when it should be introduced and 1.7% had other views to include after 9, 10 etc. months.

On the views of mothers about how long a child should be made to breastfeeding upon the introduction of complementary foods before they are weaned; 3.6% were of the view that it should be done for less than 18 months, 4.5% said that it should be done for 18 to 24 months and 388(91.8%) said it should be done for 24 months and above.

All mothers who took part in the study were doing complementary feeding and hence the prevalence of complementary feeding was 100%. These are shown in Table 4 below.

Table 4: Complementary feeding practices, (n=422)

Variable	Frequency	Percent
Initiation of complementary feeding		
Less than six months	8	1.9
On the sixth month	39	11.1
After sixth month	375	88.9
Mothers' views on when to introduce complementary feeding		
Less than 6 months	69	16.4
On the 6 th month	246	58.3
Soon after the 6 th month	2	0.5
Any time	83	19.7
I don't know	15	3.6
Other	7	1.7
How long to wean a child off the breast after introducing complementary foods		
<18 months	15	3.6
18-24 months	19	4.5
After 24 months	388	91.9
Complementary feeding prevalence	422	100.0

4.6 Feeding challenges associated with children aged 06-24 months

Table 5 presents the data on challenges associated with infant/child feeding in the district. 59.2% of mothers reported that their babies take longer times to feed, 27.7% reported refusal of different textures of foods by the child, 21.8% of the mothers said their children were not paying attention to feeding, 28.8% also said their children refused food and water. 24.9% of mothers said their children mostly spurt the food out when feeding them. Allergies to certain foods were also reported and had a prevalence of 17.3%, 20.4% of the children were reported to be vomiting after eating. 18.0% of mothers reported that their

children drool excessively after eating, 23.0% complained of respiratory infection and 22.0% of mothers complained of having back ache when feeding their children.

Table 5: Feeding challenges associated with children aged 06-24 months in the Mamprugu-Moakduri district (n=422 unless otherwise indicated)

Variable	Frequency	Percent
Longer feeding times (more than 30 minutes)	250	59.2
Refusing different textures of food	117	27.7
Not paying attention when eating	92	21.8
Refusing food and water	92	21.8
Spitting when feeding	105	24.9
Child is allergic to certain foods	73	17.3
Child vomits after eating	86	20.4
Child drools excessively after eating	76	18.0

4.7 Food preferences

Table 6 presents the data on the responses of mothers on questions on a 24-hour dietary recall that was meant to ascertain the food preferences of children. The most consumed food among the children was revealed to be porridge (68.5%) and the least patronized food was infant formula (12.3%). The details are shown in Table 6 below.



Table 6: Food preferences (n=422 unless otherwise indicated)

Variable	Frequency	Percent
24 hour dietary recall		
Porridge	289	68.5
Water	380	90.0
Infant formula	52	12.3
Special porridge	175	41.5
Fruit juice	86	20.4
Tea or coffee	106	25.1
Carbonated drink	54	12.8
Liquid herbs	77	18.2
Grain product	287	68.0
Root tubers	67	15.9
Vegetables	244	57.8
Fruits	225	53.3
Meat	123	29.1
Fish	242	57.3
Egg	153	36.3
Nuts	190	45.0

4.8 Feeding frequency from the seven food groups

Figure 2 presents data on the feeding frequencies of children in the district from the seven major food groupings. The study revealed that 40.9% of the children ate food from animal sources, 45% consumed foods made from beans and nuts, 16.4% consumed foods containing milk, and 15.9% consumed food from tubers. Also, 59.3% consumed foods made from cereals and grains, 55.7% consumed foods from green leafy vegetables and fruit but no one consumed containing fats and oils. Figure 2: Feeding frequency from the seven food groups,

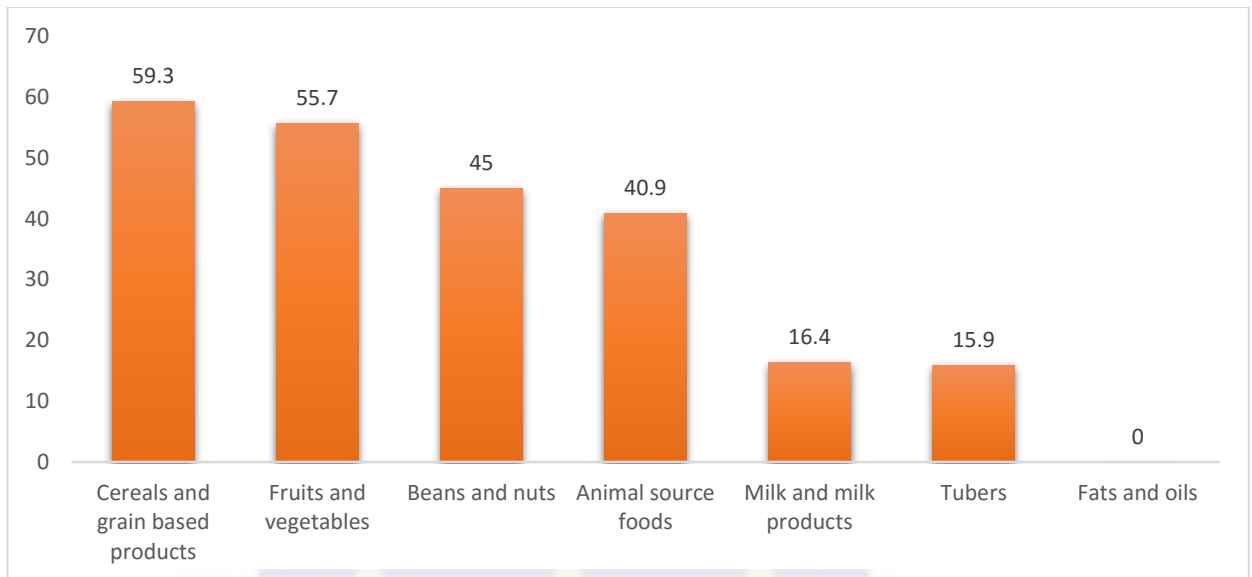


Figure 2: Feeding frequency from the seven food groups

4.9 Nutritional indicators of children aged 06-24 months in the Mamprugu-Moakduri district

This section presents data on the nutritional indicators of the 422 children aged 06-24 months who were involved in the study. These are as shown in the Tables 7 and 8 below.

From the study, it was revealed that 40.3% of the children were stunted of which 47.2% were male and 32.8% were female.

The prevalence of moderate stunting was 16.1% of which 14.2% were male and 18.1% were female.

Severe stunting had a prevalence of 22.7% of which 14.2% were male and 18.1% were female.

Overall there was a high prevalence of stunting among children aged 06-17 months (66.6%) compared to those within the age brackets of 18-24 (58.8%).

