UNIVERSITY OF CAPE COAST

FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN UNDER TWO YEARS IN KWAHU AFRAM PLAINS NORTH AND SOUTH DISTRICTS IN GHANA

CHRISTIANA NSIAH-ASAMOAH

2020

UNIVERSITY OF CAPE COAST

FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN UNDER TWO YEARS IN KWAHU AFRAM PLAINS NORTH AND SOUTH DISTRICTS IN GHANA

BY

CHRISTIANA NSIAH-ASAMOAH

Thesis submitted to the Department of Population and Health, Faculty of Social Sciences, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Doctor of Philosophy Degree in Population and Health.

MARCH 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: .... Date: ....

Name: Christiana Nsiah-Asamoah

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature: .... Date: ....

Name: Dr. David Teye Doku

Co-Supervisor's Signature: ....Date: ....

Name: Dr. Samuel Agblorti

ABSTRACT

Child undernutrition is a public health problem. In Ghana, less than one out of five children is fed on a minimum acceptable diet. However, less is known about the cultural dynamics of child feeding practices. Also, most previous studies focused on just single feeding indicators and this does not allow for a holistic assessment of how feeding practices determine the nutritional status of children. The purpose of this study was to explore the socio-cultural, maternal and household factors that influence the feeding practices and the nutritional status of children under two years in the Kwahu Afram Plains North and South Districts of Ghana. Moreso, a composite feeding index was constructed and its associations with the nutritional status of children were examined. Focused group discussions were conducted involving grandmothers and health workers to collect qualitative data. For the quantitative data, 935 mothers were interviewed to assess maternal and household factors that are associated with the feeding practices and nutritional status of children. The qualitative data was thematically analysed while logistic regression models were used to determine the association of the maternal and household factors with the feeding and nutritional status. The results revealed that cultural norms prevent mothers from exclusively breastfeeding their babies and feeding them with certain nutritious foods. Only 37.0% and 22.1% of the children had a minimum dietary diversity score and a minimum acceptable diet respectively. The prevalence of wasting (19.1%), underweight (29.5%) and stunting (20.4%) were high. Small household size, access to a toilet facility, being employed, a high educational level, high decision-making power and financial independence of a mother were associated with a higher likelihood of children receiving an adequate minimum acceptable diet. Education on the importance of child nutrition, family planning and crop diversification, providing employment opportunities for mothers and improvement in girl-child education is recommended.

KEY WORDS

Composite Feeding Index

Household-factors

Maternal-factors

Nutritional Status

Socio-cultural factors

Under-2 years

ACKNOWLEDGEMENTS

I am very grateful to my supervisors, Dr. David Teye Doku and Dr. Samuel Agblorti for their intellectual guidance, encouragement, patience in reading and editing my thesis and for the various insightful comments that helped me immensely at various stages of this work.

I would like to express my profound gratitude to the data collection team comprising Mr. David Kwame Tsotorvor, Ms. Victoria Parkoo, Mr Fabrics Asinyo, Mr Frank Kwasi Arthur and Mr Isaac Manford, who are all staff of the District Health Directorate. I acknowledge the support and technical advice given by the two District Health Directors, Mr. Robert Kweku Bio and Mrs. Joana Amankwah.

Special mention is deserved by my mentors Prof. (Mrs) Sarah Darkwah, Prof. (Mrs) Elizabeth Afriyie and Dr. Eugene Johnson. Their constant asking about the progress of work spurred me on greatly. I am also indebted to my parents, Mr. and Dr (Mrs) Thomas Buxton and my brother Dr. David Buxton for their encouragement and support in various ways, including proof-reading my work. I am very grateful to my husband, Dr. Prince Nsiah-Asamoah, for his understanding of my academic ambition, encouragement and invaluable support. I am also very grateful to my daughter, Priscilla, for enduring my frequent absence from home in pursuit of this work. Finally, I would like to extend my sincere appreciation to all my colleagues and friends who, in diverse ways contributed to the completion of this work. May the Lord richly bless you all.

DEDICATION

To my family

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

CHV	Community Health Volunteer
CHW	Community Health Worker
CWC	Child Welfare Clinic
DHS	Demographic Health Surveys
GDHS	Ghana Demographic Health Survey
GHS	Ghana Health Service
GSS	Ghana Statistical Service
ICFI	Infants and Young Children Feeding Index
IYCF	Infant and Young Child Feeding
KAPND	Kwahu Afram Plains North District
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MFF	Meal Feeding Frequency
MICS	Multiple Indicator Cluster Survey
MMF	Minimum Meal Frequency
SSA	sub-Saharan Africa
UNICEF	United Nations International Children's Emergency Fund
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

Background to the Study

According to the Convention on the Rights of the Child, every infant and child has the right to good nutrition (World Health Organization (WHO), 2016). However, the WHO and the 2018 Global Nutrition Report reveal that infants and young children bear the greatest burden of undernutrition which contributes to approximately 45% of deaths in children aged under 5 years, worldwide (Fanzo, Hawkes, Udomkesmalee, Afshin, Allemandi, Assery & Corvalan, 2018; WHO, 2018). Undernutrition in children is usually exhibited as a permanent growth impairment which results in becoming too-short for one's age (stunting), too thin for one's height (wasting), too light for one's age (underweight) and in micronutritient deficiency disorders such as iron deficiency anaemia and vitamin A deficiency disorders (Hawkes, Demaio & Branca, 2017). Malnutrition rates remain alarmingly high, globally. Stunting is declining too slowly while wasting still impacts the lives of far too many young children (UNICEF/WHO/World Bank Group, 2019). Consequently, it has been reported that progress in ending all forms of malnutrition is still limited and insufficient, and malnutrition remains a serious concern for most regions and nations (Hawkes, Demaio & Branca, 2017).

Undernutrition has profound short-term and long-term consequences at the individual, household, community, national and international levels. At the individual level, apart from irreversible outcomes of stunting, undernutrition results in sub-optimal brain and cognitive development and significantly increased risks of many chronic and infectious diseases (Tegegne, Sileshi, Benti, Teshome & Woldie, 2017). At the household level, malnourished children are at higher risks of being repeated in their classes (due to absenting themselves often from school) and of even dropping out of school, which can result in a 20% lower earning capacity during the adulthood stage of life (Demaio & Branca, 2018). Consequently, malnourished children during the adulthood stage of life have a reduced ability to meet the economic needs (adequate access to nutritious foods, health services and a healthy house environment) of their households (Ntenda & Chuang, 2018; Reinhardt & Fanzo, 2014). At the national level, poor nutrition in children has ill effect on the productivity of countries and causes both economic and social challenges among vulnerable groups (Akombi, Agho, Merom, Renzaho & Hall, 2017; Leroy, Ruel, Frongillo, Harri & Ballard, 2015).

The first months of a child’s life (0-23 months) are a very critical phase during which rapid physical and mental development occurs (De Onis & Branca, 2016). Consequently, infant and young child feeding (IYCF) is crucial, and inappropriate practices can have an irreversible negative effect on a child's development, health and morbidity status (Akombi et al., 2017; De Onis & Branca, 2016). Appropriate nutrition to support both physical growth and brain development is, therefore, essential during the early days of life, before a child attains two years of age (Larson & Yousafzai, 2017; Prado & Dewey,2014).

Although the world as a whole has been accelerating progress in reducing the under-5 mortality rate, disparities exist in under-5 mortality across regions and countries. Sub-Saharan Africa remains the region with the highest under-5 mortality rate in the world, with 1 child in 13 dying before his or her fifth birthday, 14 times higher than in high income countries (WHO, 2018; Walson & Berkley, 2018). Among these childhood mortality cases, more than two - thirds are associated with non-recommended and inappropriate child feeding practices such as non-exclusive breastfeeding for the first six months of life and late start of complementary feeding at 6 months of age (Haddad, Achadi, Bendech, Ahuja, Bhatia, Bhutta & Eriksen, 2015).

Africa's situation is very bleak, since one-third of the world's undernourished children reside in the region (Akombi et al., 2017; Black et al., 2013). In Sub-Saharan Africa, reports indicate that inadequate IYCF practices are among the major causes of the high prevalence of stunting, wasting and underweight in children (Kimiywe & Chege, 2015). With regard to stunting, approximately 149 million children under 5 in the world are stunted (UNICEF, WHO, World Bank Group, 2019). In 2018, more than half (55%) of all stunted children under 5 lived in Asia and more than one third (39%) lived in Africa. With respect to wasting, in 2018, more than two thirds (68%) of all wasted children under 5 lived in Asia and more than one quarter (28%) lived in Africa. The situation, with regard to stunting, is worse in sub-Saharan Africa (SSA) − whereas the number of stunted children has fallen in all regions, the figure in SSA increased from 50.3 million in 2000 to 58.8 million in 2018 (UNICEF, WHO & World Bank Group, 2019).

To help tackle the debilitating effects of stunting, the World Health Assembly adopted the internationally set target of reducing by 40% the number of stunted children under five years by 2025 (United Nations Children's Fund (UNICEF), 2013). In addition, WHO and UNICEF continue to reiterate that infant and young child feeding is a key area that needs to be addressed in order to improve child survival and promote healthy growth and development (WHO, 2016). With the adoption of the 2030 Agenda for Sustainable Development, the quest to improve infant and young child feeding practices has become more urgent than ever. Good nutrition in early life is central to achieving Sustainable Development Goal (SDG) 2 on ending hunger, achieving food security and improving nutrition. Specifically, Target 2.2 of SDG Goal 2 aims at ending all forms of malnutrition by 2030 and achieving, by 2025, the internationally agreed targets on stunting and wasting in children under five years of age.

In 2002, the World Health Organization and UNICEF adopted the Global Strategy for Infant and Young Child Feeding (IYCF). The Global Strategy is based on the evidence (regarding the importance) of nutrition in the early months and years of life, and of the crucial role that appropriate feeding practices play in achieving optimal health outcomes. The strategy indicates recommended and appropriate feeding practices, such as exclusive breastfeeding and timely, adequate and safe complementary feeding (WHO, 2003). Yet, for more than a decade after the introduction of IYCF practices, compliance has been shown to be very low. For example, current global breastfeeding rates reported by the WHO in 2018 indicate that less than half (42%) of newborns begin breastfeeding in the first hour after birth (WHO, 2018). In addition, UNICEF global databases, 2018 (based on MICS, DHS and other nationally representative sources for countries between 2013-2018) indicate that 41% of infants less than 6 months of age are exclusively breastfed, far short of the 2030 global target of 70% (UNICEF, 2018; WHO, 2018).

According to the 2014 Ghana Demographic Health Survey (GDHS 2015), 19 percent of children under five years of age were stunted (short for their age), 5 percent were wasted (thin for their height), and 11 percent were underweight (light for their age) (Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF International, 2015). Although the national prevalence rates for stunting, wasting and undeweight indicate that some positive "strides" have been achieved in Ghana, particularly when these rates are benchmarked against those in other African countries (UNICEF, WHO & World Bank, 2018), they are still higher than the World Health Organization's (WHO) classification of low prevalence (Frempong & Annim, 2017). Again, the prevalence figures for stunting and wasting are higher than the thresholds developed by the WHO–UNICEF Technical Expert Advisory Group on Nutrition Monitoring (De Onis, Borghi, Arimond, Webb, Croft, Saha & Hayashi, 2019). Therefore, notwithstanding any progress made, there is the need to investigate the "drivers" of child malnutrition in Ghana. This has become necessary in view of the fact that there has been no steady downward trend of the indicators, particularly those that assess compliance to recommended infant and young child feeding practices which influence the nutritional status of children under two years.

The situation regarding non-compliance to recommended infant and young child feeding practices by mothers and caregivers in Ghana is not different from what it is in most developing countries. With respect to breastfeeding, the 2014 GDHS findings revealed that approximately 52% of children younger than 6 months were exclusively breastfed. This proportion is less than the 63% reported in the 2008 GDHS. However, both the 52% and 63% are far below the 100% recommendation. These figures also suggest that the practice of exclusive breastfeeding appears to be declining gradually over time in Ghana (Ghana Statistical Service [GSS], Ghana Health Service [GHS], 2015). Regarding complementary feeding, findings from the GDHS (2014) revealed that overall, only 15% of breastfed children in the 2014 GDHS were able to meet the minimum standards of feeding practices with respect to food diversity and feeding frequency (Ghana Statistical Service (GSS), Ghana Health Service (GHS), 2015).

Among non-breastfed children aged between 6 and 23 months, only 5% had their feeding practices agreeing with three of the eight WHO's core indicators for assessing IYCF practices (GSS/GHS, 2015), namely, being fed with other milk or milk products at least twice a day, receiving the minimum meal frequency of 4 solid or semi-solid foods and eating from at least four food groups, apart from the milk or milk products food group (WHO, UNICEF, IFPRI, UC Davis, USAID, FANTA, 2008). Overall, only 13% of children aged between 6 and 23 months were fed a minimum acceptable diet (MAD), according to the three core infant and young child feeding (IYCF) practices (GSS/GHS, 2015). These findings from the 2014 GDHS reveal that there exists a significant gap in explaining why, in spite of the implementation of the IYCF guidelines, policies and interventions in Ghana, there is still low compliance with the recommended practices. In addition, these findings among children highlight the pressing need for developing contextualized interventions to prevent malnutrition by targeting and improving IYCF practices.

Before any effective contextualized intervention can be developed to address malnutrition in children, the socio-cultural factors that influence the feeding of children have to be explored (Akombi et al., 2017; Mwaseba et al., 2016). The Global Strategy for Infant and Young Child Feeding further emphasizes the need for those involved in promoting recommended IYCF practices (such as community health workers, public health nurses) to understand the socio-cultural and environmental circumstances around IYCF (WHO, 2003).

There is therefore the need for a better understanding of the drivers of inappropriate IYCF practices, as well as a better identification of vulnerable groups. However, until now, very few studies have been conducted to assess these multifaceted drivers or determinants of inappropriate IYCF practices at the maternal, household and community levels (Dorsey, Manohar, Neupane, Shrestha, Klemm & West, 2018; Ogbo, Page, Idoko, Claudio & Agho, 2015). In order to improve compliance with the recommended IYCF practices during this critical period of growth and development, a study that assesses factors influencing appropriate IYCF practices and the nutritional status of children is an important step in guiding the development of interventions to address this situation.

Statement of the Problem

Ghana happens to be one of the countries with a high proportion of children under five years being undernourished, although some strides have been made in tackling this public health nutrition issue (Amusgi, 2014). In Ghana, a number of interventions have been implemented to tackle undernutrition among children. These interventions include growth monitoring and promotion (GMP) activities, advocacy and support for early initiation of breastfeeding within 30 minutes after birth, exclusive breastfeeding for the first 6 months of a child's life, vitamin A supplementation given to children until 5 years, zinc supplementation, behaviour change communication on infant and young child feeding, and community management of severe acute malnutrition (Yawson, Amoaful, Senaya, Yawson, Aboagye, Mahama et al., 2017; Gongwer & Aryeetey, 2014). However, Gongwer and Aryeetey (2014) asserted that although challenges to scaling up nutrition actions are well-known at the national level; little is known about the state of affairs at the district and sub-district levels where nutrition interventions are directly implemented. Hence, more studies have to be undertaken at the district level to assess the multi-factorial causes of poor IYCF practices which ultimately affect the nutritional status of children.

From the 2014 GDHS, the national prevalence figures on the three main indicators of undernutrition indicate that in Ghana 19%, 5% and 11% of children under five years were stunted, wasted and underweight respectively. However, these prevalence figures focus on trends at the national level and largely mask important departures at the district and community levels. For instance, stunting, wasting and underweight prevalence figures that are higher than these national figures have been reported in previous studies that were conducted at the regional and district levels in Ghana (Atsu, Guure & Laar, 2017; Glover-Amengor et al., 2016). For example, Atsu et al.'s (2017) study, based on the fourth round of the Ghana Multiple Indicator Cluster Survey (MICS 4) reported that out of 7550 children studied, the prevalence rates for stunting, underweight and wasting were 27.5%, 17.3% and 7.7% respectively.

The 2014 GDHS results indicate that, among all children aged 6-23 months, only 13 percent were fed the minimum acceptable diet (MAD). About half (52%) of children under 6 months were exclusively breastfed. In addition, 28 percent ate food prepared from four or more food groups (a measure of dietary diversity), and 43 percent received food the minimum number of times recommended for their age (minimum meal frequency).

To address the problem of inadequate dietary intake and its influence on the poor nutritional status of children in Ghana, there is the need to obtain a holistic view of how feeding practices (together represented by a composite feeding index) determine the nutritional status (growth) of children (Pagui, 2015; Reinbott, Kuchenbecker, Herrmann, Jordan, Muehlhoff, Kevanna & Krawinkel, 2015). Therefore, estimating an infant and child feeding index (ICFI) (which takes into consideration all the core feeding indicators of children) is now being emphasized worldwide (Lohia & Udipi, 2014; Reinbott et al., 2015). This is because child feeding practices encompass a series of inter-related behaviours that must be considered simultaneously in order to accurately reflect how they influence the nutritional status (growth) of children (Chaudhary, Govil, Lala & Yagnik, 2018; Reinbott et al., 2015).

In Ghana, the majority of studies on child feeding practices and how they influence the nutritional status of children focused on single feeding indicators, such as breastfeeding (Asare, Preko, Baafi & Dwumfour-Asare, 2018; Issaka, Agho & Renzaho, 2017; Aryeetey & Goh 2013). Other studies that have been conducted in Ghana laid emphasis on the age at which infants were introduced to complementary foods and how it determined their nutritional status (Glover-Amengor et al., 2016; Abang, 2013). Furthermore, some studies in Ghana assessed how the number of food groups eaten at meals (as a means to assess dietary diversity and nutritional quality) influences the nutritional status of children (Ali, Abu, Ankamah, Gyinde, Seidu & Abizari, 2018; Frempong & Annim, 2017; Abang, 2013). However, focusing on just single feeding indicators does not allow a holistic assessment of how feeding practices, taken together, determine the nutritional status of children (Pagui, 2015). As indicated by Pagui (2015) and Saaka et al., (2016), there is a dearth of information in the literature on the association between a composite feeding index and the nutritional status of children in Ghana. Therefore, this study was conducted to assess how the composite feeding index (ICFI), a cumulative feeding score, determines the nutritional status (growth) of children.

Aside inadequate ICFI evidence on growth of children, studies have shown that both maternal and household choices made regarding IYCF practices are based on a number of complex issues, including economic conditions and widely-shared cultural norms and beliefs (Wanjohi et al., 2017; Mwaseba et al. 2016). Consequently, Akombi et al. (2017) and Mwaseba et al. (2016) emphasized that before any nutrition-based intervention which targets children can be successfully introduced and implemented, it is necessary to take into consideration the socio-cultural uniqueness of each sub-region and identify, understand and improve upon the native and local child-feeding practices which include food-related beliefs and norms. Studies that have been undertaken in Ghana in the area of socio-cultural influences on IYCF practices have largely focused on how cultural practices negatively affect breastfeeding practices (Mensah, Acheampong, Anokye, Okyere, Appiah-Brempong & Adjei, 2017; Ndekugri, 2017; Pedovoah, 2015; Sika-Bright & Oduro, 2013). The aspect regarding how socio-cultural factors influence complementary feeding has not been studied to a large extent in Ghana.

To the best of the researcher's knowledge, there is only one study that has assessed patterns of cultural consensus and intracultural diversity in complementary feeding practices in the erstwhile Brong-Ahafo Region (Kalra, Pelto, Tawiah, Zobrist, Milani, Manu & Parker, 2017). Kalra et al. (2017) strongly recommended that more studies would be undertaken to explore the nature of the cultural determinants of child nutrition in other communities, particularly as part of implementation research, to inform the design of IYCF interventions. Also, Rogers, Bell & Mehta (2019) underscored the need to deeply understand the social and cultural roles played by grandmothers in child feeding, in order to engage them fully as stakeholders in children's nutritional health interventions. Therefore, the present study fills the gap and adds to the literature by exploring the socio-cultural factors that influence both breastfeeding and complementray feeding practices of children under two years, on the basis of reports and experiences of grandmothers, Community Health Workers (CHWs) and Community Health Volunteers (CHVs) in the Kwahu Afram Plains North and South districts of the Eastern Region.

The Eastern Region was purposively selected for this study because, according to the GHDS (2014) report, only 4 percent of children residing in the region received a minimum acceptable diet. Specifically, this study was conducted in two districts − the Kwahu Afram Plains North District (KAPND) and the Kwahu Afram Plains South District (KAPSD) − which were ranked as the first and second districts with the highest prevalence of underweight among children in the Eastern Region in both 2013 and 2014 (Eastern Region Health Directorate, 2013; 2014).

There is a dearth of information on how socio-cultural, household and maternal factors influence IYCF practices in Ghana; and these relationships have not been investigated among children under two (2) years in the Kwahu Afram Plains North and South Districts of Ghana. In view of the knowledge gaps and recommendations in the literature, the overall goal of this study was to assess the socio-cultural, household and maternal factors that influence IYCF practices and the nutritional status of children under two years living in the Kwahu Afram Plains North and South Districts of the Eastern Region of Ghana. In addition, this study was conducted to investigate how the IYCF practices of children (estimated as a composite feeding index) determine their nutritional status.

Research Questions

The study sought to address the following questions:

1. How does socio-cultural factors influence breastfeeding practices?
2. How does socio-cultural factors influence complementary feeding practices?
3. What are the household factors which influence the feeding practices and nutritional status of children?
4. Which maternal factors are associated with the feeding practices and the nutritional status of children?
5. What is association between the feeding practices (summarized as a composite feeding index) of children and their nutritional status.

Objectives of the Study

The main aim of this study was to investigate the feeding practices and the nutritional status of infants and children aged between 0 and 23 months in the Kwahu Afram Plains South and North Districts of the Eastern Region of Ghana to provide a knowledge basis for policy-development to improve child nutrition and health.

Specifically, the study sought to:

1. explore the socio-cultural factors that influence breastfeeding practices of children;
2. investigate the socio-cultural factors that influence complementary feeding

practices of children;

3. assess household factors which influence child feeding practices and the nutritional status of children;
4. determine the association of maternal factors with the feeding practices and the nutritional status of children;
5. assess the association between the feeding practices (summarized as a composite feeding index) of children and their nutritional status.

Hypotheses

1. H_0 - There is no statistically significant relationship between household factors, and the feeding practices and nutritional status of children.
2. H_0 - There is no statistically significant relationship between maternal factors, and the feeding practices and nutritional status of children.
3. H_0 - There is no statistically significant relationship between the composite feeding index and the nutritional status of children in the selected districts in the Eastern Region of Ghana.

Significance of the Study

The first two years of life have been described as a critical window of opportunity for safeguarding appropriate growth and development through optimal feeding (Cusick & Georgieff, 2014) which staves off undernutrition and gives children the best start in life (Maalouf-Manasseh, Oot & Sethuraman, 2016). Hence, a study which focuses on investigating the feeding practices and nutritional status of children under 2 years is worthwhile, considering reports that investments in optimum nutrition before a child attains two years prevent the devastating, lifelong consequences of childhood malnutrition and enable children to be healthy, educated and become productive members of society (Shekar, Kakietek, Dayton Eberwein & Walters, 2017).

The study will also add to the body of literature that will help the Ministry of Health and other stakeholders to make evidence-based decisions when addressing the gaps in child nutrition policies and programmes and hence reduce the incidence of malnutrition and its complications, particularly during the critical first two years of life. Findings from this study could provide explanations to some of the key socio-cultural factors that influence IYCF practices and may inform District Health Directorates and healthcare providers in developing culturally-sensitive programmes and services for addressing barriers to optimal IYCF practices.

In addition, by determining the factors that influence IYCF practices and the nutritional status of children, healthcare providers can be primed with information that would help them to plan health education talks and provide better support, including appropriate counselling to caregivers at the district level.

Delimitation of the Study

The study was limited to two districts − the Kwahu Afram Plains North District (KAPND) and the Kwahu Afram Plains South District (KAPSD) − which have been ranked as the first and second districts with the highest prevalence of underweight in the Eastern Region in both 2013 and 2014 (Eastern Region Health Directorate, 2013; 2014). The study focused on investigating socio-cultural factors, as well as household and maternal factors that influence IYCF practices and the nutritional status of children under two years in these districts. This is because socio-cultural, household and maternal factors have been pointed at as particularly influencing IYCF, and are considered critical for the survival, growth and development of children (Stewart, Iannotti, Dewey, Michaelsen & Onyango, 2013).

The target group for this study included mothers with their children aged between 0 and 23 months. Any child suffering from a medical condition that interferes with feeding (e.g. cleft palate) was excluded from the study. The study participants were recruited at Child Welfare Clinics (CWCs) and Reproductive and Child Health (RCH) departments in various health facilities. The study participants also included Community Health Workers (CHWs) and Community Health Volunteers (CHVs) who were involved in providing community outreach health services through home visits, and grandmothers of children aged between 0 and 23 months.

Definition of Terms

Terms and concepts can have varied senses and definitions. In order to fully understand the terms as used in this work, this section provides a definition of relevant key terms.

Complementary Feeding Practices: They cover the time of introduction of solid and semi-solid foods or soft foods, frequency of feeding, dietary diversity, consumption of iron-rich foods and continued breastfeeding among children 6-23 months old (PAHO/WHO, 2003).

Exclusive Breastfeeding: It is the feeding process by which a child below six months is fed breast milk only, with no addition of any liquid or solids, apart from drops or syrups consisting of vitamins, mineral supplements or medicine, and nothing else (WHO/UNICEF, 2010). In the present study, mothers with babies below 6 months of age who fed their babies on only breastmilk a day before the study were considered those currently practising exclusive breastfeeding.

Inappropriate feeding practices: Include not exclusively breastfeeding infants the first six months of life and starting complementary feeding before 6 months of age. They also include not feeding children on a variety of foods (feeding from < 4 food groups) and not feeding children daily the recommended number of times based on their ages. Children 6-8 months, 9-11 months and 12 -23 months should be fed 2-3 times, 3-4 times and >4 times respectively.

Infant: An infant is a child below one year or 12 months of age (WHO, 2013)

Minimum Meal Frequency: A child feeding practice indicator that indicates the proportion of children aged 6 –23 months of age in a population who receive solid, semi-solid or soft foods the minimum number of times or more the previous day, minimum being defined as: two times for breastfed infants 6 –8 months; three times for breastfed children 9 –23 months; and four times for non-breastfed children 6 –23 months (WHO, 2008). It is the least number of times the infant is given solids, semi-solids or soft food in 24 hours. On the basis of the WHO guidelines for feeding children who are 6 months old and above, it is at least 2 times for breastfed infants 6-8 months; at least 3 times for breastfed children 6-23 months; at least 4 times for non-breastfed children 6-23 months old.

Minimum Dietary Diversity Score: A child feeding practice indicator that indicates the proportion of children 6–23 months of age in a population who receive foods from four or more food groups during the previous day. The seven food groups used for computing this indicator are: grains, roots and tubers; legumes and nuts; dairy products (milk, yoghurt and cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables (WHO, 2008).

Minimum Acceptable Diet: It is one of the child feeding practice indicator that shows the proportion of breastfed children 6–23 months of age in a population who had at least the minimum dietary diversity and the minimum meal frequency during the previous day, and non-breastfed children 6–23 months of age who received at least two milk feedings and had at least the minimum dietary diversity, not including milk feeds and the minimum meal frequency based on 24 hours recall period (WHO/UNICEF, 2010).

Nutritional Status: Refers to the current body status of an individual or a population group related to their state of nourishment (the consumption and utilization of nutrients). Nutritional status was assessed by anthropometry which is the measurement of body height/length, weight and proportions (WHO Growth Standards, 2006).

Seven Food Groups: Food eaten by the child is categorized into: grains, roots and tubers; legumes and nuts; dairy products; flesh food (Animal source food);

eggs; vitamin Rich foods (yellow vegetables and fruits) and other fruits and vegetables.

Young child: This is a child aged between 12 and 24 months (WHO, 2013).

Organisation of the Study

The research is organized into nine chapters. Chapter One provides a background to the study and states the problem, rationale, questions, objectives and the significance of the study. Also, the chapter discusses the delimitations and limitations of the study and provides definitions of key terms. The second chapter reviews the empirical literature − evidence on various aspects of the feeding practices and nutritional status of infants and young children. Chapter Three discusses the theoretical literature − issues in the nutritional care of children, the conceptual framework that links the various concepts emerging from the literature review and that guided the study. Information regarding the methodology and the procedures used to gather and organize the data for the study is provided in Chapter Four. In this chapter, the research philosophy and design are also presented, followed by a description of the study area, population, sampling procedure, data collection instruments and procedures and data processing and analysis. Chapter Five discusses findings on the cultural practices that influence appropriate and recommended IYCF practices, based on reports from grandmothers, mothers-in-law, community health workers (CHWs) and community health volunteers (CHVs). Chapter Six presents findings on how household factors influence feeding practices and the nutritional status of children. Chapter Seven discusses findings on maternal factors that influence feeding practices and the nutritional status of children. Chapter Eight presents findings on the associaiction between the feeding indicators and nutritional status of children. The final chapter summaries the entire study, draws conclusions from the evidence, makes recommendations on the basis of the key findings and suggests areas for further research.

CHAPTER TWO

REVIEW OF EMPIRICAL LITERATURE

Introduction

This chapter focuses on a review of the empirical literature on infants' and young children's nutrition at the global, regional and country levels. The issues explored in this chapter are presented under seven sections. The first three sections deal with the literature on the global burden of poor child feeding practices and malnutrition, infant and young child feeding practices in Ghana and the nutritional status of children in Ghana. In the fourth to sixth sections socio-cultural, maternal and household factors that influence the feeding practices and nutritional status of children are presented. The last section is of account on previous studies that assessed the association between child feeding practices and the nutritional status of children.

In order to access and retrieve published articles related to child nutrition, a three-step search strategy was employed. The first step involved utilizing internet databases, such as MEDLINE, SCOPUS, PUBMED, HINARI, Cochrane Database of Systemic Reviews, Web of Science and the Combined Health Information Databases to search for related literature. Related strings in titles, abstracts, and indexing fields were identified. The second step entailed using all the identified key words and indexed terms to search for articles in the databases previously mentioned. The keywords used in the search for related literature were; infant feeding, breastfeeding, child undernutrition, complementray feeding, child malnutrition, child nutritional status, stunting, wasting and underweight. Other key words related to feeding indicators in children, such as minimum acceptable diet, dietary diversity scores, minimum feeding frequency, and infant and young child composite feeding index were also used in the search. Step three of the search involved referring to the reference list of the articles retrieved to search for additional studies related to the feeding practices and nutritional status of children by using Google Scholar and PDF Science meta-search engines.

The Global Burden of Poor Child Feeding Practices and Malnutrition

Malnutrition is one of the leading causes of mortality and morbidity among children in both low- and middle-income countries (Pravana, Piryani, Chaurasiya, Kawan, Thapa & Shrestha, 2017; Black et al., 2013). The 2018 Global Nutrition Report (GNR) reveals that child malnutrition is unacceptably high and affects every country in the world. The 2018 GNR assessment of progress in respect of nine targets to address child malnutrition reveals that only 94 of 194 countries are on track for at least one of the nine nutrition targets assessed. This suggests that most countries are significantly off-track, and no country is on course to meet all nine targets (Development Initiatives, 2018; Fanzo, Hawkes, Udomkesmalee, Afshin, Allemandi, Assery & Corvalan, 2018). Nutrition-related factors contribute to about 45% of deaths in children under 5 years of age, particularly among those with severe acute malnutrition who are at a high risk of dying from common childhood illnesses, such as diarrhoea, pneumonia, and malaria (WHO, 2018). The period between conception and 24 months of age is a critical period in life because it is the stage where inappropriate care and feeding practices typically increase the burden of child undernutrition and result in childhood morbidity and mortality (Som, Prak, Laillou, Gauthier, Berger, Poirot & Wieringa, 2018).

According to the 2019 edition of WHO, UNICEF and the World Bank (WB) Group's joint child malnutrition estimates, stunting threatened the lives of an estimated 149 million or 21.9% of children under 5 years worldwide in 2018. In 2018, wasting jeopardized the lives of over 49 million children under 5 years. In addition, in 2018 approximately 17 million of children under 5 years were severely wasted, globally (UNICEF/WHO/World Bank Group, 2019). In absolute terms, Africa is the only region where the number of stunted children has risen, with Western Africa accounting for half of this increase (FAO, IFAD, UNICEF, WFP & WHO, 2017). In the African region, the number of stunted children under 5 years rose from 50.3 million in 2000 to 58.8 million in 2018, an approximately 16.9% increase (UNICEF/WHO/World Bank Group, 2019).

In addition, reports from the Global Burden of Diseases (GBD) 2017 Risk Factors Collaboration reveal that currently a dual burden of malnutrition threatens the life of children, particularly in low and middle-income countries. The reports indicate that between 1975 and 2016, there has been an increase in the prevalence of obesity in children, which is greater than the rate of decline in undernutrition (Gakidou, Afshin, Abajobir, Abate, Abbafati, Abbas… & Abu-Raddad, 2017). Consequently, both Demaio and Branca (2018) and WHO (2018) reiterate that progress on ending all forms of malnutrition is still inadequate and unsatisfactory, and remains a serious concern in achieving both the ambitions of the UN Decade of Action on Nutrition and the Sustainable Development Goals for most regions and nations.

Ideally, infants should be breastfed within one hour of birth, breastfed exclusively for the first six months of life and continue to be breastfed up to 2 years of age and beyond. Starting at 6 months, breastfeeding should be combined with safe, age-appropriate feeding of solid, semi-solid and soft foods. Timely initiation of breastfeeding, exclusive breastfeeding and adequate feeding with complementary foods from 6 months onwards can prevent undernutrition and decrease the risk of infectious diseases, such as diarrhoea and pneumonia (NEOVITA Study Group, 2016).

With regard to timely initiation of breastfeeding after birth, UNICEF reports that globally, only 42% of babies are put to the breast within one hour of birth. Additionally, worldwide, only about two fifths (41%) of infants 0-5 months of age are exclusively breastfed. The UNICEF global databases also reveal that approximately 71% and 45% of infants continue breastfeeding by 1 year and 2 years respectively (UNICEF, 2018). Regarding timely introduction of solid, semi-solid or soft foods at 6 to 8 months, UNICEF (2018) indicates that only two thirds (69%) of children are benefiting from this practice. About one third of infants (6–8 months old) are not yet eating solid foods, which poses a threat to their growth and development (WHO, 2017).

In addition, global estimates, based on analyses of Multiple Indicator Cluster Surveys (MICS), Demographic Health Surveys (DHS) and other nationally representative data sources, obtained between 2013 and 2018 reveal that only 1 in 2 (50%) children aged between 6 and 24 months is fed the minimum number of times recommended for their age daily (minimum meal frequency). Again, 1 in 4 (25%) of young children aged between 6 and 23 months are fed a minimally diverse diet consisting of at least four out of seven food groups in a day. When both the minimum meal frequency and minimum diet diversity are taken into consideration, only one in 6 (16%) children are receiving a minimally acceptable diet (UNICEF, 2018). A little more than two thirds of 6-8 month olds are fed on any solid food at all. With respect to the measures of diet quantity and quality, the rates are much lower: approximately half (50%) receive a minimum meal frequency; and about 25% were fed on meals which met the requirement of minimum diet diversity.

According to UNICEF (2018), on the basis of a review of MICS, DHS and other nationally representative surveys that were held between 2013 and 2018, there are wide disparities among the regions in the world with regard to the levels of recommended IYCF practices. The proportion of infants that are timely breastfed within one hour of birth ranges from about 40 per cent in West and Central Africa and South Asia to approximately 65 per cent in Eastern and Southern Africa (UNICEF, 2018). With respect to the minimum diet diversity, to some degree, similar rates are identified across regions. Compared with approximately 20% children 6-23 months old in Eastern and Southern Africa and South Asia, about 25% children in West and Central Africa receive the minimum diet diversity (UNICEF, 2018).

Nutritional Status of Children in Ghana

Ghana is "plagued" with undernutrition among children. Ghana is one of 36 countries in the world with the highest burden of stunting (Yawson et al., 2017). Mensah (2015) and Ofori-Attah (2013) highlighted that undernutrition contributes to about half of all child deaths beyond early infancy, whilst one out of every thirteen children in Ghana dies before their fifth birthday, mostly as a result of undernutrition. This literature review focuses on all the three main indicators of assessing the nutritional status of children, namely, stunting (too short- for- age), wasting (too thin- for- height) and underweight (too light- for-age).

Generally, an analysis of GDHS surveys conducted from 2003 to 2014 indicates that in Ghana some progress has been made with regard to improving the nutritional status of children, although the current prevalence rates of malnutrition remain higher than international cut-off figures (Frempong & Annim, 2017). Findings from the latest GDHS conducted in 2014 indicated that the proportion of stunted children decreased substantially from 28% in 2008 to 19% in 2014. Similarly, the prevalence of wasting also decreased from 9% in 2008 to 5% in 2014. With regard to underweight, the proportion fell from 14% in 2008 to 11% in 2014.

The analysis presented above shows that generally, Ghana has made some gains in the reduction of undernutrition among children under-five years old. Stunting, for instance, has decreased among Ghanaian children from 33% in 1993 to 19% by 2014. Although the decrease is a positive development, approximately

42% reduction over 20 years is not good enough for Ghana to be able to meet the target set by the World Health Organization (WHO) that every country should endeavour to reduce childhood stunting by 40% by 2025. Besides, findings from recent surveys in Ghana show a persistently high burden of stunting among Ghanaian children (Atsu, Guure & Laar, 2017; Saaka & Galaa, 2016). For example, Atsu et al.'s (2017) study which involved anthropometric analysis of 7550 Ghanaian children found that the prevalence of stunting was 27.5%, underweight was 17.3% and wasting was 7.7%. Similarly, Ali et al.'s (2017) study involving a sample of 425 mother-child pairs drawn from 25 clusters reported that the prevalence of stunting, wasting and underweight were 28.2%, 9.9% and 19.3% respectively.

Although the picture with regard to stunting is not as bright as expected, it appears that some gains have been made in the attempt to reduce the number of children who are underweight and wasted. Between 1993 and 2014, underweight among Ghanaian children has significantly decreased from 23% in 1993 to 11% in 2014, about 52% reduction over 20 years. This means that, in 2014 Ghana achieved the United Nations Millennium Development Goals (MDGs) target set for all developing countries to reduce underweight by half by 2015. This is an absolutely positive progress for Ghana. However, more efforts are still needed to sustain this achievement or further improve upon it. With regard to wasting, there has been some progress resulting in a decline in the proportion of wasted children from 14% in 1993 to 5% in 2014, about 64% reduction over 20 years.

State of Infant and Young Child Feeding Practices in Sub-sahara Africa and Ghana

What and how children are fed, particularly in the first two years of life, is critical to their health, development and survival. In Ghana, past studies report that inappropriate complementary feeding practices are associated with undernourishment, which negatively impacts children's growth and development (Saaka, Larbi, Mutaru & Hoeschle-Zeledon, 2016; Pagui, 2015; Issaka et al., 2015). It has been indicated that although many lower-income countries, including Ghana, have made steady progress towards meeting exclusive breastfeeding goals, less has been achieved with regard to complementary feeding (Aaron, Strutt, Boateng, Guevarra, Siling, Norris & Foriwa, 2016). Findings from the 2014 Ghana Demographic and Health Survey (GDHS) indicated that although 71% of infants in the first 6 months of life are predominantly breastfed, only 31% of children aged between 6 and 23 months received optimal age-appropriate IYCF practices during the complementary feeding period of their lives (Ghana Statistical Service/Ghana Health Service, 2015).

With regard to the Minimum Dietary Diversity (MDD) among breastfed infants aged 6-23 months, 68% were given foods from four or more food groups in the 2008 GDHS survey, which, however, declined to 24% in the 2014 GDHS. Regarding the Minimum Meal Frequency (MMF) among breastfed children, the proportion declined slightly from 50% in the 2008 survey to 45% in the 2014 survey. With respect to the Minimum Acceptable Diet (MAD) among breastfed infants, this indicator also decreased substantially from 41% in the 2008 survey to 15% in the 2014 survey.

Among non-breasting infants aged 6-23 months, the MDD significantly decreased from 74% in the 2008 GDHS to 49% in the 2014 survey. On the contrary, among non-breastfeeding infants, the proportion that were fed at least the minimum number of times (MMF) significantly increased from 22% in the 2008 survey to 37% in the 2014 survey. Overall, among non-breastfed infants, the proportion that received a minimum acceptable diet significantly reduced from 11% in the 2008 survey to 5% in the 2014 survey. Among all children aged 6-23 months, the proportion of children who were given food from at least four food groups in 24 hours prior to the study greatly declined from 69% in the 2008 GDHS to 28% in the 2014 survey. Similarly, for the MMF indicator among all children aged 6-23 months, there was a marginal decrease from 46% in the 2008 survey to 43% in the 2014 survey. Likewise, for the MAD indicator, there was a substantial reduction from 36% in 2008 to 13% in the 2014 survey.

Obviously, the figures comparing IYCF practices between 2008 and 2014 reveal that there have been declines in the proportion of children in Ghana who meet the requirements for appropriate IYCF practices; and the current rates remain unacceptably low. The trends indicate that a higher proportion of children aged 6-23 months are not meeting the minimum standards with respect to dietary diversity, feeding frequency and being fed on an acceptable diet. Consequently, research efforts need to be intensified to identify factors leading to this decline in adhering to the recommended IYCF practices.

It is also worthwhile to note that the 2014 GDHS highlights that there are regional differences with respect to the proportions of children who are fed a minimum acceptable diet daily. In the 2014 GDHS, it was reported that whereas children living in the Central Region of Ghana were most likely to receive the minimum acceptable diet (27%), those in the Eastern Region were the least likely (4%). This demonstrates that looking at the problem of poor IYCF practices with a national lens could be misleading and may conceal important differences in various settings at the regional, district or community levels.

Determinants of Feeding Practices and Nutritional Status of Children

The factors that predispose infants and young children to undernutrition are complex and multidimensional (Abera, Dejene & Laelago, 2017; Tegegne et al., 2017). The factors may be child-related (Tariq, Sajjad, Zakar, Zakar & Fischer, 2018); maternal-related (Kabir & Maitrot, 2017) and caused by household factors (Kabir & Maitrot, 2017; Mitchodigni, Hounkpatin, Ntandou-Bouzitou, Avohou, Termote, Kennedy & Hounhouigan, 2017). Socio-cultural factors also stand out as significant barriers to adhering to recommended infant and young child feeding practices (IYCF) (Kabir & Maitrot, 2017; Mwaseba, Kaarhus & Mvena, 2016).

Socio-Cultural factors influencing the feeding practices of children

According to UNICEF (2016), families all over the world are clearly facing complex social and cultural barriers to providing children with adequate quantities of safe, nutritious and age-appropriate foods.With respect to infant feeding, cultural practices, myths, misconceptions and beliefs influence mothers' decisions regarding the initiation and duration of breastfeeding particularly in low-income countries (Wanjohi et al., 2017; Mwaseba et al., 2016; Kimani-Murage et al., 2015; Tampah-Naah & Kumi-Kyereme, 2013). Tampah-Naah and Kumi-Kyereme (2013) assert that the limited practice of exclusive breastfeeding in all regions of Ghana can be attributed to cultural beliefs.

Findings from several studies have revealed that mothers or relatives usually give water and other concoctions to infants because of the perception that it is a means of quenching their thirst or it is a sign of welcoming them into the world (Jimoh et al., 2017; Tariku et al., 2016; Legesse et al., 2014).

Generally, in most African settings, grandmothers (GMs) play a central role in various aspects of child rearing practices within the family unit; and they largely do not encourage exclusive breastfeeding for the first six months of a child's life (Jama, Wilford, Masango, Haskins, Coutsoudis, Spies & Horwood, 2017; Negin, Coffman Vizintin, & Raynes-Greenow, 2016; Thet et al., 2016; Agunbiade & Ogunleye, 2012). In the study by Jama et al., (2017) which was undertaken in KwaZulu-Natal, South Africa, some of the mothers reported that they were pressured by their grandmother to introduce complementary foods at two months and hence prevented them from exclusively breastfeeding their babies.

Other studies in African countries highlighted the cultural practice of giving infants herbal mixtures, drinks and concoctions for allegedly protective purposes after birth in Uganda (Kayom, Kakuru & Kiguli, 2015), Northern Ghana

(Dako-Gyeke, 2015; Aborigo et al., 2012), Nigeria (John et al., 2015) and Kenya (Kimiywe & Ndungu, 2015). Dako-Gyeke's (2015) study in Northern Ghana revealed the cultural practice of performing "*pakopilla*" rituals in which a newly born baby is fed with herbal concoctions or tea for a number of days. These concoctions and tea are perceived to protect the infant against diseases and any harm which could be caused by "*pakopilla*" (a white widow).

Some cultural practices, beliefs and traditions also result in the discarding of colostrum which must be given to new-born babies within the first hour of their lives, as recommended by WHO and UNICEF (UNICEF, 2016). Practices associated with colostrum discarding, withholding or avoidance have been reported in several studies conducted in developing countries (Yimer & Liben, 2018; Gebreyesus, Girma, & Cherie, 2017; Tariku et al., 2016; Legesse et al., 2015). In some studies, mothers reported that they discarded their colostrum because of the belief that it is inadequate nutritionally, dirty, pus- like, and was detrimental to the infant's health (resulted in the baby falling ill or even caused death) (Raman et al., 2016; Sharma et al., 2016). In a study that was carried out in two sub-districts in the Atwima Nwabiagya District of Ghana, it was reported that colostrum disposal was practised by approximately 46.7% and 33.3% of respondents in Abuakwa and Barekese respectively, because it was regarded impure, and also as a tradition (Ayawine & Ayuurebobi, 2015).

Evidence from previous studies reveals that in some settings, certain foods are not given to infants and young children because of the belief that consuming them could delay some developmental milestones in growing children (Chege, Kimiywe & Ndungu, 2015). For instance, in Chege et al.'s (2015) study in Kenya, it was found that the Maasai culture prohibits growing children from consuming wild animals, chicken and fish, which limits their food scope. Fish consumption is forbidden because of the perception that aquatic animals are not fit for human consumption. In other settings, it is a taboo to give eggs to children (Karigi, Mutuli & Bukhala, 2016; Gadegbeku, Wayo, Ackah–Badu, Nukpe & Okai, 2013). Karigi et al.'s (2016) study in Lubao sub-location, Kakamega County, Kenya, found a common taboo that most infants and young children were not fed on eggs, as it was believed that eggs made the "tongue heavy" and hence would cause the child not to be able to talk or would delay talking.

The literature reviewed in this section reveals that most studies undertaken in the past to investigate cultural practices influencing IYCF practices were focused on only breastfeeding (Wanjohi et al., 2017; Mwaseba et al., 2016; Kimani-Murage et al., 2015) and were conducted among mothers (Sharma et al., 2016; Thet et al., 2016) and grandmothers (Agunbiade & Ogunleye, 2012; Thet et al., 2016). In other studies, the perceptions of fathers or male partners were also sought with respect to the barriers to EBF (Ihekuna, Rosenburg, Menson, Gbadamosi, Olawepo, Chike-Okoli & Ezeanolue, 2018; Thet et al., 2016) etc. Clearly, many studies have not focused on assessing the local context, norms and cultural practices influencing IYCF practices from the viewpoint of health workers (HWs). However, recommendations from past studies suggest the need for health professionals in various cultural settings to understand and be well-informed about these cultural practices and misconceptions that act as barriers to appropriate IYCF practices (Radzyminski & Callister, 2015; Wren et al., 2015). Other recommendations have been made regarding the need for HWs to take into consideration local cultural beliefs, practices and sentiments of mothers before making efforts to initiate changes in their infant feeding practices (Pemunta & Fubah, 2015). To the best knowledge of the researcher, it is only the study of Wanjohi et al., (2017) which has assessed the views of community health volunteers (CHVs) on cultural and social beliefs and practices that influence breastfeeding in two urban areas in Nairobi, Kenya. Therefore, to the best of the knowledge of the researcher this study might be the first study that is aimed at assessing the views of Health Workers (HWs) regarding socio-cultural influences on IYCF practices altogether, and not only on breastfeeding in two predominantly rural districts in Ghana. Lack of research in this area suggests that a qualitative study on socio-cultural factors influencing IYCF practices from the perception of HWs on the basis of their work experiences in communities where they offer health services will make a significant contribution to the literature on IYCF practices in Ghana.

Maternal Factors Influencing Feeding Practices and Nutritional Status of Children

Maternal factors that influence IYCF practices include mother's level of education, marital status, parity, work status, access to antenatal and post-natal health services, mother's nutritional status (as measured by her Body Mass Index (BMI) and stature) and her nutritional knowledge.

Marital Status

There is also some evidence in the literature demonstrating that the level of malnutrition, mainly exhibited in the form of stunted growth, is lower among children of married mothers compared with those of unmarried, separated or divorced mothers (Tette et al., 2016; Boatbil & Guure, 2014; Abuya, Ciera & Kimani-Murage, 2012). Tette et al's (2016) study in Ghana found that mothers of malnourished children were more likely to be unmarried or cohabiting. In the study by Abuya et al. (2012), stunting was more common among children born to single mothers than married mothers. Another study conducted among the three main Frafra groups in the Upper East Region of Ghana reported that the levels of stunting among children of separated or divorced mothers were very high compared with the children of married, widowed and single mothers (Boatbil & Guure, 2014).

However, contrary to the above, some studies have found that married mothers are more likely to have undernourished children compared with the unmarried. This may arise as a result of the cost of maintaining families which sometimes prevents them from providing nutritious foods to their children, apart from the time devoted to care for male-partners, sometimes at the expense of children (Habaasa, 2014). Habaasa's (2014) study in Uganda revealed that nearly half (44.6%) of the stunted, underweight and wasted children were from mothers who were married or cohabiting.

Maternal Educational Level

The educational level of a mother can influence her child's nutrition, mainly because if a mother attains a higher level of education, it is more likely to increase her income, her ability to control household resources, and even its allocation (Mulu & Mengistie, 2017). A higher educational level of a mother can be translated into improved dietary intakes of her children (Oh, Kang, Cho, Ju & Faye, 2019; Van Ansem, Schrijvers, Rodenburg & van de Mheen, 2014). For example, the study by Van Ansem et al. (2014) reported that children of mothers with a high educational level consumed more fruits and vegetables in a day; and they were more likely to have breakfast on a daily basis than children of mothers with a low educational level.

Previous studies have also reported that mothers who attained higher educational levels were less likely to have malnourished children (Frempong & Annim, 2017; Khattak, Iqbal & Ghazanfar, 2017; Ickes, Hurst & Flax, 2015; Wolde, Berhan & Chala, 2015). For instance, the study by Wolde et al. (2015) in Ethiopia revealed that children whose mothers had never had any form of formal education were more likely to be stunted and underweight, compared with those whose mothers had formal education. Other studies provide evidence that the educational level of a mother influences the dietary diversity scores and feeding frequency of children (Tegegne, et al., 2017; Solomon, Aderaw & Tegegne, 2017). It can be concluded from the findings in the literature that mothers who attain higher educational levels are able to feed their children often on nutritious and diversified foods which protect them from stunting, wasting and underweight.

Mother's Employment Status

The employment status of a mother has been identified as one of the factors that affect infant and young children feeding practices (Boralingiah, Polineni, Kulkarni & Manjunath, 2017; Kabir & Maitrot, 2017; Shubha, Angadi & Nagarajachari, 2016). For example, the study by Shuhaimi and Muniandy (2012) reported that the prevalence of severe wasting was higher in the children of unemployed mothers (17%) than in those employed (8%). However, such a finding contradicts those of other studies which rather found that mothers' employment without adequate alternative childcare (from a family member or at the work place) negatively impacted the nutritional status of their children (Kabir & Maitrot, 2017; Roshita, Schubert & Whittaker, 2013). For example, Roshita et al.'s (2013) study at Surabaya, Indonesia, found a significantly higher prevalence of stunting and wasting among infants and young children of working compared with non-working mothers. Explanations that can be given for this finding is the likelihood that working mothers spent more time out of the home, and as a result of work demands which sometimes continued after the stipulated working hours, were not able to provide nutritious meals frequently to meet the nutritional needs of their children.

With regard to IYCF practices, a study in the Philippines found that children of non-working mothers were more likely to meet the MAD than those of employed mothers (Guirindola, Maniego, Silvestre & Acuin, 2018). The findings of Guirindola et al. (2018), Shubha et al. (2016) and Vaida (2013) suggest that being employed could also rather end up having some adverse consequences on the feeding of children, perhaps because of the lack of time among employed mothers to cook nutritious meals often for their children. However, contrary to these findings, another study conducted in two rural districts of Sindh province, Pakistan, observed that mothers who were employed were more likely to provide a minimum acceptable diet to their children than their unemployed counterparts (Khan, Ariff, Khan, Habib, Umer, Suhag & Khan, 2017), perhaps as a result of earning a regular income that enabled them to optimally feed their children.

In sum, these inconsistent results in the literature suggest that being employed as a mother does not guarantee that the nutritional needs of one's children would be met as expected, and that other influencing factors should be considered. In other words, the conflicting findings in the literature highlight the need for more research on the effect of mothers' employment status on both the feeding practices and nutritional status of children, while adjusting for possible confounding factors in rural settings in Ghana where much studies have not be carried out in this area.

Maternal Autonomy

Maternal autonomy is a multidimensional concept, with four key elements: decision-making capacity inside and outside the house; mobility outside the house; financial independence; and attitude towards and experiences of domestic violence (Barrios, 2012). Evidence in the literature shows that maternal autonomy in influencing decision making with regard to access and allocation of resources has a positive impact on the dietary intakes and the nutritional status of children (Ickes et al., 2018; Sraboni & Quisumbing, 2018; Abate & Belachew, 2017; Amugsi, Mittelmark & Oduro, 2016). The study by Amugsi et al. (2016) which entailed an analysis of the 2008 Ghana demographic and health survey showed that women participation in decision-making regarding household purchases was significantly associated with a higher dietary diversity score (DDS) of their children. Similarly, in the study by Kamiya et al. (2018), it was found out that the likelihood of childhood stunting was significantly lower if mothers had control of money to enable them conduct big purchases compared with those who had no autonomy (OR = 0.11, $p = 0.041$).

Some studies found a positive correlation between greater mother's autonomy and an adherence to recommended IYCF practices (Ickes et al., 2018; Sraboni & Quisumbing, 2018; Abate & Belachew, 2017; Ickes, Mandel & Roberts, 2016). For example, Ickes et al.'s (2016) study in Uganda found that mothers who reported high levels of freedom and empowerment were more likely to feed their children on iron-rich foods, and met the requirements for a minimal acceptable diet and a diversified diet.

In Ghana, however, Malapit and Quisumbing's (2015) study revealed that greater mother's autonomy was weakly associated with the nutritional status of her children, although it was strongly associated with the quality of infant and young child feeding practices. The inconsistencies in these findings highlight the need to conduct more context-specific studies that aim at investigating the role of mothers' autonomy on not only the nutritional status of children but also their feeding practices, especially in settings where women generally have lower social status than men, as also emphasized by Kamiya et al., (2018).

Overall, research on the influence of mother's autonomy on IYCF practices and the nutritional status of children is recent in Ghana; and nationally, little research has been conducted to explore the various dimensions and how they relate to IYCF practices. Consequently, there are few published studies in this area in Ghana. In addition, the two previous studies (Amugsi et al., 2016; Malapit & Quisumbing, 2015) presented in this literature review were based on secondary data, and this raises concerns on limitations associated with the likelihood of not having adequate data on important possible confounding factors that might have influenced the findings obtained. Besides, the available secondary data were not collected to address the particular research question or to test the exact hypothesis of the studies by Amugsi et al. (2016) and Malapit and Quisumbing, (2015). Also, Malapit and Quisumbing's (2015) study only focused on women in agriculture based on the Feed the Future's zone of influence (ZoI) data collected in some selected districts in the Northern, Upper West, Upper East and Brong Ahafo Regions in Ghana. Therefore, the influence of two dimensions of women's autonomy (decision-making power and financial independence) will be explored in chapter seven of this thesis.

Parity of mother

There is some evidence in the literature indicating that parity of a mother could influence the feeding practices of her children (Udoh & Amodu, 2016). In addition, the number of children below five years that a mother has is found to be a determinant of the dietary quality and nutritional status of children (Galgamuwa, Iddawela, Dharmaratne & Galgamuwa, 2017; Asfaw, Wondaferash, Taha & Dube, 2015). This has been attributed largely to limited availability of time for a mother with several children to care for and feed each child, particularly when most of the children are below 5 years. In the study by Galgamuwa et al. (2017) which was conducted in Sri Lanka, it was revealed that wasting was significantly associated with having a higher number of children below five years. In addition, studies conducted in Ethiopia (Dewana, Fikadu, Facha & Mekonnen, 2017) and Mozambique (García Cruz, Gonzalez Azpeitia, Reyes Suarez, Santana Rodríguez, Loro Ferrer & Serra-Majem, 2017) revealed that having more children who are less than five years of age increased their risk of becoming stunted than a single child in a household. With respect to feeding practices, Tegegne et al.'s (2017) study in Bale zone, South-east Ethiopia, showed that the higher the parity of a mother, the lower minimum meal frequency of her children.

Maternal Nutritional Knowledge

Poor maternal nutritional knowledge has been found to be a predisposing factor of inappropriate IYCF practices (Chege & Kuria, 2017; Williams et al., 2012) and malnutrition (Jemide, Ene-Obong, Edet & Udoh, 2016) in children, particularly in the first two years of their lives. For instance, in the study by Chege and Kuria (2017) in Kenya, poor nutritional knowledge was translated into sub-optimal dietary practices among children, resulting in the majority (76.1%) of the children being fed less than three meals per day and 95.7% having a low dietary diversity score of eating from less than four different food groups daily. These studies demonstrate that when caregivers have the required nutritional knowledge, there is a higher likelihood that they will provide the recommended quality, quantity, and frequency of foods to their children.

On the contrary, the findings of Agize, Jara and Dejenu, (2017) in their study in Ethiopia revealed that although the majority (51%) of mothers had good knowledge of how to improve the dietary diversity of children aged between 6 and 23 months, a low proportion (16%) of these children were fed on meals which were highly diversified. These findings suggest that, in some situations, high nutritional knowledge levels of mothers may not be translated into improved IYCF practices.

The findings from previous studies demonstrate that the association between maternal nutritional knowledge and the feeding practices of children is generally unclear. While some authors reported positive associations, others have reported no associations. The nutritional knowledge of a mother has been found to be influenced by other factors, such as her educational background, access to the media and participation in post-natal care services at health facilities. The question is: Were these possible confounding factors controlled in these previous studies that assessed the association between mothers' nutritional knowledge and the nutritional status of their children?

Household Factors Influencing Feeding Practices and Nutritional Status of Children

Household factors that influence IYCF practices and the nutritional status of children as reported from past studies include household size, socio-economic status (SES), household monthly expenditure, and access to basic amenities like water and electricity. In the sections that follow these factors will be discussed.

Household size

Household size has been shown to significantly affect household food access in terms of the quality, quantity, and number of meals consumed daily (Chakona & Shackleton, 2018). Findings from previous studies suggest that there exists a positive relationship between the number of members in a household and the level of its expenditures on food (Kostakis, 2014; Caswell, Yaktine & National Research Council, 2013; Jacobson, Mavrikiou & Minas, 2010). According to Caswell et al. (2013), as household size increases, the resources for acquiring, preparing, and serving meals are spread over more individuals and may reduce the portion sizes of meals served to individual members. Likewise, in the study by Codjoe et al. (2016), undertaken in Accra, Ghana, it was found that smaller households are more likely to have more diverse food consumption, compared with larger households.

Of particular concern are children in large household sizes, who have poor access to sufficient and quality food (Fentaw, Bogale & Abebaw, 2013). Some evidence indicates that household size determines the dietary diversity scores and meal feeding frequencies of children (Mitchodigni, et al., 2017; Tegegne et al., 2017). The study by Mitchodigni et al. (2017), conducted in Benin, revealed that an increase in household size had a detrimental effect on children's probability of meeting a minimum meal frequency (MMF) ($p < 0.05$).

In addition, previous studies indicate that a large household size is a risk factor for poor nutritional status among children **(**Galgamuwa, Iddawela, Dharmaratne & Galgamuwa, 2017; Okeyo & Kirabira, 2016; Mekonnen, Tadesse & Kisi, 2013). For instance, in a study in Kenya, Okeyo and Kirabira (2016) found that household size was significantly associated with stunting (Adjusted odds ratio (AOR) =1.238, CI=1.031-1.486, $p<0.05$). Likewise, Mekonnen et al. (2013) found among 790 primary school children from rural Ethiopia that children from a family size of 6-8 had an increased risk of being stunted than those from a family size of 2-5 members.

Household Socio-economic Status

Socio-economic status (SES) is one of the major determinants of the nutritional status of children (Chowdhury, Chakrabarty, Rakib, Saltmarsh & Davis, 2018; Akombi, et al., 2017). Generally, it is argued that children from households of low SES are more likely to be stunted or underweight, compared with children from high SES households (Frempong & Annim, 2017; Novignon, Aboagye, Agyemang & Aryeetey, 2015). In the study by Frempong and Annim (2017) which was based on an analysis of the 2008 GDHS data, it was revealed that approximately 30 percent of children born to poor parents were stunted, and about 20 percent of children born into poor households were underweight, compared with only 6 percent of those in the richest households, suggesting that wealthier households had children with better nutritional status than poorer households.

Findings from some studies show that children living in poorer households are usually less likely to be fed on a wide range of different food items, which results in lower dietary diversity scores (DDS), compared with children residing in wealthier households (Saaka & Galaa, 2017; Ali, Tahsina, Hoque, Amena, Rahman & Arifeen, 2016; Codjoe, Okutu & Abu, 2016). For example, findings from the study by Saaka and Galaa, (2017), based on an analysis of the 2014 Ghana Demographic and Health survey data, showed that household wealth index was positively correlated with children under five years who had at least a minimum dietary diversity (MDD) score (chi-square = 21.2, $p < 0.001$). An explanation that can be given for these findings is that wealthier households are expected to have higher incomes and more resources to purchase more food of greater diversity, compared with poor households which are more likely to consume monotonous diets from a few food groups (Codjoe et al., 2016). Generally, the above findings indicate that children from households of low wealth status are more likely to be at a disadvantage, since their families are usually unable to afford nutritious foods, which increases their risk of becoming malnourished.

Household Monthly Expenditure

The proportion of total household income allocated to the purchase of food, especially animal food and fruits and vegetables, has an impact on the nutritional status of children (Mahmudiono, Sumarmi & Rosenkranz, 2016; Ochieng, 2013; Krebs et al., 2011). Higher household expenditure is strongly inversely associated with stunting risk in children (Dorsey, Manohar, Neupane, Shrestha, Klemm & West, 2018). In addition, higher household monthly income is positively associated with an increase in the dietary diversity scores of children (Solomon et al., 2017; Joshi, Agho, Dibley, Senarath & Tiwari, 2012). An explanation that can be given for this occurrence is that children living in higher-monthly-income-earning households are more likely to be fed on diversified foods, as their families are in a better position to afford foods from a wide range of food groups, compared with children from households with lower income levels.

Generally, the literature demonstrates that whereas many studies have looked at the effect of household income on the nutritional status of children, its effect on children's feeding practices has been largely overlooked. Not many studies have been conducted on this aspect.

Sanitation Factors

Sanitation factors, such as the type of toilet facility and the source of drinking water, tend to have a significant association with the nutritional status of children (Beal, Tumilowicz, Sutrisna, Izwardy & Neufeld, 2018; Frempong & Annim, 2017). Beal et al. (2018) found Indonesian children who were born into households with both unimproved latrines and untreated drinking water sources at an increased risk of stunting.

Household Access to Potable Water

Access to potable water at the household-level has been found to improve the nutritional status of infants and young children (Li, Liu & BeLue, 2018; Chirande, Charwe, Mbwana, Victor, Kimboka, Issaka & Agho, 2015). In the study by Li et al. (2018), undertaken in India, access to treated water in a household increased the likelihood of having normal-weighted children by 1.7 %; and it decreased the possibility of children being thin by 2.5%, and being severely thin by 1.7%. On the contrary, Rah et al.'s (2015) study in some rural communities in India found that household access to piped water was not associated with a reduced risk of stunting among children, suggesting that a non-significant association exists between access to improved water and anthropometric outcomes of children.

Type of Toilet Facility Available to Household

Regarding access to sanitary facilities, there is some evidence in the literature that unavailability of latrine is significantly linked to an increased risk of stunted growth in children (Demilew & Abie, 2017; Derso et al., 2017; Frempong & Annim, 2017). For example, in a community based cross-sectional study in Ethiopia, the unavailability of latrine was significantly associated with higher odds of stunting (Derso et al., 2017). Similarly, in the study by Frempong and Annim (2017) which was based on an analysis of the 2008 GDHS data, about 30 percent of children found in households where the bush or bucket was used as toilet facility were stunted, whereas only 10 percent of their counterparts in households with flush toilets were stunted. Likewise, only 4 percent of children found in households with flush toilets were wasted as compared with 7 percent of children found in households which neither used flush toilet nor pit latrine. The implication of this relationship is that chidren residing in houses without having access to improved sanitation conditions such as flush toilet facilities are more likely to be affected by unsanitary practices which can predispose them to infections. When children are affected by an infection, it usually leads to a reduction in their dietary intakes mainly as a result of a loss in their appetite.

Evidence available indicates that the use of untreated water, poor sanitation and unhygienic conditions in households increases children's susceptibility to recurrent diarrhoea and other gastro-intestinal infections considerably, which consequently affects the growth of children, usually exhibited as stunting (Rah et al., 2015).

Household Access to Electricity

Rao and Pachauri (2017) asserted that electricity access is known to improve the living standards of households; and this may have a positive influence on household access to food.

As to how access to electricity may improve the dietary intakes and nutritional status of children, the argument is that caregivers who have access to electricity can benefit from educational programmes on nutrition from the electronic media, and this may help improve upon the feeding practices and nutritional status of their children (Aguayo, Nair, Badgaiyan & Krishna, 2016; Ali, Batu & Kaushik, 2016). For example, Aguayo, et al.'s (2016) study in India revealed that children of mothers without access to the electronic media were not fed dairy products, fruits and vegetables, probably because these mothers do not have access to health educational information about the nutritional value of these food sources and their role in promoting growth of children. Aguayo et al. (2016) also found that mothers' lack of access to the electronic media increased the odds of stunting in children by 34%. Similarly, Ali et al.'s (2016) study in Ethiopia found that access to electric power had a significant positive correlation with underweight in children. Availability of electricity in households could also suggest a possibility of acquiring refrigeration systems for storing and preserving food items. Households who have electricity may be in a better position to buy food items in bulk and store them in refrigerators or freezers over a period of time, thus ensuring that food is made available often at home.

Type of Fuel Used in Cooking

Apart from other amenities like drinking water and toilet facility, the type of fuel that is used for cooking food has been described as one of the household factors that can affect the health and nutritional status of children in developing countries (Singh, Alagarajan & Ladusingh, 2015). The type of fuel that is used for cooking could influence the time used in preparing food often at home and the possibility of feeding household members different foods regularly.

The type of fuel used for cooking could also determine dietary choices of households. For example, scarcity of firewood can potentially affect dietary choices, result in a switch to foods that are less demanding of fuel, or may even lead to skipping of meals. In addition, protein food sources such as meat and beans that are highly nutritious are more fuel demanding. Therefore, when it is difficult to acquire fuel to cook them, households may reduce their intake; and this could be a cause of malnutrition among children, in particular (Sola, Ochieng, Yila & Iiyama, 2016). In rural Kenya, M'Kaibi (2014) asked respondents to discuss the reasons why people stopped preparing nutritious traditional dishes such as millet and *ugali*. The respondents indicated that due to the difficulty in getting firewood, they preferred and resorted to preparing foods that take shorter time to cook.

It has also been established that using modern cooking stoves that are fueled by liquid petroleum gas (LPG), kerosene or electricity could free women's time spent in collecting firewood to be channeled towards other productive activities (Rao & Pachauri, 2017), such as taking more time to care for and feed children.

Generally, caregivers who use these clean cooking sources of fuel do not have to go through the trouble of spending time searching for firewood before cooking. The time that would have been used searching for firewood could be channeled into caring for children − feeding them often and also cooking different meals for them, rather than feeding them on few foods to save oneself from the burden of lighting firewood anytime one wants to cook.

Relationship between Child Feeding Practices and Nutritional Status of Children

There is an association between the IYCF indicators and the nutritional status of children (Wondafrash, Huybregts, Lachat, Bouckaert & Kolsteren, 2017; Udoh & Amodu, 2016). Wondafrash et al. (2017) revealed that high DDS was positively associated with a low likelihood of stunting among children in Ethiopia ($\beta = 0.16$; 95% CI: 0.01, 0.30; $P = 0.03$), after controlling for confounding factors. Similarly, Doracaj et al.'s (2014) study in Albania found that among the components of the infant and child feeding index, dietary diversity, food-group frequency and frequency of feeding were positively associated with all the three anthropometric indices.

With respect to the Minimum Acceptable Diet (MAD) indicator, there is some evidence that it influences the nutritional status of children (Owais, Schwartz, Kleinbaum, Suchdev, Faruque, Das, & Stein, 2016; Jones, Ickes, Smith, Mbuya, Chasekwa, Heidkamp et al., 2014). For example, the study by Owais et al. (2016) carried out in Bangladesh showed that by age 24 months, infants receiving MAD had attained a higher LAZ (had a less risk of stunting) compared with infants who did not receive MAD (adjusted $\beta = 0.25$, 95% CI: 0.13–0.37).

An infant and child feeding index (ICFI), constructed on brief recalls of breastfeeding, feeding frequency and dietary diversification has been recommended to provide long-term prediction about child feeding practices (Ma et al., 2012). Findings of previous studies show that a significant association exists between the Infant and Child Feeding Index (ICFI) and nutritional status of children (Chaudhary, Govil, Lala & Yagnik, 2018; Qu, Mi, Wang, Zhang, Yang & Liu, 2017; Doracaj et al., 2014). For example, Qu et al.'s (2017) study in rural western China showed that children with high ICFI were less likely to be classified as stunted, underweight, wasted and overall malnourished than children with low ICFI (OR = 0.77, 95% CI = 0.69±0.85;OR = 0.75, 95% CI = 0.64±0.86; OR = 0.81, 95% CI = 0.67±0.98; OR = 0.76, 95% CI = 0.69±0.84). Likewise, Chaudhary et al. (2018) showed that a higher proportion of children with lower ICFI scores in the urban slums of Ahmedabad had a higher risk of becoming wasted, underweight and stunted.

In conclusion, the findings of previous studies presented in this section have established that ensuring infants receive a diverse, high quality diet from 6 months onwards may reduce rates of stunting, underweight and wasting before they attain two years of age. However, in Ghana, studies that assess how the different feeding indicators, summarized as a composite feeding index, influence the growth and nutritional status of children, are scarce as asserted by Saaka et al. (2015) and Pagui (2015). Besides, most of the past studies assessing IYCF practices focused on a few feeding indicators, particularly breastfeeding (timely-initiation, exclusive breastfeeding practices and continued breastfeeding until two years). In addition, there is paucity of evidence regarding how socio-cultural factors influence child feeding practices in their entirety in Ghana, apart from breastfeeding. Therefore, the factors that are associated with the feeding practices and nutritional status of children under three main levels: (1) socio-cultural (2) household and (3) maternal factors were assessed in this study.

CHAPTER THREE

CONCEPTS AND THEORETICAL ISSUES IN CHILD NUTRITION

Introduction

Chapter Three discusses the concepts, theories and conceptual framework underpinning the study. Specifically, it discusses relevant theoretical concepts that pertain to the feeding practices and nutritional status of infants and young children. The chapter presents a discussion of some theories and models that have been developed for explaining factors that influence the dietary intakes and nutritional status of children. The chapter includes a presentation of three theories - Becker's Micro-economic theory of the household and nutrition (Becker, 1965, 1981), Pierre Bourdieu's social theory of practice (1984) and Urie Bronfenbrenner's social-ecological theory, (Bronfenbrenner, 1992, 1994) which informed and underpinned the study. It also includes an explanation and justification of the choice of each of them. The chapter concludes with the conceptual framework adapted for the study - the WHO conceptual framework on Childhood Stunting: Context, Causes, and Consequences, with an emphasis on complementary feeding. The rationale for the use of this framework is also presented in this chapter.

Descriptions of Key Concepts

In this section, a number of concepts and indicators related to the nutritional status and child feeding practices are presented to provide an understanding of the key issues of the study.

Nutritional Status of Children

Nutritional status can be defined as the physiological state of an individual that results from either a balance or imbalance between nutrient requirements and intake, and the ability of the body to absorb and use these nutrients (Benson, 2008). The imbalance between nutrient requirements and intake, and the utilization of nutrients, can lead to either undernutrition or overnutrition. Undernutrition results from inadequate consumption, poor absorption or excessive loss of nutrients (Abera, Dejene & Laelago, 2017). Generally, children who suffer from undernutrition end up becoming undernourished (low weight- for- age), too thin/wasted (low weight- for- height) or too short/stunted (low height- for- age) (World Health Organization, 2008).Undernutrition affects its victims in several ways, including the effects that lead stunted children to grow up to be adults of short stature, with a reduction in their lean body mass, limiting their productivity and reducing their tendencies to earn from employments requiring manual labour (Black et al., 2013). Undernutrition in children results in cognitive impairment, thereby leading to delayed school entry and poor school performance (Victora et al., 2010).

On the other hand, overnutrition is an imbalanced nutritional status resulting from excessive intake of nutrients. Overnutrition also refers to a condition in which the body has too much food, especially fats and sugars (Pridmore & Carr-Hill, 2009). Typically, overnutrition generates an energy imbalance between food consumption and energy expenditure leading to disorders such as overweight and obesity. Overweight in children is defined as the percentage of children aged 0-59 months whose weight for height is above two standard deviations from the median of the WHO Child Growth Standards (UNICEF, 2013). Overnutrition affects a child's potential contributions to society. Childhood obesity is associated with a higher likelihood of being confronted by adult chronic diseases such as hypertension, diabetes and other cardiovascular-related medical conditions, particularly, during the adolescence stage of life (Blüher, 2015).

Anthropometric Indicators for Assessing Nutritional Status of Children

Child malnutrition can manifest itself in several ways. It is most commonly assessed through anthropometric body measurements of weight and height which are transformed to assess the occurrence of stunting, wasting and underweight in children (WHO, 2006).

Wasting

Wasting or thinness is a reduction or loss in body weight in relation to height. Wasting is measured as weight-for-length/height and reflects body weight in proportion to attained growth in length or height. Wasting is usually caused by a disease or significant food shortages that result in acute and severe weight loss, although chronic undernutrition or illness can also cause this condition. According to the WHO growth reference for weight-for-height (WHO, 2006), wasting which results from acute malnutrition is classified as severe or moderate. Severe acute malnutrition is defined as severe wasting and/or with a mid-upper arm circumference (MUAC) value of<115 mm and/or with bilateral pitting oedema. Moderate acute malnutrition is defined as moderate wasting and/or with a MUAC value between ≥115 mm and <125 mm (WHO, 2014). A child with a weight-for-height z-score (WHZ) value of <-3 to -2, >-2 to -1, > -1 to 1 is considered to be severely wasted, wasted and normal/healthy respectively. On the other hand, a child with a WHZ value of >1 to 2, > 2 to 3 and >3 is considered likely to be at the risk of becoming overweight, is overweight and obese respectively. According to WHO, a prevalence figure below 5% in at the population-level is considered low, between 5% and 9% is medium, between 10% and 14% is regarded high, and above or equal to 15% is considered very high (WHO, 2007).

Stunting

Stunting usually comes about as a result of mild chronic undernutrition. It is increasingly used as the key measure of nutritional status in under two year olds, because it can lead to irreversible physical and neurocognitive damages (De Onis & Branca, 2016). Even though it is well known that stature has a genetic basis, there is ample evidence that environmental factors, such as poverty and being affected by several episodes of infections, also play a significant role in the determination of one's final stature (Hwang, Mack, Hamilton, James Gauderman, Bernstein, Cockburn & Cozen, 2013). Stunting, therefore, reflects the cumulative effects of undernutrition and infections since and even before birth (Dewey & Begum, 2011).

A child with a height-for-age z-score (HAZ) value of < -3 to -2, >-2 to -1, > -1 to 1 is considered severely stunted, stunted and normal/healthy respectively. According to WHO, a prevalence figure below 20% in a population is considered low, between 20% and 29% is medium, between 30% and 39% is regarded high, and above or equal to 40% is considered very high (WHO, 2007).

Stunted children are at higher risks of being affected by lower cognitive performance and poorer motor development. This limits their learning abilities, that is, reduces the abilities of children to explore and extract learning opportunities, thereby reducing their future earnings (Sudfeld, McCoy, Danaei, Fink, Ezzati, Andrews & Fawzi, 2015). Another consequence of stunting is a weakened immune system resulting in a low immune function (Bourke, Berkley & Prendergast, 2016).

Underweight

Underweight, measured by low weight–for–age reflects body weight relative to the child's sex and age. Underweight is a composite form of undernutrition, and thus reflects both acute and chronic undernutrition (Raju & Dsouza, 2017). It is a composite measure of stunting and wasting and is recommended as the indicator to assess changes in the magnitude of malnutrition over time (Abera et al., 2017). It is the proportion of children who have low weight for their age and can be a sign of wasting, stunting, or both. A child with a weight-for- age z-score (WAZ) value of <-3 to -2, < -2 to -1, > -1 to 1 is considered to be severely underweight, underweight and normal/healthy respectively. On the other hand, a child with a WAZ value of >1 to 3 may have a growth problem; but this is better assessed from the weight-for-length/height or Body Mass Index (BMI)-for-age indicators (WHO, 2008). According to WHO, at the population level, a prevalence figure below 10% is considered low, between 10% and 19% is medium, between 20% and 29% is regarded high, and above or equal to 30% is considered very high (WHO, 2007). Underweight children end up having a weakened immune system and may end up becoming shorter than their expected height (Paciorek, Stevens, Finucane, Ezzati, & Nutrition Impact Model Study Group, 2013).

Infant and Young Child Feeding (IYCF) Indicators

The World Health Organization (WHO) has developed eight core infant and young child feeding indicators to monitor and guide the feeding practices of infants and young children (WHO, 2010). The guidelines include the following: (1) Early initiation of breastfeeding; (2) exclusive breastfeeding for the first six months; (3) continued breastfeeding for two years and beyond; (4) the timely introduction of solid, semi-solid or soft foods; (5) minimum feeding frequency (MFF); (6) minimum dietary diversity (MDD); (7) minimum acceptable diet (MAD); and (8) consumption of iron rich or iron-fortified foods. Below is an explanation of the eight core infant and young child feeding indicators.

Early Initiation of Breastfeeding

With regard to the early initiation of breastfeeding, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend the early initiation of breastfeeding, which is putting babies to the breast within the first hour of life in order to safeguard infants from dying during this most vulnerable time in their lives.