Wasting which is a measure of acute malnutrition was somehow lower in prevalence compared to stunting. Overall, 18.4% of the children were wasted of which 21.6% were

male and 15.1% were female. About 14.7% of the children were moderately wasted, of which 15.6% were male and 13.7% were female. Severe wasted had prevalence of 3.8%, of which 6% were male and 15% were female. Averagely, wasting was higher among 06-17 month olds (88.4%) compared to 18-24 month olds (81.4%)

Underweight which measures weight deficits per the ages of persons had an overall prevalence of 35.7% of which 43.6% were male and 27.3% were female. Moderate underweight was 22.9% prevalent and high among male with a prevalence of 25.7% and 20.0% among female.

Severe underweight was 12.8% prevalent, this was higher among male (17.9%) compared to female (7.3%). Underweight was highly prevalent among 06-17 month olds (70.0%) compared to 18-24 month olds (46.6%)

Table 7: Prevalence of child undernutrition (stunting, wasting and underweight) based on height-for-age, weight-for-height and weight-for-age z-scores by sex

	Total n = 422	Boys n = 218	Girls n = 204
Stunting (<-2 z-score)	(170) 40.3 %	(103) 47.2 %	(67) 32.8 %
Moderate stunting (<-2 z-score and >=-3 z-score)	(68) 16.1 %	(31) 14.2 %	(37) 18.1 %
Severe stunting (<-3 z-score)	(96) 22.7 %	(66) 30.3 %	(30) 14.7 %
Wasting (<-2 z-score and/or edema)	(78) 18.4 %	(47) 21.6 %	(31) 15.1 %
Moderate wasted (<-2 z-score and >=-3 z-score, no edema)	(62) 14.7 %	(34) 15.6 %	(28) 13.7 %
Severe wasting (<-3 z-score and/or edema)	(16) 3.8 %	(13) 6.0 %	(3) 1.5 %
Underweight (<-2 z-score)	(151) 35.7 %	(95) 43.6 %	(56) 27.3 %
Moderate underweight (<-2 z-score and >=-3 z-score)	(97) 22.9 %	(56) 25.7 %	(41) 20.0 %
Severe underweight (<-3 z-score)	(54) 12.8 %	(39) 17.9 %	(15) 7.3 %

Table 8: Prevalence of stunting, wasting and underweight by age based on height-for-age, weight-for-height-age and weight-for-age z-scores

	06-17 Frequency (%)	18-24 Frequency (%)	Total (n=422)
Stunting(normal height-for-age <-2 z-score)	213(66.6)	60(58.8)	273(64.7)
Moderate stunting (<-2 z-score and >=-3 z-score)	52(16.)	14(13.7)	66(15.6)
Severe stunting (<-3 z-score)	55(17.2)	28(27.5)	83(19.7)
Wasting (<-2 z-score and/or edema)	283(88.4)	83(81.4)	366(86.7)
Moderate wasted (<-2 z-score and >=-3 z-score, no edema)	33(10.3)	18(17.6)	51(12.1)
Severe wasting (<-3 z-score and/or edema)	4(1.3)	1(1.0)	5(1.2)
Underweight (<-2 z-score)	221(70.0)	48(46.6)	269(63.7)
Moderate underweight (<-2 z-score and >=-3 z-score)	72(22.5)	21(24.3)	93(22.0)
Severe underweight (<-3 z-score)	24(7.5)	30(29.1)	54(12.8)

4.11 Association between breastfeeding initiation and background characteristics of mothers

Table 9 shows the results of the bivariate and multiple logistic regression analysis between breastfeeding initiation, background characteristics of respondents and some other variables of the study. Background characteristics such as; age of respondent, educational status, marital status, occupation and sex of child were cross tabulated against breastfeeding initiation time. Other variable like complementary feeding initiation time and nutritional indicators of children were also cross tabulated against breastfeeding initiation time. The analysis shows that no association exists between breastfeeding initiation time and the background characteristics of respondents as well as the other variables and the results are as presented in the Table 9.

Further multiple logistic regression analysis revealed that early initiation of breastfeeding was significantly associated with timely introduction of complementary feeding,

OR=0.416, 95% (0.260, 0.667). This implies mothers who initiated breastfeeding within one hour of birth were 0.41 time more likely to initiate complementary feeding on the sixth month compared to those who did not.



Table 9: Association between breastfeeding initiation and background characteristics of mothers, complementary feeding initiation and nutritional indicators of children Breastfeeding initiation

Variable	Initiated BF within 1 hr Frequency (%)	Initiated BF after 1 hr Frequency (%)	P value	AOR (95% CI)
Age of respondent				
Below 24	81(60.4)	53(39.6)	0.144	0.646 (0.4202, 1.038)
Above 24	195(67.7)	93(32.3)		
Educational status				
Educated	120(67.4)	58(32.6)	0.458	1.303 (0.835, 2.050)
Not educated	156(63.9)	88(36.1)		
Marital status				
Married	273(65.3)	145(34.7)	0.685	0.725 (0.073, 7.222)
Not married	3(75.0)	1(25)		
Occupation				
Salary worker	10(71.4)	4(28.6)	0.677	1.211 (0.694, 2.114)
Self employed	237(65.8)	123(34.2)		
Not employed	29(60.4)	19(39.6)		
Sex of child				
Male	147(67.4)	71(32.6)	0.365	1.193 (0.788, 1.805)
Female	129(63.2)	75(36.8)		
Complementary feeding initiation				
Before 6 months	3(37.5)	5(62.5)	0.000	0.416 (0.260, 0.667)
On the 6 th month	28(71.8)	11(28.2)		
After 6 th month	245(65)	130(34.7)		

P-values are from Chi-square analysis

OR is the odds ratio from the multiple logistic regressions. The variables that were fed into the model were; age of mother, educational status of mother, marital status of mother, occupation, sex of child and complementary feeding initiation time.

The coefficient of determination, $R^2 = 0.529$ implies the model was able to explain 52.9% of the variability in the outcome variable (breastfeeding initiation)

4.12 Association between Complementary initiation and background characteristics of mothers and child

Table 10 shows the results of the bivariate analysis between complementary feeding initiation, background characteristics of respondents and some other variables of the study. Background characteristics such as; age of respondent, educational status, marital status, occupation and sex of child were cross tabulated against complementary feeding initiation time. Other variable like breastfeeding initiation time and duration of breastfeeding were also cross tabulated against complementary feeding initiation time. The analysis showed no association existed between complementary feeding initiation time and the background characteristics of respondents.

However, complementary feeding initiation time was found to be significantly associated with breastfeeding initiation time with $p < 0.001$. The results are as presented in the table below.