Exclusive Breastfeeding for First Six Months

Exclusive breastfeeding (EBF) of infants under 6 months of age is breastfeeding infants with only breastmilk for the first six months of life. It is considered the safest and healthiest alternative for children everywhere (UNICEF, 2016). Similarly, WHO recommends that infants must be exclusively breastfed during the first 6 months of their infancy, and it considers this practice as a critical public health intervention to promote the physical, mental, and intellectual growth of infants. Data available from both low- and middle-income countries indicate that infants who received mixed feeding (foods and liquids in addition to breastmilk before 6 months) were up to 2.8 times at a higher risk of dying, as compared with those who were exclusively breastfed (UNICEF, 2016).

Continued Breastfeeding for One Year and Beyond

Continued breastfeeding is recommended during the Complementary Feeding (CF) period and refers to the continuation of frequent, on-demand breastfeeding for the period between 6 months and 2 years of age or beyond (WHO, 2003). When infants are sick and consequently lose their appetite, continued breastfeeding can help prevent dehydration, while also providing the nutrients essential for recovery. In reality, continued breastfeeding could prevent 50% of all deaths during the first 12–23 months' period (Victora et al., 2016).

According to reports by UNICEF, breastfeeding rates decrease by about one third by the time infants attain 12 months, and reduce further by the time they are 23 months old. UNICEF further reiterates that progress to improve exclusive breastfeeding has stagnated over the past 15 years (2003-2018) in all regions in the world. Global rates have improved modestly, seeing an increase of only 7 percentage points in the last 15 years (2003- 2018) (UNICEF, 2018).

Timely Introduction of Solid, Semi-solid or Soft Foods

Complementary feeding (CF) is the timely introduction of solid, semi-solids or soft foods when breastmilk, by itself, is no longer sufficient to meet the nutritional requirements of infants as they transition from exclusive breastfeeding to family foods (Abeshu et al., 2016). According to the World Health Organization (WHO), CF should start around six months and continue to about two years. This is a critical period for child growth and development when infants are at a high risk of developing malnutrition (WHO, 2016). It is important to introduce solid foods at 6 months of age, because after the first six months of life an infant's nutrient requirements begin to exceed what breastmilk alone can provide (Kuo, Inkelas, Slusser, Maidenberg & Halfon, 2011).

Findings from past studies in both low and high-income countries demonstrated that inadequate nutrition during this period increases the risk of becoming underweight, with potentially severe life-threatening health effects

(Ersino, Henry & Zello, 2016). In addition, growth faltering is most evident between 6 and 23 months of age (Black, Makrides & Ong, 2017), particularly when foods of low nutrient density begin to replace breastmilk and make infants more susceptible to diarrhoeal illness, as a result of food contamination through unhygienic ways of preparing food (WHO, 2013). Frequent exposure to many microbes, in addition to insufficient and poor-quality diets, leads to repeated bouts of infectious diseases, which contribute to growth deficits in infants and young children during this stage of life (Black et al., 2017).

Meal Feeding Frequency (MFF)

Although infants and children are usually the youngest members of families, their nutritional demands are their greatest needs, and it is imperative that their nutrient needs are met. Due to their small stomach sizes, they can only eat small quantities of food at a meal sitting. This requires that infants and young children eat often in the course of the day in order to meet their energy and nutrient requirements. For healthy breastfeeding of infants who are aged between 6 and 8 months, the recommendation is to eat between two to three meals or snacks daily, in addition to breastmilk. For breastfeeding young children aged between 9 and 23 months, the advice given is to feed them at least three meals or snacks in a day. However, for non-breastfeeding children, the recommendation is to feed them more frequently - ideally, at least four times each day, with one or two snacks from 6 months of age (WHO, 2009).

Studies have demonstrated that low meal feeding frequency in a day among children aged 6-23 months is associated with a high risk of suffering from growth faltering, exhibited as stunting, wasting and underweight (Derso, Tariku, Biks & Wassie, 2017; Lamichhane, Leem, Kim, Park, Lee, Moon & Ko, 2016; Aguayo et al., 2016).

Minimum Dietary Diversity (MDD)

Eating from a wide range of foods (dietary diversity) is very critical for infants and young children after 6 months of age, particularly because of their small stomach sizes and the tendency to eat small quantities of meals at a sitting. Dietary diversity is critical as early as 6 months of age, because children aged between 6 and 23 months are likely to depend mainly on monotonous diets of staple foods, and this prevents them from staying healthy, and takes a devastating toll on the development of their brains and bodies (Dewey, 2013). According to WHO (2010) recommendations, to provide the minimum level of dietary diversity, children aged 6–23 months should eat food from at least four out of seven food groups in a day. The seven food groups are grains, roots and tubers, legumes and nuts, dairy products, meats and fish, eggs, vitamin-A rich fruits and vegetables, and other fruits and vegetables. There is evidence that children, who were fed on a diverse diet from 6 months of age become taller, less wasted and underweight as compared with children who do not consume such diets (Lamichhane et al., 2016; Udoh & Amodu, 2016).

Minimum Acceptable Diet (MAD)

Ensuring that children are appropriately fed depends not only on what they eat, but also on when and how often they eat (UNICEF, 2016). Appropriate and acceptable feeding practices comprise feeding children frequently on nutrient-dense meals which must be prepared from a variety of different food groups. According to WHO, a Minimum Acceptable Diet (MAD) is a composite indicator for assessing feeding practices among 6–23 months old children and considers whether the child has been fed a minimum number of times (MFF) and on a diversified diet (MDD) daily (WHO, 2010).

Theoretical Works underpinning the Study

The study is underpinned by three theories which support the notion that maternal, household and community (socio-cultural) factors influence the dietary intakes of children and their nutritional status. These are Becker's Micro-economic theory of the household and nutrition (Becker, 1965, 1981), Pierre Bourdieu's social theory of practice (1984) and Urie Bronfenbrenner's social-ecological theory, (Bronfenbrenner, 1992, 1994). The sections that follow explain each of these theories underlying the study.

Becker's Micro-economic Theory of the Household and Nutrition

Becker's Micro-economic theory of the household and nutrition (Becker, 1965, 1981; Chernichovsky & Zangwill, 1990) focuses mainly on explaining the household determinants of nutrition. Becker (1965) revealed the household determinants of nutrition, particularly the dietary intakes of children. According to the theory, a 'nutrition production function' relates a child's nutritional status (measured in terms of height- for -age or weight - for - age) to a set of household 'inputs'. Becker's Micro-economic theory conceives of a child's nutritional status as a “good”or output produced in the home setting by means of resources (inputs) that are provided for the child.

The inputs that determine a child’s nutritional status include the child’s nutrient intake, whether the child is breastfed and the duration of breastfeeding, utilization of preventive and curative medical care, and the quantity and quality of time that a mother or other household members commit to the caring of the child. The quality of a child’s care is likely to be determined by the mother’s age, financial independence, child care experience, educational background, her health and nutritional status, and environmental factors. For example, greater income from a mother’s employment is likely to be translated into higher consumption of nutritious foods which will raise the nutritional status and wellbeing of her children as found by Heinrich, (2014). According to Becker's theory lack of food is no longer the major cause of malnutrition among children but rather certain factors related to decision- making at the household level. Becker's Micro-economic theory underpins the present study since it supports the notion that a mother’s autonomy with respect to her participation in decision-making at the household level and her financial independence are associated with the feeding practices and nutritional status of her children. Becker's theory focuses on decisions that are made at the household level about scarce food resources, based on considerations such as: (a) the size and composition of the family; (b) the purchasing power of the family; (c) the availability of healthful foods; (d) the family's food preferences; (e) environmental variables (such as ethnic traditions and the mother’s level of education); and (f) family health (since diseases can limit the absorption of nutrients). In other words, Becker supports the idea that various household factors are associated with the risk of malnutrition in children − household size and composition, command over human and non-human resources, environmental conditions, and a host of cultural and social factors (Chernichovsky & Zangwill, 1990).

These factors affect households′ access to food and ultimately the nutritional status of children in the home. For example, the studies by Mitchodigni et al. (2017) and Guirindola et al. (2018) in Benin and the Philippines respectively provide some evidence that children in large household sizes are more likely to have poor access to sufficient and quality food. Again, a study by Galgamuwa, Iddawela, Dharmaratne and Galgamuwa, (2017) in Sri Lanka found that a large household size is a risk factor for stunted growth among children. With regard to the purchasing power of a household, a study undertaken in Nepal revealed that a higher household expenditure on healthy foods is strongly associated with a lower risk of stunting among children (Dorsey, Manohar, Neupane, Shrestha, Klemm & West, 2018).

In sum, Becker's Micro-economic theory of the household and nutrition theory proposes that a child’s nutritional status reflects the combined effects of many factors, including nutrient intake, health, birth order, and behavioural factors determined by parental preferences. In the production function notation: A Child’s Nutritional status = f (nutritional input, child’s health, child’s birth, biological factors, childcare time). The theory was postulated at two levels, the household and child levels. A child’s nutritional status is an indirect measure of the overall child health, in addition to a direct measure of access to sufficient nutritious foods in the home.

One drawback of Becker's theory is that the external socio-cultural factors within the community that a child resides in are not taken into consideration in assessing the nutritional status of the child, although they also play a major role, in addition to the child-level and household-related factors. This is because child and household-level factors are nested in community/societal level factors which include cultural practices, norms, beliefs and misconceptions of people which can influence feeding of children. Therefore, investigating only the effect of child and household levels factors on the feeding practices and nutritional status of children may bias the findings (Berhanu, Alemu & Argaw, 2019; Gebre, Reddy, Mulugeta, Sedik & Kahssay, 2019).

Pierre Bourdieu's Social Theory of Practice

To address the gap in Becker's Micro-economic theory of the household and nutrition, Pierre Bourdieu's social theory of practice (1984) and Urie Bronfenbrenner's social-ecological theory, (Bronfenbrenner, 1992, 1994) were considered to shed more light on how social and cultural factors within the external environment of infants and children influence their feeding practices. With respect to Pierre Bourdieu's social theory of practice (1984), there have been claims that using concepts developed by him can enhance our understanding and interpretation of infant feeding practices (Amir, 2011; Cuinhane, Coene, Roelens & Vanroelen, 2017; Groleau, Pizarro, Molino, Gray-Donald & Semenic, 2017; Groleau & Sibeko, 2012). Bourdieu acknowledges that individuals exist within a social environment. He therefore emphasizes that the experiences of people are influenced by the social circumstances in which they live. According to Bourdieu, individuals perceive and act according to their social background (Power, 1999). This theory helps one to understand how both structural and individual factors may influence infant feeding practices within a specific context (Cuinhane et al., 2017).

In the area of infant feeding, Bourdieu proposes that eating practices are associated with a child's gender, a mother's employment status, educational background as well as her position and status within the society. On the basis of Bourdieu's theory, it can be inferred that a mother's decision and ability to adopt particular feeding practices such as the duration of exclusive breastfeeding, the kinds of food to feed her child with and the number of meals to give to a child at a particular age depend on her perceptions, nutritional knowledge, learned experiences and her social environment. Bourdieu's ideas also help us to understand how cultural norms are passed on to the next generation through unconscious reminiscences of societal practices. For example, if women grow up in communities where formula feeding is the norm, according to Bourdieu, these norms will usually be translated into their child caring practices as confirmed by Amir, (2011). Bourdieu's theory thus helps us to understand the interplay of individual and structural factors that influence a mother's infant feeding practices, enabling her to avoid those practices which place her children at a risk of becoming malnourished.

One critique of Bourdieu’s theory is that it focuses mainly on individual and societal factors that are likely to determine the dietray intakes and nutritional status of children. Bourdieu’s theory is “silent” on how household level factors can influence the dietary intakes of children.

Urie Bronfenbrenner’s Social-ecological Theory

Urie Bronfenbrenner’s (1994) social-ecological theory has been applied to explore personal, socioeconomic, psychosocial, and cultural factors that affect the infant feeding practices of mothers (Dunn, Kalich, Fedrizzi & Phillips, 2015; Reeves & Woods-Giscombé, 2015). Even though studies employing the ecological theory differ with regard to the terminologies used and the extent of concentration, they all emphasize that to appreciate human behaviour (a mother’s feeding practices), one must understand the setting in which such behaviour takes place (Carter, 2017; Rose, 2013). An application of the social-ecological theory in the study of infant feeding involves an examination of how a child’s mother, household as well as the external systems (the healthcare delivery system, the community and societal/cultural system) determine infant feeding practices.

The idea behind this theory is that interventions aimed at promoting infant feeding should go beyond the individual level, and simultaneously target the household and community as well. Bronfenbrenner’s (1994) theory employs three levels of influence to guide analyses of health behaviours which include child feeding practices. These three levels of influence are (a) the microsystem, including familial and interpersonal relationships; (b) the exosystem − the social networks and the community, including health-care providers; and (c) the macrosystem, comprising cultural beliefs and customs. Urie Bronfenbrenner's social-ecological theory was chosen as one of the theories underpinning this research because it has been widely employed to study other public health issues, mainly because it examines how individual, household and community environments act as either facilitators or barriers to appropriate IYCF practices. At the individual level, it helps to understand how appropriate IYCF practices are associated with maternal employment as found by Boralingiah, Polineni, Kulkarni and Manjunath, (2017) and Eshete, Abebe, Loha, Gebru and Tesheme, (2017) and higher levels of maternal education as confirmed by Alderman and Headey, (2017) and Oh, Kang, Cho, Ju and Faye, (2019). In addition, a mother's autonomy with respect to decision making as found by Ickes et al., (2018) and Kamiya et al., (2018) and high nutritional knowledge (Biks, Tariku, Wassie & Derso, 2018; Chege & Kuria, 2017; Demilew, 2017) also positively impact on the nutritional status of her children. At the microsystem level, it helps to appreciate how the availability and the quality of social support for breastfeeding received by new mothers can significantly affect how effectively they are able to maintain breastfeeding.

Previous studies report that a father's attitude towards and perceptions about breastfeeding could also influence a mother's breastfeeding practices (Furman, Banks & North, 2013; Hansen, Tesch & Ayton, 2018). Other family members, especially maternal and paternal grandmothers (mothers-in-law) also influence infant feeding practices as found by Ferreira, Piccioni, Queiroz, Silva and Vale, (2018) and Karmacharya, Cunningham, Choufani and Kadiyala, (2017).

At the exosystem level, it helps to gain insight into how the influence of a woman's work environment, neighborhood and community can affect her infant feeding choices and practices. For instance, women working in "blue-collar" industries usually have more difficulty negotiating work hours and shifts, as well as maternity leaves to enable them successfully breastfeed their babies (Reeves & Woods-Giscombé, 2015). At the macrosystem level, it helps to understand how cultural beliefs about breastfeeding, complementary feeding and other infant feeding practices play an important role in the infant feeding choices and behaviours of mothers as confirmed in the studies by Ibe, Obasi and Nwoke, (2017) and Karigi, Mutuli and Bukhala, (2016). For instance, Wanjohi et al.'s (2017) study in the Korogocho and Viwandani slums, Kenya, highlighted some social and cultural beliefs and practices that resulted in suboptimal breastfeeding practices.

These beliefs included: − considering colostrum as 'dirty' or 'curdled milk', a curse or 'bad omen' associated with engaging in extra marital affairs while breastfeeding, a fear of the 'evil eye' when breastfeeding in public and breastfeeding being associated with sagging breasts. In a summary, the concepts developed by Urie Bronfenbrenner's theory (1994) illustrate the complex interplay of personal, household, social and cultural factors that influence the infant-feeding choices and practices of mothers.

The three theories presented above show some development with regard to how various determinants of child feeding practices influences the nutritional status of children. Previously, as reflected in Beckers theory (1965), the perception was that only household factors influences the nutritional status of children. However, with findings from more empirical studies it was revealed that aside household factors, maternal and socio-cultural factors within the external community of children can determine their nutritional status as presented in the theories of Pierre Bourdieu (1984) and Urie Bronfenbrenner (1994). Taken together, the theories outlined above suggest that a study aimed at investigating the factors that influence IYCF practices requires looking beyond maternal factors to also examine household-related and socio-cultural factors. As such the three theories informs the study by “shedding light” on various maternal, household and socio-cultural factors which determine the nutritional status of children which were assessed in the present sudy.

Models and Conceptual Frameworks on Child Nutrition

This review includes a discussion on various models and frameworks relating to child nutrition. It also discusses the applicability of these models to studying the feeding practices and nutritional status of children. Three previously postulated frameworks/ models informed the development of the conceptual framework for this study − the WHO conceptual framework on Childhood Stunting: Context, Causes, and Consequences, with emphasis on complementary feeding (Stewart, Iannotti, Dewey, Michaelsen & Onyango, 2013). The three frameworks are the UNICEF conceptual framework for the causes of undernutrition in young children (UNICEF, 1990), the extended care model by

Engle, Menon and Haddad, (1999) and the Model of childcare. An account of each of these models/frameworks is presented in the sections that follow.

UNICEF Conceptual Framework for the Causes of Undernutrition in Young Children

The WHO conceptual framework adapted for this study has its basis from the commonly-used UNICEF conceptual framework in which food, health and care are suggested as the three fundamental "pillars" influencing child survival, growth and development (UNICEF, 1990). The UNICEF framework depicts multiple causes/factors of undernutrition in children which are categorized under three main levels: immediate (operating at the individual level), underlying (influencing households and families) and basic (societal) causes. The framework proposes that these causal factors determine a child's nutritional status in a step-by-step and progressive manner—the basic factors influence the underlying factors, which in turn affect the immediate factors, and finally determine the nutritional status of children.

The UNICEF conceptual framework demonstrates that there are three major underlying causes at the household and community levels. These are (i) inadequate access to food and or/poor utilization of accessible food (ii) inadequate child care practices and (iii) poor water, sanitation and inadequate healthcare services. The inadequate child care practices include poor breastfeeding practices, non-exclusive breastfeeding practices, discarding of colostrum, prelacteal feeding practices, early introduction of complementary foods before 6 months of age etc. The framework also depicts the linkages between these underlying causes. An example of the interaction between the underlying causes is that prelacteal feeding practices result in non-exclusive breastfeeding. Again, inadequate access to food results in low dietary diversity and also reduces the feeding frequency of a child.

Finally, this conceptual framework recognises that human and environmental resources, cultural influences in the society, and political factors are basic causes that contribute to malnutrition at the societal level. The underlying causes previously mentioned are heightened by these basic causes which constitute the institutional structures in society. The basic causes control the level and use of potential human resources present at the household level and determine the extent of self-sufficiency, independence and autonomy of women in the society. In conclusion, the UNICEF conceptual framework relates the causal factors for undernutrition to different socio-organisational levels.

The Extended Care Model

The second framework, the extended care model by Engle, Menon and Haddad (1999) is an extension of the 1990 UNICEF Care Model; and the three UNICEF levels were re-named broadly as context, resources and care giving. According to Engle et al. 1999, a number of complex factors influence complementary feeding; and it entails a caregiver's decision on what, when, where, how and the number of times to feed a child daily. Aside caregiver's decisions, knowledge and skills on feeding her child and context-specific factors at the household and community level also influence feeding behaviours and practices of caregivers (Saaka, et al., 2016; Stewart et al., 2013). Stewart et al. (2013) emphasized that most of the interventions aimed at improving complementary feeding usually highlighted the most proximal determinants of child undernutrition−inadequate dietary composition, intake and complementary feeding practices − whereas the impact of context is not given much attention. Pelto, Levitt and Thairu (2003) asserted that any intervention that aims at promoting appropriate infant and young child feeding in order to improve child care practices, and ultimately, child survival, should take into consideration the community context rather than just focusing on caregiver and household-level factors, such as a mother's background characteristics and resources/assets available to a household. In an attempt to conceptualize the contextual factors that determine complementary feeding practices, two reviews (Black et al. 2013, Stewart et al. 2013) and one formative research (Paul et al., 2011) further explain some determinants at the community or societal levels thereby broadening the scope of the widely used UNICEF and care frameworks. Some of the contextual factors at the household and community levels that influence the feeding practices of children as highlighted in the articles of Black et al. (2013), Stewart et al. (2013) and Paul et al. (2011) are shown in Figure 1.

The Extended Care Model lists six care practices, and three resources needed for good care of children. The care practices are: care for women, food preparation and storage, hygiene practices, health practices, psychosocial care and cognitive stimulation, and feeding and breastfeeding. The three sets of resources needed to promote optimal child care include: food and economic resources, caregiver resources and health resources. The food and economic resources that determine IYCF practices include caregiver’s educational level and employment status, as well as caregiver's health, well-being, attitudes, beliefs and perceptions. Caregiver resources are factors that influence a caregiver’s ability to provide care and complementary feeding to her children. They include caregivers’ knowledge, self-confidence, physical and mental health, in addition to the lack of stress. Other caregiver resources include her autonomy, time constraints and access to social support, which influence her capability in caring for her children. The health resources include accessibility to healthcare services, qualified healthcare providers, health services infrastructure and development and implementation of health care policies.

Model of Childcare

In order to be able to effectively care for children, caregivers need adequate resources (Engle, Bentley, & Pelto, 2000). In the Model of Childcare, three childcare resources are highlighted as influencing childcare and child health: food security resources, maternal resources, and infrastructural resources.

Food security resources are key in determining a caregiver's capability in caring and providing the nutritional needs of her children. It is generally accepted that household food insecurity reflects a household’s access, availability and utilization of food (Leroy et al., 2015). Findings from previous studies indicate that caregivers’ access to food positively influences the feeding practices of children by increasing their dietary diversity and feeding frequencies (Agbadi, Urke & Mittelmark, 2017). For example, Agbadi et al.’s (2017) study, conducted in northern Ghana, found that 64 percent of the children lived in food secure households, and they were significantly more likely than children in food insecure households to receive a recommended minimum acceptable diet [OR = 0.53; 95% CI: 0.35, 0.82].

The second major requirement in caring for children is maternal resources. Maternal resources reported from previous studies as influential on feeding and the nutritional status of children include maternal education, employment, knowledge and beliefs, autonomy and health status (Iftikhar, Bari, Bano & Masood, 2017). For instance, the study by Saaka (2014) in impoverished rural communities in Ghana showed that a significant association exists between maternal knowledge of childcare practices and the nutritional status of children. Some studies also provide evidence that, women empowerment may translate into better childcare practices and improve upon the nutritional status of children (Alaofè, Zhu, Burney, Naylor & Douglas, 2017). In the study by Alaofe et al. (2017), a mother's freedom of movement (mobility) was positively associated with decreased risk of wasting in her female children and reduced susceptibility to stunting and underweight in her male children. This suggests that mother's empowerment can be associated with child undernutrition.

Another element of maternal resources depicted in the Childcare model is knowledge and beliefs which may be acquired through formal or informal education. Findings from empirical studies suggest a linkage between maternal knowledge, especially in nutrition, and child feeding practices (Jemide, Ene-Obong, Edet & Udoh, 2016). The model also demonstrates a linkage between the support of caregivers' partners and caregivers' ability to care for children, as highlighted in previous studies (Ickes et al., 2018).

According to the childcare model, the third resource for caring for children is infrastructural resources. Infrastructural resources include the availability of and accessibility to schools or educational institutions like libraries, sources of safe drinking water, proper sanitation facilities, and availability and accessibility to healthcare services.

Findings of previous studies suggest that, the availability and accessibility of healthcare services such as antenatal and post-natal care received by mothers are significantly associated with adhering to recommended infant feeding practices such as exclusive breastfeeding (EBF) (Derso, et al., 2017). Another factor under infrastructural resources is access to safe drinking water. Previous studies reported that children below 5 years who drank untreated water increased their likelihood of suffering from diarrhoeal diseases, which resulted in such children becoming malnourished (Tariku, Woldie, Fekadu, Adane, Ferede & Yitayew, 2016; Chirande et al., 2015). For example, Tariku et al.'s (2016) study in Dembia district, North-west Ethiopia, found that children aged 0–23 months who had no access to protected drinking water were 1.74 times more likely to be stunted than those who had access to protected drinking well water.

All these three frameworks/models illustrate the multi-level nature of the factors that influence and determine feeding practices and the nutritional status of children. Thus, all the three were collectively employed to ascertain the household, maternal and socio-cultural factors that can determine the nutritional status of children.

Conceptual Framework of the Study

As presented earlier in the text, several models/frameworks explain the feeding practices and nutritional status of children. However, on the basis of the literature reviewed, including the various models and frameworks for explaining child feeding and empirical studies, a modified version (see Figure 1) of the WHO conceptual framework on Childhood Stunting: Context, Causes, and Consequences, with an emphasis on complementary feeding (Stewart et al., 2013), formed the basis for conducting this study.

The adapted WHO conceptual framework employed in this study builds on the three models presented earlier in this chapter. All the models suggest that, apart from the immediate determinants of a child's nutritional status, such as dietary intake or morbidity, there are underlying determinants such as food security, availability and access to healthcare services, and a healthy environment, which are critical for the survival, growth and development of children. Various components of the aforementioned three models suggest that different care practices and resources at the maternal and household levels that are needed to meet the nutritional needs of children. Thes different maternal, household and societal resources required to nutritionally care for children as indicated in the UNICEF conceptual framework, Extended Care Model and the Model of Childcare were pieced into the adapted WHO conceptual framework. These resources from the three models include mother's educational level, employment status, autonomy at the household level, as well as her health and nutritional status, beliefs and perceptions. Other determining factors from the three models that were included in the adapted WHO conceptual framework included household size and composition, sources of safe drinking water and proper sanitation facilities at the household level.

The framework also depicts a complex interplay of distant community and societal factors, such as access to healthcare and nutrition education, social support networks, cultural beliefs and norms which influence feeding of children (Stewart et al., 2013).

This framework was adapted for the present study because of its comprehensiveness in illustrating the influence of community, household, maternal and individual (child) factors on IYCF practices and, consequently, the nutritional status of children. Again, its choice rests on the fact that the framework is flexible and allows manipulation to suit different contexts. In addition, the immediate, underlying and basic determinants of the nutritional status of children are detailed more in the WHO conceptual framework than in other related models. It has also been indicated that the WHO conceptual framework includes more explanatory variables and, therefore, enables a more context-specific guidance in developing nutrition-sensitive strategies and interventions to tackle suboptimal IYCF practices and nutritional problems of children (Nkurunziza, Meessen & Korachais, 2017).

The conceptual framework of this thesis demonstrates the interrelatedness between household and maternal resources and the associations between child feeding and child under- or over-nutrition, as depicted in Figure 1. The components of the framework have been combined in an integrated and holistic way, on the basis of evidence from empirical studies and attempts to predict the determinants of infant and young child feeding practices and the nutritional status of children (the dependent variables of the study). Consequently, the four broad objectives of this study, which are to explore the socio-cultural factors influencing child feeding, assess household-related factors and maternal-related factors that influence the feeding practices and nutritional status of children and assess the association between IYCF practices and the nutritional status of children, make the use of this framework reasonably practicable.

In conclusion, this chapter reviewed literature relevant to the study. The review highlighted concepts and definitions, theories and empirical evidence that are related to the study. Some of the concepts that were reviewed in this chapter were exclusive breastfeeding for the first six months, the timely introduction of solid, semi-solid or soft foods, minimum feeding frequency (MFF), minimum dietary diversity (MDD) and minimum acceptable diet (MAD). The concepts of nutritional status as well as stunting, wasting and underweight − anthropometric indicators in children − were also reviewed. Three models that informed the development of the conceptual framework for this study − the WHO conceptual framework on Childhood Stunting: Context, Causes, and Consequences, with an emphasis on complementary feeding − were reviewed. The three models are the UNICEF conceptual framework for the causes of undernutrition in young children

(UNICEF, 1990), the extended care model by Engle, Menon and Haddad, (1999) and the Model of childcare.

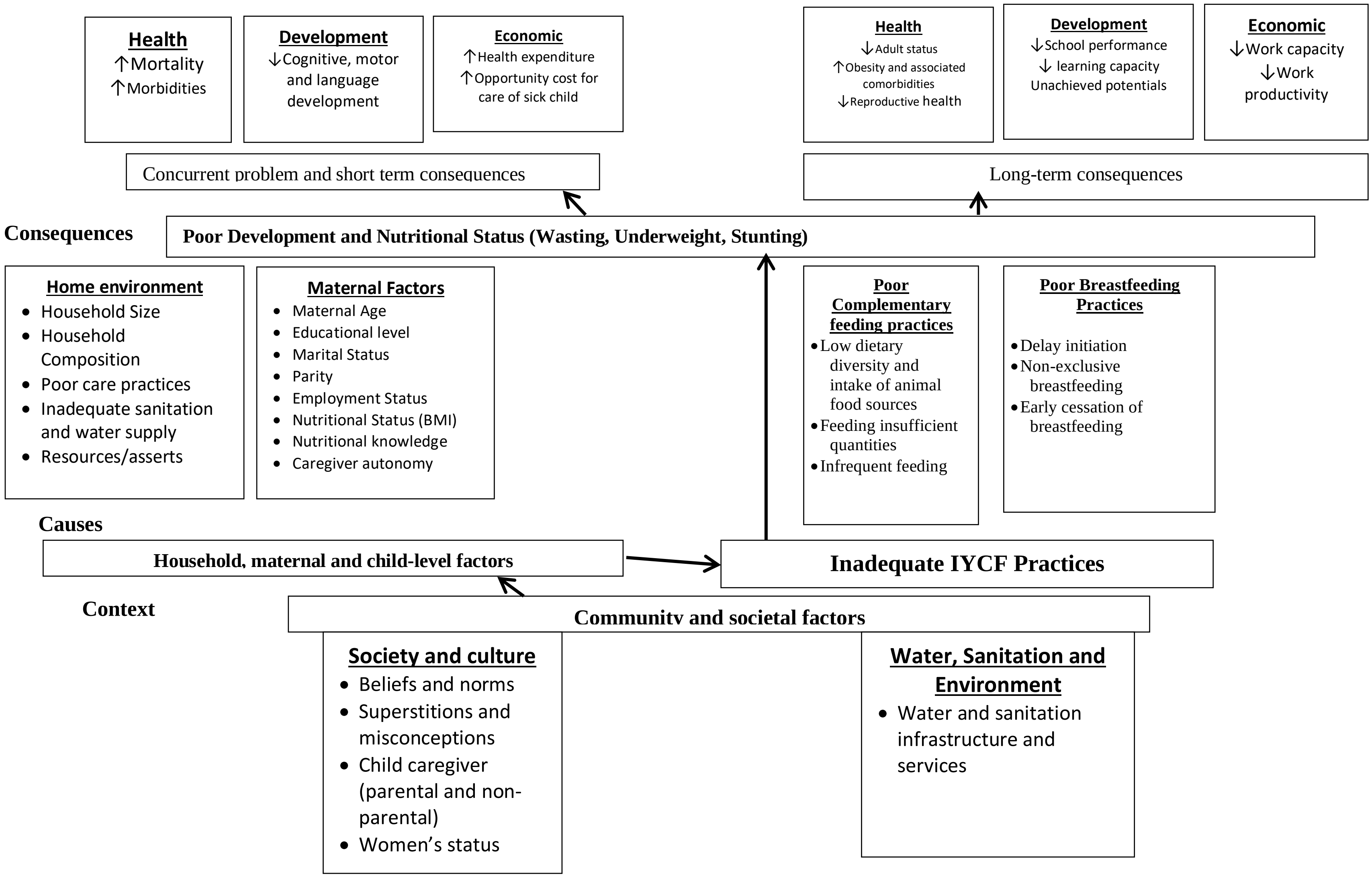


Figure 1: Adapted WHO Conceptual Framework on Childhood Stunting: Context, Causes, and Consequences, with an emphasis on Complementary Feeding (Stewart et al., 2013)

CHAPTER FOUR

METHODS OF THE STUDY

Introduction

This chapter presents information on how the study was conducted. An explanation is given of the research philosophy guiding the study, the research design employed for the study, a description of the study area, the study population and the sampling techniques that were employed. Other sub-sections that are explained in this chapter include ethical issues, a description of the data collection instruments used and details of fieldwork and related experiences. The chapter also describes how the qualitative and quantitative data were collected, processed and analyzed for each research question.

Profile of Kwahu Afram Plains North and South Districts

The Kwahu Afram Plains North District (KAPND) was created in 1988 out of the Kwahu District Council as part of the Government's local reform policy. The KAPN District is situated at the northern-most part of the Eastern Region and covers an area of 5,040 sq km and is the largest district in the Eastern Region in terms of landmass. The District is bounded by five other districts namely, the Kwahu Afram Plains South District to the South, the Sekyere Afram Plains and Asante-Akim North Districts in the Ashanti Region to the west, and the Sene and Atebubu Districts in the Brong Ahafo Region to the north (see Appendix D). The capital of the district is Donkorkrom. With the exception of Donkorkrom, the capital town, which is urban, the rest of the settlements in the district are peri-urban, rural and small communities. A few towns, notably

Adiembra and Amankwa are peri-urban. The district has 86% rural and 14% urban population distribution. The population of Kwahu Afram Plains North District, according to the 2010 Population and Housing Census, is 102,423 representing 3.8percent of the region's total population. Males constitute 52.9% and females represent 47.1% (Kwahu Afram Plains North District Analytical Report, Ghana Statistical Service, 2014).

Regarding health services infrastructure, the district has one hospital at Donkorkrom, thirteen Community-based Health Planning Services (CHPS) compounds at Ntonaboma, Dome, Bonkrom, Bruben, Amankwaa, Abomsarefo, Memchemfere and Nyakuikope, among others. According to the Kwahu Afram Plains North District Assembly programme based budget estimates for 2018-2021, the three leading causes of admission are deliveries (607), malaria (449) and anaemia in children (261) comprising 19%, 14% and 8% of all causes of admission respectively. According to the District Director of Health Services, approximately 20 percent of children in the district are malnourished, have less than three meals a day and take meals which do not provide all body nutrient requirements. The farming households rely on their produce for food which is mostly carbohydrate-rich and lacks most of the other nutrients such as protein and vitamins (Kwahu Afram Plains North District Assembly Report, 2017). The nutrition division collaborates with the medical care and Reproductive and Child Health (RCH) staff in educating patients and attendants at the out-patients department, child welfare clinic (CWC), antenatal, post-natal and outreach clinics. At the clinics, mothers are educated on the importance of exclusive breast feeding, diet during pregnancy and the importance of growth monitoring and its interpretation in malnourished children. However, inadequate personnel and logistics have hampered high coverage of nutritional activities in the district (Kwahu Afram Plains North District Assembly Report, 2017).

The Kwahu Afram Plains South District (KAPSD) is located at the north-western part of the Eastern Region, with a total land area of approximately 3,095 sq km. The district is bounded to the north by the Kwahu Afram Plains North, to the south by the Kwahu South, to the east by the Volta River and to the west by two districts in the Ashanti Region, the Sekyere East (Sekyere Afram Plains) and the Ashanti-Akim districts (see Appendix D). The 2010 Population and Housing Census (PHC) data reveals that the district has a total population of 115,812, consisting of 62,450 males (53.9%) and 53,362 females (46.1%). The higher percentage of male population is due to the fact that the district is a typical migrant destination similar to the Kwahu Afram Plains North. Tease is the administrative capital of the district. For the purpose of effective monitoring and supervision, the district is divided into 9 operative sub-districts - Agyata, Asanyansu, Forifori, Dim Sakabo, Ekye, Kwasi Fante, Maame Krobo, Samanhyia and Tease.

With respect to health services infrastructure, there are twenty-two (22) health facilities in the district. They comprise 6 health centers, 15 Community-based Health Planning Service (CHPS) zones and 1 private clinic. With regard to nutritional issues among children, according to the District Director of Health Services, more than 20% of children are malnourished (have less than three meals a day and take meals which do not provide all the nutrient requirements to support growth in children). At the household level, farming households rely on their produce for food, which is mostly carbohydrate-rich and lacks most of the other nutrients, such as protein and vitamins. According to the District Director of Health Services, inadequate personnel and logistics have hampered high coverage of nutritional activities in the district (District Medium Term Development Plan, 2014-2017).

The two districts were purposively selected because of the high rate of poverty in these districts in Eastern Region. According to the Ghana Poverty Mapping Results by the Ghana Statistical Service, Kwahu Afram Plains South District (59.7%) has the highest poverty incidence in the Eastern Region followed by Kwahu South (48.0%) and Upper Manya (43.6%) districts (Ghana Statistical Service, 2015).

The study areas were also selected on the basis of information about the trends in cases of underweight among children below 5 years in all districts in the Eastern Region between 2010 and 2014 (Kwahu Afram Plains South and North Trends in Underweight, 2015) and discussions with the Eastern Regional Nutrition Officer. The prevalence of cases of underweight among children was used because it is a composite indicator that reflects both chronic and acute malnutrition, and therefore, is related to both stunting and wasting in children. These two districts were purposively selected from the 26 districts on the basis of being ranked as the first and second districts with the highest prevalence of underweight in the Eastern Region in both 2013 and 2014. In 2013, the prevalence of underweight in the 26 districts within the Eastern Region ranged between 0.02 percent and 20.85 percent. These two districts, the Kwahu Afram Plains North and the Kwahu Afram Plains South, were ranked first and second with an underweight prevalence of 20.85 percent and 18.21 percent respectively among children under five years. Similarly, in 2014, within a range of 0.4 percent and 22.0 percent for the prevalence of underweight among the 26 districts within the Eastern Region, the Kwahu Afram Plains North and the Kwahu Afram Plains South had an underweight prevalence of 22.0 percent and 16.3 percent respectively. These two districts were purposively selected because previously, before 1988, they were together as one district, Kwahu Afram Plains District. Both districts were choosen because between 2013 and 2015, they were the only districts which had the prevalence of malnutrition among children rising. Again, most of the interventions to address undernutrition among children by NGO's such as PLAN Ghana, CARE International in the Eastern Region, at the time of the study, were being undertaken in these two districts.

Research Philosophy

This study was mainly guided by both the positivist and interpretativist philosophical worldviews; and their respective quantitative and qualitative methods provided the basis for the methodologies used. It has been argued that it is not possible to integrate two philosophical worldviews in one study because they are conflicting and competing (Aliyu, Bello, Kasim & Martin, 2014). On the other hand, some schools of thought rather argue in favour of combining two or more different philosophical perspectives within a single study, suggesting that research results are richer and more reliable if different paradigms are routinely combined (Baškarada & Koronios, 2018; Schoonenboom & Johnson, 2017). In other words, a richer understanding of a research topic is gained by using several methodologies and philosophical paradigms together in a single piece of research. Other researchers have also advocated a combination of different philosophical orientations in the same study because philosophical paradigms when combined in a single study become 'complementary' and enable researchers to answer research questions that span different worldviews (Brannen, 2017, Aliyu et al., 2014).

In buttressing the advantages of combining different philosophical worldviews in a single study, Idowu (2017) emphasized that using mixed philosophical orientations and methodologies is much more robust, in that, greater validity is accomplished through data triangulation, and greater cultural understanding is attained. He further argues that, by combining methodologies and methods at the data and paradigm level, scholars can achieve a more complete understanding of the complexities of the culture of people in a particular setting, in relation to its dynamics and the multi-dimensionality of the complex constructs of culture. On the basis of these benefits and strengths in combining philosophical paradigms that have been highlighted above, the basic tenets of two philosophical worldviews (the positivist and interpretivist paradigms) were adopted for this study; and they contributed significantly in unravelling the factors influencing the feeding practices and nutritional status of children, and in interpreting the final results and determining possible intervention directions.

To explore the socio-cultural factors that influence the feeding practices of caregivers with children under- two years of age from reports of grandmothers and community health workers, the study used qualitative methods, situated within the interpretative paradigm. Interpretivism can be used to capture multidimensionality of human behaviour (in the present study, specifically, the socio-cultural influences on child feeding), bounded by time and history (Thanh & Thanh, 2015). The interpretivist paradigm entails an exploration and analysis of the opinions, ideas, thinking, and meanings associated with the way of life of study participants in their natural settings, with the aim of gaining understanding and interpretations of how they create and maintain their collective and shared culture (Mohajan, 2018; Chowdhury, 2014). Since the study sought to unearth the socio-cultural aspects of child feeding, by employing qualitative methods to assess and interpret the experiences, understandings and perceptions of study participants rather than rely on numbers of statistics (Chowdhury, 2014), the interpretative paradigm of research was found to be more applicable to the study.

Therefore, in order to explore the views, interpretations, customs, and beliefs of the study participants, applying the interpretative methodology provided a context that allowed an examination of what the participants in the study had to say about the place of culture and its role in the feeding of children. Again, this study was based on this philosophy because it enabled the researcher to understand households' construction of the nutrition of children and the practices caregivers engage in so far as the feeding of children under-two years of age is concerned. The interpretive paradigm was also employed because it takes into consideration multiple perspectives, different versions of life experiences of people as well as the values mothers, family and community members attach to the feeding of children right from birth till they attain two years of age. In the present study, the interpretative paradigm employed the technique of conducting Focus Group Discussions (FGDs), which required detailed evaluation of transcripts of narrated reports from grandmothers and community health workers, in order to describe and understand the socio-cultural context of feeding children in the Kwahu Afram Plains North and South Districts.

Notwithstanding the opportunities offered by this kind of inquiry that enables a researcher to understand the ideas and views of a people's way of life in their own setting, it has some challenges which must be acknowledged when it is applied. First, the bias of the researcher in interpreting perceptions and experiences, as reported by the study participants, is one of such challenges that are difficult to overcome. Again, another concern is about the generalizability of findings that emerge from the study which, largely, may not be based on a representative sample of the population (Thorne, 2016). However, generalization is not the main aim of the qualitative aspect of the present study. The aim is to establish and interpret the presence of cultural practices, experiences, beliefs and customs of the study participants and how they influence the feeding and nutritional status of children in the study area. This was done by capturing and communicating participants' experiences in their own words through focus group discussions that were conducted.

The study also employed the positivist ideology which is based on objectivism, takes into account scientific methods and technicalities in obtaining empirical information specific to the study sample (Bunniss & Kelly, 2010). The positivist research paradigm entails quantitative investigations which start with prearranged, instrument-based questions aimed at statistically testing prior hypotheses (Creswell et al., 2011). This method allows the researcher to ask the respondents (mothers) the same questions, with pre-determined responses, by means of an interviewer-administered questionnaire which allows objective data to be collected. Specifically, mothers provided information on their background and the household socio-economic and demographic characteristics of the children who participated in the study. Again, the weight and height of both mothers and children were measured to assess their nutritional status. The data obtained from mothers resulted in numerical counts that were analyzed statistically, and from which statistical inferences were drawn (Creswell & Plano Clarke, 2011). The data collected was analysed to assess the association between maternal and household factors and the feeding practices, as well as the nutritional status of the children.

The positivist perspective, however, has not been approved of by some scientists, since it is associated with some problems as well as a number of questionable assumptions. For example, critics attack positivism in respect of its propensity to reduce human beings to numbers, using abstract formulas which are not relevant to the actual lives of people (Gray, 2013). In addition, early positivist social scientists assumed that social reality can be explained in rational terms, because people mostly act rationally (Denzin & Lincoln, 2011).

In conclusion, a blend of the positivism and interpretivism philosophical paradigms allowed a combination of elements of qualitative and quantitative research approaches for the purposes of breadth and depth of understanding (Schoonenboom & Johnson, 2017) the factors that influence the feeding practices and nutritional status of children. Furthermore, a combination of the elements of qualitative and quantitative research methodologies provides researchers with an opportunity to compensate for inherent method weaknesses and offset inevitable method biases (Almalki, 2016).

Research Design

The study employed the mixed-methods approach which involved the simultaneous collection, merging and use of both quantitative and qualitative data in a single study (Fetters et al., 2013). The advantages of adopting a mixed methods approach is that it gives a voice to study participants and ensure that study findings are grounded in participants' experiences. A mixed methods approach enables the researcher to gain a deeper, broader understanding of the phenomenon than studies that do not utilize both a quantitative and qualitative approach (McKim, 2017). Another value of mixed methods is the integration component. Integration gives readers more confidence in the results and the conclusions that are drawn from the study (O'Cathain,Murphy, & Nicholl, 2010).

The challenges associated with the mixed methods approach include the much more time and resources that are required to plan and implement this type of research. In addition, planning and implementing one method by drawing on the findings of another method always proves to be difficult. Also, resolving discrepancies that arise in the interpretation of the findings may often prove to be unclear and again, time consuming. Additionally, the large volume of data generated by mixed methods research can create challenges in analysis and dissemination (Creswell, & Plano Clark, 2011; Halcomb, 2018; Lieber & Weisner, 2010).

To investigate the infants and young children feeding practices and the nutritional status of children aged between 0 and 23 months, a cross-sectional study design was employed where caregivers of infants who attended Child Welfare Clinics (CWCs) between August and December, 2017 were interviewed. Cross sectional designs involve the collection of data from any given sample at one point in time. This design allows the researcher to investigate various aspects of the study at the same time. It helps researchers to capture large factual numerical and descriptive data on a one-shot basis (Rovai, Baker & Ponton, 2013). The cross-sectional design was employed for this study because it is an efficient and rapid way to assess practices of individuals, and therefore makes it an efficient design to use.

Target Population

The target population for the study included healthy children aged between 0 and 23 months. Children aged below two years, their mothers and health workers (HWs) who offer child health services were recruited at Child Welfare Clinics (CWCs). The HWs mainly comprised public health nurses, community health workers (CHWs) and community health volunteers (CHVs). Infants and children were sub-divided into 4 groups (less than 6 months, 6-8 months, 9-11 months, and 12 months and above) during the analysis of the feeding practices data to represent the variations in feeding recommendations for different age groups. The IYCF indicators are based on age-specific scoring systems that assigned scores for positive practices, such as breastfeeding, increased dietary diversity etc. The scoring system for the IYCF indicators are dependent on the age group of each child and the current WHO feeding recommendations for that particular age group.

Eligibility criteria for infants included healthy singleton infants aged between 0 and 23 months, born between 37 and 42 weeks gestational age, with birth weight between 2,500 to 4,000 g, with no metabolic or physical problems. The eligibility criteria for prospective study participants was assessed by checking the child's health record booklet with the assistance of the in-charges at the CWCs. Specifically, information on the child's birth weight, birth defects or medication conditions were obtained from the health record booklet and formed the basis for determining their eligibility to participate in the study. Children who were twins were excluded from this study since the evidence regarding the differences between their nutritional status and that of singletons is inconsistent (Bentil et al., 2016). In addition, a child was excluded if he/she had a chronic or congenital illness or any medical condition that interfered with feeding (e.g. cleft palate) or the taking of body measurements. The medical condition of the child was determined on the basis of the mother's self-reports, observation and records in the child's health card.

Determination of Sample Size and Sampling Procedure

The sample size required for the study was estimated using the prevalence of underweight among children under-five years for the Kwahu Afram Plains North and South Districts in 2014, which are 22.0% and 16.3% respectively (District Health Directorate Report, 2015). The prevalence of underweight was used because it is a composite indicator reflecting both chronic and acute malnutrition, and therefore, it is related to both stunting and wasting. This ensured that all the three indices of nutritional status were captured. Therefore, if the prevalence for both the North and South districts, on the average, was 19.2%, then the minimum sample size was estimated using the formula:

$n= Z^2*p*(1-p)/e^2$ where Z= confidence level, p= proportion of underweight children in the combined districts and e= precision (Suresh & Chandrashekara, 2012).

With a confidence level of 95% (i.e Z=1.96, e=2.8% and p=10.8%), the minimum sample size estimated was 765 children. Making a provision of 20% for the likelihood of incomplete data and other contingencies, a sample size of 912 (rounded up to 950) infants and children aged between 0 and 23 months was estimated for this study.

A two-stage sampling strategy was employed in this study. Firstly, a total number of 21 health facilities were randomly selected for the study. The simple random sampling method was used in sampling health facilities from a compiled list of all health facilities in the two districts. Out of a total number of 63 health facilities in both districts, one-third (1/3), that is a total number of 21 facilities, were randomly selected. For the Kwahu Afram Plains South District, 9 health facilities were randomly selected out of 22 facilities. These were Asanyansu health centre, Ekye health centre, Forifori CHPS, Kwasi Fante health centre, Maame Krobo health centre, Samanhyia CHPS, Dim Sakabo CHPS, Hwanyonso CHPS and Tease health centre. In the Kwahu Afram Plains North District, 12 health facilities were randomly selected out of 41 facilities in the district. The health facilities in the North were Adiemmbra Health Centre, Amankwa CHPS, Atakora CHPS, Donkorkrom Hospital (RCH Unit), Ntonaboma Health Centre, Memchemfre Health Centre, Asikasu CHPS, Manchare CHPS, Supom CHPS, Abotaso CHPS, Cedikope CHPS, and Kwaekese CHPS.

Secondly, mothers and their children aged between 0 and 23 months were recruited for the study from the selected health facilities in both districts. The total number of infants and young children who visit the CWCs in the selected health facilities on a monthly basis was obtained. A percentage of the sample size to be selected from each health facility and its corresponding absolute value was estimated for each health facility using proportional allocation (See Table 1).

Table 1: Proportionate Allocation of Study Participants for each Health Facility in Study Districts

Health Facilities	Estimated Average Number of children who visit on a monthly basis	Percentage	Sample Size
Adiemmbra Health Center	78	2.7	26
Amankwa CHPS	81	2.9	28
Atakora CHPS	93	3.2	30
Donkorkrom Hospital (RCH Unit)	104	3.7	35
Ntonaboma Health Center	100	3.5	33
Memchemfre Health Center	97	3.4	32
Asikasu CHPS	88	3.1	30
Manchare CHPS	106	3.7	35
Supom CHPS	88	3.1	30
Abotaso CHPS	87	3.0	29
Cedikope CHPS	110	3.9	37
Kwaekese CHPS	52	1.8	17
Asanyansu Health Centre	200	7.0	67
Ekye Health Centre	225	8.0	76
Forifori CHPS	210	7.4	70
Kwasi Fante Health Centre	120	4.2	40
Maame Krobo Health Centre	207	7.3	69
Samanhyia CHPS	201	7.1	67
Dim Sakabo CHPS	215	7.6	72
Hwanyonso CHPS	167	5.9	56
Tease Health Centre	212	7.5	71
Total	2841	100	950

Source: (Kwahu Afram Plains North District Health Directorate, 2017; Kwahu Afram Plains South District Health Directorate, 2017)

All eligible study participants - that is, mother-child pairs - were sampled, using the consecutive sampling method. In consecutive sampling, the consent of every prospective participant that met the inclusion criteria was sought for, and they were included upon consenting to be part of the study. Consecutive sampling has been employed in similar studies where mothers who had delivered healthy term-infants were initially approached in post-natal wards for their consent to participate in studies conducted to assess infant feeding practices (Gadappa & Behera, 2016; Daniels et al., 2015).

Consecutive sampling is very similar to convenience sampling, except that it seeks to include all accessible subjects as part of the sample (Suresh, 2914). Consecutive sampling is relatively easy to employ and creates less opportunity for intentional or unintentional manipulation by clinic staff. However, disadvantages associated with this sampling method are that it is not based on randomisation, and there may be variations in who is seen at CWCs at different times of the year. For example, during the rainy season, some caregivers may have problems coming from rural areas to the clinic. Again, there can be cases where some mothers will never access CWC services with their children, but may only rely on community outreach and home visit services provided by the community health Workers (CHWs)

For community health workers, community health volunteers, and grandmothers, the purposive sampling method was employed to recruit those who gave their consent to participate in the study. The purposive sampling method was employed because it is usually applied in situations where information that has to be obtained in a study can only be given by a specific calibre of people possessing some particular characteristics, or individuals who are regarded as having certain expertise in an area and are therefore deliberately selected (Kothari, 2004). Purposive sampling is also often applied in situations where not every sampling unit might be willing to participate (Tongco, 2007), and possibly, not be around during sampling as in the case of the community health workers who work on a shift basis and therefore might not always be present during the five working days in a week.

Instruments for Data Collection

The instruments used for data collection were questionnaires (for mothers), and a focus group discussion interview guide for grandmothers, CHWs and CHVs.

Mothers and Children Questionnaire

A questionnaire was administered to the mothers of children to collect quantitative data (see Appendix A). The questionnaire was organised in seven (A to G) sections. Section A solicited for information on socio-demographic characteristics of the mother such as marital status, parity, highest level of education attained, employment status and caregiver's autonomy (decision-making power and financial independence). Section B of the questionnaire sought for information on background characteristics of the index child such as sex, age, birth order and birth weight.

Section C dwelt on household information of the caregiver and child. Information obtained on household characteristics included household size, the number of rooms occupied by household, main source of drinking water, access to a toilet facility, type of toilet facility used and an estimate of average monthly household income. Other information related to feeding in the household was also obtained in Section C.

Section D of the questionnaire dealt with information on the caregiver's feeding practices for the index child. Information sought in this section included time of initiating breastfeeding after child's birth, giving of colostrum to child after birth, age at which child started complementary feeding and the number of times child is fed daily.

Section E of the questionnaire focused on the dietary intakes of children, by administering a 24-hour dietary recall and a seven (7) day food group frequency questionnaire (FGFQ). A 24-hour recall interview was conducted to collect dietary information on the number of food groups the child had eaten within the 24-hour period prior to data collection, which was used to estimate the dietary diversity scores (DDS) per day of the children. Data on the number of times that a child was offered food was also used to estimate the minimum feeding frequency scores (FFS) of each child.

In Section F, the nutritional status of both the index child and mother was assessed by taking anthropometric measurements. For each child, data was obtained for weight and height/ length measurements.

Section G of the questionnaire was administered to caregivers to assess their nutritional knowledge. In all, caregivers were required to answer twenty-three (23) questions based on WHO recommendations on appropriate IYCF practices.

Focused Group Discussion Interview Guide

Focused Group Discussions (FGDs) were conducted to collect data on socio-cultural factors influencing IYCF practices in the selected districts, using a Focused Group Discussion Interview Guide which had been developed (see Appendices B and C). The purpose of the FGDs was to gain a better understanding of how various cultural and traditional beliefs, norms and practices among the study participants influence the act of feeding children.

Training of Field Assistants

Two (2) field supervisors with a background in public health nutrition and disease control and twenty-one (21) field assistants were recruited and trained to assist in data collection from caregivers. The two field supervisors had been involved in previous health data collection exercises conducted at the district, regional and national levels by the Ghana Health Service for more than 10 years. The field supervisors and assistants were also fluent in Ewe, Akan and Frafra languages which are predominantly spoken in these districts.

The training took place at the Donkorkrom DHMT office and the Tease community centre for field assistants from the North and South districts respectively. Six days intensive training was organized for the field assistants and the supervisors in July 2017. The training programme was organized in two phases. The first phase entailed oral translation of each question or concept, first into Akan and later into Ewe and Frafra. The training also included a discussion on techniques of data collection, communication skills, explanation of questionnaires, administration of the instruments and how to maintain ethical standards. The second phase of the training programme (the last two days) entailed conducting role-plays among the field assistants, pre-testing the instruments and discussing issues that emerged in the pre-testing.

Pre-testing of Instruments

The data collection instruments were pre-tested at two health centres in the Eastern Region (Anidzi CHPS Zone and Bruben CHPS Zone) to ascertain the reliability, clarity and simplicity of the tools. Fourteen (14) mothers who consented to participate in the pilot study were interviewed by field assistants under the supervision of the two supervisors and the researcher. Two FGDs were conducted, one for eight grandmothers and another for six health workers to pre-test the FGD interview guide that had been developed. These two health facilities, situated in different communities, were selected because caregivers who accessed these facilities shared similar characteristics (with respect to language, major economic activities (farming and fishing) and also drank from the Afram River and used it for cooking).

In pre-testing the instrument, it was observed that some items were repeated. It also revealed important reactions of respondents to the instrument. Some reactions related to the administration of the 7- day Food Frequency questionnaire, the 24 - hour dietary recall and IYCF practices in the past, which caregivers found challenging to recall as a result of memory lapses. Another reaction of the caregivers was that they did not have much time to spend at the clinic. In almost every case they were in a hurry to return to their farms or the market since most CWC days for the weighing of children were on major market days.

As a result of pre-testing, the dietary assessment questionnaires, some food items which are grown and commonly eaten by people in the districts, but were initially not included, were identified and added to the final questionnaire. These food items included groundnuts, specific green leafy vegetables such as *ayoyo* (jute leaves), *alefu*, *borkorborkor,* Turkey berry leaves (*Solanum torvum),* locally called "*kantosi",* cocoyam leaves (*"kontomire"*), and watermelon which are cultivated and sold on a large scale in the district.

It was also revealed that some of the items indicated in the household questionnaire to assess household assets were not present in most households. However, other household assets such as motorcycles and bicycles which were not previously indicated as part of assessing household assets (a measure of socioeconomic status) in the questionnaire were mostly mentioned by the mothers, and hence were finally included. It was also found that some mothers had no idea about the date of birth and ages of their children. Therefore, a sentence in italics was later included instructing field assistants to confirm answers given by mothers from immunization/weighing cards of all children.

After pre-testing the FGD interview guides, it was realized from the responses of both the grandmothers and CHWs/CHVs that there was the need to add questions on local foods believed to boost growth and development of children, protect children against common childhood diseases, give blood and help in the brain development of children. Again, the responses from the FGD participants highlighted the need to re-structure the questions in the guide to indicate rites/customs performed before a mother starts breastfeeding, exclusive breastfeeding practices, prelacteal feeding practices, complementary feeding practices and cultural practices influencing IYCF practices.

The results from the pilot-study were used as a guide to thoroughly revise and make the needed modifications to the research instruments to suit the study population better, before conducting the actual field work.

District Community Entry

Prior to the commencement of the actual data collection, the researcher embarked on two visits to the Afram Plains South and North districts. During the first visit, permission was sought from the Regional Nutrition Officer and the two Directors of the District Health Directorate. The two district health directors also formally introduced the researcher to two health information and diseases control officers who are in charge of planning and supervising health research in the district. The two health officers gave technical advice and suggestions, supported and assisted with the recruitment of field assistants, their training and the pre-testing of the research instruments after training. During the second visit, with the assistance of the health officers, the researcher met and obtained permission from the heads and in-charges of the 21 health facilities where caregivers and their children were going to be recruited for the study. The researcher also had opportunity to formally introduce herself and inform the assemblymen and sub-chiefs of the various communities (where the health facilities were located) about the intended study. During the visits to the assemblymen and sub-chiefs, their support and assistance were solicited for organizing grandmothers for the FGDs.

Data Collection Procedure

Prior to the commencement of the fieldwork, permission was sought from the Regional Health Directorate, the two District Health Management Teams

(DHMT) and the Directors of Health Services in the 21 health facilities that were selected for the study. A document summarizing the rationale of the study, the significance of the study and the research methods was attached to a letter to obtain permission to conduct the study in the selected health facilities in the two districts within the region.

Data was collected directly from the responses of mothers who gave their consent to participate in the study by either signing or thumb-printing the informed-consent form. This was after the purpose of the study had been explained and mothers had been informed about their right to interrupt the interview at any time or opt out of the study without any fear of future prejudice. The mothers were informed about the duration (approximately 35 minutes) for answering the questionnaire.

There were no risks associated with the study and there were no material or financial benefits to respondents. The questionnaires were interviewer-administered and the data was collected within four months, that is from 2nd August to 30th November, 2017.

In an attempt to eliminate language barriers, data was collected in the 3 major local dialects spoken in the two districts - Twi, Ewe and Frafra. In respect of grandmothers and community health workers/volunteers, FGDs were conducted in school settings or at the premises of the District Health Directorate. The purpose of the study was explained to all the participants before each session of the FGD started. Participants who gave their consent to participate in the study were given a consent form to either sign or thumbprint. The seating was arranged in a semi-circle with the moderator seated at the centre of the circle. The note taker and the digital recorder were positioned at vantage points.

All FGDs were audio recorded; and notes and pictures were taken after obtaining permission from each participant. Different sessions of FGDs were conducted for grandmothers and community health workers/volunteers. The proceedings of the FGDs were recorded, using a voice tape-recorder, and detailed notes were taken by the researcher and two research assistants. The FGD sessions were undertaken between 13th November, 2017 and 15th December, 2017.

Ethical Consideration and Community Entry Protocol

Ethical approval and clearance for the study was granted by the Dodowa Health Research Centre's (DHRC) Institutional Review Board (IRB) of the Ghana Health Service (Reference/Identification: DHRCIRB/04/02/17) and the IRB of the University of Cape Coast (Reference/Identification: UCCIRB/ CHLS/2017/02) (See Appendices F and G). Once approval was obtained from the two Boards, all potential study participants (mother-child pairs) were each approached at the selected health centres they had visited to access growth monitoring and promotion services for their children. The consent of each mother was sought to voluntarily participate in the study. The consenting process involved explaining the purpose of the study, confidentiality procedures, risks, benefits and the freedom to opt out of the study at any time without any penalty. After the study had been thoroughly explained to the caregivers and health workers, they were recruited to participate in the study after they had given their consent by either thumb-printing or signing an informed-consent form. To ensure respondents' data confidentiality, respondents were identified with identity numbers. The completed questionnaires and information on interviews and audio files of the FGDs conducted were kept safely under lock and key within the University and were accessible to only the researcher.

Field Experiences

The field work was undertaken between August and December, 2017. A number of challenges were encountered in some communities.

Although the majority of the mothers were willing to participate and gave their consent to participate in the study, mid-way through an interview, approximately 20 minutes after starting, most of them complained about the time involved in completing the questionnaire. The complaints were made because the interview delayed their return to their farms or to the market on market days. Most of the mothers visited the CWCs and RCH on the market days in the community and were in a hurry to go to the market to sell their farm produce, since most of the caregivers were farmers. To overcome this problem, it was ensured that the mother's household background information and the anthropometric measurements were taken and recorded at the clinic for both the caregiver and her child; and the remaining sections on the questionnaire, such as dietary assessment and nutritional knowledge of the caregiver were completed in the homes of the study participants. It is important to note that out of the 950 questionnaires that were administered at the various heath facilities, a total of 935 mother-child pairs were finally obtained and used in the analysis. In other words, 15(1.6%) were regarded as non-reponses as a result of not being able to access their homes during days of heavy rainfall or mothers declining later to complete other sections of the questionnaire. However, the 1.6% that was lost to follow-up was negligible and did not affect the sample size which was originally estimated at 912 and rounded to 950, after making a provision of 20% for the likelihood of incomplete data and other contingencies. Therefore, administering the questionnaire to the mothers was conducted in such a way that it did not affect their daily routines as well as the quality of the data collected.

Another challenge was the demand for gifts or monetary rewards from the researcher and assistants after conducting FGDs. In most communities, grandmothers only agreed to participate in the FGDs on condition that they would be given gifts or money. In all cases, the Health Information and Disease Control Officers in the district health directorate and the assemblymen who assisted with organizing the women explained the benefits and relevance of the study to the people, particularly nursing mothers and their children. This enabled the grandmothers to appreciate the need for the study. Therefore, they agreed to participate in the FGDs without demanding any gift or money.

Again, with regard to conducting the FGDs among grandmothers, an incident occurred in a Fulani herdsmen community (the Zongo community, popularly referred to as *Room 10*). A FGD was arranged through the nurse-in-charge at the CHPS Zone in the Zongo community and the assemblyman on a Sunday evening at 4:00pm. Out of the expected number of 12 grandmothers, 9 attended. However, they were reluctant to provide any answers or actively participate in the discussions. Most of the grandmothers were quiet. On several occasions, the researcher paused, and with the assistance of the nurse-in-charge and the disease control officer who was present, encouraged them to talk; but all these efforts were fruitless. Only two women were talking most of the time. Later on, the nurse-in-charge indicated that some of their responses were not entirely true, particularly in respect of the giving of colostrum to babies and exclusive breastfeeding of infants. As a result of the reluctance of most participants to talk during the FGD in the "*Room 10*" community and reports that some of the responses were not true, the entire FGD session conducted in this community was not included in the final analysis.

During the FGD, one of the women stated that some of the men in the community were moving around or had sent their children to come and listen to the discussions and inform them. After that statement, none of the women were willing to talk again; and most of them got up and left. The researcher's attention was later drawn by an elderly man living in the community to the fact that women in Zongo communities need permission from their husbands/men before they can participate in such discussions or interviews. So, it would have been better to rather visit their homes, explain the purpose of the study and obtain permission from their husbands. Then they would, in turn, encourage or instruct their wives to actively participate. Another way was to obtain permission (to engage the women) through the Chief Imam of the Zongo community. Then he would inform their husbands and obtain permission on their behalf. The Chief Imam would then invite the women, explain the purpose of the research to them and encourage them to actively participate in the study.

One other challenge was mobilizing CHWs and CHVs who, on the average, numbered three in most communities, for their FGDs. To address this problem, the researcher, with the assistance of the Technical Officers in the directorate and the in-charge of the various health facilities, combined CHWs and CHVs from three or four facilities, and conducted the FGD at a central location after working hours, usually at 4:00pm. The CHWs and CHVs travelled to these central locations; and they were given money, depending on the distance from their community, to offset their transportation expenses.

Data Quality Checks and Control Measures

In developing the FGD interview guide for grandmothers, CHWs and CHVs, the items were modified versions of past related studies (Karigi et al., 2016; Wanjohi et al., 2016; DaCosta, 2012). As a result of adapting standard questionnaires and FGD guides, the items were not ambiguous or confusing, and therefore, the respondents in this study did not complain about the clarity of any question. For the quantitative aspect of the study, the reliability of the questionnaire was assessed on the basis of responses from the mothers during pretesting of the instrument. This enabled the researcher to determine how the items relate to each other. The test-retest method was used to assess the reliability of the instrument. This entailed repeating the administration of the same questionnaire on some (10 mothers) of the respondents by using different field assistants. A Cronbach’s alpha coefficient value of 0.902 was obtained for the pretested instrument. On the basis of using a scale from 0.00 (very unreliable) to 1.00 (very reliable) (Tavakol & Dennick, 2011), the questionnaire was considered to have a high internal consistency of the items measured and hence was considered reliable. The responses given in the repeated administration of questionnaires on the mothers were consistent with data previously collected. This also gave an indication that the field assistants were reliable, to a large extent.

A number of control measures were implemented to ensure that the data collected was accurate. Field assistants were adequately trained on how to administer the questionnaire to caregivers and on how to take anthropometric measurements of both caregivers and their children. The questionnaire was pretested for consistency. Questionnaires were administered to caregivers in their local languages, and the questionnaires were vetted in the field to ensure that all responses were valid and any errors or inconsistencies or wrong recordings of information that were identified were corrected, particularly with the dietary intakes of the children. At the end of each day when the field assistant returned from the field, the supervisors checked questionnaires for completeness. The researcher and two supervisors visited each field assistant in the field to carry out spot checks on interviews, filling of questionnaires and the taking of anthropometric measurements of children and their mothers. Invalidities and errors in responses were checked, and to some extent reduced, by allowing an elder sibling, father or household members who saw the child eat to be present during the dietary recall process, after obtaining the approval of the caregiver.

Analysis of Qualitative Data

Qualitative data, obtained mainly from FGDs with grandmothers and health workers were analysed, using the inductive analytical process. Commonly applied in qualitative research, the inductive analysis uses collected data to create, test and generate themes to understand and interpret the data collected. Specifically, the data were analysed manually using thematic content analysis (Elo, Kääriäinen, Kanste, Pölkki, Utriainen and Kyngäs, 2014; Vaismoradi, Turunen and Bondas, 2013). The researcher coded the summarized transcript by reading it through several times and attaching words or a phrase to form a code to describe each statement or new issue raised by the participant.

Next after this initial coding, each transcript was compared with other transcripts, taking note of patterns of similarities and differences. The final codes were created by either merging or dividing the initial codes and renaming, if needed (Creswell and Creswell, 2017). Subthemes were created by grouping similar or associated codes. Likewise, associated subthemes were pooled together to form the major themes. The analysis was a continuous process until the researcher judged that the final codes, themes and subthemes entirely reflected and captured the participants' naratives. Therefore, the themes and subthemes were not predetermined but were derived inductively during the analysis of the participants accounts (Elo et al., 2014). The themes identified were clustered and used in writing a narrative account.

Data Management and Analysis

This section describes how quantitative data on maternal, household, feeding variables and anthropometric data (weight and height measurements of mothers and children) were processed and coded as well as how statistical analysis was done.

Data Management

Quantitative data were entered into Microsoft Excel software (version 13.0). Verification was applied to resolve discrepancies in records. The data was screened for inconsistencies by checking for missing data, extreme values (outliers) and logical flow of responses. The screening of the data enabled the researcher to determine the adequacy of the data and the assumptions of the specific procedure for the analyses. Finally, the cleaned data were exported to Stata (version 14.0) for coding of variables and statistical analysis.

Coding of Variables

Coding of socio-economic status (SES)

For socioeconomic status, an overall wealth index was computed for each study participants using principal component analysis (PCA) considering the assets holdings of participants as described by Vyas and Kumaranayake (2006).The computation of the wealth index was based on the type of assets including telephone, refrigerator, solar panel, generator, radio, television, video deck, multi-TV, bicycle, motorcycle, vehicle Kiosk/Store, PC/laptop available in the participant's household. Also, included in the PCA were the household income, home ownership, type of building material and household ownership of domestic animals such as poultry, goat, sheep, pigs, cattle, rabbit and snails. Study participants were grouped by their wealth indices into low, middle and high socio-economic status (SES). The wealth quintiles (from low to high) were ranked into three equal categories. As was done in other studies (Chowdhury et al., 2018; Osorio, Romero, Bonilla & Aguado, 2018; Galgamuwa et al., 2017) the lowest 40% of the study participants were classified into low SES, the next 40% in middle SES and the highest 20% into high SES.

Coding of Nutritional Status of Children

The WHO Anthro software (World Health Organization, 2011) was used to transform the weight and length/height of the infants into the growth indices - weight-for-age, weight-for-length and length-for-age z-scores. Infants with z-scores less than -2 standard deviations from the median reference length-for-age (LAZ), weight-for-length (WLZ) and weight-for-age (WAZ) were classified as stunted, wasted and underweight, respectively

Coding of Nutritional Status of Mothers

With regard to the nutritional status of mothers, the height and weight measurements were used to calculate the Body Mass Index (BMI). The BMI was calculated by dividing a mother's weight in kilograms (Kg) by the square of her height in meters (m^2) [BMI = weight (kg)/height^2 (m^2)]. The BMI values were re-categorized on the basis of the Centers for Disease Control (CDC) and Prevention classifications of BMI in adults (CDC, 2015). Mothers with BMI less than 18.5

kg/m^2, were classified as underweight. Those with BMI between 18.5 kg/m^2 and 24.9 kg/m^2, were categorised as normal/healthy. Mothers with BMI between 25.0 kg/m^2 and 30 kg/m^2 were considered as overweight. Additionally, mothers whose BMI was 30.0 kg/m^2 or higher were classified as obese.

Coding of mother's autonomy

In this study, a mother's autonomy was assessed using two predictor terms - decision making power at the household level and financial independence. A mother's household decision-making autonomy was based on responses to 15 questions (A14 - A28) regarding who makes decisions in the respondent's household about obtaining healthcare, large household purchases, visits to family or relatives, and child health care. Each of the questions had four (4) response options – respondent alone, respondent and husband/partner jointly, husband/partner alone and other household member which were coded as 4, 3, 2 and 1 respectively. The total scores which were between 15 and 60 were re-categorised as low (15-30), medium/average (31- 45) and high (46-60) decision making power similar to the coding of mother's household decision-making level in related studies (Abate & Belachew, 2017; Rahman, Saima & Goni, 2015; Sraboni & Quisumbing, 2018).

Mothers whose decision-making power was classified as low were respondents who had decisions mainly made by only their husbands or other members of the household on their behalf. Mothers with a medium or average decision-making power usually took decisions together with their husbands or other male partners. Participants who were classified as having a high decision-making power generally took decisions alone without being under any obligation to consult their husbands or any other household member.

Control and access over finances or financial independence of a mother was assessed based on her responses to 12 questions (A29-A40). Seven (7) of the questions (A29-A35) assessed a mother's ability to have control over money to buy perishable food items, clothes, medicine, toiletriess, jewelry, gifts for parents or other family members. Each of the questions had two response options namely- respondent has control (Yes) and no control (No). "Yes" and "No" were coded as 1 and 0 respectively. The other 5 questions (A36-A40) assessed the mother's ability to save a portion of the money she had earned, spend her earnings as she wished and have a say in how the household's overall income should be spent. Each of these 5 questions were given three response options – no/never, yes/some of the time and yes/ all the time which were coded as 0, 1 and 2 respectively. The total scores ranged between 0 and 17 and were categorised into low (0-8), medium/average (9- 12) and high (13-17) financial independence similar to the coding of levels in related studies (Abate & Belachew, 2017; Rahman, Saima & Goni, 2015; Sraboni & Quisumbing, 2018).

Coding of Mother's Nutritional Knowledge

Mothers provided answers to twenty-three (23) questions which assessed their nutritional knowledge on IYCF practices based on WHO and UNICEF recommendations. Depending on the number of correct responses, a mother was either regarded as having low (0-7 correct responses), average (8-15 correct responses) or high (16-23 correct responses) nutritional knowledge.

Variables used to code the Composite Feeding Index (CFI)

Current Breastfeeding Status

Regarding the current breastfeeding status (assessed as breastfeeding practice in past 24-hours prior to data collection), a score of three (3) was assigned to infants 0-6 months who were expected to be exclusively breastfed, two (2) for infants > 6-12 months and one (1) for children >12-23 months who were breastfeeding at the time of the study. Information regarding the current breastfeeding status of a child was obtained by asking whether the child was breastfed in the past 24 hours prior to the study. For infants below 6 months, it was probed further to assess whether the child was solely being fed on only breastmilk (indicative of exclusive breastfeeding) or ate other foods in addition to the breastmilk (suggesting non-exclusive breastfeeding practice).

Dietary Diversity Score (DDS)

The dietary diversity scores (DDS) were calculated on the basis of whether the child had received food from any of 7 food groups within a 24-hour period prior to the data collection by conducting a 24-hour dietary recall interview. The seven food groups that were used included; grain/roots/tubers, legumes and nuts, dairy products, flesh(animal) foods, eggs, vitamin A rich fruits and vegetables, other fruits and vegetables.

The WHO recommends that children aged between 6 and 23 months should be given foods from at least four food groups each day to meet their minimum dietary diversity score. On the basis of this recommendation, a child in any age group who is not fed from any food group or fed from only 3 or less food groups in a day earned a score of 0. A score of one (1) was awarded to a child who was fed from 4 food groups, and a score of two (2) was given to children in the age groups >6-8 months and 9-12 months if more than four food groups are consumed. The scoring system that was applied in the study was informed by and based on the scoring pattern for the feeding indicator of dietray diversity score as applied in the studies by Bork et al. (2012), Chaudhary et al. (2018), Khatoon et al. (2011), Lohia & Udipi, (2014), Ma et al. (2012) and Pagui, (2015). A child aged between >12 and 23 months was given a score of three (3) if she consumed more than four food groups within a 24-hour period before interviewing the caregiver. This is because of WHO's emphasis on feeding children above 12 months from a wide variety of foods and gradually substituting their usual infant foods with family foods.

Food-Group Frequency Score (FGFS)

The seven-day food-group frequency score (7-D FGFS) was calculated using the same 7 food groups as specified previously in the Dietary Diversity Score (DDS) sub-section. Information on the 7-D FGFS for each child was obtained by administering a 7-day Food Group Frequency questionnaire. For each of the food groups, a score ranging from 0-2 was assigned, depending on the number of times that food items belonging to that food group were consumed over a period of one week prior to the interview. If no food item belonging to a particular food-group was eaten during the whole week, a score of zero was assigned, if eaten for 1-3 days, a score of one (1) was given, and if eaten for 4 or more days a score of two (2) was awarded, regardless of the child's age.

A total score ranging between 0 and 14 was calculated by adding the separate scores of the seven food groups, and then new scores were assigned as applied in the studies by Bork et al. (2012), Chaudhary et al. (2018), Khatoon et al. (2011), Lohia & Udipi, (2014), Ma et al. (2012) and Pagui, (2015). The scoring pattern of the FGFS is presented in Table 2 to reflect the recommendations for specific age-groups. The individual total scores were categorised to give new scores ranging from 0-2 to reflect their specific age requirements as presented in Table 2. For example, for children aged 6-8 months, a score ranging between 0 and 2 from the total score of 14 was re-assigned a zero (0) score in the new scoring system. A score of 3 - 4 in the total score was re-assigned one (1) in the new score. Finally, a score of five or higher ($\geq$5) in the total score was assigned two (2) in the new score. For the other age groups, information regarding how scores were awarded for total FGFS attained is presented in Table 2.

Feeding Frequency Score (FFS)

Feeding Frequency Score (FFS) refers to the number of times that a child consumed solid or semi-solid foods within a day, including meals and snacks, depending on the breastfeeding status of the child. Information on the feeding frequency score over a period of 24-hours was obtained by conducting a 24-hour dietary recall interview. The FFS scoring pattern applied in this study was based on WHO's recommendations on the number of meals that children belonging to the various age-groups should be fed daily in addition to breastfeeding and as described by Bork et al., 2012; Chaudhary et al., 2018; Lohia & Udipi, 2014, Ma et al., 2012 and Pagui, 2015. The WHO recommends that children aged 6-8 months, who ideally should be breastfeeding, should be fed complementary foods at least two (2) times in a 24-hour period, in addition to breast milk (WHO, 2008). On the basis of these recommendations, a score of zero (0) was given to children aged 6-8 months who were fed complementary foods 0-1 times, one (1) when fed **two** (2) times, and a score of two (2) when fed more than two times (>2) over a 24-hour period prior to interviewing the caregiver. For children aged 9-11 months, a score of zero was awarded if a child was fed 0-2 times in a day, a score of one (1) was given when a child ate complementary foods three (3) times in a day, and a score of two (2) was awarded when a child ate complementary foods more than three (>3) times in a day.

To arrive at the Composite Feeding Index (CFI) scores, which ranged from 0 to 8, scores of each of the four individual feeding indicators were summed as presented in Table 2. Further, the CFI distribution per age group and the division into terciles were presented as: low/poor (0) (a CFI score of 0–4), medium/average (1) (a CFI score of 5-6) and high/good (2) (a CFI score of 7-8) as applied in the studies by Bork et al., 2012; Chaudhary et al., 2018; Khatoon et al., 2011; Lohia & Udipi, 2014, Ma et al., 2012; Pagui, 2015). Information regarding the scoring system applied for each of the age-groups is shown in Table 2.

Coding of Composite Feeding Index (CFI)

This study took into account the main feeding practice indicators of children and represented them by calculating a single summary/a composite feeding index (CFI). Calculating a composite feeding index, which is age-specific is an appropriate technique to evaluate overall feeding practices of children considering the multi-dimensional nature of feeding practices (Khatoon et al., 2011). The need for employing a composite child feeding index to assess its implications for the nutritional status of children is being regarded as very important in recent times (Reinbott et al., 2015). Using a quantifiable summary index may also increase the possibility of comparing findings of different studies (Lohia & Udipi, 2014).

In this study, the effect of following the recommendations on appropriate IYCF practices on the growth of infants and young children was evaluated. The composite feeding index (CFI) was constructed by using data on feeding practices from the quantitative 24-hour dietary recalls and the Food Group frequency questionnaire (FFQ).