Further multiple logistic regression analysis revealed that complementary feeding initiation was significantly associated with breastfeeding initiation, $OR = 0.415$, 95% CI, 0.261-0.660. This implies mothers who initiated complementary feeding on time (on the 6th month) were 0.41 times more likely to have initiated breastfeeding with the first one hour of birth compared to those who did not.

Table 10: Association between Complementary initiation and background characteristics of mothers and child

Variable	Initiated before months Frequency (%)	CF six months Frequency (%)	Initiated after months Frequency (%)	CF six months Frequency (%)	P value	AOR (95% CI)
Educational status						
Educated	21(11.8)		157(88.2)		0.713	0.9 (0.586, 1.573)
Not educated	26(10.7)		218(89.3)			
Marital status						
Married	47(11.2)		371(88.8)		0.477	
Not married	0(0.0)		4(100.0)			
Age of mother						
Below 24	15(11.2)		119(88.8)		0.980	0.751 (0.436, 1.292)
Above 24	32(11.1)		256(88.9)			
Occupation						
Salary worker	3(21.4)		11(78.6)		0.178	0.866 (0.459, 1.631)
Self employed	36(10.0)		324(90.0)			
Not employed	8(16.7)		40(83.3)			
Sex of child						
Male	14(6.4)		204(93.6)		0.001	1.091 (0.685, 1.736)
Female	33(16.2)		171(88.9)			
Breastfeeding initiation						
Within 1 hour of birth	48(17.4)		228(82.6)		0.000	0.417 (0.261, 0.668)
After 1 hour of birth	49(33.6)		97(66.4)			
Breastfeeding duration						
Up to 24 months	28(20.9)		106(79.1)		0.486	1.585 (0.723, 3.474)
Over 24 months	69(24.0)		219(76.0)			

P-values are from Chi-square analysis

OR is the odds ratio from the multiple logistic regressions. The variables that were fed into the model were; age of mother, educational status of mother, marital status of mother, occupation, sex of child, breastfeeding initiation time and breastfeeding duration.

The coefficient of determination, $R^2 = 0.061$ implies the model was able to explain about 6% of the variability in the outcome variable (complementary feeding initiation)

4.13 Association between some feeding challenges and background characteristics of children

Table 11 shows the results of the bivariate analysis between some feeding challenges and background characteristics of children involved in the study. Feeding challenges such as; excessive drooling, vomiting after eating, allergies to certain foods, and spitting while feeding were cross tabulated against ages of children and sex of children. The analysis shows that no association existed between feeding challenges and the background characteristics of children. The results are as presented in the table below.

Further multiple logistic regressions revealed there are no significant statistical relationship between feeding challenges and background characteristics of children since all the p-values from the multiple logistic regressions were greater than 0.05 and 0.001 ($p > 0.05$ and $p > 0.001$)



Table 11: Association between feeding challenges and background characteristics of children

Excessive drooling				
Variable	Yes Frequency (%)	No Frequency (%)	P value	AOR(95% CI)
Age of child				
Up to 24	20(14.9)	114(85.1)	0.261	0.755(0.459, 1.244)
Above 24	56(19.4)	232(80.6)		
Sex of child				
Male	35(16.1)	183(83.9)	0.280	0.934(0.754, 1.156)
Female	41(20.1)	163(79.9)		
Vomiting after eating				
Variable	Yes Frequency (%)	No Frequency (%)	P value	AOR (95%CI)
Age of child				
Up to 24	28(20.9)	106(79.1)	0.857	1.113 (0.908, 1.364)
Above 24	58(20.1)	230(79.9)		
Sex of child				
Male	43(19.7)	175(80.3)	0.730	0.929(0.578, 1.494)
Female	43(21.1)	161(78.9)		
Allergies to certain foods				
Variable	Yes Frequency (%)	No Frequency (%)	P value	AOR(95%)
Age of child				
Up to 24	21(15.7)	113(84.3)	0.547	1.022 (0.823, 1.269)
Above 24	52(18.1)	236(81.9)		
Sex of child				
Male	33(15.1)	185(84.9)	0.238	0.733 (0.441, 1.217)
Female	40(19.6)	164(80.4)		

Spitting when feeding

Variable	Yes Frequency (%)	No Frequency (%)	P value	AOR(95%CI)
Age of child				
Up to 24	33(24.6)	101(75.4)	0.934	0.871 (0.720, 1.054)
Above 24	72(25.0)	216(75.0)		
Sex of child				
Male	49(22.5)	169(77.5)	0.238	0.756 (0.485, 1.178)
Female	56(27.5)	148(72.5)		

P-values are from Chi-square analysis

4.14 Associations between feeding challenges and complementary initiation

Table 12 shows the results of the bivariate and multivariable analysis between some feeding challenges and the timing of complementary feeding which is an early infant feeding modality. Feeding challenges such as; excessive drooling, vomiting after eating, allergies to certain foods, and spitting while feeding were cross tabulated against complementary feeding initiation. The analysis showed that only excessive drooling was significantly associated with complementary feeding initiation.

Further multiple logistic regression analysis revealed that early initiation of complementary feeding was significantly associated with excessive drooling, OR= 0.505, 95%CI, 0.205-1.250. This implies infants who were initiated to complementary feeding before six months were 0.505 more likely to drool compared to those who were initiated on the sixth month.

Table 12: Associations between feeding challenges and complementary feeding initiation

	Initiated CF before six months	Initiated CF after six months	P value	AOR (95% CI)
Variable	Frequency (%)	Frequency (%)		
Vomiting after eating				
Yes	20(23.3)	66(76.7)	0.947	1.701 (0.8 97, 3.225)
No	77(22.9)	259(77.1)		
Excessive drooling				
Yes	9(11.8)	67(88.2)	0.011	0.505 (0.205, 1.250)
No	88(25.4)	258(74.6)		
Allergies to certain foods				
Yes	11(15.1)	62(84.9)	0.077	0.925 (0.399, 2.144)
No	86(24.6)	263(75.4)		
Spitting when eating				
Yes	13(12.4)	92(87.6)	0.003	0.442 (0.213, 0.919)
No	84(26.5)	233(73.5)		

P-values are from Chi-square analysis

OR is the odds ratio from the multiple logistic regressions. The variables that were fed into the model were; vomiting after eating, excessive drooling, allergies to certain foods and spitting during feeding.

$R^2 = 0.050$, this implies the model was able to explain 5% of the variability in the outcome variable (complementary feeding initiation)

4.15 Associations between feeding challenges and breastfeeding initiation

Table 13 shows the results of the bivariate and multivariate analysis between feeding challenges and breastfeeding feeding initiation. Feeding challenges such as excessive

drooling, vomiting after eating, allergies to certain foods, and spitting while feeding were cross-tabulated against breastfeeding initiation. The analysis showed that none of the feeding challenges was significantly associated with breastfeeding initiation.