The Composite Feeding Index (CFI) was computed as described by Bork et al. (2012), Chaudhary et al. (2018), Lohia and Udipi, (2014) and Pagui, (2015). The four feeding indicators - information on current breastfeeding status (whether the child was breastfed within the past 24 hours prior to the interview), Dietary Diversity Score (DDS) - the number of food groups the child had eaten from within 24 hours prior to the interview, food group frequency score (FGFS) - the frequency of consuming various food groups in the previous 7 days before the study, and feeding frequency scores (FFS) - the number of times the child had been fed in the past 24 hours, including the intakes of snacks, were used to calculate the CFI.

The index was based on age-specific scoring systems that assigned scores for positive practices, such as breastfeeding, increased dietary diversity etc. The scoring system was dependent on the age group of each child and the current WHO feeding recommendations for that particular age group. The scoring system of the CFI entailed assigning a score of zero (0) for negative feeding practices and a score of one (1) for positive feeding. For practices that are particularly vital for specific age groups, for example, breastfeeding for children 6-12 months, a score of two (2) was assigned.

The composite feeding index was used to determine the association between IYCF practices and the nutritional status of children in the following age categories: 0-6 months, >6-8 months, 9-12 months, and >12-23 months.

Statistical Analysis

Descriptive statistics, including frequencies and percentages as well as charts, were used to describe the general characteristics of the study population and the study variables. Categorical variables were summarized and presented as percentages together with their corresponding frequencies. For continuous variables such as the ages of the child and mother which were normally distributed, were expressed in means and their corresponding standard deviations provided. For the composite feeding index, a continuous variable, which was not normally distributed, the median and its interquartile range were reported.

The third objective of the study was to assess household factors which influenced child feeding practices and the nutritional status of children. Bivariate and multinomial logistic regressions were used to assess the association between household-related factors and the feeding practices of children (dietary diversity score (DDS) and minimum acceptable diet meal feeding frequency (MAD). Moreover, bivariate and multivariate logistic regressions were used to assess the association between the minimum acceptable diet (MAD) (a dichotomous dependent variable) and household factors.

The fourth objective of the study was to investigate the association of maternal factors with child feeding practices and the nutritional status of children. To assess the association between maternal-related factors and the IYCF indicator (dietary diversity score (DDS), a multinomial logistic regression was employed. For the dichotomous feeding practice index (minimum acceptable diet (MAD), bivariate and multivariate logistic regressions were used to assess its association with maternal-related factors. The association between maternal-related factors and a child's nutritional status (using the anthropometric measures) was determined using bivariate and multivariate logistic regressions. Bivariate and multivariate logistic regressions were used to explore the association between the dependent variables (feeding indicator (MAD) and anthropometric measures) and a wide range of independent variables at the household and maternal levels. Variables with p-values <0.05 were included in the multivariate logistic regression. That is, only factors that were significantly associated with a child's feeding practices in the bivariate regression were used in the multivariate regression analysis.

All the variables used in the multivariate analyses were considered as covariates and so they all adjusted for each other. All statistical tests were two-sided and were considered statistically significant if p-value <0.05. The results were presented as unadjusted and adjusted odds ratios (OR) and 95% confidence intervals (CI). A summary of the study variables and the statistical methods that were applied for each of the research objectives is presented in Table 2.

Table 2: Variables and Scoring System used to compute the Composite Feeding Index (CFI)

Variables	0 - 6 Months	>6 - 8 Months	9 – 12 Months	>12 – 23Months
Currently breastfeeding	Yes = 3 (exclusive, breastfeeds ≥10 times day and night, no water is given) Yes =1 (gives water and infant formula in addition to breast milk, breastfeeds < 10 times) Not breastfeeding = 0	Yes = 2 No = 0	Yes = 2 No = 0	Yes = 1 No = 0
Dietary diversity score (DDS) [1] (24-h recall)	*Not applicable*	**Poor DDS** : 0 - 3 food groups = 0 **Average DDS** : 4 food groups = 1 **Good DDS** : >4 food groups =2 **Adequate DDS**: ≥ 4 food groups **Inadequate DDS** : < 4 food groups	**Poor DDS**: 0 - 3 food groups = 0 **Average DDS** : 4 food groups = 1 **Good DDS** : > 4 food groups =2 **Adequate DDS**: ≥ 4 food groups **Inadequate DDS** : < 4 food groups	**Poor DDS** : 0 – 3 food groups = 0 **Average DDS** : 4 food groups = 1 **Good DDS** : > 4 food groups =3 **Adequate DDS** : ≥ 4 food groups **Inadequate DDS** : < 4 food groups
Food group frequency score (FGFS) (For past 7days)	*Not applicable*	**Poor FGFS**: 0 (no food in previous week) =0 **Average FGFS**: 1 or 2 = 1 **Good FGFS**: ≥3 = 2	**Poor FGFS** : 0 or 1 = 0 **Average FGFS** : 2 - 4 = 1 **Good FGFS** : ≥5 =2	**Poor FGFS** : 0 – 3 = 0 **Average FGFS** : 4 - 6 = 1 **Good FGFS**: ≥7 =2
Feeding Frequency Score (FFS)	*Not applicable*	**Poor FFS**: 0 – 1 times = 0 **Average FFS**: 2 times = 1 **Good FFS**: ≥3 times = 2	**Poor FFS**: 0 – 2 times = 0 **Average FFS**: 3 times = 1 **Good FFS**: ≥4 times = 2	**Poor FFS**: 0 – 2 times = 0 **Average FFS**: 3 times = 1 **Good FFS**: ≥4 times = 2
Total score (Min/Max)	**(0/3)**	**(0/8)**	**(0/8)**	**(0/8)**

Source: Nsiah-Asamoah (2019)

CHAPTER FIVE

SOCIO-CULTURAL FACTORS INFLUENCING CHILD FEEDING PRACTICES IN THE KWAHU AFRAM PLAINS NORTH AND SOUTH DISTRICTS

Introduction

In this chapter, the researcher explores how socio-cultural factors influence child feeding practices in the selected districts from the perspective of grandmothers (GMs), Community Health Workers (CHWs) and Community Health Volunteers (CHVs).

The Chapter is divided into two sections. The first section presents an account of the views of GMs, whereas the second section summarizes the views of CHWs and CHVs on socio-cultural practices influencing the feeding of children in the districts.

The CHWs and CHVs were included in this study on the basis of recommendations from previous studies, emphasizing the need for health professionals in various cultural settings to understand and be well-informed about the cultural practices and misconceptions that act as barriers to appropriate IYCF practices (Pemunta & Fubah, 2015; Radzyminski & Callister, 2015). A total of 9 FGD sessions were conducted for CHWs and CHVs in groups ranging between 8 and 10 members. A total of 14 Focused Group Discussions (FGDs) were conducted among GMs in groups of between 10 and 12 members in Adeemmra, Adofo, Amankwa, Kwaekese, Abomasarefo, Agordeke, Amankwa Tornu, Foso, Supom, Cedikope, Koranteng Krachie, Maame Krobo, Ntonabomah and Tease.

Grandmother's Views about Cultural Practices Affecting IYCF

Practices, Customs and Rites Performed Before Breastfeeding Commences

According to the grandmothers, traditions vary from home to home since communities in the district comprise different ethnic groups. Some have rites they perform before a mother breastfeeds a child, while others do not have any such rites or traditions. Grandmothers in Adeemmra and Ntonaboma indicated that some practices or customs are performed before a mother starts breastfeeding to enable her produce enough breast milk.

As one GM from Adeemmra stated:

> "*In our community, before a mother breastfeeds, the child's mouth is touched with maize flour as a means of welcoming the baby into the world."*(GM 1, FGD, Adeemmra)

This rite is performed, perhaps to introduce the baby to maize, one of the most important staple food crops grown in Ghana, and to indirectly prepare the baby, since most of the foods that he or she will eat later on are prepared from maize.

Grandmothers in Ntonaboma indicated that the cultural practice performed for babies before they start breastfeeding is to clear their throats to prevent choking during breastfeeding. As narrated by one of the GMs:

> "*This is done by dipping the mother's index finger in lime juice and dropping it in the child's throat. This will trigger vomiting of phlegm believed to block the child's throat*."(GM 1, FGD Ntonaboma).

Another GM explained further, stating that:

> "*Previously, about a decade ago, alcohol ("akpeteshie") was used to clear the throats of babies; but currently, lime juice is used*."(GM 2, FGD Ntonaboma).

According to another GM in Amankwa Tornu:

> "*The practice usually undertaken for mothers is to ensure that the entire breast is thoroughly washed before she starts to breastfeed the baby; because the nipples of the breast harbour some dirt. If the breasts are not cleaned well, it may cause diarrhoea in the child*."(GM 1, FGD Amankwa Tornu).

In two communities, Foso and Cedikope, the GMs indicated that although there are no special rites or traditions that are performed before a mother starts breastfeeding a child, if she lacks breastmilk after delivery; she is fed on roasted corn with copra (dried kernel of the coconut*)*. In other cases, the breasts are smeared with shea-butter to soften the breasts and enable the mother to produce enough breastmilk. In Cedikope, one of the GMs indicated:

> "We *usually prepare palm-nut soup with some herbs for the mother to enable her produce enough breastmilk fast*." (GM 1, FGD Cedikope)

Likewise, in Kwaekese, another GM indicated:

> "*In situations where the mother cannot breastfeed due to lack of breastmilk, we roast dried corn for the mother to eat which enables her to produce breastmilk."* (GM 4, FGD Kwaekese)

A study reported that lactating mothers who ate coconut oil and other coconut products gained a considerable increase in levels of three mono chain unsaturated fatty acids − lauric acid, caprylic acid and capric acid − in their breastmilk, producing milk rich in health-promoting nutrients (Fife, 2000). Similarly, in an extension of his previous study in 2000, Fife (2013) also found that when lactating mothers ate coconut products in whatever form (shredded coconut, coconut milk, coconut oil, etc.), the fatty acids level in their milk increased significantly. Fife (2013) discovered that eating 40 grams (about 3 tablespoonfuls) of coconut oil in one meal can temporarily increase the lauric acid in the milk of a nursing mother from 3.9% to 9.6%, after 14 hours. Fife (2013) further indicated that coconut oil is easy for an infant's immature digestive system to absorb and utilize.

Exclusive Breastfeeding Knowledge and Practices

Generally, grandmothers were in support of teachings regarding breastfeeding given to mothers at clinics when they accessed CWC services; but they did not support exclusive breastfeeding (EBF). The following statements by different GMs from various communities demonstrate that, generally, they do not support the practice of EBF.

> "*For me, exclusive breastfeeding is not good, because when I gave birth to my children, I prepared a sugar solution, using warm water and cubed sugar, which I gave to them; and it enabled them to remain warm, calm and grow healthy and strong. I advise my daughter also to give a sugar solution to my grandchildren.*" (GM 2, FGD Amankwa).

Another GM in Adeemmra also stated

> "*Even though health workers educate our daughters and new mothers to practise exclusive breastfeeding, I strongly think that giving water in addition to breastmilk calms babies down, helps them feel better and also enables them to sleep well. This is because, in this part of the country, it is too hot, and this becomes stressful for children, making them feel thirsty often*." (GM 3, FGD Adeemmra)

The above statements from GMs were similar to those made by other GMs in Adofo who also expressed their disapproval of the practice of exclusive breastfeeding, as indicated in the quotations below.

In Adofo, this is what one GM said:

> "*I had an argument with a nurse over this exclusive breastfeeding recommendation; because withholding water and waiting to give water to children after six months makes some of them sick. I know a child who rather became sick when given water after six months of exclusive breastfeeding; so giving water alongside breast milk is very necessary, and it makes a child healthier and stronger"*. (GM 1, FGD Adofo)

Another GM in Adofo also pointed out why she and other GMs did not support the recommendation to withhold water from new-borns during the first 6 months of their lives. According to this GM:

> *"Maybe, these children given to us by God are reincarnated people who need water to drink. Therefore, denying them water for such a long time is wickedness."*(GM 2, FGD Adofo)

These statements from GMs support the findings of previous studies that GMs may have a negative influence on breastfeeding, with respect to its recommended duration of at least 6 months and mothers' adherence to its exclusiveness (Negin et al., 2016; Thet et al., 2016). Again, these statements from GMs corroborate the findings from other studies in which plain water was indicated as one of the common pre-lacteal drinks given to infants below 6 months of age, resulting in the abandonment of exclusive breastfeeding by the end of the first month, due to the advise or influence of grandmothers and mothers-in-law in the United Arab Emirates (Radwan & Sapsford, 2016), São Paulo (Ferreira, Piccioni, Queiroz, Silva & Vale, 2018) and in a systematic review by Negin, Coffman, Vizintin and Raynes-Greenow, (2016). In the study by Ferreira et al (2018) in São Paulo, 69% of grandmothers offered water or tea to their grandchildren who were less than 6 months of age.

The practice of giving water, in addition to breastmilk, to infants under 6 months, even when the weather is hot, is not endorsed by the WHO (WHO, 2014). Giving water to new-born babies before they attain 6 months of age is not recommended, mainly because, in especially rural areas in developing countries such as Ghana, potable water is usually in short supply. The water used at the household-level is usually not clean, thereby introducing contaminants or pathogens which increase a baby's risk of becoming affected by some infections, mainly because their immune systems are not well developed. For this reason, water consumed in its plain state or used in preparing pre-lacteal foods in these settings may not only inhibit breastfeeding but could also be directly harmful to the health of the new-born (Jimoh et al., 2017). The point is that, giving water may inhibit breastfeeding by causing the baby to drink less breastmilk or stop breastfeeding early, making the child more susceptible to malnutrition (WHO, 2014). According to the WHO, diarrhoea and malnutrition, linked to drinking unsafe water, cause significant morbidity and mortality among children under five years of age (WHO, 2014).

Exclusive breastfeeding is recommended for infants below 6 months because breastmilk is more than 80% water, particularly the fore milk that comes during each feed. For this reason, mothers are advised to just breastfeed their babies each time they suspect the baby is thirsty. This will satisfy the baby's thirst, confer protection against infections and enable the baby to continue to grow well. When a mother exclusively breastfeeds her baby, she gives her baby all the "safe water" he or she needs, protecting the baby against diarrhoea (WHO, 2014).

The practice of giving a sugary solution prepared using warm water and cubed sugar was reported by some of the grandmothers in the present study (see the quotation from (GM 2, FGD Amankwa). The influence that GMs have in decisions regarding the feeding of their grandchildren with sugary water was reported in a study undertaken in rural communities in Uganda, where new mothers stated that their mothers stopped them from giving breast milk unless they first gave sugary water to their babies (Engebretsen et al., 2010). Some of the reasons for giving a sugary solution are to calm down the baby, relieve pain, and allow stool to be passed (El-Gilany& Abdel-Hady, 2014). There is some evidence in the literature that babies up to 1 year old cry less and may feel less pain when given sugary water before getting a vaccine shot, because the sweet taste is believed to have a soothing effect (Goldman, 2016). Despite the perceived soothing effect that a sugary solution gives to babies, there are some negative implications of this practice. One implication is that if the quantity of the mixture is not appropriate and the child gets too much water, it can cause electrolyte disturbances that may lead to seizures in severe cases. Other potential side effects include stomach upsets and a decreased appetite for breast milk or formula.

Pre-lacteal feeding practices for infants below 6 months

In Adeemmra, GMs opined that foods such as "*kokoo*" (maize porridge) and "tom-brown" (milled roasted corn porridge) are the most nutrient- rich foods for a baby between the ages of 0 and 6 months. Tom-brown is mainly made out of roasted maize with beans, to which groundnut, millet and a few *hwentia* (negro pepper, *Xylopia aethiopica*) have been added and milled together. According to the GMs, maize, beans and groundnuts contain good nutrients that keep the baby healthy. They also believe that negro pepper (*hwentia)* heals sores in the stomach and prevents diarrhoea in babies. Regarding the health benefits of negro pepper, it has been indicated that it has anti-bacterial effects; and it is known to be effective in killing bacteria present in the stomach and the intestines, and therefore can help relieve digestive issues such as dysentery and diarrhoea in adults (Mshana, 2000). Although, there is no evidence in the literature that negro pepper can heal stomach sores and prevent diarrhoea in babies, it is likely that in this study area, the experiences of adults with respect to the healing benefits of negro pepper are being applied to children.

According to another GM:

> "*The breastmilk is not enough for the child, so we add porridge and water. Since the breastmilk alone is not enough, our grandchildren cry a lot because they become*

> *hungry; and when we add porridge and water, they grow stronger, are happy and sleep well for their mothers to have peace of mind*."(GM 2, FGD Amankwa Tornu)

In support of the statement above from a GM in Amankwa Tornu, another GM in Cedikope stressed:

> "*Exclusive breastfeeding is not helping our grandchildren to grow well. As a result, they do not eat well when they grow up"*. (GM 2, FGD Cedikope)

The practice of giving to babies below 6 months other foods and drinks, apart from only breastmilk, is known as pre-lacteal feeding; and it is associated with an increased risk of diarrhoea and many "early-life" diseases (Agho et al., 2016; El-Gilany & Abdel-Hady, 2014). Pre-lacteal foods which are given to newborns delay the establishment of lactation. Also, the contamination of pre-lacteal foods can cause diarrhoea in children (UNICEF, 2016). Pre-lacteal feeding contravenes the WHO's recommendation of exclusively breastfeeding infants for the first 6 months of their lives. It remains a challenge to ensure optimal breastfeeding and adequate infant nutrition (Tekaly et al., 2018).

Complementary Feeding Knowledge and Practices

Age to introduce complementary foods

Generally, most of the GMs who participated in the FGDs were of the view that complementary foods (CF) should be introduced to children before 6 months of age. Those who indicated that other foods should be introduced before 6 months of age gave the reason that breastmilk alone was not enough for children a month or 2 months after delivery, depending on the feeding ability of the child. For instance, one GM said:

> "*I would recommend two months to start introducing other foods like porridge; but since the nurses are saying that we should wait for 6 months, we would try to conform to it; but it is very difficult*." (GM 1, FGD Ntonabomah)

Buttresssing the point about the difficulty in adhering to exclusive breastfeeding, as asserted by GM 1 in Ntonabomah, another GM in Amankwa Tornu indicated:

> "*Latest by one month, a baby should be given porridge, in addition to breastmilk, since breastmilk alone will not be enough to promote growth and development.*"(GM 3, FGD Amankwa Tornu)

The perception that milk secreted by the mother is not adequate for her baby, and as such makes the child hungry, is one of the most common reasons stated by both mothers and grandmothers for early introduction of complementary foods (Odom, Li, Scanlon, Perrine & Grummer-Strawn, 2013).

Examples of complementary foods given to babies

Grandmothers recommended the following as healthy foods for babies after 6 months of exclusive breastfeeding: cooked mashed beans, *kontomire* (cocoyam leaves) stew with boiled yam, anchovies stew with mashed yam, *ayoyo* (jute leaves) soup, groundnut soup, palm-nut soup prepared with *kantosi* (Turkey berries), okro stew/soup, corn foods such as porridge, tom-brown (milled roasted corn) and *banku* (prepared from corn and cassava dough).

Examples of foods that give blood to children

Generally, most of the GMs in the selected communities indicated that foods that give blood include turkey berries, locally called *kantosi* stew or soup, *kantosi* leaves tea with milk, soup from *ayoyo* (jute leaves), botanically known as *Corchorus olitorius*, *Yevu Gboma* soup and cocoyam leaves stew or soup, locally referred to as *kontomire*.

One GM in Supom averred:

> "*To give children blood, we give them 'kantosi', garden eggs, tomato paste, mixed with coca-cola, and kontomire.*" (GM 2, FGD Supom)

These foods are mainly plant-based food sources (green leafy vegetables) which contain iron of low bioavailability; and therefore, not a substantial proportion of the iron in them can be absorbed by the body (Gibson, Perlas & Hotz, 2006). The responses of the GMs suggest that, perhaps, they do not know that animal-based food sources like red meat, poultry and fish contain high bioavailable heme iron compared with plant-based food sources (Schönfeldt, Pretorius, & Hall, 2016).

Examples of foods that help in the brain development of children

As regards foods that help a child's brain to develop, most of the GMs mentioned honey. Some said they give 2 tea-spoonfuls of honey per day. One of the GMs in Adeemmra said:

> "*We mix the honey with the yolk of uncooked eggs and give it to our grandchildren in order to make them more intelligent.*" (GM 3, FGD Adeemmra)

Likewise, another GM in Adofo also stated:

> *"We usually either mix honey with raw egg yolk or give only honey to young children to boost the development of their brains."* (GM 4, FGD Adofo)

Contrary to these practices in Adeemmra and Adofo, GMs in Amankwa indicated that they either gave only honey or mixed the white part of eggs (albumen) with the honey. This is because they believed that egg yolk gives children constipation. Responses from GMs in other communities are summarized below in the following statements:

> "*To boost brain development in children we give only honey or honey mixed with the ground bark of' nyamedua'* (God's tree) (Alstoniaboonei De Wild)". (GM 2, FGD Ntonabomah)

> In support of the perception that honey boosts the development of the brains of children, another grandmother stated that:
>
> "*For brain development, we pick mud from the dauber wasps' nests, grind it and mix it with honey to give to the child, from 6 months onward*" (GM 3, FGD Tease)

Giving honey to infants below 2 years has also been reported in previous studies (Agho et al., 2016; Legesse et al., 2014). However, it has been found that the intake of honey by young children is not safe for those below one (1) year, due to the insufficient development of their gut, which is unable to fight off disease-causing bacteria. Some studies have shown that the ingestion of honey is associated with infant botulism (López-Laso et al., 2014; Abdulla et al., 2012). As a result of substantial evidence from these studies, caregivers have been cautioned by the World Health Organization (2018) not to give honey to children under 12 months, because honey can contain spores of the bacterium *Clostridium botulinum* which causes botulism, a disease that results in a blockade of voluntary motor and autonomic functions. Abdulla et al., (2012) emphasize that, in order to curtail the risk of infantile botulism, public health interventions should aim at educating parents, community health workers and midwives against feeding infants with honey.

The other issue is the mixing of honey with uncooked/raw eggs. Of much concern is the implication of eating raw eggs which are likely to be contaminated with a pathogenic bacterium, *Salmonella*. It has been found that the intake of uncooked or undercooked eggs increases the risk of *Salmonella* infection (Centres for Disease Control and Prevention (CDC), (2000). Infants and young children (the youngest age group) are more susceptible to infections because of their immature immune systems (Kendall et al., 2003). The remarks by GMs concerning the giving of both honey and uncooked eggs to infants and young children signify the need for health workers to intensify their health education programmes to highlight old cultural practices that have negative implications for the health of children.

Cultural Practices Influencing Infants and Young Children Feeding (IYCF)

From the responses of the GMs, it became evident that some herbal preparations were given to infants after birth. These herbal preparations are given to protect children against evil spirits and are also used to prevent and treat infections and diseases like measles, diarrhoea, cough, catarrh, stomach pain, vomiting, fever, malaria and convulsion. The responses from GMs in some communities are presented in the following statements:

One of the GMs indicated:

> "*When a child is born, a concoction is prepared, using the leaves of "nyanya" (Momordica foetida), "nunum" (Ocinumum gratissimum) and "nkranedua" (Jatropha gossypiifolia) or bellyache bush and lime, which is used to bathe the child for 7 days; and about a table-spoonful is given to the child to drink every morning.*" (GM 2, FGD Agordeke)

In support of the above statement, another GM further explained, giving some reasons why these herbal preparations are administered to new-born babies.

> "*This herbal concoction, prepared by boiling the leaves of Momordica foetida, Ocinumum gratissimum and Jatropha gossypiifolia, is given orally to protect children against evil spirits. It is also used to prevent and treat infections and diseases like measles, diarrhoea, cough, catarrh, stomach pain, vomiting, fever, malaria and convulsion, especially in children.*" (GM 3, FGD Agordeke).

Another GM also indicated that the leaves of some plants and trees are recommended to promote growth and health in children. According to this GM:

> *"There are recommended herbs for young children such as Baobab leaves, "borkorborkor" leaves (Talinumu triangulare or water leaf) and okro leaves. We believe that these herbs help the child to grow well, killing germs and worms in their stomach."* (GM 4, FGD Amankwa Tornu**)**

The giving of herbal preparations in the form of tea, drinks and concoctions have been reported in some cultural settings by Chege, et al., (2015) (in Kenya), John et al., (2015) (in Nigeria) and Kayom et al., (2015) (in Uganda). These herbal preparations from leaves, roots and tree barks are usually given to newborns for protection against witches/sorceries_and for the prevention and treatment of diseases such as cough, intestinal disorders and toothache (John et al., 2015; Kayom et al., 2015).

Extracts of *Ocinumum gratissimum/O. gratissimum*, a scented leaf, exhibit both antifungal and antibacterial properties and, therefore, are reportedly used in herbal medicines to treat stomach ache, diarrhoea, chronic dysentery and vomiting (John et al., 2015). Although herbal preparations may possess a potentially high medicinal value, there are grave concerns with respect to their dosages, toxicity, and interactions with some drugs when taken together, in addition to other side effects (Spiteri Staines, 2011). In a systematic review on adverse effects of herbal medicines, it was revealed that intake of some herbs could result in severe adverse effects, such as kidney failure, liver damage, colon perforation and carcinoma (Posadzki, Watson & Ernst, 2013).

Preventing children from eating the albumen of eggs

Grandmothers in Cedikope indicated that there is a belief that when a child has not started talking, he or she should not be given the albumen of an egg; else he or she would become dumb. One of them asserted:

> "*There is a belief that the white part of eggs is not good for children under two years because our great grandmothers believed it makes them dumb. So, we only give them the yellow part of the egg, because it is believed that it helps them to talk early."* (GM 3, FGD Cedikope)

Ekwochi et al., (2016) and Maduforo (2010) have also noted that one food item that has been less frequently given to children is an egg, which is a rich protein food source containing all the nine essential amino acids required for stimulating the synthesis of skeletal muscle protein. Denying children eggs has been attributed mainly to the fact that they are examples of essential food items that are expensive. It is believed that if children are raised on such expensive foods, they will grow up to steal in order to maintain the expensive eating lifestlye they acquired at their younger age (Ekwochi et al., 2016).

Preventing children from eating some parts of animals

Grandmothers in Ntonabomah also reported that children are prohibited from eating the gizzard of fowls in order to protect them from becoming affected by certain stomach infections. In a similar study undertaken in rural communities and urban centres in the Delta State, Nigeria, it was reported that young children are not given liver to eat, as elders in these communities have the belief that it causes abscess in the liver of children (Onyesom et al., 2008).

Eggs and gizzard are comparatively cheaper than meat and fish; and they are commonly available sources of essential nutrients for a balanced diet in developing countries. The implication of these beliefs and superstitions is that denying children of these dietary protein food sources could result in a depletion of their body's protein stores. Consequently, their ability to maintain body tissues and sustain growth is lost, resulting in protein-energy malnutrition.

Grandmothers' recommendations to improve IYCF practices

According to grandmothers who accompany their daughters to post-natal clinics or CWCs (weighing sessions), there is the need to intensify and organize more educational programmes on nutrition in IYCF, especially for mothers after 6 months of exclusive breastfeeding. For instance, one of the GMs stated:

> *"It appears health workers lay much emphasis on exclusive breastfeeding and hardly educate or give guidelines on feeding of children after 6 months of age. It is highly desirable that nurses also educate mothers on what to feed children on and how to introduce new foods to babies after 6 months "*(GM 2, FGD Koranteng Krachie)

The GMs who participated in this study were emphatic in expressing their displeasure at how young mothers nowadays prefer to buy street foods for their children, for lack of time because of work demands.

The following statements from some of the GMs indicate their concerns and the recommendations for addressing this issue:

One GM complained:

> *"Nowadays, you find most mothers buying especially porridge for their babies, instead of preparing it themselves to ensure it is prepared under hygienic conditions. This practice results in diarrhoea cases among children. Therefore nurses should educate mothers on the health implications of buying prepared food for their childen. There is the need for nurses to educate mothers on the benefits of feeding young children with home-prepared foods"* (GM 4, FGD Tease)

In support of the concern about buying cooked foods for young children, another GM protested:

> *"Young mothers, because of lack of time and their busy work schedules, prefer to buy food such as porridge, rice or*

> *'waakye' (boiled rice and beans) for their children and this practice is not helpful to children."Nurses at weighing centres should caution mothers against this practice and emphasize why young children should eat foods cooked at home and not foods bought outside the home. Nurses should teach mothers how to prepare nutritious meals for their children"* (GM 3, FGD Supom)

According to the GMs, this practice has contributed to various diarrhoea cases that confront children in the district. Their recommendation is that health workers must encourage mothers to cook for their children at home and, if possible, teach and demonstrate how nutritious foods could be prepared to boost the growth of children.

Views of Community Health Workers and Volunteers about Cultural Practices affecting IYCF

Reasons given by mothers for not practising EBF

Most of the CHWs and CHVs indicated that, generally, mothers do not exclusively breastfeed their babies for the first 6 months of their lives. Some mothers practise EBF for only a month or two and stop for a number of reasons. The statements presented below indicate some of the reasons reported by the CHWs and CHVs for the break in the practice of EBF.

Rituals performed before breastfeeding commences

One CHV emphasized:

> "*There are some cultural practices that have to be stopped to enable mothers breastfeed their infants as expected. For example, the practice of spitting into the mouth of a newborn baby by an elderly person after whom the baby is named, with the belief that the elderly person is passing to*

> *the child powers that he/she possesses".* (CHV 1, FGD 5 KAPND)

This finding corroborates those of other studies which noted that traditional rituals were usually performed before newborn babies started breastfeeding; and mothers had to go through some cultural rituals before they were considered ready to start breastfeeding (Aborigo et al., 2012).

Gestures and actions of babies suggesting their readiness to eat solid foods

As narrated by one of the CHWs:

> "*Some mothers say their babies put their hands or other objects in their mouth and chew on them. Others say their babies chew and suck their fingers. To them, these signs suggest that the child is ready to eat other foods and not only breastmilk.* " (CHW 1, FGD 2 KAPND)

In support of the above statement, another CHV also reported:

> "*According to some mothers, they started feeding their babies on solid foods like soft rice and soft banku by four months, because the babies put their hands into their mother's food when they are eating, suggesting that they also want to eat some of the food, maybe because they are not satisfied with only the breastmilk"*(CHV 3, FGD 3 KAPSD)

These findings are consistent with those of some studies which explored why mothers introduced solid foods early. The principal reason for an early introduction of solid foods was found to be mothers' response to gestures, behaviours and cues exhibited by infants, suggesting readiness to start eating foods (Walsh, Kearney & Dennis, 2015).

These findings have implications for the need for mothers to learn to understand infant's cues, gestures and behaviours regarding specific needs, especially during the first few months of infancy when mothers are familiarizing themselves with their newborn babies. These findings therefore suggest the need to introduce health education interventions that focus on the accurate interpretation of infant cues, gestures, behaviours and putative weaning signs.

Mothers' perception that breastmilk is not sufficient

The health workers indicated that another reason that led to the inability of mothers to exclusively breastfeed their babies is their perception that the breastmilk produced by them is not sufficient to satisfy their babies. One CHV asserted:

> "*Some mothers have the perception that the breastmilk alone is not sufficient for the baby, which results in frequent crying and inability to sleep soundly for long hours. Therefore they feed them on other foods, such as porridge and tom-brown*." (CHV 2, FGD 1 KAPND)

In studies by Safon et al. (2017) and Sun et al. (2017), mothers introduced other foods because they felt their babies could not live throughout a day on breastmilk only, considered inadequate to satisfy a baby's hunger (Safon et al., 2017; Sun et al., 2017). This assumption of mothers resulted in an early introduction of other foods or liquids like porridge (Bazzano et al., 2017). These actions of caregivers may have implications for allergies and other medical conditions, such as an increased risk of diarrhoea (WHO, 2014). Another implication of an early introduction of complementary foods is an increasing rate of weight gain during infancy and a higher risk of obesity during the pre-school stages of life (Pearce, Taylor & Langley-Evans, 2013).

Pre-lacteal practice of giving water to infants

The following statements by HWs show that an early introduction of water, especially some days after birth, appears to be a common pre-lacteal feeding practice among mothers, as reported in previous studies (Radwan & Sapsford, 2016; Thet et al., 2016; Aborigo et al., 2012).

One CHV intimated:

> "*In our community, most mothers fail to exclusively breastfeed their babies for the first 6 months of their lives. They would tell you that water is important in life; and if they do not give their child water, he or she may die*".(CHV 1, FGD 4 KAPND)

In further explaining why mothers did not practise exclusive breastfeeding for the first six months of a child's life but rather gave water, another CHV indicated:

> "*Some mothers also claim that breastmilk alone is not enough for the child. So they give water, just as adults would drink water after eating their food to make them satisfied*". (CHV 2, FGD 3 KAPSD)

To buttress the statement above, another CHW narrated an encounter she had with a mother who refused to exclusively breastfeed her baby. The CHW narrated:

> "*A mother openly refused to exclusively breastfeed her baby because she lost a child when she practised EBF without giving the baby any water. She thinks the child died as a result of exclusive breastfeeding without giving her any water. Therefore, she is not encouraged to practise EBF again on any of the children that she would have*". (CHW 1, FGD 4 KAPSD)

Similar responses were given by mothers in previous studies in which they felt that water is essential in life. Therefore, they gave water to their infants who were less than 6 months old (Chea & Asefa, 2018; Jimoh et al., 2017; Wanjohi et al., 2016).

Mothers' perception that breastmilk is not adequate in satisfying infants and that they have to give water after breastfeeding, to ensure that their babies are satisfied, suggests that mothers are not well-informed regarding the water content of breastmilk, which can adequately satisfy a thirsty baby. Contrary to the beliefs of these women, the initial fore milk secreted at the start of a feed is mainly water and is rich in proteins, sugar, vitamins and minerals, and therefore can satisfy thirsty babies (The American Academy of Pediatrics, 2012; Lauwers & Swisher, 2011). Again, according to the WHO and UNICEF, breastmilk is 88% water and supplies all the fluids that a baby needs. Even in very hot climates, water is unnecessary for breastfed infants, as it may introduce contaminants or allergens (WHO & UNICEF, 2003)

Influence of family members preventing EBF

Some of the CHWs/CHVs reported that mothers with children below 6 months who feed them other foods and fail to adhere to recommendations on EBF, are usually influenced by some family members, usually their own mothers, mothers-in-law and husbands, as indicated in the following statements by CHWs and CHVs:

> "*There are times when babies cry frequently and grandmothers assume that the child may be hungry; so they prepare porridge or any food for infants below 6 months of age in order to stop them from crying*".(CHV 2, FGD 2 KAPND)

> "*The inability of some mothers to practise EBF is mainly a result of influences from grandmothers and mothers-in-law. Even though some mothers are willing to practise EBF, some of their own mothers and mothers-in-law continue to discourage them and complain by saying: 'Can't you see the child is hungry or thirsty and will have constipation?"* (CHV 1, FGD 3 KAPSD)

Several studies have reported that breastfeeding mothers are often not encouraged and supported to exclusively breastfeed their babies, because grandmothers and mothers-in-law have the perception that breastmilk is not sufficient for babies (Radwan & Sapsford, 2016; Agunbiade & Ogunleye, 2012). The implication of introducing babies to complementary foods early is that it increases their risk of becoming exposed to diarrhoeal diseases, particularly when hygienic measures are compromised (Ameyaw, Acheampong & Appiagyei, 2017).

Perception that EBF was not practised by great grandmothers; and yet their children survived

One CHV observed:

> "*Grandmothers always complain that they fed their own babies under 6 months with food and water, and nothing happened to them. So why are health workers worrying them with EBF*?"(CHV 1, FGD 4 KAPND)

In support of the perception that children of GMs and great GMs survived without being exclusively breastfed, a CHW further indicated:

> "*Some mothers with babies under 6 months of age, who feed them other foods, would tell you that this was what their mothers and grandmothers did and there was no*

> *problem with their children. Therefore, if they do the same, there would be no problem*."(CHW 4, FGD 2 KAPND)

These responses from mothers confirm reports that grandmothers bring their own infant feeding practices and beliefs to support new mothers; and their knowledge and advice normally undermine EBF practices (Negin et al., 2016; Radwan & Sapsford, 2016). Previous studies also indicate that pressures exerted by grandmothers, with concerns relating to infant's hunger, thirst, constipation and inability to sleep soundly, do not encourage mothers to exclusively breastfeed their babies (Negin et al., 2016; Talbert, Ngari, Tsofa, Mramba, Mumbo, Berkley & Mwangome, 2016).

Given grandmothers' influence in childcare, encouraging active involvement of grandmothers in health and nutrition interventions could positively impact on mothers' knowledge and facilitate the adoption of better child feeding practices. Hence, programmes that seek to effectively promote EBF should include grandmothers in their interventions in order to attain greater success.

Cultural Practices that Prevent EBF

According to the CHWs and CHVs who participated in the FGDs, there are some cultural practices and customs that lead to pre-lacteal feeding practices and prevent mothers from exclusively breastfeeding their babies. As one CHV said:

> "*As a tradition and custom, when a child is born, corn flour is mixed with water and given to the child to welcome him or her with the following statement: 'This is what we have been eating before you arrived; so if you have joined us*

today you are also going to eat the same'." (CHV 2, FGD 4 KAPND)

The giving of corn flour (a common staple food in most African settings) mixed with water to newborns was also reported in a previous study (Aborigo et al., 2012).

Another CHW explained further by giving a reason why maize porridge was given to newborn babies. The CHW narrated:

"*There are some cultural practices which demand that light maize porridge is given to newborn babies during the first few days after birth to welcome them, because it is believed that the child has travelled over a long distance into this world, and for that matter is hungry*." (CHW 1, FGD 4 KAPND)

In a related study in rural communities in Kenya, light porridge was also given to new-borns because of the belief that children from that setting (*Luhya*) are always hungry, even right from birth (Wanjohi et al., 2016).

Foods commonly introduced to babies under 6 months

According to the CHWs and CHVs, some of the foods commonly introduced to babies under 6 months are porridge, "tom-brown", soft "*tuo zaafi*" (all prepared from corn as the main ingredient) and 'Cerelac'. Some mothers also give mashed beans, banana and polished-corn banku (*pakapaka*). The following statements by the HWs show that some mothers start feeding their babies who are under 6 months on solid and semi-solid foods.

One respondent from among the CHVs asserted:

"*In my community, some mothers start giving maize porridge, "tom-brown", soft "tuo zaafi" and "banku" with soup to their babies by the* *age of two months, mainly because they claim their breastmilk is not satisfying the child and therefore prevents the child from sleeping soundly*." (CHV 3, FGD 2 KAPSD)

In support of the report that carbohydrate-based foods are commonly introduced to infants below six months, because only breastmilk does not satisfy them, another CHW also intimated:

> "*You will find that most mothers start giving mashed rice, rice water, "koko", soft "banku" and even soft "fufu" with soup to their babies by the age of three months. The reason given by most mothers is that the breastmilk is not enough for their babies, and therefore they cry a lot even after breastfeeding them.*" (CHW 4, FGD 3 KAPND)

The afore-mentioned statements confirm the findings of previous studies in which porridges prepared from cereals such as maize, sorghum and millet were reported to be the main meal introduced to infants up to 6 months of age (Abeshu et al., 2016; Sayed & Schönfeldt, 2018). These carbohydrate-based complementary porridges and gruels, often of less energy and nutrients, compared with breastmilk, usually fill the small stomachs of infants and prevent their nutritional needs from being met, thus contributing to early growth faltering (Abeshu et al., 2016).