Further multiple logistic regression analysis confirmed that breastfeeding initiation was not significantly associated with any of the feeding challenges. These are shown in table 18 below.

Table 13: Association between feeding challenges and breastfeeding initiation

Variable	Initiated BF with I hour of birth Frequency (%)	Initiated BF after 1 hour of birth Frequency (%)	P value	AOR (95% CI)
Vomiting after eating				
Yes	53(61.6)	33(38.4)	0.410	0.926 (0.540, 1.586)
No	223(66.4)	113(33.6)		
Excessive drooling				
Yes	54(64.2)	22(28.9)	0.253	1.556 (0.808, 2.995)
No	222(64.2)	124(35.8)		
Allergies to certain foods				
Yes	51(69.9)	22(30.1)	0.378	0.789 (0.409, 1.522)
No	225(64.5)	124(35.5)		
Child spitting while feeding				
Yes	72(68.6)	33(31.4)	0.431	1.531 (0.894, 2.621)
No	204(64.4)	113(35.6)		

P-values are from Chi-square analysis

OR is the odds ratio from the multiple logistic regressions. The variables that were included in the model were; vomiting after eating, excessive drooling, allergies to certain foods and spitting during feeding.

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This section presents the discussions of the findings of the community survey done in the Mamprugu-Moakduri district on the various objectives the study set out to achieve, relating the findings to similar studies done in Ghana and outside of Ghana. The discussions are done on the following themes: breastfeeding practices, complementary practices, feeding challenges at 06-24 months associated with infant and young child feeding, associations between early feeding modalities and feeding difficulties, nutritional indicators of children aged 06-24 months in the Mamprugu-Moakduri district and the associations between nutritional indicators and feeding difficulties at 06-24 months.

5.2 Infant and Young Child Feeding Practices

5.2.1 Breastfeeding Practices.

The study revealed that a little over 65% of mothers initiated breastfeeding within the first hour of birth, and this coincides with the findings of the GDHS of 2015 which reported that 65% of mothers residing in the Northern and Upper East region are most likely to initiate breastfeeding within one hour of birth, which is a very good proportion compared to the national prevalence of 56% as reported by the Ghana Demographic and Health Survey, 2015. Early initiation of breastfeeding comes with several benefits both to the mother and the child and they include: stimulation of the release of prolactin which helps in the production of milk and oxytocin which is responsible for the release of the milk. It also helps in the contraction of the uterus and reduces postpartum blood loss. Colostrum which is the first milk is produced immediately following suckling after delivery and is highly

nutritious and contains anti-infective factors which provide natural immunity for the child. It is recommended that children are fed with colostrum immediately after birth and that they continue to be exclusively breastfed even if regular breast milk has not yet to flow.

Exclusive breastfeeding prevalence was revealed to be zero implying none of the mothers who took part in the study practiced exclusive breastfeeding for the first six months. The national prevalence of exclusive breastfeeding for the first six months in Ghana is 52% (GSS *et al.*, 2015) which is higher than the global prevalence of 46% (WHO, 2016) and several other Africa countries. The zero prevalence of exclusive breastfeeding in the Mamprugu-Moakduri is due to the fact that mothers prefer to do mixed feeding rather than following the recommended early infant feeding procedures and this could be one of the reasons for the high prevalence of child under nutrition and the feeding challenges mothers reported encountering as captured in this report.

About 99 percent of the mothers were still breastfeeding and this in line with the 98% prevalence of breastfeeding in Ghana (GSS *et al.*, 2015) indicating that there is high prevalence of breastfeeding in Ghana and it could even be higher within the rural settings since most mothers in those settings are usually not employed and most likely to breastfeed and for longer periods.

The GDHS in 2014 reported that Ghanaian mothers are likely to breastfeed for 21.2 months before weaning their children off the breast. The field survey discovered that the average breastfeeding duration of a child in the Mamprugu-Moakduri district was 27 months as was reported by mothers, this is about double the national breastfeeding duration and this could be attributed to the fact that mothers in the local communities are not employed with white color jobs which will usually truncate the duration of breastfeeding due to work pressure and demands. This is good because prolonged breastfeeding comes with good benefits

which include; balanced nutrition, boosted immunity, improved health, improved brain development, soothing to the baby etc.

5.2.2 Initiation of solids to infants

The field study revealed that 23% of infants were introduced to solids before six months, 63.7% were introduced to solids on the sixth month and about 13% were introduced to solids between 6-9 months. None of the mothers reported introducing solids to the infant in the tenth month and over. The findings of the study tell that most of the mothers do not introduce solids to their infants at the right time (6-9) months as a mere 13% of the mothers are those who do the introduction at the right time. This goes to say that those few children (13%) are those who are most likely to grow to have easy acceptance and adoptability to other family foods with minimal feeding challenges and good food preferences (Northstone *et al.*, 2011 & Beauchamp, & Mennella, 1998). None of the infants/children was introduced to solids at 10 months and beyond and this means none of the children is likely to grow feeding with feeding difficulty and definite likes and dislikes for certain foods (Northstone *et al.*, 2011). The 23% who were introduced to solids earlier are most likely to have to have good control over their food preferences. Studies have shown that early initiation of solids (before six months) within the “sensitive periods” turn to impact very strongly the food preferences of children in later life.

5.2.3 Complementary feeding practices

The findings of the study revealed that, nearly (2%) of the mothers who took part in the study started complementary feeding before six months, 11.1% on time (on the sixth month) and a little over 88% started late (7-8 months). The number who initiated complementary feeding on the sixth month was very low compared to findings from

Lahore, Pakistan (43%), Kathmandu, Nepal (33%), Delhi, India (17.5%) and United Arab Emirates (<17%), but lower than in studies done in Northern Ethiopia (80%) and South India (77.5%) (Rao S, Swathi PM, Unnikrishnan B, Hegde A, 2011).

Early introduction of complementary feeding is usually due to breast milk not being enough, advice of others (family /friends), the feeling that the timing is appropriate, nipple infection, mother being pregnant with another baby or child showing interest in other foods. However, early introduction to complementary feeding does not have any potential benefits in regards to improved growth velocities or food acceptance by infants/ children (Rao *et al.*, 2011, Semahegn A, Tesfaye G, Bogale A, 2014). Late introduction of complementary feeding is due to; mothers thinking of having ample amount of breast milk, the feeling that the child will fall sick upon early initiation of complementary feeding.

Studies done in Germany by Radwn H. in 2013, in Kong Kong by Tarrant M, Fong DYT, Wu KM, Lee ILY, Wong EM, Sham A, *et al.*, in 2010 and in Belgium by Sonia S, Veit G, Silvia S, Veronica L, Francoise M, Anna S, *et al.*, in 2010 all found maternal education not to be statistically significant with timely initiation of complementary feeding. The findings of this study also revealed similar results as maternal education was found not to be statistically significant with timely initiation of complementary feeding ($p= 0.713$).