One CHV narrated another common practice of Hausa-Fulani households which usually give milled-grain foods with fresh cow- milk to babies below 6 months of age. The CHV stated:

> "*Some mothers prepare soft "banku" and okro soup for their children. In typical Hausa-Fulani households, babies below 6 months of age are fed on mashed "fula" or "fura da*

> *nono" (prepared from milled grains and rolled into balls) which is eaten with fresh cow- milk*)". (CHV 2, FGD 5 KAPND)

The reports of these HWs are corroborated by a previous study in Uganda in which infants under 6 months of age were fed on fresh cow-milk (Ssemukasa & Kearney, 2014). However, giving cow-milk to infants is not recommended because of cow-milk's tendency to lead to iron deficiency and an increased risk of severe dehydration (Gupta, 2017).

Another CHV reported about a flowering plant, *Jatropha*, that was commonly given to infants under 6 months and the belief that it makes them sleep well and protects them against diseases. The CHV stated:

> *"For children under 6 months, some mothers also boil "jathrofa" with negro pepper in a pot and give it to the child. They believe that it enables the child to sleep well and protects him/her against diseases."* (CHV 2, FGD 4 KAPSD)

According to a CHV, some mothers give a shea butter drink, believed to aid in giving infants free bowels. The CHV reported:

> "*Some mothers give shea butter mixed with warm water to their babies to drink. They believe it enables them to have free bowels."* (CHV 3, FGD 5 KAPND)

Another statement by a CHW also suggests that in this rural population, some mothers can afford infant milk formula, which was associated with faster growth in babies. The CHW narrated:

> "*There are some cases where mothers who have money feed their babies on "Lactogen" (an infant milk formula) because they believe it enables infants to grow faster,*

bigger and chubbier than when solely fed on breastmilk". (CHW 2, FGD 4 KAPSD)

In support of these assertions, some studies report that formula-fed infants gain weight more rapidly than breast-fed infants (Huang, Zhang, Wu, Wang, Wang, Zhou & Yang, 2018; Wood, Skinner, Yin, Rothman, Sanders, Delamater & Perrin, 2016). One possible explanation for the difference in weight gain is that formula-fed infants consume a higher volume and more energy-dense milk, which result in a higher macronutrient intake and faster growth (Huang et al., 2018).

The implications of the practice of giving infant formula milk include the difficulty associated with digesting infant formula milk, compared with breast milk (Martin, Ling & Blackburn, 2016). Another effect of giving formula-milk to newborns rather than breastfeeding them is that it results in faster weight gain among infants, which may contribute to a greater risk of obesity later in life (Huang et al., 2018; Wood et al., 2016), thus making breastfeeding a significant protector against overweight and obesity in infants.

Cultural Beliefs and Traditions that Prevent Appropriate IYCF Practices

Discarding of colostrum

During the fourth FGD session in the Kwahu Afram Plains South District, one CHV reported: "*During our home visits, we sometimes come across mothers who express the colostrum and throw it away before they start breastfeeding their baby*". (CHV 4, FGD 4 KAPSD)

This and several other responses from these health workers indicate that despite intensive health promotional and educational activities sensitizing mothers to give colostrum to newborn babies, this outmoded practice of discarding colostrum is still being practised, and some infants are still being deprived of colostrum in some communities in Ghana. Discarding of colostrum by mothers has been reported in similar studies (Yimer & Liben, 2018; Tariku et al., 2016). Contrary to this practice of some mothers, both the WHO and UNICEF recommend that colostrum is a newborn's perfect food that should be given within the first hour after birth (UNICEF, 2016).

Another CHV further commented on this practice as follows:

> *"This practice is common among mothers who delivered at home and not in a health facility"*. (CHV 5, FGD 4 KAPSD)

In support of this assertion, previous studies also reported that giving birth at home was a significant factor associated with colostrum avoidance and discarding practices (Yimer & Liben, 2018; Tariku et al., 2016; Legesse et al., 2015). A possible explanation is that grandmothers, older women and untrained traditional birth attendants who usually assist and attend to births in the home setting are more likely to strongly influence mothers to discard colostrum, as reported in previous studies (Legesse et al., 2015).

One CHV explained further, giving reasons why some mothers discarded colostrum. The CHV intimated as follows:

> *"The reason attributed to this practice is that some women believe that colostrum is not clean; so it is not good for children. Some mothers also say that they know the colour of breastmilk is white; so the yellowish part is not good for a child; it is dirty breastmilk"*.(CHV 6, FGD 4 KAPSD)

In related studies, similar assertions have been made by mothers who indicated that colostrum was yellowish and not the usual white colour of breastmilk. As such, it was dirty milk that is not good for infants (Raman et al., 2016; Sharma et al., 2016; Legesse et al., 2015). However, as noted by some researchers, discarding colostrum robs and denies newborns of their first source of protective proteins (immune factors) in the form of antibodies and immunity boost, while their own immune systems are still developing. In addition, robbing newborns of colostrum increases their risk of becoming jaundiced, as a result of the accumulation of bilirubin, which can only be gotten rid of when meconium is excreted out of their bodies after taking in colostrum (Kio, 2015).

Forbidding the consumption of eggs

Similar to the reports of the GMs, the CHWs/CHVs also indicated that there are some superstitions in some communities in the district regarding the consumption of eggs by infants and young children. One CHV stated:

> "*In some communities, young children are prevented from eating eggs, because there is a belief that the child will become a thief if given eggs. It is also believed that a child who has not started talking will become dumb when given eggs*". (CHV 4, FGD 5 KAPND)

In the study by Karigi et al. (2016) in the rural western region (Kakamega County) in Kenya, a taboo that infants and young children were not to be fed eggs was found, and the taboo derived from the belief that eggs made the “tongue heavy” and prevented children from talking or delayed speech development. This cultural belief, associated with the giving of eggs to children, has been reported in other studies (Gadegbeku et al., 2013; Maduforo, 2010). The argument is that because an egg is an essential food item which is expensive, generally, if children are cared for and nurtured on such costly foods, they may have to steal later in life to be able to maintain the expensive eating habits they acquired at their younger age. However, it has been noted that denying children of consuming eggs, a source of high biological value, and a cheaper protein food source, compared with meat, fish and poultry, could increase the susceptibility of infants to protein-energy malnutrition, exhibited in the form of *kwashiokor* and marasmus (Onyesom et al., 2008).

The responses of the CHWs and CHVs with regard to foods believed to positively influence growth and development of children, build blood, boost brain development and protect children against diseases are similar to those of the GMs.

Conclusions

Overall, there was a good fit between the first and second research objectives (that sought to explore socio-cultural factors that influence breastfeeding and complementary feeding practices of children) and the conceptual framework that guided this study. In this study it was evident that cultural factors such as superstitions, beliefs, food taboos and norms continue to contribute to non-recommended and inappropriate IYCF practices in some rural settings, such as the Kwahu Afram Plains North and South Districts in Ghana. For example, the findings of this research reveal that long-standing cultural norms that encourage mothers to give their babies water and other herbal concoctions, even immediately after birth, still persist in the Kwahu Afram Plains North and South Districts in Ghana. Generally, GMs did not support EBF and they influenced the EBF practices of their daughters, as reported by the HWs.

Cultural beliefs and taboos associated with certain foods (eggs, catfish) which result in being restricted in the diets of young children undermine and compromise optimal complementary feeding as children miss on the nutrients provided by these food items. These findings that contextual factors such as cultural beliefs, norms, superstitions and practices within a community influences the feeding of children validates the adapted WHO conceptual framework by Stewart, et al. (2013) in this study. The findings are also compatible with Pierre Bourdieu’s social theory of practice (1984) and Urie Bronfenbrenner’s social-ecological theory, (1992, 1994) which expound on how social and cultural factors within the external environment of infants and children influence their feeding practices. This finding also suggests a gap in knowledge levels of mothers and other family members like targeting improved IYCF practices, in the study area. The findings also have implications for the need to engage grandmothers and mothers-in-law fully as stakeholders in the development and implementation of children's nutritional health interventions.

CHAPTER SIX

HOUSEHOLD FACTORS INFLUENCING THE FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN

Introduction

One of the objectives of this study was to assess household-related factors that influence the feeding practices and nutritional status of children in the Kwahu Afram Plains North and South Districts. In the study, the nutritional status and the feeding practices of the children are the dependent variables, which may be influenced by household factors. This chapter presents an analysis and a discussion of the influence of household factors on the feeding practices and nutritional status of the children. The chapter is divided into four sections. In the first section, information on the household characteristics and feeding practices of the surveyed children is presented. In the second section, the findings and a discussion of the household factors that influence the feeding practices of the children are presented. In the third section, information on the nutritional status of the children, on the basis of anthropometric indicators, is presented and discussed. In the final section, the results and a discussion of the household factors that determine the nutritional status of the surveyed children are presented. In the discussion, inferences are made, and there are references to the findings of previous studies and the assumptions of the WHO conceptual framework adapted for this study.

Household Characteristics of the Children

Table 3 is a summary of the household characteristics of the children and mothers who participated in the study. Regarding household size, a significant proportion of the caregivers (36.0%) belonged to household sizes ranging between 5 and 6 members. As regards the number of rooms occupied by households, a large majority (86.6%) had either 1 or 2 rooms; and most (64.1%) of them did not own their current place of dwelling. A high proportion of the respondents (40.2%) had an estimated average monthly income ranging between GH¢100 and GH¢300.

The two major sources of drinking water for the study population were boreholes (38.6%) and River Afram (32.9.6%). More than half (57.4%) of the respondents reported that they had access to a toilet facility. However, high percentages (75.5%) of the toilet facilities used by the households were described as unimproved. As regards the main type of fuel used in cooking, a large proportion of the respondents (70.2%) used firewood. Again, as shown in Table 3, less than half of the respondents (44.2%) belonged to households that had access to electricity.

Table 3: Household Characteristics of the Children

Variable	Frequency N=935	Percentage (%)
Household Head		
Father	682	72.9
Mother	75	8.0
Elder family member[a]	151	16.2
Others	27	2.9
Household Size		
<3	28	3.0
3-4	77	8.2
5-6	337	36.0
7-8	271	29.0
9-10	121	13.0
>10	101	10.8
Number of rooms occupied by household		
1-2	810	86.6
3-4	113	12.1
5-6	12	1.3

Table 3 continued

Ownership of current place of dwelling(house)		
Yes	336	35.9
No	599	64.1
Building material used for house		
Cement blocks	251	26.8
Wood	24	2.6
Mud, plastered with cement	561	60.0
Baked bricks	54	5.8
Others	45	4.8
Estimated average monthly household income		
Less than GH¢100	367	39.3
Between GH¢100 - GH¢300	376	40.2
Between GH¢301 - GH¢500	131	14.0
Between GH¢501 - GH¢700	27	2.9
Between GH¢701 - GH¢900	13	1.4
More than GH¢900	21	2.2
Socio-economic status		
Poor	374	40.00
Middle	374	40.00
Rich	187	20.00
Possession score		
Low	454	48.5
Average	400	42.8
Above average	73	7.8
High	8	0.9
Main source of drinking water		
River Afram	308	32.9
Volta lake	103	11.0
Water tap	140	15.0
Borehole	361	38.6
Unprotected well	15	1.6
Protected well	8	0.9
Had water from source in the past two weeks		
Yes	812	86.8
No	123	13.2
Type of treatment to water before drinking		
No treatment	711	76.0
Boiling	81	8.7

Table 3 continued

Use traditional herbs	17	1.8
Use chemicals	17	1.8
Filters/Sieves	102	11.0
Decant	7	0.7
Access to toilet facility		
Yes	537	57.4
No	398	42.6
Type of toilet facility[b]		
Improved	229	24.5
Unimproved	706	75.5
Main type of fuel used in cooking		
Gas	43	4.6
Electricity	11	1.2
Kerosene	13	1.4
Firewood	656	70.2
Charcoal	212	22.6
Presence of electricity in house		
Yes	413	44.2
No	522	55.8

Source: Nsiah-Asamoah (2019)

[a]Elder family members include uncles and grandparents; [b]Improved toilet: ventilated improved pit latrine, flush toilet/water closet, Unimproved toilet: bucket, traditional pit latrine, bush, open field, near the river/lake, behind the house

Feeding in Households of the Children

Information on feeding in the households of the children is presented in Table 4. The results show that, for the majority of the households (72.6%), the major source of food was their own farm produce. In most households (74.8%), the person responsible for the provision of food was the father/husband. Also, whereas 33.6 percent of the households allocated about 50 percent of their total household income to food, 21.5 percent spent more than 50 percent of their income on food. In other words, the majority (55.1%) of the households spent at least half of their income on food. Besides, in a large majority (78.0%) of the households, husbands took decisions on how the household income should be used, corroborating studies carried out in Nepal

(Morrison, Dulal, Harris-Fry, Basnet, Sharma, Shrestha & Saville, 2018) and Ethiopia (Berhane, Ekström, Jirström, Berhane, Turner, Alsanius & Trenholm, 2018) where it was found that majority of mothers at the household level had limited decision-making power over food-purchasing decisions. In these studies, the gender role of a mother in child feeding was described solely as the preparer of the food and the one responsible for feeding the children, while fathers were designated as the providers and decision-makers. Majority (78.0%) of the mothers did not participate in decisions regarding how household income should be spent, probably because most of them (64.4%) were not employed and earned no income at the time of the study. The majority of caregivers (58.2%) reported that their husbands decided on foods to be cooked each day in the house. A study undertaken in a rural and urban setting in KwaZulu-Natal, South Africa, among mothers, revealed that those who were financially dependent on their husbands or other family members had a lower autonomy and a reduced ability to influence infant feeding practices or challenge incorrect advice given at home on_feeding of children (Jama, Wilford, Haskins, Coutsoudis, Spies & Horwood, 2018).

The implication of this finding is that, in cases where a husband allocates a substantial proportion of the total income to other needs than providing food, the dietary needs of the household members, especially children, may be affected. It is noteworthy that there is some evidence in the literature to the effect that one of the determinants of the nutritional status and dietary diversity of children is the person responsible for making decisions regarding the allocation of household income on food (Sraboni & Quisumbing, 2018; Amugsi et al., 2016).

Table 4: Feeding in the Households of the Children

Variable	Frequency N=935	Percentage (%)
Main means of obtaining food in the household		
Mainly farming	679	72.6
Mainly buying	210	22.5
Mainly Food aid/donation	10	1.1
Others	36	3.8
Person responsible for providing food for the household		
Father/husband	699	74.8
Mother/wife	165	17.6
Grandparent	45	4.8
Other relatives	26	2.8
Estimated percentage of household income allocated to food		
Largest percentage (>50%)	201	21.5
Medium percentage (50%)	314	33.6
Smallest percentage (<50%)	147	15.7
No specific allocation	175	18.7
Do not know	98	10.5
Person who decides how family income should be used		
Father/husband	729	78.0
Mother/wife	102	10.9
Others	104	11.1
Person who decides food to be cooked each day in the household		
Father/husband	544	58.2
Mother/wife	294	31.4
Others	97	10.4

Source: Nsiah-Asamoah (2019)

Feeding Practices of the Children

Information regarding the feeding practices of the children who participated in the study is presented in Table 5. With respect to the time of initiating breastfeeding after delivery, a large majority (83.5%) of the mothers reported that they started breastfeeding within 30 minutes after birth. This finding implies that most mothers in the study area are likely to commence breastfeeding early and adhere to UNICEF's recommendation of a timely initiation of breastfeeding within 1 hour after birth (UNICEF, 2016). It is noteworthy that the vast majority of the children (90.7%) were being breastfed at the time of interviewing their mothers. This could be because the health information shared by health workers at the health facilities mainly focus on the importance of breastfeeding infants (Nikièma et al., 2017). The results show that most of the mothers did not adhere to the recommendation of exclusive breastfeeding for the first 6 months of life, as evident in the responses of about 68.7 percent of mothers who indicated that they introduced their children to other foods, drinks, herbal mixtures and water before they attained 6 months of age. This finding is consistent with those of studies conducted by Haroon et al. (2013) and Cai et al. (2012) which showed that exclusive breastfeeding is not widely practised in most developed countries, even in those with high rates of breastfeeding initiation, as in the case of this study population in which a large majority (83.5%) started breastfeeding within 30 minutes after birth.

As indicated in Chapter Five, with the present study population, various factors − cultural influences from grandmothers, misconceptions about the adequacy of breastmilk for satisfying babies and beliefs that exclusively breastfed children do not gain weight fast − could prevent mothers from practising exclusive breastfeeding. In addition, as also reported in Chapter Five, caregiver's perception that some gestures and actions of babies suggest their readiness to start eating food, and mothers' opinions that their grandmothers and great grandmothers did not practise exclusive breastfeeding

(EBF) with their children but they grew as well as could be expected, and they were also healthy, could also prevent some mothers from practising EBF. The results also showed that a large majority of the children (81.0%) were introduced to water before 6 months of age confirming reports that water is the major prelacteal drink that is introduced to most children before 6 months (Chea & Asefa, 2018; Jimoh et al., 2018). Giving of water to infants before 6 months of age has been regarded as a major threat to promoting exclusive breastfeeding of children, since it may inhibit breastfeeding by causing the baby to drink less breastmilk (WHO, 2014).

As shown in Table 5, a high proportion of the children (74.9%) were first introduced to *koko* (porridge prepared from maize) at the start of complementary feeding. This confirms the finding of the 2014 Ghana Demographic Health Survey that common complementary foods (78%) such as porriage (*koko*), *banku* and *kenkey*, *tuo zaafi* and *akple* provided for infants at 6 months of age are prepared from maize, perhaps because it is the major staple food item in Ghana (Darfour & Rosentrater, 2016). The findings of the current study also corroborate those of other studies in Zambia (Alamu, Gondwe, Akello, Sakala, Munthali, Mukanga & Maziya-Dixon, 2018) and Tanzania (Ochieng, Afari-Sefa, Lukumay & Dubois, 2017) where most children aged between 6 and 23 were reported to consume foods mainly prepared from maize. In support of the findings in the present study, Abeshu et al. (2016) also reported that in Ghana the main complementary food for infants up to 6 months of age is a traditional fermented maize porridge (*koko*). However, concerns have been raised regarding the heavy reliance on porridges typically made from starchy staples such as maize, which have much lower nutrient densities and poor mineral bioavailability and do not promote the growth of infants (Dewey, 2013). In addition, there are concerns about the phytate content of cereal-based diets, which reduces the absorption of micronutrients, such as iron and zinc, making it difficult to meet their high requirements during the infancy period of life (Dewey, 2013). Alamu et al. (2018), in their study which focused on a population in Zambia, also raised other concerns with regard to the aflatoxin contamination of these maize-based complementary foods, apart from their low nutrient composition. The heavy reliance on maize-based gruels as complementary foods has an implication for the need to educate mothers on how to increase the nutrient density of plain maize porridge, by adding milk, fish powder, groundnut paste, boiled egg yolk and roasted soybean flour, which have been proven to boost the nutrient quality of cereal-based infant porridges and meet the nutritional needs of infants (Abeshu et al., 2016).

Information on the proportions of children aged between 6 and 23 months who consumed meals prepared from the seven food groups within the previous 24 hours and the 7 days prior to data collection is presented in Figures 2 and 3 respectively. As Figures 2 and 3 reveal, all the children (100%) consumed foods prepared from grains, roots or tubers in the previous 24 hours and in the 7 days before their caregivers were interviewed, indicating the high dependence on starchy foods, which largely, do not meet the nutritional needs of children. This finding substantiates a report by Dewey (2013) that, in many developing countries, the basic food items used for the preparation of complementary foods are the locally available staples - cereals, roots, and starchy tubers that consist mainly of carbohydrates and provide energy.

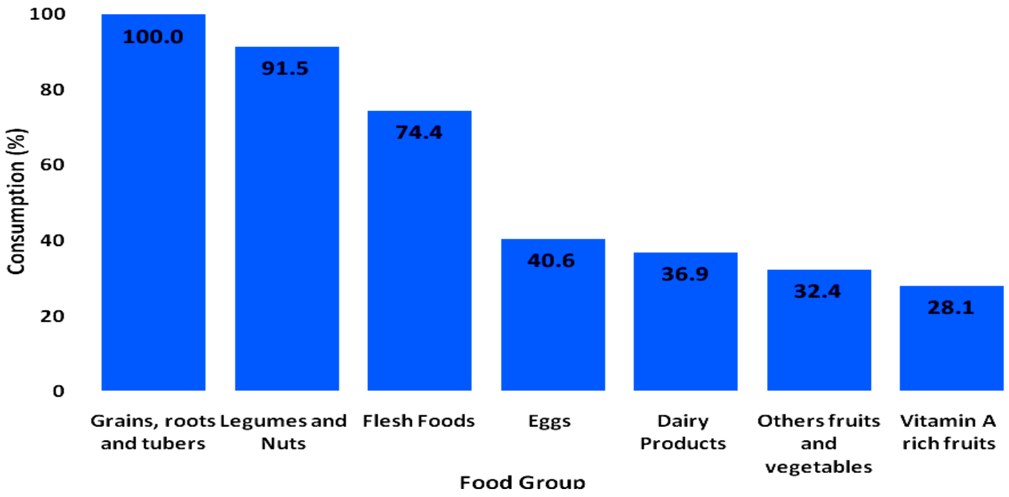


Figure 2: Food groups consumed by children aged 6–23 months based on 24 hours dietary recall

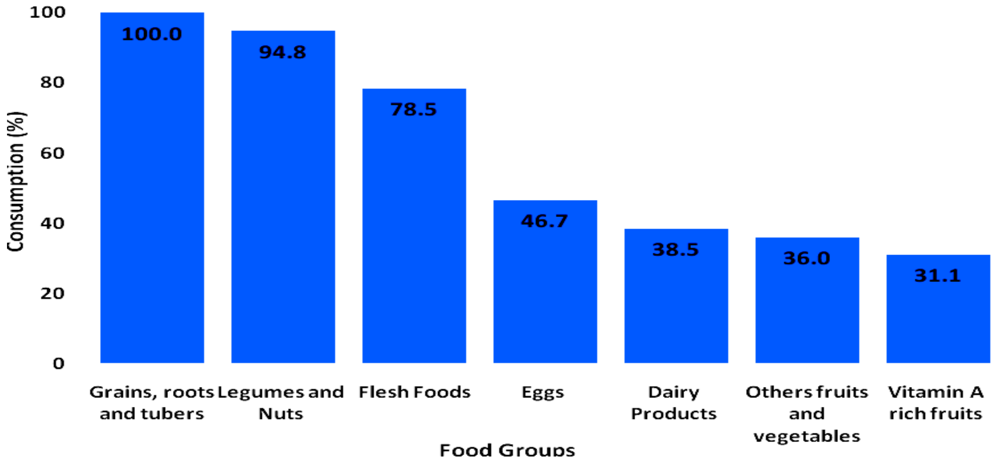


Figure 3: Food groups consumed by children aged 6–23 months based on 7-days food recall

However, the protein quality of these starchy foods is very low, compared with that of animal-based foods (Abeshu et al., 2016). Abeshu et al.'s (2016) study in Ethiopia revealed that, whereas cereals contain 65-75 percent of carbohydrates, they only contain 6–12 percent protein and 1–5 percent fat. The results also indicate that a little over 90 percent of the children ate from the legumes and nuts food group, probably because groundnuts are grown on a large scale in these districts; and a large majority of households (72.6%), as shown in Table 4, mainly depend on their farm produce as their major source of food.

Similarly, with regard to flesh foods which include meat and fish, high proportions (74.4% and 78.5%) of the children had consumed them in the 24 hours and 7 days respectively, prior to the study. This high intake of flesh foods can be attributed to the fact that the district has resident Fulani herdsmen who rear cattle and, therefore, make meat readily available in the district. Likewise, communities in the district are surrounded by rivers such as the Afram River to the west, the Volta River to the east and the Obosom River to the north, which make fishing a major economic activity for most of the people, thus making fish readily available.

Table 5: Information on Feeding Practices of Children

Feeding Practices and Measures	Frequency N=935	Percentage (%)
[a]*Time of initiation of breastfeeding*		
Within 30 minutes	781	83.5
Between 30 minutes to an hour	78	8.3
More than one hour on first day	36	3.8
Within 24 hours	25	2.7
After first day of delivery	15	1.6
Currently breastfeeding		
Yes	848	90.7
No	87	9.3
Feeding Practices and Measures (of children aged 6-23 months)	Frequency N=673	Percentage (%)
Child introduced to other foods/drinks/herbal mixture/water before 6 months		
Yes	462	68.7
No	211	31.3
[b]*Type of foods/drinks/herbal mixture/water introduced*		
Water	374	81.0
Sugar/glucose solution	45	9.7
Herbal drink	25	5.4
Infant formula	18	3.9

Table 5 continued

Food first given to child at the start of complementary feeding		
Koko(maize porriage)	504	74.9
Rice water	67	9.9
Tom brown	25	3.7
Others. Infant formula such as lactogen	61	9.1
Cerelac	16	2.4
Dietary Diversity Score (DDS)		
Poor	246	36.5
Average	178	26.5
Good	249	37.0
Minimum Dietary Diversity Score		
Adequate	249	37.0
Inadequate	424	63.0
Food Group Frequency Score (FGFS), (Past 7 days)		
Poor	172	25.6
Average	293	43.5
Good	208	30.9
Meal Frequency		
Poor	91	13.5
Average	181	26.9
Good	401	59.6
Minimum Meal Frequency		
Adequate	401	59.6
Inadequate	272	40.4
Minimum Adequate Diet		
Adequate	149	22.1
Inadequate	524	77.9
ICFI Classification		
Low	252	37.4
Medium	234	34.8
High	187	27.8
ICFI (continuous scale)		
Range (minimum-maximum)	0-8	
Median (interquartile range)	5(4-7)	
Mean $\pm$ SD	5.09 $\pm$ 1.97	

Source: Nsiah-Asamoah (2019) [a]categorization was informed by Ghana Health Service recommendation of early initiation of breastfeeding within the first 30 minutes of birth and WHO recommendation of early initiation of breastfeeding, within one (1) hour of birth. [b] For children who were introduced to other foods before 6 months

However, as seen in Figure 3, less than 50 percent of the children were reported to have consumed dairy food products, eggs, vitamin A-rich foods and other fruits and vegetables in the week prior to the study, suggesting that the majority of these children are not getting the required essential micronutrients such as calcium, iron and vitamin A. The findings in this study are supported by previous studies which reported that, whereas the majority of children eat from the cereals, roots and tubers food groups, less than 50 percent consume from the eggs, diary and fruits and vegetables groups (Agbadi et al., 2017; Saaka & Galaa, 2017). The low intake of eggs and dairy products, especially among low-income groups, has been attributed to cultural beliefs, superstitions, taboos, and ignorance (Abeshu et al., 2016; Iannotti, Lutter, Bunn & Stewart, 2014). Iannotti et al. (2014) reiterate that, with undernutrition remaining a significant problem in many parts of the world, the intake of eggs, especially among young children, may be an "uncracked" part of the solution.

In the current study population, the low intake of diary food products like milk, cheese and yoghurt can be attributed to the fact that the majority of the people belong to the low socio-economic group and hence may not be financially empowered to buy such items for their children. On the other hand, eggs are relatively cheaper as compared with fish and meat. Yet they are rarely consumed by children in the current study population. This can be attributed to certain cultural beliefs and superstitions of the people in the study population, as reported in chapter five.

Consequently, the results indicate that a high proportion (63.0%) of the children had an inadequate minimum dietary diversity score and did not consume foods from four (4) or more food groups in the previous seven days before the study, similar to the findings of a study conducted in Ghana in which only 24.7 percent of the children had a dietary diversity score of at least 4 (Frempong & Annim, 2017).

However, the results show that, unlike the situation with respect to the DDS, more than 50 percent met the minimum feeding frequency requirement recommended for their age. In other related studies, it was also observed that whereas most children met the requirement for the minimum feeding frequency, less than half were fed on meals prepared from a wide range of food groups (Mekonnen et al., 2017; Mitchodigni et al., 2017; Tegegne et al., 2017). This could be because although most of the children may be eating meals frequently in the day, these meals are monotonous cereal and starch-based diets, without much variety. Another possible reason that can be adduced for the high MFF but low DDS is that, in the current population, most of the households mainly feed on their farm produce; and therefore, if they do not grow different food crops, there is a high probability that they would be feeding on monotonous meals, without much variety. In support of this finding, the study by Hirvonen and Hoddinott (2017) revealed that households which do not feed mainly on their own agricultural produce are more likely to consume more diverse diets. The implication of consuming less diversified diets is the higher likelihood of children becoming underweight or malnourished.

As shown in Table 5, most of the children (77.9%) were not receiving a minimum acceptable diet, largely because the majority of the children were not being fed on highly diversified meals from different food groups (evidenced by the low proportion of children who met the minimum dietary diversity score) although they ate frequently during the day. This finding implies that, despite the high proportion of children (59.6%) meeting the MMF, still, a lot of children between 6-23 months in the two districts studied lack diversity in their diets. The current study replicates the findings by Mekonnen et al. (2017), Saaka et al. (2016) and Udoh and Amodu, (2016) that most children aged between 6 and 23 months were not receiving a minimum acceptable diet, mainly because they were not fed from a wide range of different food groups (had a low Dietary Diversity Score), although the majority met the requirement for a minimum meal frequency. The findings in the present study highlight the need for a more intensified nutrition education among caregivers to improve their knowledge levels on the nutritional values of different food items in promoting growth in children. In other words, it would be worthwhile implementing nutrition education interventions that emphasize the importance of feeding children from a wide range of different food groups, especially fruits and vegetables, which provide essential vitamins and minerals not available in most of the staple starchy foods consumed by children.

Association between household-related factors and the Feeding Indicators

The bivariate analysis assessing the association between household-related factors and the dietary diversity score (DDS) showed that a large household size, non-ownership of the current place of dwelling and a low estimated monthly income increased the likelihood that children would have a low DDS. In addition, children who belonged to households with a middle or high socio-economic status (SES), had improved sources of drinking water and toilet facilities were more likely to have an average or good DDS, compared with those with low SES and used unimproved sources of drinking water and toilet facilities. Children who belonged to households which used charcoal as the main type of fuel for cooking and did not have electricity in their houses had a higher tendency of having a poor DDS, compared with those in households which used gas, electricity or kerosene for cooking (see Table 6).

After adjusting for the significant factors in the multivariate analysis, household size, ownership of current place of dwelling, estimated average monthly household income, main source of drinking water and access to toilet facilities remained significantly associated with the DDS of the surveyed children, as shown in Table 7.

In the bivariate analysis which assessed the association between the household factors and the Minimum Acceptable Diet (MAD), household size, estimated average monthly household income and socio-economic status (SES) were significantly associated with a child being fed on a minimum acceptable diet (MAD). In addition, access to a toilet facility, main type of fuel used in cooking and the person who made decisions on how family income should be used, were significantly associated with a child being fed on a minimum acceptable diet (MAD) (see Table 8).

However, after adjusting for all the significant household-related factors in the multivariate analysis, household size, estimated average monthly income, access to toilet at home and main source of cooking fuel remained significant in determining the likelihood of children receiving an adequate MAD or not (see Table 8).

In the adjusted analysis, three household factors (household size, estimated average monthly income and access to toilet facility) remained significantly associated with both DDS and MAD.

With respect to household size, after adjusting for other factors, the results showed that the larger the household size the lower the DDS and MAD. For example, as shown in Table 7, compared with children in households with 2 to 4 members, the odds of having a good DDS were 70 percent, 79 percent and 96 percent lower in households with 5-6, 7-10 and > 10 members respectively. Similarly, concerning the MAD, the results as shown in Table 8 indicate that the odds of children receiving an adequate minimum acceptable diet were 65 percent, 72 percent and 85 percent lower in households with sizes 5-6, 7-10 and > 10 members respectively (all at a p-value of <0.001), compared with children from households with 2 to 4 members. The findings of the current study confirm those of studies conducted in the Philippines (Guirindola et al., 2018), Tanzania (Nabuuma, Ekesa & Kennedy, 2018) and Ethiopia (Bewket, Welday, Mehretie & Abebe, 2017; Tegegne et al., 2017) which established that an increase in family size was negatively associated with meeting the recommended DDS and MAD of children. In the study by Guirindola et al. (2018), children in households with more than five family members had lower odds (AOR=0.64) of meeting the MAD, compared with those in households with less than five members.

Table 6: Logistic regression model for the association between household-related factors and Dietary Diversity Score

	Average DDS vs. Poor DDS		Good DDS vs. Poor DDS	
Variable	OR (95% CI)	p-value	OR (95% CI)	p-value
Household Head				
Father	1		1	
Mother	1.03 (0.52 - 2.04)	0.925	1.19 (0.65 - 2.18)	0.577
Elder family member	0.62 (0.36 - 1.08)	0.092	0.63 (0.38 - 1.03)	0.067
Others	0.73 (0.21 - 2.54)	0.620	0.66 (0.21 - 2.12)	0.485
Household Size§				
2-4	1		1	
5-6	1.02 (0.43 - 2.40)	0.970	0.29 (0.15 - 0.54)	<0.001
7-10	1.48 (0.64 - 3.41)	0.363	0.26 (0.14 - 0.49)	<0.001
>10	0.72 (0.28 - 1.89)	0.508	0.06 (0.02 - 0.15)	<0.001
Number of rooms occupied by household				
1 room	1		1	
2 rooms	1.50 (0.98 - 2.31)	0.063	1.31 (0.89 - 1.93)	0.177
More than 2 rooms	1.65 (0.93 - 2.93)	0.085	1.17 (0.68 - 2.03)	0.566
Ownership of current place of dwelling(house)§				
No	1		1	
Yes	2.48 (1.64 - 3.74)	<0.001	2.29 (1.56 - 3.35)	<0.001
Estimate of average monthly household income§				
Less than GH¢100	1		1	
Between GH¢100 - GH¢300	1.82 (1.17 - 2.83)	0.008	1.57 (1.05 - 2.34)	0.028
Between GH¢301 - GH¢500	2.49 (1.38 - 4.50)	0.002	1.92 (1.10 - 3.35)	0.022
More than GH¢500	2.55 (1.04 - 6.27)	0.041	4.14 (1.91 - 8.96)	<0.001

Table 6 Continued

Socio-economic status[§]				
Low	1			
Middle	1.21 (0.79 - 1.85)	0.376	1.85 (1.22 - 2.78)	0.003
High	2.08 (1.18 - 3.67)	0.012	4.78 (2.84 - 8.05)	<0.001
Main source of drinking water[§]				
Unimproved source	1		1	
Improved source	1.61 (1.09 - 2.38)	0.016	1.37 (1.17 - 2.38)	0.005
Access to toilet facility[§]				
No	1		1	
Yes	1.47 (1.00 - 2.17)	0.052	2.65 (1.83 - 3.83)	<0.001
Type of toilet facility[§]				
Unimproved	1		1	
Improved	1.69 (1.06 - 2.71)	0.029	2.17 (1.42 - 3.33)	<0.001
Main type of fuel used in cooking[§]				
Gas/ Electricity/ Kerosene	1		1	
Firewood	0.46 (0.20- 1.06)	0.070	0.23 (0.11 - 0.49)	<0.001
Charcoal	0.45 (0.18 - 1.12)	0.086	0.45 (0.20 - 0.99)	0.046
Presence of electricity in house[§]				
No	1		1	
Yes	1.10 (0.95 - 2.07)	0.088	1.88 (1.31 - 2.69)	0.001
Main means of obtaining food as a household				
Mainly farming	1		1	
Mainly buying	0.93 (0.58 - 1.51)	0.782	1.32 (0.87 - 2.01)	0.193

Table 6 Continued

Estimated percentage of household income that is allocated to food				
Largest percentage (>50%)	1		1	
Medium percentage (50%)	0.91 (0.54 - 1.55)	0.735	0.67 (0.42 - 1.08)	0.097
Smallest percentage (<50%)	0.88 (0.44 - 1.78)	0.731	0.57 (0.30 - 1.10)	0.094
No specific allocation	0.93 (0.51 - 1.71)	0.826	0.64 (0.37 - 1.11)	0.116
Do not know	0.77 (0.37 - 1.60)	0.481	0.74 (0.39 - 1.40)	0.359
Person who decides how family income should be used				
Father/husband	1		1	
Mother/wife	1.27 (0.69 - 2.37)	0.443	1.18 (0.66 - 2.08)	0.580
Others	0.84 (0.46 - 1.53)	0.573	0.59 (0.37 - 1.15)	0.069
Person who decides food to be cooked each day in the household				
Father/husband	1		1	
Mother/wife	1.05 (0.68 - 1.61)	0.840	1.03 (0.70 - 1.54)	0.868
Others	0.96 (0.52- 1.79)	0.902	0.84 (0.47 - 1.51)	0.569

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05

Table 7: Multivariate multinomial logistic regression model for the association between household-related factors and Dietary Diversity Score

Variable	Average DDS vs. Poor DDS		Good DDS vs. Poor DDS	
	AOR (95% CI)	p-value	AOR (95% CI)	p-value
Household Size				
2-4	1		1	
5-6	1.07 (0.44 - 2.63)	0.879	0.30 (0.15 - 0.61)	0.001
7-10	1.23 (0.52 - 2.94)	0.637	0.21 (0.10 - 0.41)	<0.001
>10	0.56 (0.20 - 1.53)	0.256	0.04 (0.02 - 0.12)	<0.001
Ownership of current place of dwelling(house)				
No	1		1	
Yes	2.35 (1.51 - 3.67)	<0.001	2.23 (1.44 - 3.45)	<0.001
Estimate of average monthly household income				
Less than GH¢100	1		1	
Between GH¢100 - GH¢300	1.85 (1.15 - 2.96)	0.011	2.16 (1.36 - 3.43)	0.001
Between GH¢301 - GH¢500	2.50 (1.32 - 4.73)	0.005	1.88 (0.99 - 3.55)	0.052
More than GH¢500	2.57 (0.95 - 6.91)	0.062	4.46 (1.77 -11.28)	0.002
Socio-economic status				
Low	1		1	
Middle	0.89 (0.53 - 1.49)	0.651	1.39 (0.83 - 2.35)	0.210
High	1.11 (0.44 - 2.81)	0.821	2.21 (0.92 - 5.34)	0.077
Main source of drinking water				
Unimproved source	1		1	
Improved source	1.55 (1.01 - 2.36)	0.044	1.40 (0.92 - 2.11)	0.113
Access to toilet facility				
No	1		1	
Yes	1.28 (0.79 - 2.09)	0.321	2.55 (1.58 - 4.12)	<0.001
Type of toilet facility				
Unimproved	1		1	
Improved	1.17 (0.62 - 2.23)	0.629	0.82 (0.45 - 1.51)	0.528
Main type of fuel used in cooking				
Gas/ Electricity/ Kerosene	1		1	
Firewood	0.63 (0.24 - 1.69)	0.362	0.53 (0.21 - 1.33)	0.176
Charcoal	0.47 (0.18 - 1.25)	0.130	0.58 (0.24 - 1.42)	0.236
Presence of electricity in house				
No	1		1	
Yes	1.27 (0.82 - 1.99)	0.287	1.35 (0.87 - 2.09)	0.184

Source: Nsiah-Asamoah (2019)

Therefore, the current study's findings support the assertion by Codjoe et al. (2016) that smaller households are more likely to consume more diverse foods, compared with larger households. A possible explanation for this finding is that, increasing household size may mean more mouths to feed and increased expenditure on food, particularly if the resources available to the family do not increase. Usually, as the number of persons in a household increases, the resources for obtaining and preparing meals are stretched. This may reduce the likelihood of using the money available to acquire food items from different food groups to feed members.

However, the finding contradicts those of the study by Saaka et al. (2017) in Ghana and Harris-Fry et al. (2015) in Bangladesh. Both studies found that increasing household size was significantly associated with increases in dietary diversity scores of children. Although the present study and the studies by Saaka et al (2017) and Harris-Fry et al (2015) were all undertaken in rural districts in developing countries, the difference in findings could be due to the fact that the children in the studies by Saaka et al. (2017) and Harris-Fry et al. (2015) who had a high DDS also belonged to households with an increased agricultural biodiversity − that is, cultivated different crops, including vegetables, and reared various livestock. There is a high likelihood that they might have benefited from being fed on a wide range of food items from their harvested farm produce, which resulted in increasing their DDS, although they belonged to large households.

The findings of the current study also suggest that as the income level of a household increases, the probability that children will be fed meals frequently and from different food groups increases. Children in households with an average monthly income of more than GH¢500.00 were more than four times likely (AOR= 4.46, CI: 1.77 - 11.28, p =0.002) to have a good DDS and not a poor DDS, compared with children in households with an average income of less than GH¢100.00. Likewise, the results indicate that children in households that earned between GH¢100 and GH¢300 were 2.03 times (95% CI: 1.29 - 3.23 and a p-value of 0.003) more likely to have an adequate MAD than children in households with an income level below GH¢100. These findings are consistent with the results of similar studies which found that children from households with higher income levels were more likely to be fed on a more-varied and a minimum acceptable diet (Bi, Liu, Li, He, Chen, Luo & Xu, 2019; Khan et al., 2017; Solomon et al., 2017). These findings could be attributed to the fact that consumption of some food items is believed to be heavily influenced by one's income level (Laraia, Leak, Tester & Leung, 2017). Meerman and Aphane (2012) also opined that a low purchasing power of a household implies a higher likelihood of a worsening composition of diets, resulting in a reduction in the dietary quality and total energy intakes of children.

This makes children in the household more susceptible to micronutrient deficiencies which compromise their growth and cognitive development. Besides, the income level can serve as a proxy for a household's socioeconomic status, which can influence its ability to access and afford diversified food sources in order to provide quality and nutritious meals for its children. This finding has implications for the need to empower women, because about 17.9 percent and 10.0 percent of the mothers in the surveyed population are not paid at all or are paid in kind (do not receive cash payment) respectively, for employment services they render to their employers.

The findings revealed that access to a toilet facility by a household positively predicts the likelihood that a child would be fed on a minimum acceptable diet and on meals prepared from various food groups. The odds of having a good rather than a poor DDS were approximately 2.55 times (AOR = 2.55, 95% CI= 1.58 - 4.12, p = <0.001) higher in children residing in houses that have access to a toilet facility than those which did not have access to a toilet facility. Similarly, results from the multivariate analysis showed that children residing in households with access to a toilet facility had increased odds of meeting the MAD 1.71 times (95% CI: 1.11 - 2.63 and a p-value of 0.015) more than those without access to a toilet facility.

Access to improved toilet facilities can also be used as a proxy for assessing the socio-economic status and income levels of households (Rhodes & McKenzie, 2018), and hence their ability to have enough resources to buy varied foods for children in order to improve their nutritional status. In the present study, a significant association (p = <0.001) was found between household SES and access to own toilet facility. As presented in Appendix E (Table 16), approximately 7 out of 10 people (67.9%) in the rich socio-economic status group had access to an improved toilet facility while less than 1 out of every 10 people (2.41%) in the poor SES group had an improved toilet facility. It can be inferred from the results that children in higher SES households who were more likely to have access to their own toilet facility were also probably better positioned to be fed frequently, and from foods prepared from different food groups.

The findings revealed that ownership of current place of dwelling and main source of drinking water were significant predictors of a child's tendency to have a good DDS but not an adequate MAD. After adjusting for all the other significant factors, children whose parents owned their current place of dwelling were more than two times (AOR=2.23; 95% CI:1.44 - 3.45, *p*=<0.001) likely to have a good DDS and not a poor DDS, compared with children whose parents did not own their current place of dwelling. Ownership of the current dwelling place can serve as a proxy for assessing a household's income level and socio-economic status (Kemunto, 2013). The expectation is that households who own their current place of dwelling are more likely to earn high incomes and belong to a high socio-economic status and may be in a better position to afford and consume nutritious meals prepared from different food sources.

In short, the findings from this current study suggest that parental home ownership is positively associated with a higher DDS of children. Although Mosites et al. (2015) assert that the overall influence of ownership of household on the nutritional status of children is not well understood, since very few studies have examined its direct effect, ownership of one's current place of dwelling can also be used as proxy for determining a family's income level, financial accessibility and independence. It is expected that households who earn higher incomes would be in a better position to construct their own houses (compared with the lower-income families who are more likely to rent a house) and hence be able to provide high quality and nutritious meals for their children. In the present study a significant association was found between household income and home ownership (p= 0.011).

In addition, this study has confirmed that a great tendency to feed children on meals prepared from different food groups (good DDS) is influenced by the main source of drinking water (improved or unimproved). It was revealed by the current study that children residing in households with improved sources of drinking water were about 1.55 times (AOR =1.55, 95% CI = 1.01 - 2.36, p= 0.044) more likely to have an average DDS, compared with children living in households with unimproved water sources. This finding is in line with the results of studies conducted in Ethiopia (Tassew et al., 2019) and Southeast Nigeria (Onyeneke et al., 2019) which showed that access to safe potable water was significantly associated with an increase in the DDS of children. A possible explanation to this finding is that having access to improved sources of drinking water may also suggest belonging to a higher SES class in the population (Rhode & McKenzie, 2018), thus having enough resources to acquire different food items from various food groups to feed the children and so increase their DDS.

In the current study, there was a significant association (p <0.001) between household socio-economic status and access to improved sources of drinking water. The results revealed that more than 7 out of 10 people (72.2%) in the rich socio-economic status group had improved sources of drinking water while just about 4 out of every 10 people (36.4%) in the poor SES group had improved sources of drinking water. Likewise, having ready access to better/ treated water supply in the house could imply saving time to prepare food more promptly and more easily than when time is spent to walk over a distance to water bodies to fetch water for cooking. According to a UNICEF (2016b) report, most rural women are saddled with the burden of trekking over long distances in search of water which results in a colossal waste of their valuable time and opportunities which could have been channelled into productive income generating activities to improve their livelihoods. Studies, particularly in Africa and Asia, have shown how women are tasked with the responsibility of fetching water, a task that takes more than 30 minutes per trip and consequently places a burden on them in respect of preparing household meals (Cook, Kimuyu & Whittington, 2016; Graham, Hirai & Kim, 2016; Jadhav, 2018). Rural women who find themselves engaging in the labourious act of carrying heavy containers of water daily are more likely to resort to giving the same kinds of foods that are easier to prepare without using much time. In such circumstances, their children are at a higher risk of being fed on less diversified meals which are also likely to be nutritionally inadequate, particularly in proteins and micronutrients.

Table 8: Logistic regression model for the association between household-related factors and Minimum Acceptable Diet

	Bivariate analysis		Multivariate analysis	
Variable	OR (95% CI)	p-value	AOR (95% CI)	p-value
Household Head				
Father	1			
Mother	1.01 (0.55 - 1.87)	0.968		
Elder family member	0.82 (0.48 - 1.40)	0.474		
Others	0.48 (0.11 - 2.15)	0.339		
Household Size§				
2-4	1		1	
5-6	0.39 (0.23 - 0.67)	0.001	0.35 (0.20 - 0.63)	<0.001
7-10	0.33 (0.20 - 0.56)	<0.001	0.28 (0.16 - 0.50)	<0.001
>10	0.15 (0.06 -0.37)	<0.001	0.15 (0.06 -0.39)	<0.001
Number of rooms occupied by household				
1 room	1			
2 rooms	1.20 (0.81 - 1.78)	0.375		
More than 2 rooms	0.94 (0.54 - 1.66)	0.834		
Ownership of current place of dwelling(house)				
No	1			
Yes	1.39 (0.96 - 2.01)	0.081		
Estimate of average monthly household income§				

Table 8 continued

Less than GH¢100	1		1	
Between GH¢100 - GH¢300	1.56 (1.02 - 2.39)	0.039	2.03 (1.29 - 3.23)	0.003
Between GH¢301 - GH¢500	1.28 (0.72 - 2.26)	0.401	1.30 (0.70 - 2.42)	0.404
More than GH¢500	1.94 (0.98 - 3.83)	0.058	1.91 (0.88 - 4.17)	0.103
Socio-economic status§				
Poor	1		1	
Middle	1.46 (0.95 - 2.24)	0.088	1.35 (0.83 - 2.18)	0.226
Rich	1.85 (1.13 - 3.02)	0.014	1.22 (0.59 - 2.53)	0.593
Main source of drinking water				
Unimproved source	1			
Improved source	1.32 (0.92 - 1.93)	0.132		
Access to toilet facility§				
No	1		1	
Yes	1.75 (1.19 - 2.58)	0.004	1.71 (1.11 - 2.63)	0.015
Type of toilet facility				
Unimproved	1			
Improved	1.22 (0.81 - 1.85)	0.335		
Main type of fuel used in cooking§				
Gas/ Electricity/ Kerosene	1		1	
Firewood	0.40 (0.22 - 0.71)	0.002	0.49 (0.24 - 1.02)	0.057
Charcoal	0.52 (0.27 - 0.99)	0.046	0.49 (0.24 -0.99)	0.048
Presence of electricity in house				
No	1			
Yes	1.30 (0.84 - 1.73)	0.318		
Main means of obtaining food as a household				
Mainly farming	1			
Mainly buying	1.50 (0.99 - 2.26)	0.057		
Estimated percentage of household income that is allocated to food				
Largest percentage (>50%)	1			
Medium percentage (50%)	0.80 (0.49 - 1.30)	0.365		
Smallest percentage (<50%)	0.76 (0.39 - 1.48)	0.417		
No specific allocation	0.64 (0.36 - 1.14)	0.130		
Do not know	1.36 (0.74 - 2.52)	0.321		
Person who decides how family income should be used§				
Father/husband	1		1	
Mother/wife	1.50 (0.88 - 2.55)	0.134	1.53 (0.86 - 2.70)	0.146
Others	0.44 (0.20 -0.94)	0.035	0.46 (0.21 - 1.01)	0.053
Person who decides food to be cooked each day in the household				
Father/husband	1			
Mother/wife	1.14 (0.76 - 1.71)	0.513		
Others	1.01 (0.55 - 1.85)	0.968		

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05

In this current study, the main means of obtaining food as a household was weakly associated with MAD, such that children in households who mainly bought food were more likely to have adequate MAD, compared with those whose main means of obtaining food were from farm produce. An explanation that can be given for this finding is the possibility that households who depend solely on their farm produce as the major food source may not be cultivating a wide range of different food items (they grow a few food crops). The findings in this study are supported by a related study conducted in Northern Ghana which found that, although the primary source of food for 92.5 percent of households was their own farm produce, less than 50.0 percent of the children were fed on a minimum acceptable diet, mainly because most of the households (98.0%) cultivated only grains, roots and tubers, which was likely to result in feeding children on monotonous carbohydrate-based meals (Saaka et al., 2016). The findings, therefore, have implications for the need to plan interventions, aimed at encouraging and empowering farming households in rural communities to cultivate different food crops (crop diversification) and rear various kinds of animals.

The main source of fuel used for cooking was also found to be associated with the likelihood of children being fed on an adequate MAD. After adjusting for possible confounding factors in the multivariate analysis, the main type of fuel used in cooking in a household remained a significant determining factor of a child's likelihood of receiving an adequate MAD or not. Children who lived in households using charcoal as their main source of cooking fuel were 0.49 times less likely (AOR= 0.49, 95% CI =0.24 - 0.99, p = 0.048) to have an adequate MAD, compared with those who lived in households with gas, electricity or kerosene as the major source of cooking fuel. A possible explanation for this finding is that there is a greater tendency for households that earn higher incomes to acquire and use clean sources of cooking fuel such as electricity, liquid petroleum gas (LPG) or kerosene. Using these clean sources of fuel makes cooking easier, faster and saves time (Bhojvaid et al., 2014), compared with firewood and charcoal which are burdensome to light. Rao and Pachauri, (2017) also asserted that using LPG, kerosene or electricity could free up women's time spent on collecting firewood, which could be channelled into other productive activities such as cooking often, feeding and caring for children.

Therefore, the findings suggest that households with more than four members, earn less than GH¢100 in a month, have no access to a toilet facility and mainly use firewood and charcoal as their source of cooking fuel need to be specifically targeted for interventions that promote and encourage recommended child feeding practices, to enable their children to receive an adequate MAD.

Nutritional Status of children (Anthropometric Indicators)

One of the objectives of the study was to assess household factors which influence the nutritional status of children. The nutritional status of the surveyed children was assessed on the basis of anthropometric indicators of stunting, wasting and underweight. In the first sub-section, the prevalence of stunting, wasting and underweight is presented. The second sub-section discusses the association between household factors and the anthropometric indicators.

The prevalence of stunting, wasting and underweight were approximately 20.4%, 19.1% and 29.5% respectively. The stunting prevalence figures are similar to those reported in studies that were undertaken in other districts – Denkyembour (17.2%) (Kwabla, Gyan & Zotor, 2018), in the Eastern Region of Ghana. In a related study conducted in Koforidua Zongo Sub-district among children under five years, underweight, stunting and wasting among children under five years were 9%, 13% and 6.3% respectively (Sarkodie, 2018). Similarly, in another study in the Upper- Manya Krobo district of the Eastern Region, it was revealed that the prevalence of stunting, wasting and underweight were 16.2%, 10.8% and 6.9% respectively (Pagui, 2015). Studies in the above-mentioned districts (Upper- Manya Krobo and Koforidua Zongo Sub-district) were lower than those found in the present study. The higher prevelance figures obtained in the present study as compared with previous studies in other districts in the Eastern region could be attributed probably to the higher incidence of poverty in the KAPND and KAPSD districts which could predispose children to inadequate dietray intakes.

These prevalence figures are also comparable to those observed in other studies in Burkina Faso (Erismann, Knoblauch, Diagbouga, Odermatt, Gerold, Shrestha & Cissé, 2017), Tanzania (Mgongo et al., 2017), Ethiopia (Tosheno, Mehretie Adinew, Thangavel & Bitew Workie, 2017) and Nigeria (Olodu, Adeyemi, Olowookere & Esimai, 2019; Udoh & Amodu, 2016) where the majority of children were more likely to be underweight than wasted and stunted. According to the WHO, an underweight prevalence figure below 10 percent is considered low, between 10 percent and 19 percent is medium, between 20 percent and 29 percent is regarded as high, and above or equal to 30 percent is considered very high (WHO, 2007). Therefore, in the current study population, underweight, which reflects chronic or acute malnutrition among children, was at a critically high level, according to the WHO criteria (WHO, 2010).

In the current study, wasting, which comes about as a result of inadequate nutrition over a short period, was above the normal level (15.0%) recommended by the WHO. According to the WHO, a prevalence figure below 5 percent is considered acceptable, between 5 percent and 9 percent is poor, between 10 and 14 percent is regarded as serious, and above or equal to 15 percent is considered critical (WHO, 2010). Therefore, compared with the WHO cut-off point for declaring as of public health importance undernutrition, exhibited as wasting, the prevalence in this present study (19.1%) was higher than the normal level (15.0%) (WHO, 2010).

In the case of stunting, the WHO indicates that, at the population level, a prevalence figure below 20 percent is considered low, between 20 percent and 29 percent is medium, between 30 percent and 39 percent is regarded as high, and above or equal to 40 percent is considered a very high prevalence (WHO, 2010). Therefore, the prevalence figure of 20.4 percent among this study population can be described as a public health problem of medium significance.

The implication of this high prevalence of wasting among these children is that it increases their risk of becoming affected by frequent attacks of infectious diseases such as diarrhoea, pneumonia and measles (Pelletier et al., 2013). Both underweight and wasted children are at a high risk of ending up with a weakened immune system (Gaayeb et al., 2014). In addition, such affected children, as a result of being deficient in key nutrients, suffer from delays in attaining developmental milestones, as well as poor brain development, which consequently leads to learning difficulties (Mgongo et al., 2017).

As shown in Table 9, after adjusting for the significant factors in the multivariate analysis, only household size remained significantly associated with stunting; but it was not a predictor variable of wasting and underweight in the children. In the present study, children who belonged to households with sizes ranging between seven and ten members were 2.25 times [AOR = 2.25, 95% CI: (1.21 - 4.17), p=0.010] more likely to become stunted than those who lived in houses with two to four members. This finding was in agreement with those of other studies conducted in the Philippines (Capanzana et al., 2018), Mozambique (García Cruz et al., 2017) and Ethiopia (Geberselassie et al., 2018) where a higher risk of stunting in children was found in households with larger sizes. A plausible explanation could be that, families with more children are more stretched economically and may not be able to feed themselves well. Large households are also more likely to face difficulties in obtaining and providing highly nutritious foods to meet the nutritional requirements needed by children to support their physical development. An increase in the number of household members could also imply a high possibility of scarcity of resources, particularly food, for household consumption and healthcare, which can eventually result in stunted growth in children.

In addition, parents with more children usually lack adequate time to pay particular attention to the needs of every child. Buttressing this point, the study by Bogale, Bala, Tadesse and Asamoah, (2018) in Ethiopia found that a large number of household members could result in poor levels of childcare and a reduced dietary intake. There is also the possible risk of overcrowding, particularly in this study population, where the vast majority of households (86.6%) had only one or two rooms to dwell in (see Table 3). Overcrowding in rooms could facilitate the easy transmission of diseases, such as respiratory tract infections and diarrhoea, which have been identified as major causes of child malnutrition, particularly because these health conditions weaken and reduce the appetite of children, resulting in a reduction in their usual dietary intakes.

Table 9: Logistic regression model for the association between household factors and Anthropometric Indicators

Variable	Bivariate analysis (HAZ) OR (95% CI)	p-value	Multivariate analysis (HAZ) AOR (95% CI)	p-value	Bivariate analysis (WHZ) OR (95% CI)	p-value	Multivariate analysis (WHZ) AOR (95% CI)	p-value	Bivariate analysis (WAZ) OR (95% CI)	p-value	Multivariate analysis (WAZ) AOR (95% CI)	p-value
Household Head												
Father	1				1				1			
Mother	0.91 (0.50 - 1.68)	0.770			1.11 (0.62 - 1.99)	0.728			1.12 (0.67 - 1.87)	0.669		
Elder family member	1.07 (0.69 - 1.65)	0.760			0.81 (0.51 - 1.30)	0.382			0.80 (0.53 - 1.20)	0.275		
Others	1.67 (0.72 - 3.91)	0.233			0.71 (0.24 - 2.09)	0.536			1.90 (0.87 - 4.13)	0.105		
Household Size												
2-4	1		1		1				1			
5-6	1.61 (0.87 - 3.01)	0.133	1.64 (0.88 - 3.09)	0.122	0.75 (0.43 - 1.30)	0.310			0.94 (0.58 - 1.54)	0.807		
7-10	2.05 (1.12 - 3.77)	0.021	2.25 (1.21 - 4.17)	0.010[§]	0.89 (0.52 - 1.52)	0.676			1.23 (0.76 - 1.98)	0.401		
>10	1.22 (0.56 - 2.66)	0.610	1.31 (0.60 - 2.89)	0.496	1.31 (0.68 - 2.50)	0.417			1.27 (0.70 - 2.31)	0.430		
Number of rooms occupied by household												
1 room	1				1				1			
2 rooms	1.20 (0.85 - 1.69)	0.312			0.75 (0.52 - 1.09)	0.127			0.81 (0.59 - 1.11)	0.195		
More than 2 rooms	0.98 (0.60 - 1.62)	0.944			0.96 (0.59 - 1.56)	0.866			0.81 (0.52 - 1.26)	0.349		
Ownership of current place of dwelling(house)												
No	1				1				1			
Yes	1.10 (0.79 - 1.53)	0.570			0.99 (0.70 - 1.39)	0.955			1.02 (0.76 - 1.36)	0.903		
Estimate of average monthly household income[§]												
Less than GH¢100	1		1		1		1		1			
Between GH¢100 - GH¢300	0.82 (0.58 - 1.15)	0.250	0.77 (0.54 - 1.10)	0.149	0.70 (0.49 - 1.01)	0.057	0.72 (0.50 - 1.03)	0.074	0.58 (0.42 -0.79)	0.001	0.59 (0.43 - 0.81)	0.001
Between GH¢301 - GH¢500	0.58 (0.34 - 0.99)	0.045	0.58 (0.33 - 1.01)	0.054	0.47 (0.26 -0.83)	0.010	0.57 (0.31 - 1.03)	0.041	0.54 (0.34 -0.85)	0.008	0.62 (0.39 - 0.99)	0.045
More than GH¢500	0.49 (0.22 - 1.06)	0.070	0.57 (0.25 - 1.30)	0.180	1.00 (0.53 - 1.91)	0.991	1.47 (0.74 - 2.95)	0.273	0.67 (0.37 - 1.22)	0.193	0.86 (0.46 - 1.63)	0653

Table 9 continued

Socio-economic status§												
Poor	1		1		1		1		1		1	
Middle	0.91 (0.64 - 1.29)	0.596	1.08 (0.74 - 1.58)	0.681	0.78 (0.55 - 1.12)	0.179	0.81 (0.57 - 1.16)	0.247	0.79 (0.58 - 1.08)	0.135	0.83 (0.60 - 1.13)	0.232
Rich	0.57 (0.36 -0.92)	0.022	0.83 (0.46 - 1.52)	0.549	0.45 (0.27 -0.74)	0.002	0.43 (0.25 - 0.74)	0.002	0.55 (0.36 -0.82)	0.004	0.57 (0.37 -0.88)	0.011
Main source of drinking water§												
Unimproved source	1		1		1				1			
Improved source	0.71 (0.52 - 0.98)	0.035	0.72 (0.51 - 1.01)	0.057	0.93 (0.67 - 1.30)	0.683			0.83 (0.62 - 1.09)	0.183		
Access to toilet facility												
No	1				1				1			
Yes	0.81 (0.59 - 1.12)	0.207			0.80 (0.58 - 1.11)	0.190			0.95 (0.71 - 1.26)	0.715		
Type of toilet facility§												
Unimproved	1		1		1				1			
Improved	0.66 (0.45 - 0.99)	0.043	0.82 (0.51 - 1.32)	0.421	0.80 (0.54 - 1.18)	0.260			0.90 (0.65 - 1.26)	0.549		
Main type of fuel used in cooking												
Gas/ Electricity/ Kerosene	1				1				1			
Firewood	1.04 (0.56 - 1.92)	0.909			1.53 (0.76 - 3.08)	0.230			1.12 (0.64 - 1.96)	0.680		
Charcoal	0.77 (0.39 - 1.54)	0.467			0.94 (0.43 - 2.04)	0.875			0.89 (0.48 - 1.63)	0.696		
Presence of electricity in house												
No	1				1				1			
Yes	0.96 (0.70 - 1.33)	0.823			0.94 (0.68 - 1.31)	0.729			1.02 (0.77 - 1.36)	0.875		
Main means of obtaining food as a household												
Mainly farming	1				1				1			
Mainly buying	0.69 (0.46 - 1.04)	0.073			0.94 (0.63 - 1.39)	0.755			0.95 (0.68 - 1.33)	0.760		
Estimated percentage of household income that is allocated to food												
Largest percentage (>50%)	1				1				1			

Table 9 continued

Medium percentage (50%)	0.91 (0.59 - 1.42)	0.684	0.84 (0.54 - 1.31)	0.441	0.85 (0.58 - 1.23)	0.420
Smallest percentage (<50%)	1.18 (0.71 - 1.97)	0.518	1.05 (0.63 - 1.77)	0.844	1.27 (0.81 - 1.99)	0.293
No specific allocation	0.78 (0.47 - 1.32)	0.357	0.85 (0.51 - 1.41)	0.526	0.80 (0.51 - 1.26)	0.341
Do not know	1.16 (0.65 - 2.07)	0.613	0.74 (0.39 - 1.39)	0.349	0.71 (0.41 - 1.23)	0.222
Person who decides how family income should be used						
Father/husband	1		1		1	
Mother/wife	0.85 (0.50 - 1.45)	0.561	1.10 (0.66 - 1.84)	0.715	1.06 (0.68 - 1.65)	0.806
Others	0.78 (0.46 - 1.34)	0.369	0.95 (0.56 - 1.61)	0.846	0.69 (0.43 - 1.12)	0.138
Person who decides food to be cooked each day in the household						
Father/husband	1		1		1	
Mother/wife	0.79 (0.55 - 1.14)	0.210	0.98 (0.69 - 1.41)	0.922	0.83 (0.61 - 1.13)	0.242
Others	0.94 (0.55 - 1.60)	0.813	0.75 (0.41 - 1.35)	0.332	0.72 (0.44 - 1.18)	0.188

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05 in the bivariate analysis; HAZ, WHZ and WAZ represents stunting, wasting and underweight in children respectively.

Based on the multivariate regression analysis, estimated monthly household income and socio-economic status (SES) were significantly associated with both underweight and wasting in children (see Table 9).

With respect to monthly household income, children belonging to households with an estimated average monthly income ranging between GH¢301 - GH¢500 were 43 percent [AOR = 0.57, 95% CI: (0.31 - 1.03), p = 0.041] less likely to be wasted than those who lived in households with a monthly income of less than GH¢100. Likewise, children belonging to households which earned between GH¢301 and GH¢500 were 38 percent (AOR = 0.62, 95% CI: (0.39 - 0.99), p = 0.045) less likely to become underweight than their counterparts who lived in household with an income below GH¢100 (see Table 9).

Similar findings that household income is significantly associated with the nutritional status of children have been documented in other studies in Bangladesh (Chowdhury et al., 2018), Ethiopia (Tosheno et al., 2017) and Burkina Faso (Poda et al., 2017). Logically, as household income increases, the probability that children would become malnourished (exhibited as wasting and underweight) decreases probably due to an increased tendency to acquire more nutritious foods. Households with adequate monthly income can access sufficient nutritious foods, which would reduce their risk of having a poor nutritional status.

In addition, the present study revealed that both wasting and underweight were more common in children from households with a poor socio-economic status (SES), compared with those in the rich socio-economic group. In the present study, the probability of wasting in children was 57 percent less likely [AOR = 0.43, 95% CI: (0.25 - 0.74), p = 0.002] in households with a rich socio-economic status, compared with the poor ones. Similarly, the likelihood of underweight in children was 43 percent less likely (AOR = 0.57, 95% CI: (0.37 - 0.88), p = 0.011] in households with a rich socio-economic status, compared with the poor ones (refer to Table 9).

This finding is supported by other studies in Ethiopia (Endris et al., 2017), India and Nepal (Harding et al., 2018) and Iran (Kia et al., 2017). One possible explanation for this finding is that children in higher socio-economic households are more likely to belong to food-secured families that have economic access to sufficient and nutritious foods, and therefore can get enough food for their children to eat (Agbadi et al., 2017). It is expected that children belonging to high SES will be more likely to consume healthy foods such as whole grains, lean meats, fish, low-fat dairy products, fruits and vegetables, compared with those of low SES, as highlighted in a systematic review by Mayen et al. (2014). Another likely reason for this finding is that children in rich socio-economic status families are more likely to have more educated fathers and mothers. This assertion is confirmed by a study undertaken in Bangladesh which observed that mothers with higher levels of education also had better knowledge on child nutritional and health issues and had generally come from the richest households (Sarma et al., 2017). These factors could have reduced the risk of wasting and underweight among the children who belonged to rich socio-economic status households. This finding, therefore, has implications for the need to empower poor households in rural communities, perhaps by supporting mothers to be employed and earn regular income to enable them to care and meet the nutritional needs of their children.

In conclusion, it became obvious from the analysis that household factors such as household size, estimated average monthly income, access to toilet facility determines the probability that a child will be fed on diverse diets and also on the minimum number of meals recommended for his/her age daily. These assocaitions between the aforementioned household variables and the feeding indicators are reflected on the adapted WHO conceptual framework and therefore support the conclusion of this study. Both Becker's Micro-economic theory of the household and nutrition (Becker, 1965, 1981) and Urie Bronfenbrenner’s social-ecological theory, (Bronfenbrenner, 1992, 1994) which describe the household factors that influence the dietary intakes and nutritional status of children also supports the results of this study. Drawing on Becker’s and Bronfenbrenner’s theories, it became evident that household size (belonging to a household with more members (7-10 members) and that that earned low income levels (<GH¢100) increased risk of child underweight and wasting in this study.

CHAPTER SEVEN

MATERNAL FACTORS INFLUENCING THE FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN

Introduction

This chapter presents an analysis and a discussion of the influence of maternal factors on the feeding practices and nutritional status of the children. The chapter is in five sections. The first section presents information on the background characteristics of the mothers and children who participated in the study. In the second section, the findings and a discussion of the maternal factors that influence the feeding practices of the children are presented. The results and a discussion of the maternal factors that determine the nutritional status of the surveyed children are presented in the third section. The fourth section presents the findings and discussions of the association between the feeding indicators [DDS, MAD and the infant and child feeding index (ICFI)] and the nutritional status (anthropometric indicators) of the children. Lastly, the strengths and limitations of this study are discussed in section five.

Background Characteristics of Mothers and Children

The socio-demographic characteristics of the mothers and children who participated in the study are presented in Table 10. Complete responses from a total number of 935 caregiver-child pairs were analyzed. The average age of the children was approximately 9 months; and approximately equal percentages of males (49.8%) and females (50.2%) participated in the study.

The average age of the caregivers was approximately 28 years, and a higher proportion (61.0%) was within the age group of 20 to 30 years. As regards marital status of the mothers, the majority (75.2%) were married. Regarding parity, most (65.6%) of the mothers had between 1 and 3 children. As regards the employment status of mothers, 35.6 percent were employed at the time of data collection. It is worth noting that 17.9 percent of the caregivers reported that they did not receive any remuneration for work they had done. As presented in Table 10, 17.8 percent of the caregivers had no formal education and approximately 31.1 percent ended their education at the primary level. In Figure 4, whereas about 44.0 percent of the mothers had a normal or healthy BMI, 21.0 and 25.0 percent were underweight and overweight respectively.

In this study, a mother's autonomy was assessed using two predictor terms - decision making power and financial independence. Concerning decision making power, the majority (51.2%) had an average autonomy as shown in Table 10. In the case of financial independence, analyses of the responses from mothers indicate that a higher proportion (52.5%) had a low autonomy.

Table 10: Background Characteristics of Mothers and Children

Variable	Frequency N=935	Percentage (%)
Children's characteristics		
Age in months; Mean(months)	9	
Age group		
Less than 6 months	262	28.0
6 – 8 months	187	20.0
9 – 11 months	157	16.8
12 – 24 months	329	35.2
Sex		
Male	466	49.8
Female	469	50.2

Table 10 continued

Mothers' characteristics		
Age of Mother; Mean(years)	28	
Age Groups of Mothers		
< 20 years	74	7.9
20-30 years	570	61.0
31 -40 years	243	26.0
>40 years	48	5.1
Marital status		
Single (Never Married)	98	10.5
Cohabiting	83	8.8
Married	703	75.2
Separated/ Divorced	41	4.4
Widowed	10	1.1
Number of Living Children (Parity)		
1-3	614	65.6
4-6	282	30.2
> 6	39	4.2
Number of mothers with children under two years of age, distributed by number of children cared for		
1	811	86.8
2	118	12.6
3	6	0.6
Mother's Employment status		
Not employed in the last 12 months before the survey	282	30.2
Not currently employed, but worked in past 12 months	320	34.2
Currently employed	333	35.6
Work status/schedule throughout the year		
Work throughout the year	322	34.4
Work seasonally/part of the year	313	33.5
Work only once in a while	300	32.1
Form of remuneration/payment		
Cash only	372	39.8
Cash and in Kind	302	32.3
In Kind only	94	10.0
Not paid	167	17.9
Mother's highest level of education attained		
None	166	17.8

Table 10 continued

Primary	291	31.1
JHS/JSS	317	33.9
Secondary	92	9.8
Tertiary	69	7.4
Mother's Autonomy 1: Decision		
making power	320	34.2
low	479	51.2
medium/average	136	14.6
high		
Mother's Autonomy 2: Financial	491	52.5
independence	352	37.7
low	92	9.8
medium/average		
high		

Source: Nsiah-Asamoah (2019)

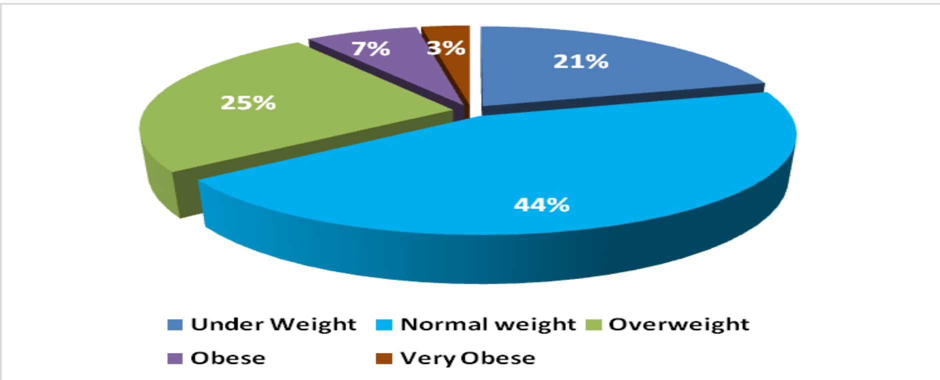


Figure 4: Body Mass Index (BMI) Distribution of Mothers

Association between maternal-related factors and Feeding Indicators

The bivariate analysis used in assessing the association between maternal-related factors and the dietary diversity score (DDS) revealed that marital status, parity, mother's employment status, work status or schedule throughout the year, highest level of education attained, decision making power and financial independence were significantly associated with DDS as presented in Table 11.

Table 11: Logistic regression model for the association between maternal-related factors and Dietary Diversity Score

	Average DDS vs. Poor DDS		Good DDS vs. Poor DDS	
Variable	OR (95% CI)	p-value	OR (95% CI)	p-value
Mother's age				
< 20 years	1		1	
20-30 years	1.54 (0.64 - 3.71)	0.340	2.04 (0.85 - 4.90)	0.111
Above 30 years	1.36 (0.54 - 3.41)	0.513	2.21 (0.90 - 5.45)	0.085
Marital status§				
Single (Never Married)	1		1	
Cohabiting	1.63 (0.74 - 3.59)	0.227	1.15 (0.49 - 2.73)	0.749
Married	1.34 (0.74 - 2.42)	0.332	2.33 (1.28 - 4.24)	0.006
Separated/ Divorced/widowed	1.85 (0.66 - 5.19)	0.242	4.11 (1.60 - 10.58)	0.003
Number of Living Children § *(Parity)*				
1-3	1		1	
4-6	1.12 (0.73 - 1.72)	0.599	1.15 (0.78 - 1.71)	0.470
> 6	0.26 (0.07 - 0.90)	0.033	0.43 (0.17 - 1.09)	0.074
Number of children under two years of age				
1	1		1	
2/ 3	1.02 (0.56 - 1.83)	0.959	1.06 (0.62 - 1.81)	0.825
Mother's Employment status§				
Not employed in last 12 months before the survey	1		1	
Not currently employed, but worked in past 12 months	1.54 (0.96 - 2.47)	0.076	1.74 (1.09 - 2.78)	0.021
Currently employed	1.71 (1.06 - 2.77)	0.027	3.52 (2.25 - 5.51)	<0.001
Work status/schedule throughout the year§				
Work throughout the year	1		1	
Work seasonally/part of the year	0.85 (0.53 - 1.37)	0.508	0.61 (0.39 - 0.95)	0.029
Work only once in a while	0.43 (0.26 -0.69)	0.001	0.39 (0.25 -0.60)	<0.001
Form of remuneration/payment				
Cash only	1			
Cash and in Kind	1.20 (0.76 - 1.89)	0.442	0.96 (0.63 - 1.47)	0.848
In Kind only	1.04 (0.52 - 2.11)	0.906	1.22 (0.66 - 2.25)	0.530
Not paid	1.13 (0.65 - 1.94)	0.671	1.02 (0.62 - 1.68)	0.929
Mother's highest level of education attained§				

Table 11 continued

None	1		1	
Primary	1.19 (0.68 - 2.09)	0.533	2.59 (1.49 - 4.50)	0.001
JHS/JSS	1.75 (1.02 - 3.01)	0.042	2.83 (1.63 - 4.93)	<0.001
Secondary+ ʆ	2.25 (1.19 - 4.26)	0.013	4.46 (2.38 - 8.36)	<0.001
Mother's nutritional Status (BMI)				
Under Weight	1		1	
Normal weight	1.72 (0.96 - 3.08)	0.066	1.55 (0.94 - 2.57)	0.089
Overweight	1.82 (0.98 - 3.38)	0.056	1.19 (0.69 - 2.08)	0.531
Obese/ very obese	1.43 (0.65 - 3.15)	0.380	1.59 (0.81 - 3.13)	0.180
Decision making power§				
Lowest	1		1	
Middle	1.33 (0.87 - 2.04)	0.186	1.93 (1.29 - 2.87)	0.001
Highest	2.06 (1.15 - 3.69)	0.015	2.73 (1.58 - 4.71)	<0.001
Financial independence§				
Low	1		1	
Middle	1.77 (1.17 - 2.69)	0.007	1.60 (1.09 - 2.37)	0.018
highest	1.77 (0.86 - 3.65)	0.020	2.98 (1.61 - 5.53)	0.001
Mother's nutritional knowledge				
Low/medium(0-15)	1		1	
High (16-23)	0.66 (0.43 - 1.00)	0.052	1.07 (0.74 - 1.54)	0.719

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05; ʆ Secondary+ is secondary education or higher

After adjusting for the significant factors in the multivariate multinomial logistic regression model, maternal factors that remained statistically significant and associated with the DDS of children were marital status, employment status, work schedule throughout the year, mother's highest level of education attained and financial independence (See Table 12).

The results summarized in Table 13 show maternal factors that positively predicted a child's propensity to be fed on a minimum acceptable diet (MAD) in the bivariate analysis. The factors that were statistically associated with a child's tendency to be fed on a minimum acceptable diet were mother's age, employment status, work schedule throughout the year, highest level of education attained and decision-making power.

However, after adjusting for the significant factors in the multivariate multinomial logistic regression model, the maternal factors that remained statistically significant and associated with the likelihood that a child would have an adequate MAD were mother's employment status, highest level of education attained and decision-making power (refer to Table 13). The results therefore revealed that mother's employment status and highest level of education attained are significant predictors of a child's likelihood of being fed on varied meals and minimum acceptable diets.

Concerning mother's employment status, the findings revealed that children of mothers who were currently employed were 2.74 times [AOR = 2.74, 95% CI = (1.61 - 4.68)] more likely to have a good DDS, compared with their counterparts whose mothers were not employed in the 12 months before the survey. With regard to the MAD, the findings (as shown in Table 13) indicate that children of mothers who were employed at the time of the survey were 3.07 times (AOR = 3.07, 95% CI = 1.71 - 5.49, p = <0.001) more likely to have an adequate MAD, compared with their counterparts whose mothers were not employed in the 12 months before the survey. The findings in the present study were comparable to the results of studies in Ethiopia (Solomon et al., 2017) and Pakistan (Khan et al., 2017), which indicated that the DDS of children whose mothers were employed, and therefore, earned an income, were higher than those of children of unemployed mothers. Oddo and Ickes's (2018) meta-analysis of 50 Demographic and Health Surveys found that children of both formally and informally employed women, compared with children of unemployed women, had higher odds of achieving a minimum diet diversity score. An explanation that can be given for this finding is the possibility that being employed might have enabled mothers to earn a regular income, become economically empowered and have a high purchasing power to be better positioned to adequately provide nutritious and varied meals often for their children. On the other hand, because unemployment is often associated with food insecurity, unemployed mothers may not be financially independent and secured to afford different food items to prepare varied meals for their children, and so may end up giving monotonous meals often.