However, timely initiation of complementary feeding was found to be statistically significant with initiating breastfeeding within the first hour of birth at $p < 0.001$, $aOR=0.417$ 95% CI (0.0261, 0.668). This implies that the odds of initiating complementary feeding at the sixth month among mothers who initiated breastfeeding within the first hour of birth was 4.1 compared to those mothers who did not, and this alludes to the fact that early initiation of breastfeeding after birth is good since it has a great potential of preventing

early initiation of prelacteal feeds and hence distorting the practice of exclusive breastfeeding and timely initiation of complementary feeding.

5.3 Feeding challenges at 06-24 months

The study also sought to find out if mothers encountered any challenges in feeding their children since feeding challenges are another set of predictors of nutritional indicators across all stages of life. The findings revealed that majority of the mothers (59%) have their children taking longer time (over 30 minutes) to feed, about 28% had their children refusing different textures of foods, almost a quarter (25%) reported their children spat the food out when feeding, both lack of attention and refusing food and water were reported by 21.8% each of the mothers. Children who vomited after eating were 20.4%, 18.0% reported excessive drooling and 17.3% reported allergies to certain foods. Evidence from research indicates that the introduction of solids is delayed beyond 10 months of age, it may increase the risk of feeding difficulties later in life (UNICEF/WHO, 1998).

The reports of the feeding challenges could also be attributable to the none adherence to the recommendations of the infant and young child feeding recommendations of the WHO and UNICEF since according to their reporting, children who are exclusively breastfed for the first six months of life are less likely to have challenges with feeding upon introduction of complementary feedings (UNICEF, 2008).

Further regression analysis using multiple regression modeling revealed there are no statistical relationship between feeding challenges and background characteristics of children since all the p-values were greater than 0.05 and 0.001 ($p > 0.05$ and $p > 0.001$).

However, excessive drooling was found to be statistically significant with complementary feeding initiation at $p < 0.05$, aOR = 0.505, 95% CI (0.205, 1.250) indicating that children who were initiated to complementary feeding earlier than six months had 0.5 odds of

drooling excessively compared to those who did not, pointing to the relevance of introducing complementary feeding on time (the 6th month) in order to prevent this feeding challenge.

Breastfeeding initiation time was found not to be statistically significant with any feeding challenge since all the p-values were higher than 0.05 and 0.001 indicating that the timing for breastfeeding initiation does not call for any feeding challenge in the life of a child or infant.

5.4 Associations between early infant modalities and feeding difficulties

5.4.1 Early infant feeding modalities

The early infant feeding modalities that were considered here included; exclusive breastfeeding mixed feeding and complementary feeding. The data gathered indicated that none of the mothers did exclusive breastfeeding and this quite shocking since in the 1990s, according to the GDHS the national prevalence of exclusive breastfeeding was 2% (GSS *et al.*, 1993) which was due to lack of adequate information and access to information about the benefits of exclusive breastfeeding and hence it was pardonable if mothers did not exclusively breastfeed for the first six months. Currently, the prevalence of exclusive breastfeeding in Ghana stands at 52% (GSS *et al.*, 2015) hence its worry to know that in the midst of all the strives by the health sector policy makers and implementers, mothers within certain parts of the country do not exclusive breastfeeding despite the numerous benefit that comes with it.

Nearly all the mothers who took part in the study did mixed feeding within the first six months and this feeding modality comes with the risk of infections and diarrheal related diseases (UNICEF, 2010) if not done appropriately and this could negatively impact the nutritional status of the child (WHO, 2016).

On complementary feeding, it was revealed that 1.9% of the mothers started complementary feeding early (before six months), 11.1% on time (on the sixth month) and a little over 88% started late (7-8 months). This is in great contradiction with the recommendation of the infant and young child feeding practices by according to the WHO in 2008 which recommends the introduction of complementary feeds on the sixth month of the infant's life and this could partly account for the feeding challenges the mothers most of the mothers reported as hindrances to practicing optimal infant feeding within the district.

5.4.2 Feeding difficulties

The feeding difficulties that were recording during the study included: longer feeding time (over 30 minutes), children refusing different textures of foods, lack of attention, refusing food and water vomiting after eating, excessive drooling and allergies to certain foods. Since these challenges on the phase look could appear to impact the modality employed in feeding the child, their association were ascertained using both bivariate and multivariate regression modeling and the findings are discussed as follows;

Both bivariate and multivariate regression analysis revealed no significant statistical associations between exclusive and any feeding challenge, and mixed feeding which was also practiced by all the mothers showed no significant statistical associations with any of the feeding difficulties. However, excessive drooling was found to be significantly associated with complementary feeding initiation time at $p < 0.05$, aOR = 0.505 95% CI (0.205, 1.250). Indicating that infants who were initiated to complementary foods earlier had 0.505 the odds of drooling compared to those who were not.

5.5 Nutritional indicators of children aged 06-24 months in the Mamprugu-Moakduri district.

The study, revealed that 40.3% of the children were stunted of which 47.2% were male and 32.8% were female. This is extremely higher than the national prevalence of 19% (GSS *et al.*, 2015) which has been a drop in prevalence over the years from 35% in 2003 through 28% in 2008 (GSS *et al.*, 2003 and 2008). This reflects a high prevalence of chronic under nutrition since stunting is a measure of nutritional deficits accumulated over a long period. This is also lower than the 61% prevalence reported in India by the UNICEF in 2016 representing 33 per cent of stunted children in the world.

Stunting (inadequate length/height for age) reflects cumulative effects of intergenerational poverty, poor maternal and early childhood nutrition, and repeated episodes of illness in childhood, (UNICEF, 2016) and this concurs with the fact that Mamprugu-Moakduri district is being considered as one of the poorest districts in Ghana with an average income earning of about GHC 75.0 in a month.

Wasting which is a measure of acute malnutrition was somehow lower in prevalence compared to stunting. Overall, 18.4% of the children were wasted a rate extremely higher than the 5% national prevalence according to GDHS in 2015. This could be attributable to loss of nutrients due to infections, low nutrient intake and high loss and chronic diarrheal disease.

Underweight which measures weight deficits per the ages of persons had an overall prevalence of 35.7% of which 43.6% were male and 27.3% were female. This is abnormally higher than the 3% (GSS *et al.*, 2015) national prevalence rate.

Conclusively, all the nutritional indicators were presented with higher prevalence among 6-17 month olds compared to 18-24 month olds as seen from stunting through underweight:

stunting among children aged 06-17 months (66.6%) compared to those within the age brackets of 18-24 (58.8%), wasting was higher among 06-17 month olds (88.4%) compared to 18-24 month olds (81.4%) and underweight was highly prevalent among 06-17 month olds (70.0%) compared to 18-24 month olds (46.6%). This could be attributed to the fact that mothers did not follow the infant and young child feeding recommendations to exclusively breastfeed for the first six months, introduced complementary feeding on the sixth months and continued with breastfeeding appropriately alongside the complementary foods for two at least two years as recommended by the WHO.

5.6 Associations between nutritional indicators (Stunting, Wasting and Underweight) and feeding challenges.

Regression modeling were used (both bivariate and multivariate logistic) regression were performed on each of the nutritional indicators with some feeding difficulties to find out how the associate with one another. The revelations from the analysis showed that stunting was not significantly associated with longer feeding times, vomiting after eating, excessive drooling, allergies to certain foods and spitting during eating.

However, there was a statistically significant relationship between stunting and chewing problems at $p < 0.05$, aOR=0.560, 95% CI (0.336, 0.933). Indicating that children who had problems chewing foods during infancy had 0.560 the odds of being stunted compared to those who did not.

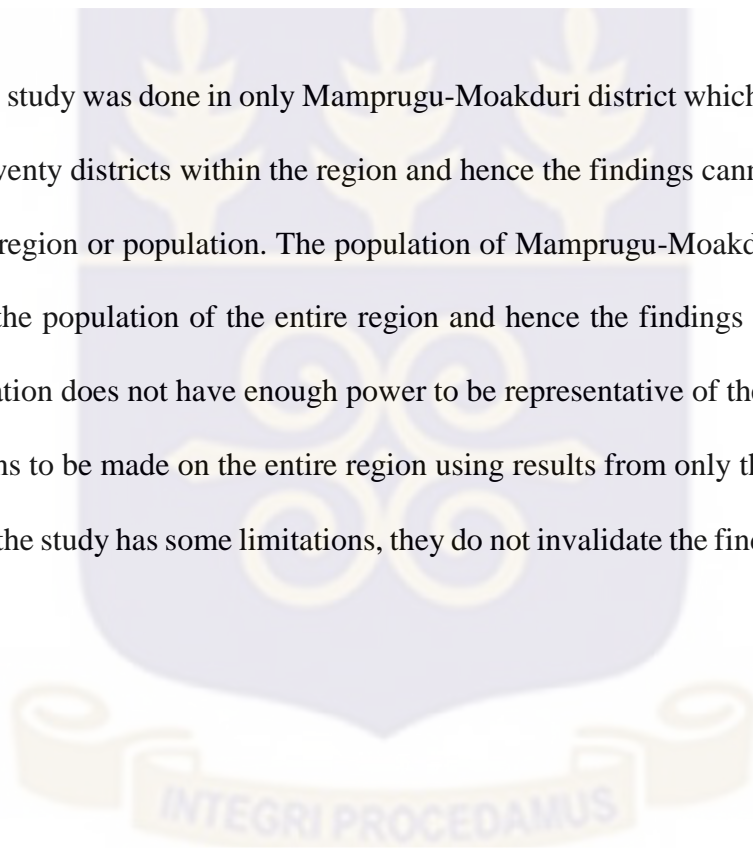
Wasting and underweight on the other hand were found not have any statistically significant relationship with all the feeding challenges that were fed into the model as results from the regression modeling presented p-values greater than 0.001 and 0.05 in all cases.

5.7 Limitations of the study

Although the study was carefully planned and executed and yielded some findings, I am still aware of its shortcomings and limitations. First and foremost, the study was purely quantitative and hence was limited in probing further to get to establish the reasons behind some of the feeding modalities mothers practiced which the mixed methods approach could have done better. Further research using mixed methods will enable the researcher to be able to establish the appropriate themes underpinning the approaches they follow to feed their infant.

Secondly, the study was done in only Mamprugu-Moakduri district which is a small district out of over twenty districts within the region and hence the findings cannot be generalized on the entire region or population. The population of Mamprugu-Moakduri is just about a twentieth of the population of the entire region and hence the findings of a study among such a population does not have enough power to be representative of the entire region for generalizations to be made on the entire region using results from only that district.

Even though the study has some limitations, they do not invalidate the findings of the study.



CHAPTER SIX

6.0 Conclusions

The study presents findings on breastfeeding practices, timing of initiation of solids to infants/ children, complementary feeding, feeding challenges associated with infant/children aged 06-24 months, the associations between early infant feeding modalities and feeding difficulties and also the nutritional indicators of children aged 06-24 months and the associations between the nutritional indicators and feeding challenges.

The study revealed that none of the mothers who took part in the study practiced exclusive breastfeeding for the first six months after the birth of their last child. A little over 65% of the mothers initiated breastfeeding within the first hour of birth and nearly, 92% of the mothers were of the view that children should be breastfed for over 24 months before they are weaned.

Findings from the field survey indicates that majority of the mothers (63.7%) initiated solids to their infants on the sixth month, this was followed by those who initiated earlier (before 6 months), 23.0% and just about 13% initiated solids when the infants were between 6-9 months. None of the mothers initiated their infants to solids after the tenth month

Almost 2% of mothers initiated complementary feeding before six months, 11.1% initiated complementary feeding on the sixth month after birth and 88.9% initiated complementary feeding soon after the sixth month of birth. Majority of the mothers (58.3%) were of the view that complementary foods should be introduced on the sixth month, 0.5% were of the view that it should be introduced soon after the sixth month.

Some of the feeding challenges that were reported by mothers who took part in the study included; longer feeding times (59.2%), refusal of different textures of foods by child (27.7%), lack of attention during feeding (21.8%), children refusing food and water (28.8%), spitting when feeding (24.9%), allergies to certain foods (17.3%), be vomiting after eating (20.4%) and excessive drooling (18.0%).

Multivariate regression analysis revealed no significant statistical relationships between exclusive breastfeeding and any feeding challenge. Mixed feeding which was also practiced by all the mothers showed no significant statistical relationship with any of the feeding difficulties. However, excessive drooling was found to be significantly associated with complementary feeding initiation time, aOR = 0.505 95% CI (0.205, 1.250).

The prevalence of stunting, wasting and underweight were found to be 40.3%, 18.4% and 38.7% respectively.

6.1 Recommendations

In order to improve upon infant feeding and get good nutritional outcomes among children in the study district, the following recommendations are put forward for consideration:

6.1.1 Practice

- Efforts should be made by the Ghana health service to ensure that mothers do exclusive breastfeeding for the first six months to ensure good nutritional outcomes.

- The Ghana health service should also encourage mothers to pay a critical attention to the “sensitive period” (6-9 months) and introduce their infants to solids during that window period to help them develop good food choices and also grab the best part of nutrition from what they will be consuming in later life because if the most is not made of this window of opportunity it could affect the child in future.
- The Ghana health service should educate mothers on the right timing for complementary feeding as the study revealed just about 11% get the timing of complementary feeding right and hence introduce their children to complementary foods on the sixth month.

6.1.2 Policy

- Following the high prevalence of stunting, wasting and underweight in the district as recorded by the finding of the study, it will be very helpful to the district and nation if policy makers consider strengthening the community based management of acute malnutrition program to help reduce the prevalence of undernutrition in the district.

6.1.3 Research

- Further research using the mixed methods approach could help in establishing the reasons behind the feeding modalities mothers in the district practice, hence I recommend that future research on the topic should employ the mixed methods approach so a be able to give more information about the topic than the quantitative approach is able to do.

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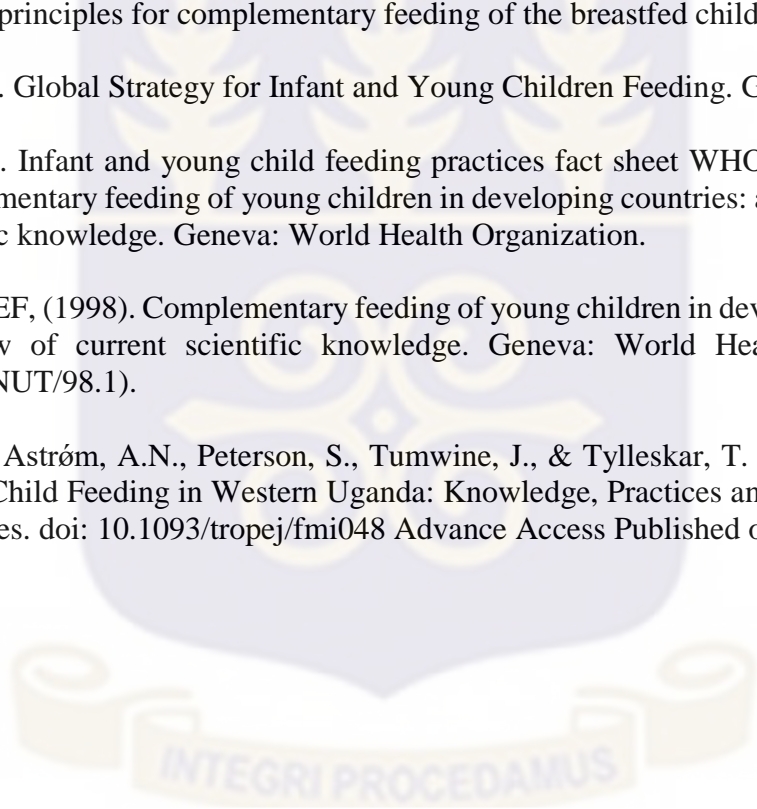
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APPENDICES

Appendix 1: Informed Consent Form

Topic: Early Infant Feeding Modality and Nutritional Indicators of Children Aged 06 – 24 months in the Mamprugu–Moakduri District, Ghana

Introduction

My name is Tiimob Gideon Likida, a student of University of Ghana, School of Public Health. I am conducting a study on early infant feeding modality and nutritional indicators of children aged 06 to 24 months. I would like to humbly request your participation in the study.

Background information about the study

This research is a study requirement at the University of Ghana, School of Public Health, Legon to attaining a master's degree in Public Health.

The research is being done with the main objective of assessing early infant feeding modality and the nutritional indicators of children aged 06 – 24 months in the Mamprugu–Moakduri district. The study will specifically look at the prevalence of exclusive breastfeeding in the district, the age of introduction of solids to infants, identify infant feeding difficulties at ages 06 to 24 months and also determine the association between early feeding modalities and feeding difficulties/ food preferences of children at 06-24 months.

Malnutrition usually, sets in during the critical window period of children which is 06-24 months and this usually could transcend into adulthood causing growth deficits, low academic output, repeated episodes of illness and sometime death. This study seeks to reveal the modalities of infant feeding and how they influence the nutritional indicators of children and hence provide a roadmap to preventing child under nutrition and its undesirable effects during a person's life.

The duration of the study will be less than a year. The findings of the study will give a better explanation to the reasons underpinning the high prevalence of child under nutrition in the district. It will also serve as a useful source of information to policy makers and implementers to designing informed nutrition intervention programs to arrest the problems associated with infant feeding and under nutrition holistically.

Study Procedures

Mothers with children aged 06-24 months in the Mamprugu-Moakduri district and their children will be used in this study. If you are eligible and agree to participate, you will be required to answer a set of questions from a structured questionnaire. I will ask you questions about your background, breastfeeding, complementary feeding, feeding difficulties associated with children at aged 06 to 24 months and also food preferences of children aged 06-24 months. Afterwards I will measure the weight of your child using a weighing scale and the height/length of your child using an infant meter to help me determine the nutritional status of the child.

Benefits

You will not obtain any benefit from participating in the study. However, information obtained from this study will help in planning health services to improve children's health.

Possible Risks/ Discomforts

This study might pose some inconveniences to you in terms of the time spent answering questions and invasion of your privacy. You are however not obliged to answer any question you are not comfortable with.

Voluntariness

Participation in the study is voluntary. You can decline or withdraw from participating if you desire. However, your participation would be very much appreciated.

Confidentiality

Whatever information you provide will be kept strictly confidential and will not be shown to other persons. All forms filled will be highly secured and only members of the research team will have access to them.

Do you want to ask me anything about the survey before consenting to the study? If

Yes,.....

.....

.....

You can contact the researcher on 020-6299266 or gtiimob86@gmail.com or the Ghana Health Service Ethics Review Committee Administrator (Hannah Frimpong) on 050-7041223 to seek further clarification when needed.

Ideclare that the purpose, procedures, risks and benefits of this study have been explained thoroughly to me. All questions and doubts have been answered and I have understood. I hereby agree to participate.

Signature/ thumbprint of respondent..... Date.....

I verify that the purpose, procedures, risks and benefits of this study have been explained thoroughly to me. All questions and doubts have been answered and I have understood. The participant has willingly agreed to participate in the study.

Signature.....

Date.....

Appendix 2: Volunteer Agreement

The document above describing the benefits, risks and procedures for the research titled”

Early

Infant Feeding Mordality and the Nutritional Indicators of Children Aged 06-24

Months In the Mamprugu-Moakduri District” has been read and explained to me. I have

been given an opportunity to ask any questions about the research and the answered give

me are satisfactory. I agree to participate as a volunteer.

Name and signature/thumbprint of volunteer.....

Date.....

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

I was present while the purpose, procedures, risks and benefits were read to the volunteer.

All questions and doubts were answered and the volunteer has agreed to take part in the study.

Name and signature/thumbprint of witness.....

Date.....

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

.....

.....

Date

Name/ signature of person who obtained consent

Appendix 3: Questionnaire

**ALL QUESTIONS ARE TO BE ADDRESSED TO MOTHERS/CAREGIVERS
WITH A CHILD 06-24 MONTHS OF AGE**

A: Socio-Demographic Characteristics

Q01. Respondent ID

Q02. Age of respondent.....

Q03. Marital status of respondent

Never married/single..... Married.....

Divorced, Separated, or Widowed..... Others (specify).....

Q04. What religion does respondent practice?

Christianity..... Islam..... Traditionalist..... Other

(specify)..... None..... Don't know.....

Q05. What is the ethnicity of respondent?

Mamprusi.....Builsa..... Komma..... Kantonsi.....Fulani Other

(Specify).....Don't Know.....

Q06. Has respondent ever attended school? Yes..... No.....

Q07. If yes, what is the highest level of education attained?

Primary..... JSS/Middle..... SSS/O

Level/Postsecondary..... Tertiary..... Other (specify).....

.Don't know.....

Q08. What is the occupation of mother/caregiver?

Salary worker..... Pitobrewing..... Sheabutter extraction.....rice

processing.....Farming/By-day.....Pottery/craft working.....

Petty Trading..... Others (specify).....

Q09. What is the age of your child in months?.....

Q10. What is the sex of your child? Male..... Female.....

Q11. How many children do you have.....

B: Breastfeeding

Q12. Did you ever breastfeed your child? Yes..... No..... Don't know.....

Q13. Did you exclusively breastfeed your child during the first 6 months of life?

Yes..... No.....I don't Know.....

Q14. If NO, when was child given foods/liquids?

Less than a week after birth..... less than a month after birth..... Less than 2 months after birth..... Within 2-5 months after birth..... I don't know.....

Q15. Are you still breastfeeding? Yes..... No.....

Q16. If NO, for how many months did you breastfeed your child? I don't know.....

Q17. If YES, How many times did you breastfeed last night between sunset and sunrise? I don't know..... On Demand.....

Q18. How many times did you breastfeed yesterday during the day light hours?.....I don't know.....On demand.....

Q19. How old was you baby when you introduced foods/complementary foods to him/her?

Less than 2 months..... between 3-5 months.....On the 6th month.....

Soon after 6 months..... after 7 months..... I don't know..... Others (specify).....

Q20. In your own opinion when should complementary foods be introduced to infants?

Less than 6 months.....On 6th month..... Soon after 6th month.....

Any time..... Don't know.....

Others (specify).....

Q21. In your own opinion, how long should a child be made to breast feed before he/she is weaned? months. I don't know.....

Q22. From answer in Q21 above, why?

.....
.....
.....

C. Feeding difficulties at age 06 to 24 months

Q23. What challenge(s) do you face feeding your child?

.....
.....
.....

Q24. How did you overcome the challenge(s)?

.....
.....
.....

Q25. Which of the following challenges do you face in feeding your infant/child?

- A. Excessively longer feeding times. Yes.....No.....
- B. Chewing problems. Yes.....No.....
- C. Refusing different textures of food. Yes.....No.....
- D. Fussiness or lack of alertness during feeding. Yes.....No.....
- E. Refusing to eat and drink food and water. Yes.....No.....
- F. Spitting up. Yes.....No.....
- G. Food allergies. Yes.....No.....
- H. Vomiting. Yes.....No.....
- I. Excessive drooling. Yes.....No.....

D: Dietary recall and food preferences at age 06 to 24 months

Q26. Did your child eat porridge yesterday during the day or at night?" Yes..... No.....

Don't Know.....

Q27. Did your child drink any of the following liquids yesterday during the day or at night?

A). Breast milk? Yes..... No.....I don't know.....

B). Plain water? Yes..... No.....I don't know.....

C). Commercially produced infant formula eg lactogen? Yes..... No.....I don't know.....

D). Any fortified, commercially available infant and young child food" [e.g. Cerelac]?

Yes.....No..... don't know.....

E). Any (other) porridge e.g flour? Yes..... No..... I don't know.....

F). Any other milk such as tinned, powdered, or fresh animal milk? Yes.....No.....I don't know.....

G). Fruit juice? Yes.....No.....I don't know.....

H) Tea or coffee? Yes.....No.....I don't know

I). Any other liquids such as sugar water, carbonated drinks? Yes..... No..... I don't know..... J). Liquid or semi-liquid traditional medicine (herbs)? Yes..... No..... I don't

know..... Q28. Did your child drink anything from a bottle with a nipple yesterday or last night?

Yes..... No.....I don't know.....

Q29. Does your child eat any of the following foods during the day or at night?

A). Any foods made from grain (for example, made with millet, sorghum, maize, rice, wheat, or other local grains, porridge, bread)? Yes..... No..... I don't know.....

B). Carrots, or yellow sweet potatoes? Yes..... No.....I don't know.....

C). Any other food made from roots or tubers (for example, white potatoes, yam, cassava, or other local roots/tubers)? Yes.....No..... I don't know.....

D). Any dark green leafy vegetables (for example, cassava leaves, bean leaves, or other dark green leaves eg kenaf etc)? Yes..... No.....I don't know.....

E). Ripe mango, ripe pawpaw (or other local vitamin A-rich fruits)? Yes..... No..... I don't know.....

F). Any other fruits and vegetables (for example, banana, avocados, tomatoes, onions, apples, oranges, others)? Yes..... No..... I don't know.....

G). Any beef, pork, lamb, goat, rabbit (or wild game meat)? Yes.....No..... I don't know.....

H). Any chicken, duck, or other birds? Yes..... No.....Don't know.....

I). Any fresh or dried fish? Yes..... No..... I don't know.....

J). Any eggs? Yes..... No..... Don't know.....

K). Any foods made from beans (for example, made with cowpeas, soybeans or others)? Yes..... No.....I don't know.....

L). Any groundnuts/peanuts, or any other nuts? Yes..... No..... Don't know.....

Q30. Which are the favorite foods of your child like best?

.....
.....
.....
.....

Q31. What challenges does your child face in eating his/her most preferred foods?

.....
.....

.....
Q32. What challenges do you face as a caregiver in feeding your child even with his/her most preferred foods?

.....
.....
.....

E. Nutritional indicators of children

Q33. Age of child in months.....

Q34. Weight of child in kilograms.....

Q35. Length (Lying) of child in centimeters.....

*Weight-for-Age.....

*Weight-for-Height (Length).....

*Height (Length)-for-Age.....

Thank you for your time and answer