However, the present study did not support the findings of Guirindola et al. (2018) in the Philippines and Vaida (2013) in India that children of unemployed mothers were more likely to be fed on a minimum acceptable diet than those of employed mothers. The differences in these findings could be attributed to other socio-economic indicators that might have played a significant role in the observation that children of unemployed mothers were able to meet the requirements of an adequate MAD like those of employed mothers. Another possible explanation is that the non-working mothers might have had a higher tendency to stay at home and take care of their children by feeding them properly, which could have contributed to meeting their MAD.

In respect of mother's highest level of education attained, the findings showed that maternal educational attainment of secondary education and above was significantly associated with a child's propensity to have a good DDS and MAD, compared with those whose mothers had no formal education. In the present study, children of mothers who were educated up to the secondary school level were 3.15 times (AOR = 3.15, 95% CI = 1.57 - 6.33, $p = 0.001$) more likely to be fed on diversified meals than those of mothers who had no form of formal education, and ended up having a poor DDS. With respect to a child being fed on a minimum acceptable diet, the study showed that children of mothers with junior high school education were

2.24 times (AOR = 2.24, 95% CI = 1.15 - 4.33, p = 0.017) more likely to have an adequate MAD than those whose mothers did not have any formal education. Similarly, children of mothers with secondary or higher education were even more at an advantage in meeting an adequate MAD, with an adjusted odds ratio of 2.86 (95% CI: 1.42 - 5.78, p=0.003). This finding corroborates the results of other studies conducted in the Philippines (Guirindola et al., 2018), Pakistan (Khan et al., 2017), Ethiopia (Tegegne et al., 2017) and China (Bi et al., 2019). The fact that maternal education is positively associated with child feeding might be due to the inability of illiterate mothers to read nutrition education materials provided when they access child health facilities.

Besides, women who had attained higher levels of education may be more likely to have access to more nutritional information and understand educational messages delivered through different media outlets; and this might help them to follow optimal child feeding practices. In addition, highly educated mothers are more likely to secure jobs requiring higher qualifications, enabling them to earn regular salaries in order to be empowered to have more resources in their hands to provide their children with adequate and varied meals. In the current study, there was a significant association (p <0.001) between the educational level of a mother and her employment status. As shown in Appendix E (Table 18), more than half (57.1%) of those with secondary education or higher were employed at the time of the study compared with 27.7% employment among those with no formal education.

However, the finding is inconsistent with the results of the study by Ickes et al.'s (2015) in Uganda which found no significant associations between maternal education and any of the indicators of IYCF practices. Ickes et al. (2015) explained their findings with reference to the fact that in a context of extreme poverty, with limited job prospects, even for those with formal education, they may end up being unemployed, and so would not be well positioned to provide quality nutritious meals with a wide range of diversity for their children. In such settings, a mother's educational attainment may not be translated into greater advantage in terms of becoming employed, but may be more significant for processing information on recommended IYCF practices and adhering to them in order to prevent children from becoming undernourished.

Table 12: Multivariate multinomial logistic regression model for the association between maternal-related factors and Dietary Diversity Score

	Average DDS vs. Poor DDS		Good DDS vs. Poor DDS	
Variable	AOR (95% CI)	p-value	AOR (95% CI)	p-value
Marital status§				
Single (Never Married)	1		1	
Cohabiting	1.48 (0.63 - 3.45)	0.367	1.47 (0.58 - 3.70)	0.413
Married	1.37 (0.70 - 2.66)	0.358	2.82 (1.45 - 5.52)	0.002
Separated/ Divorced/widowed	1.19 (0.40 - 3.57)	0.751	3.07 (1.11 - 8.48)	0.030
Number of Living Children (Parity)				
1-3	1		1	
4-6	1.12 (0.72 - 1.77)	0.610	1.14 (0.74 - 1.74)	0.557
> 6	0.31 (0.08 - 1.13)	0.075	0.55 (0.20 - 1.52)	0.252
Mother's Employment status§				
Not employed in last 12 months before the survey	1		1	
Not currently employed, but worked in past 12 months	1.41 (0.85 - 2.34)	0.185	1.68 (1.02 - 2.78)	0.042
Currently employed	1.17 (0.67 - 2.03)	0.586	2.74 (1.61 - 4.68)	<0.001
Work status/schedule throughout the year§				
Work throughout the year	1		1	
Work seasonally/part of the year	0.88 (0.52 - 1.49)	0.644	0.87 (0.52 - 1.44)	0.588
Work only once in a while	0.52 (0.28 - 0.98)	0.044	1.07 (0.59 - 1.96)	0.816

Table 12 continued

Mother's highest level of education attained§				
None	1		1	
Primary	1.13 (0.63 - 2.05)	0.678	2.79 (1.55 - 5.02)	0.001
JHS/JSS	1.61 (0.90 - 2.88)	0.105	2.65 (1.46 - 4.80)	0.001
Secondary+	2.02 (1.00 - 4.06)	0.049	3.15 (1.57 - 6.33)	0.001
Decision making power				
Lowest	1		1	
Middle	0.93 (0.56 - 1.52)	0.759	1.29 (0.81 - 2.08)	0.285
Highest	1.44 (0.71 - 2.95)	0.316	1.99 (1.00 - 3.97)	0.051
Financial independence§				
Low	1		1	
Middle	1.64 (1.05 - 2.55)	0.029	1.55 (1.01 - 2.38)	0.045
highest	1.07 (0.47 - 2.48)	0.867	1.79 (0.84 - 3.79)	0.131

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05; ʛSecondary+ is secondary education or higher

As indicated in Table 12, a mother's marital status, work schedule throughout the year and financial independence level were significant predictor variables of her child's likelihood of being fed on diversified foods or not. In respect of marital status, this study found that children of married mothers were 2.82 times more likely to have a good DDS, compared with those whose mothers were single. Similarly, children of mothers who were separated, divorced or widowed were 3.07 times more likely to have a good DDS, compared with those whose mothers were single. These findings corroborate the results of studies in Tanzania (Ochieng et al., 2017) and Benin (Mitchodigni et al., 2017) in which children of single mothers who also headed their households had low DDS and MMF. Mitchodigni et al., (2017) observed that children were more liable to be fed less frequently on diversified meals when they lived in large female-headed households, thus accentuating the important role of fathers or husbands in ensuring that their children are optimally fed, and the entire household is food-secured. On the other hand, the present study's findings contradict those by Agize et al. (2017) in Ethiopia that children of single mothers had a better DDS, compared with those of married and divorced mothers. Agize et al., (2017) found that children of mothers who were married and lived with their husbands were 88 percent less likely to achieve good dietary diversity, compared with children of single mothers [AOR = 0.22, 95% CI = (0.08, 0.59)]; and mothers who were divorced were 91 percent less likely to practise good dietary diversity feeding, compared with single mothers [AOR = 0.09, 95% CI= (0.02, 0.53)]. The differences in these findings could be attributed to the time committed to caring for male-partners in the case of married mothers, sometimes at the expense of children, which may negatively affect their dietary intakes, as reported in the study by Habaasa (2014). In other cases, married women, particularly in impoverished settings, who are likely to be confronted by food insecurity may aim at pleasing their husbands by feeding them first, giving them the best part of the meal and large portion sizes, to the detriment of their children and themselves. This assertion is confirmed by Lentz (2018), who found that, in poverty-stricken areas in Bangladesh, mothers reported that they fed their husbands first, and later on ate the leftovers with their children.

The finding that children of married, separated, divorced or widowed mothers had good DDS compared with their counterparts whose mothers were single, can also be attributed to the high poverty levels among single mothers who often single-handedly have to provide for all the needs of their children, including their dietary intakes, which may become difficult for them. In the case of separated, divorced or widowed mothers, they were married before their current marital status and might be in a better position, through legal proceedings, to ensure that their husbands commit some resources for the upkeep of their children. Hence, compared with children of single mothers, those of married, separated, divorced or widowed mothers may be at an advantage and not suffer unduly in terms of meeting their dietary intakes. Another reason that can be given for the finding that children of married women were at a lower risk of not being fed on diversified meals is that they might have received some support from discussions with their husbands on how to ensure that their children were optimally fed on different nutritious food items, to ensure they grow well. It is also likely that married women might have been supported by their husbands who provided money for the upkeep of their children. This might have enabled married mothers to provide a wide variety of foods for their children, which may be absent in the case of single mothers. For example, in a study carried out in Western Kenya, married mothers gave testimonies of situations where their husbands, on their own, supported them by buying a wide range of nutritious foods for the household (Mukuria et al., 2016). Similarly, another study undertaken in South Kivu, the Congo, found that about 64 percent of married women interviewed indicated that their husbands advised them on matters related to child feeding and health (Burns et al., 2016).

Furthermore, in the present study, in relation to a mother's work schedule throughout the year, lower odds of being fed on meals with a good DDS were observed among children of mothers who did not work consistently throughout the year but rather worked once in a while (AOR = 0.52; 95% CI: 0.28 - 0.98), compared with those of mothers who worked throughout the year. The preceding explanations for the employment status of a mother also apply in the case of a mother's work schedule throughout the year.

Additionally, when mothers work throughout the year and receive a regular income, they can usually plan and apportion a part to provide varied meals for their children often, compared with cases where a mother only waits for an opportunity once in a while to render some work services before she earns some money.

Regarding the financial independence dimension of women's autonomy, this study observed that children of mothers with a middle autonomy were 1.64 times (AOR = 1.64, 95% CI = 1.05 - 2.55, p = 0.029) and 1.55 (AOR = 1.55, 95% CI = 1.01 - 2.38, p = 0.045) more likely to have an average and good DDS respectively than those of mothers with a low level of financial independence. The present finding is comparable to the results of studies done in Lao People's Democratic Republic (Kamiya et al., 2018) and Uganda (Ickes et al., 2016) and India (Shroff et al., 2011), which indicated that mothers with high autonomy had greater household decision-making powers and financial independence to provide nutritious and highly diversified diets for their children, thus ensuring that the entire household was food-secured. The present study's finding could be due to the fact that a higher proportion of the women (64.4%) were not employed at the time of the survey, and only a few (34.4%) worked throughout the year. In addition, only 17.2 percent had secondary or a higher education. These characteristics of mothers in the study population might have excluded them from jobs requiring higher qualifications which would have enabled them to earn regular incomes and be better able to command the resources needed to provide quality childcare and adopt optimal IYCF practices. In the current study, more than 65% of the mothers with high financial independence were employed at the time of the study, whereas majority (70.7%) of the mothers with low financial independence were not employed at the time of the study (see Table 19 of Appendix E). In situations where women are likely to be uneducated and unemployed, they are likely to depend on their spouses for financial resources to meet their own needs and those of their children. Such mothers may lack the purchasing power to provide a sufficiently varied diet for their children. In addition, in such situations, their opinions on financial decisions and the allocation of resources in the household may not be considered by the head of the household, mainly because they hardly contribute any monetary resources to the total income of the household and its upkeep. Again, such women with low autonomy may not even have much control over their own money earned from selling farm produce or from their small businesses. This means that they may not be in a good position to buy a variety of foods, to improve the DDS of their children. For instance, Shroff et al.'s (2011) study in rural Andhra Pradesh, India, revealed that approximately 50 percent of mothers sometimes or most of the time gave their earnings to their husbands, and 45% of them did not have their own cash for household expenditures, probably because more than one third of the mothers had no education, and another third had only primary education.

The findings showed that a mother who had an average ability to participate in decision-making at the household level was significantly associated with a high likelihood that her children would be fed on a minimum acceptable diet. The results of the study showed that a mother having an average decision-making autonomy increased the child’s odds (AOR = 1.68, 95% CI = 1.02 - 2.76, p = 0.040) of being fed on an adequate MAD.

Conversely, mothers with the lowest decision-making autonomy reduced the likelihood of their children receiving an adequate MAD. The findings of the current study are in line with those of a growing body of research which indicate that women in low-income countries who report constraints on their decision-making abilities at the household level are more likely to have children that feed less adequately and who are more likely to be malnourished (Abate & Belachew, 2017; Burn et al., 2016; Ickes et al., 2018; Sraboni & Quisumbing, 2018).

Table 13: Logistic regression model for the association between maternal-related factors and Minimum Acceptable Diet

	Bivariate analysis		Multivariate analysis	
Variable	OR (95% CI)	p-value	AOR (95% CI)	p-value
Mother's age§				
< 20 years	1		1	
20-30 years	2.54 (0.76 - 8.54)	0.131	2.26 (0.65 - 7.82)	0.200
Above 30 years	3.54 (1.04 -12.07)	0.044	3.27 (0.92 - 11.58)	0.066
Marital status				
Single (Never Married)	1			
Cohabiting	0.83 (0.33 - 2.08)	0.685		
Married	1.45 (0.77 - 2.73)	0.248		
Separated/ Divorced/widowed	1.81 (0.72 - 4.52)	0.205		
Number of Living Children (Parity)				
1-3	1			
4-6	1.08 (0.73 - 1.60)	0.711		
> 6	0.85 (0.31 - 2.32)	0.753		
Number of children under two years of age				
1	1			
2/ 3	1.39 (0.82 - 2.33)	0.218		
Mother's Employment status§				
Not employed in last 12 months before the survey	1		1	
Not currently employed, but worked in past 12 months	2.11 (1.21 - 3.67)	0.008	1.96 (1.10 - 3.47)	0.022
Currently employed	3.67 (2.19 - 6.13)	<0.001	3.07 (1.71 - 5.49)	<0.001
Work status/schedule throughout the year§				
Work throughout the year	1		1	
Work seasonally/part of the year	0.83 (0.55 - 1.27)	0.402	1.06 (0.67 - 1.68)	0.815

Table 13 continued

Work only once in a while	0.47 (0.29 -0.75)	0.002	1.06 (0.58 - 1.91)	0.854
Form of remuneration/payment				
Cash only	1			
Cash and in Kind	1.01 (0.66 - 1.55)	0.962		
In Kind only	1.44 (0.79 - 2.60)	0.232		
Not paid	0.58 (0.33 - 1.04)	0.066		
Mother's highest level of education attained§				
None	1		1	
Primary	2.25 (1.18 - 4.29)	0.014	2.44 (1.24 - 4.75)	0.009
JHS/JSS	2.31 (1.22 - 4.38)	0.010	2.24 (1.15 - 4.33)	0.017
Secondary+	3.33 (1.70 - 6.54)	<0.001	2.86 (1.42 - 5.78)	0.003
Mother's nutritional status (BMI)				
Under Weight	1			
Normal weight	1.25 (0.72 - 2.15)	0.428		
Overweight	0.96 (0.52 - 1.75)	0.887		
Obese/ very obese	1.50 (0.74 - 3.02)	0.258		
Decision making power§				
Lowest	1		1	
Average	2.32 (1.49 - 3.63)	<0.001	1.68 (1.02 - 2.76)	0.040
Highest	2.08 (1.19 - 3.65)	0.010	1.34 (0.73 - 2.57)	0.328
Financial independence				
Low	1			
Average	1.12 (0.75 - 1.66)	0.588		
Highest	1.56 (0.88 - 2.74)	0.126		
Mother's nutritional knowledge				
Low/medium (0-15)	1			
High (16-23)	1.05 (0.71 - 1.53)	0.816		

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05 in the bivariate analysis

Burn et al. (2016) averred that a mother's power over decision-making within households influenced what foods were prepared, who ate different kinds of foods, and how money was spent. Burn et al.'s (2016) study in the Congo further revealed that two major barriers to optimal IYCF practices were the lack of purchasing power and power over decision-making in the household by mothers, which consequently reduced their ability to adequately feed their children. For example, Ickes et al.'s (2018) study in Uganda revealed that over half (56%) of mothers wished that they could use more of their income on food for their children. However, this was not possible, mainly because in the majority (80%) of the cases their husbands made the final decisions. An explanation for the finding that mothers' low decision-making capabilities limit their ability to provide a minimum adequate diet for their children can be that in this study population, the majority of mothers (78.0%) reported that their husbands made final decisions on how the household income should be used. Therefore, if a low proportion of income was allocated to food then the one in charge of preparing food, most probably the woman, may have to ensure that the money she had at hand met their dietary needs until she received money later. However, in the present study population, a little more than half (55.1%) of households allocated 50 percent or more of their total income to food; and therefore the inability of the large majority (77.9%) of the children to be fed on a MAD could also be attributed to the low-income levels of households.

The vast majority (97.8%) of the households earned GH¢900 or less per month (refer to Table 3). As asserted by Rohner et al. (2013), poor households may lack the purchasing power to provide a sufficiently varied diet to their children; and they are more likely to buy only cereals, tubers and grains, compared with better-off households who have a higher tendency to purchase meat, fruits and vegetables. In addition, as shown in Table 4, nearly sixty percent of the mothers (58.2%) reported that their husbands decided on foods to be cooked each day. This practice, probably, neglected the nutritional needs of the children. The nutritional needs of children are not likely to be met, particularly in situations where husbands requested for the same meals often, which can result in feeding children on monotonous foods, thereby reducing their DDS.

Association between maternal-related factors and Children's Nutritional Status

On the basis of the multivariate regression analysis, the number of children under two years of age that a mother had was a significant predictor of both stunting and underweight in children (Refer to Table 14). With respect to stunting, children of mothers who had 2 or 3 children under two years were 1.88 times [AOR = 1.88, 95% CI: (1.23 - 2.87), p=0.003] more likely to be stunted than those with only one child under two years. Likewise, higher odds of becoming underweight [AOR = 1.53; 95% CI: 1.02 – 2.30, p=0.039] were observed among children of mothers who had 2 or 3 children under two years than among those with only one child under two years. These findings corroborate those of other studies conducted in Ethiopia (Dewana et al., 2017), Sri Lanka (Galgamuwa et al., 2017) and Mozambique (García Cruz et al., 2017) which all showed that children residing together with more than two under-five children were at a higher risk of becoming stunted or underweight than a single child in a household. This could be due to the fact that, as the number of children increases, it causes a strain on family resources, as well as predisposes the children more to infectious diseases. The cumulative effect of having more children to feed on meagre resources and the high risk of being affected by infectious diseases is the increased risk of stunting and underweight in the children of mothers who had more under-two years old children.

Additionally, the higher odds of stunting among children of mothers with more under-two children could be attributed to a high possibility of inadequate feeding practices in both breastfeeding and complementary feeding, given that mothers would have other young children to care for, and therefore, might not be able to optimally meet the IYCF recommendations. Another probable explanation for this finding is that, mothers with two or three under-two year old children are likely to terminate breastfeeding early, once they realize that they are pregnant, and therefore reduced the support that breastmilk was offering to boost the growth of these children. In such situations, their children are not likely to be breastfed for even up to one year, and they may not fully benefit from the nutritional value of breastmilk in supporting growth of children.

In the present study, the highest level of educational attainment by a mother was a significant predictor variable of both underweight and wasting in children (refer to Table 14). It was found that the chances of wasting were 45 percent, 44 percent and 51 percent less likely in children of mothers with primary, junior high and secondary or higher levels of education respectively, compared with those whose mothers had no formal education (see Table 14). The results showed that children of mothers who had secondary or a higher level of education were 41 percent [(AOR=0.59, 95% CI = 0.36 -0.97), p = 0.040] less likely to become underweight, compared with their counterparts whose mothers had no formal education (see Table 14).

This finding confirms the results of previous studies that a high educational level of mothers impacts the nutritional status of children (Chowdhury et al., 2018; Harding et al., 2018; Ickes et al., 2015; Wolde et al., 2015). There are plausible explanations as to why a higher maternal education reduces the risk of wasting and underweight among children. First, mothers who are educated to a higher level are at an advantage in processing, interpreting and applying nutrition and health information that concerns their children's nutritional and health needs. Such information as is likely to be possessed by educated mothers can enable them to make informed decisions about their children's nutrition and health care, thus leading to improved child nutrition and better health outcomes, such as a reduced risk of wasting and underweight in children. There is evidence that literate women are more likely to be aware of the importance of feeding children at appropriate times and in the right quantities, as well as taking early actions against child malnutrition (Makoka, 2013). Similarly, Ramos, Dumith and César (2015) also averred that mothers with higher levels of schooling are more able to provide better care for their children due to increased knowledge, and better understanding of health and nutritional information, which are influenced by the level of a mother's schooling.

The results also show that mother's current employment status and financial independence also had a significant influence on the odds of stunting in children. As shown in Table 14, children of mothers who were employed at the time of the study were 29 percent (AOR= 0.71 95% CI: (0.47 - 1.07), p = 0.043) less likely to be stunted, compared with their counterparts whose mothers were not employed in the 12 months before the survey. Findings from the study also revealed that the odds of stunting among children of mothers with high financial independence were 42 percent (AOR= 0.58 95% CI: (0.30 - 1.11), p = 0.048) less likely than among children of mothers with low financial independence. This finding is in line with reports from other developing countries, such as the Lao People's Democratic Republic (Kamiya et al., 2018), Nepal (Malapit et al., 2015), Ethiopia (Wondafrash et al., 2017) and Egypt (Mahmoud et al., 2016). These studies found that the likelihood of childhood stunting was significantly lower if mothers were employed, and therefore had control of money, or were financially independent. A plausible explanation might be that employed mothers may earn a regular income and may use it to benefit their children's health and nutrition. In the current study, a significant association was found between a mother's employment status and her financial independence (p-value < 0.001). It was found that more than 65% of the mothers with high financial independence were employed at the time of the study, whereas majority (70.7%) of the mothers with low financial independence were not employed at the time of the study. It can be inferred from these findings that a mother's employment is likely to increase the economic gains of the mother and have a positive impact on her children's dietary intakes and their growth.

On the other hand, children of unemployed mothers might not have adequate access to good nutrition over a long period of time, as their mothers may lack the economic means to meet their nutritional needs. Carlson et al. (2015) further explained this association by indicating that when mothers are employed it is more likely to enable them to have control over financial resources. In such cases, mothers are able to divert some resources to their children, thus improving their dietary intakes and growth. Therefore, these findings suggest that empowering mothers to be gainfully employed in order for them to be financially independent is vital in improving their children's nutritional status.

The results, as shown in Table 14, indicate that the parity of a mother was a significant predictor variable of underweight in children. In the present study, children of mothers who had more than 6 children were 1.86 times [(AOR=1.86, 95% CI = 0.94 - 3.69), p = 0.046] at a higher risk of becoming underweight than the children of mothers with fewer (between 1 and 3) children. These results are comparable to other findings in the literature (Asfaw et al., 2015; Frempong & Annim, 2017; Sobgui et al., 2018) which show that an increase in the number of children in the household reduces their nutritional status. A high risk of underweight was found among children with a greater number of siblings. A probable reason for this finding is that having a large number of children may lead to competition for both household resources and mother's time and strength required for care-giving (Annim, Awusabo-Asare & Amo-Adjei, 2015). Competition for the limited available dietary resources at home might cause each child to receive sub-optimal care, which includes feeding frequently and adequately on different nutritious food sources, in order to reduce one's risk of becoming underweight.

In addition, the results of the current study indicate that a mother's autonomy with respect to decision making power at the household level, is associated with a reduced risk of wasting in children (See Table 14). The present finding is comparable to those of studies in Bangladesh (Bhagowalia et al., 2012) and India (Shroff et al., 2011) which indicated that women's decision-making power was a significant predictor of wasting in children. The logic is that mothers with high decision-making power have control over resources and are likely to take decisions independently, which may culminate in positively influencing choices that best promote the survival and growth of their children.

Table 14: Logistic regression model for the association between maternal-related factors and Anthropometric Indicators

	Bivariate analysis (HAZ)		Multivariate analysis (HAZ)		Bivariate analysis (WHZ)		Multivariate analysis (WHZ)		Bivariate analysis (WAZ)		Multivariate analysis (WAZ)	
Variable	OR (95% CI)	p-value	AOR (95% CI)	p-value	OR (95% CI)	p-value	AOR (95% CI)	p-value	OR (95% CI)	p-value	AOR (95% CI)	p-value
Mother's age												
< 20 years	1				1				1			
20-30 years	0.98 (0.54 - 1.76)	0.938			0.71 (0.39 - 1.28)	0.254			0.89 (0.52 - 1.52)	0.669		
Above 30 years	0.83 (0.44 - 1.55)	0.550			1.15 (0.62 - 2.12)	0.660			1.20 (0.69 - 2.09)	0.519		
Marital status												
Single (Never Married)	1				1				1			
Cohabiting	1.10 (0.56 - 2.18)	0.775			1.16 (0.58 - 2.34)	0.669			1.21 (0.64 - 2.27)	0.564		
Married	0.76 (0.46 - 1.26)	0.288			0.82 (0.49 - 1.38)	0.465			1.04 (0.65 - 1.66)	0.859		
Separated/ Divorced/widowed	1.23 (0.57 - 2.67)	0.594			0.79 (0.33 - 1.87)	0.585			0.95 (0.44 - 2.01)	0.885		
Number of Living Children (Parity)												
1-3	1				1				1	1		
4-6	1.04 (0.74 - 1.48)	0.809			1.37 (0.96 - 1.94)	0.082	1.30 (0.91 - 1.85)	0.155	1.28 (0.94 - 1.73)	0.120	1.25 (0.91 - 1.71)	0.162
> 6	1.58 (0.77 - 3.27)	0.214			2.15 (1.06 - 4.39)	0.035	1.75 (0.84 - 3.65)	0.138	2.29 (1.19 - 4.41)	0.013	1.86 (0.94 - 3.69)	0.046
Number of children under two years of age§												
1	1		1		1				**1**		1	
2/ 3	1.90 (1.25 - 2.89)	0.003	1.88 (1.23-2.87)	0.003	1.02 (0.63 - 1.64)	0.949			1.68 (1.14 - 2.49)	0.009	1.53 (1.02 - 2.30)	0.039
Mother's Employment status§												
Not employed in last 12 months before the survey	1		1		1				**1**			

Table 14 continued

Not currently employed, but worked in past 12 months	0.95 (0.65 - 1.40)	0.801	0.93(0.63- 1.36)	0.701	0.93 (0.62 - 1.40)	0.739			0.96 (0.68 - 1.36)	0.829		
Currently employed	0.66 (0.44 - 0.99)	0.021	0.71(0.47- 1.07)	0.043	1.00 (0.67 - 1.49)	0.996			0.91 (0.64 - 1.29)	0.594		
Work status/schedule throughout the year												
Work throughout the year	1				1				**1**			
Work seasonally/part of the year	1.24 (0.84 - 1.83)	0.283			0.95 (0.63 - 1.43)	0.802			1.04 (0.73 - 1.48)	0.828	0.95 (0.66 - 1.37)	0778
Work only once in a while	1.28 (0.87 - 1.90)	0.214			1.31 (0.88 - 1.94)	0.180			1.46 (1.03 - 2.05)	0.032	1.39 (0.97 - 1.97)	0.071
Form of remuneration/payment												
Cash only	1				1				**1**			
Cash and in Kind	1.04 (0.71 - 1.52)	0.852			0.74 (0.50 - 1.10)	0.139			0.92 (0.66 - 1.29)	0.644		
In Kind only	1.18 (0.68 - 2.04)	0.558			1.17 (0.68 - 2.01)	0.567			1.26 (0.78 - 2.03)	0.350		
Not paid	1.13 (0.72 - 1.76)	0.605			0.87 (0.55 - 1.39)	0.576			0.86 (0.57 - 1.29)	0.455		
Mother's highest level of education attained												
None	1		1						**1**		1	
Primary	1.45 (0.91 - 2.32)	0.116			0.49 (0.32 - 0.78)	0.002	0.55 (0.35 - 0.88)	0.012	0.75 (0.50 - 1.12)	0.154	0.79 (0.52 - 1.19)	0.260
JHS/JSS	0.96 (0.59 - 1.54)	0.859			0.50 (0.32 -0.78)	0.002	0.56 (0.36 -0.89)	0.015	0.68 (0.46 - 1.02)	0.061	0.74 (0.49 - 1.11)	0.146
Secondary+	0.77 (0.43 - 1.37)	0.859			0.44 (0.26 -0.75)	0.003	0.49 (0.28 -0.86)	0.014	0.51 (0.32 -0.83)	0.007	0.59 (0.36 -0.97)	0.040
Mother's nutritional Status (BMI)												
Under Weight	1		1		1				**1**			
Normal weight	1.02 (0.67 - 1.55)	0.930			0.78 (0.51 - 1.20)	0.256			0.78 (0.54 - 1.13)	0.187		
Overweight	1.11 (0.70 - 1.76)	0.668			0.94 (0.59 - 1.51)	0.810			0.87 (0.58 - 1.31)	0.507		
Obese/ very obese	0.63 (0.32 - 1.24)	0.183			1.03 (0.56 - 1.88)	0.926			0.70 (0.40 - 1.21)	0.197		

Table 14 Continued

Decision making power										
Lowest	1				1				**1**	
Middle	0.83 (0.58 - 1.18)	0.300			0.59 (0.41 -0.84)	0.004			0.82 (0.60 - 1.11)	0.199
Highest	1.17 (0.73 - 1.87)	0.527			0.96 (0.60 - 1.55)	0.882			1.04 (0.67 - 1.59)	0.868
Financial independence§										
Low	1		1	1	1		1		**1**	
Middle	0.87 (0.62 - 1.22)	0.418	0.89(0.64-1.26)		0.99 (0.70 - 1.40)	0.956	0.66(0.45-0.95)	0.025	1.02 (0.76 - 1.38)	0.886
Highest	0.53 (0.28 – 1.00)	0.030	0.58(0.30-1.11)		0.67 (0.36 - 1.25)	0.208	1.14(0.70.-1.86)	0.606	0.74 (0.44 - 1.23)	0.244
Mother's nutritional knowledge										
Low/medium (0-15)	1				1				**1**	
High (16-23)	1.25 (0.80 - 1.74)	0.187			0.96 (0.68 - 1.36)	0.812			1.19 (0.88 - 1.60)	0.254

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05 in the bivariate analysis; HAZ, WHZ and WAZ represents stunting, wasting and underweight in children respectively.

In conclusion, it became obvious from the analysis that some maternal factors such as a high educational level, having a stable means of employment throughout the year and having a high decision-making power at the household-level can contribute to the likelihood of feeding children on at least the number of meals recommended for their age and also on diversified meals daily. Again, with respect to the maternal factors, this study has revealed that not having more than one child under two years of age, being employed throughout the year, participating in household decision-making and having a high financial independence status can reduce the odds of stunting and wasting in children. On the otherhand, mothers with high parity and who have no formal education are more likely to have underweight children.

Therefore, the null hypothesis suggesting no relationships between maternal factors and the feeding practices and nutritional status of children were rejected. Overall, the findings align with the WHO conceptual framework that guided this study. Again, the findings that the aforementioned maternal factors correlate with the likelihood that children with be feed frequently on the number of meals recommended for their age and on diversified meals validates both Bourdieu’s social theory of practice (1984) and Bronfenbrenner’s social-ecological theory, (Bronfenbrenner, 1992, 1994). The findings in this study are confirmed by both Bourdieu’s and Bronfenbrenner’s theories which propose that the eating practices of a child are associated with a mother’s employment status, educational background as well as her position and status within the society.

CHAPTER EIGHT

ASSOCIATION BETWEEN FEEDING INDICATORS AND NUTRITIONAL STATUS OF CHILDREN

This chapter discusses the associations between the feeding indicators and the nutritional status of the children who participated in the study. Specifically, the focus is on how the dietary diversity score, meal feeding frequency score, food group frequency score and minimum acceptable diet are related to the three anthropometric variables (stunting, wasting and underweight). In the last section of this chapter, findings on the association between the composite feeding index and the anthropometric variables are discussed.

The findings revealed that a good DDS was a significant predictor of a reduced risk of stunting and underweight. In the present study, it was revealed that children who had a good DDS were at a reduced risk of becoming stunted and underweight. The findings revealed that children who ate diversified meals were 36 percent [(AOR=0.64, 95% CI = 0.41 - 1.02), p = 0.039] less likely to become stunted as shown in Table 15. The findings as depicted in Table 15 also indicate that, having a good DDS was found to reduce the odds of underweight in children by 40 percent [(AOR=0.60, 95% CI = 0.39 -0.91), p = 0.017].

Table 15: Logistic regression model for the association between children's feeding and anthropometric indicators

	Unadjusted analysis (HAZ)		Unadjusted analysis (WHZ)		Unadjusted analysis (WAZ)	
Feeding indicator	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Dietary diversity score						
Poor	1		1		1	
Average	1.32 (0.85 - 2.06)	0.223	0.98 (0.59 - 1.65)	0.953	0.96 (0.62 - 1.47)	0.834
Good	0.64 (0.41 - 1.02)	0.039	0.85 (0.52 - 1.37)	0.502	0.60 (0.39 -0.91)	§0.017
Meal Feeding frequency score (MFF)						
Poor	1		1		1	
Average	0.68 (0.36 - 1.28)	0.230	0.87 (0.46 - 1.65)	0.673	0.63 (0.36 - 1.10)	0.102
Good	1.09 (0.63 - 1.88)	0.765	0.70 (0.39 - 1.26)	0.232	0.68 (0.42 - 1.12)	0.131
Food group Frequency Score (FGFS)						
Poor	1		1		1	
Average	1.09 (0.69 - 1.70)	0.719	0.97 (0.59 - 1.60)	0.917	0.95 (0.63 - 1.45)	0.825
Good	0.74 (0.44 - 1.23)	0.242	0.77 (0.44 - 1.34)	0.349	0.62 (0.38 -0.99)	§0.047
Minimum acceptable Diet (MAD)						
Inadequate	1		1		1	
Adequate	0.92 (0.58 - 1.44)	0.706	0.65 (0.38 - 1.12)	0.124	0.54 (0.34 - 0.87)	§0.011
Child Feeding Index score (CFI)						
Low	1		1		1	
Medium	1.07 (0.70 - 1.65)	0.741	1.16 (0.72 - 1.86)	0.542	1.06 (0.71 - 1.58)	0.768
High	0.80 (0.49 - 1.28)	0.348	0.89 (0.53 - 1.52)	0.679	0.64 (0.40 - 1.01)	§0.045

Source: Nsiah-Asamoah (2019) § Factors with overall p-value < 0.05 in the bivariate analysis; HAZ, WHZ and WAZ represents stunting, wasting and underweight in children respectively.

In relation to the DDS, children who had a good food group frequency score (FGFS) were 38 percent [(OR=0.62, 95% CI = 0.38 -0.99), p = 0.047] less likely to become underweight, compared with their counterparts who had a poor or average FGFS corroborating the results of a study that was undertaken in Albania which found that food group frequency score was positively associated with all the three anthropometric indices (Doracaj et al., 2014). Similar findings have been observed in studies in India (Apurva et al., 2018), Ethiopia (Wondafrash et al., 2017), Philippines (Ocampo-Guirindola et al., 2016) and Nigeria (Udoh & Amodu, 2016). Stunting or chronic malnutrition is usually an indication of long-term food deprivation, whereas underweight could occur as a result of wasting, stunting, or both (WHO, 2014b).

Therefore, there is a higher likelihood that a stunted child would also be underweight at the same time, as confirmed by a descriptive epidemiological study of multiple anthropometric deficits using data from 51 countries (Myatt, Khara, Schoenbuchner, Pietzsch, Dolan, Lelijveld & Briend, 2018). As shown in Table 5, only 37.0 percent of the children had a good DDS, which implies that a large majority of them were not fed on meals prepared from different food groups. The meals of the surveyed children were mostly starchy and carbohydrate-based, and would most likely not meet their nutrient requirements to reduce their risk of becoming stunted and underweight. In this study, whereas all the children consumed meals prepared with grains, roots and tubers, less than 50 percent of them ate eggs, dairy food products, fruits and vegetables in the 7 days prior to the study. Eggs and dairy food products are body-building food items, whereas fruits and vegetables contain vitamins and minerals which are disease-fighting and body-protective nutrients. In support of this finding, a systematic review on dairy consumption and physical growth of children provided evidence that a daily intake of 245 ml of milk is associated with 0.4 cm increase in height per annum, compared with non-consumers (De Beer, 2012). In addition, a study found that low consumption of vegetables and fruits were associated with poor linear growth (stunting) in children aged 6–23 months (Aguayo et al., 2016). The findings of this study imply that interventions aimed at improving diversified food intake among this population should aim specifically at increasing the accessibility to and consumption of dairy food products, vegetables and fruits, which would possibly contribute substantially to reduce the prevalence of stunting and underweight among these children.

The results also show that children who had an adequate MAD were 46 percent [(OR=0.54, 95% CI = 0.38 -0.99), p = 0.011] less likely to become underweight, compared with their counterparts who received an inadequate MAD (see Table 15). The result of this study is consistent with that of previous studies (Khor, Tan, Tan, Chan & Amarra, 2016; Udoh & Amodu, 2016) which showed that having an adequate MAD was associated with reduced odds of underweight in children. The minimum acceptable diet is a composite indicator of minimum dietary diversity and minimum meal frequency. Achieving this indicator of an acceptable diet is important, as it reflects compliance with both the qualitative and quantitative aspects of complementary feeding.

Finally, low weight-for-age (underweight) was the only anthropometric indicator that was significantly associated with the composite infant and child feeding index (ICFI). In the present study, children who had a high ICFI score were 36 percent less likely to be underweight, compared with those who had a low or medium ICFI (see Table 15). This result corroborated that of previous studies in India (Chaudhary et al., 2018) and China (Qu et al., 2017) which showed that the infant and child feeding index is significantly associated with underweight in children. In the present study, the ICFI was not statistically associated with the anthropometric indicators of stunting and wasting, as reported in other studies (Wondafrash et al., 2017; Pagui, 2015). This lack of association between the ICFI and wasting as well as stunting may be explained by the low prevalence of both stunting (20.4%) and wasting (19.1%) compared with underweight (29.5%) in this study. This finding can be regarded as providing some evidence of the usefulness of the ICFI, with reference to its ability to reflect acute malnutrition, exhibited as underweight among children in the study area corroborating with findings in other related studies (Chaudhary et al., 2018; Lohia & Udipi, 2014, Ma et al., 2012; Pagui, 2015). In addition, since the ICFI in itself is a sum total of critical IYCF practices, the index can reflect IYCF practices as a whole, and also depict its influence in determining the nutritional status of children.

In conclusion, it became obvious from the analysis that a child's feeding practices represented as the number of times meals are consumed in a day and the diversification of meals served to a child can contribute to determine a child's nutritional status. It was evident from the analysis that children with a high dietary diversity score were less likely to become stunted. Again, it was revealed from the analysis that children with an adequate minimum acceptable diet and a high composite feeding index score were less likely to become underweight.

Therefore, the null hypothesis suggesting that there is no association between the feeding practices and the nutritional status of children was also rejected. Overall, the findings substantiate and align with the WHO conceptual framework that informed this study since it provides evidence that the feeding practices of children can determine their nutritional status. Again, the findings indicating an association between the feeding indicators and the nutritional status of children verifies and supports Becker's Micro-economic theory of the household and nutrition. Becker's theory shed's light on how a child's nutritional status (measured in terms of height- for -age, weight - for – age or weight-for-height) is produced in the home setting as a result of resources (inputs) which include a child's nutrient intake (meals) and the number of times that a child is fed daily.

CHAPTER NINE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Adhering to recommended feeding practices, especially during the first two years of a child's life, has been regarded as a vital window of opportunity for ensuring appropriate child growth and development. Some studies suggest that children who are not optimally fed during this critical stage of life suffer consequences which leave long-lasting damages which are largely irreversible. If nutritional interventions that are implemented before two years yield benefits a lifetime, even without the need to be reinforced, then factors influencing the feeding practices and nutritional status of children under two years of age ought to be explored to help plan such interventions. To this end, this study was undertaken to assess socio-cultural, household and maternal factors that could influence the feeding practices and nutritional status of children under two years in the Kwahu Afram Plains North and South Districts of the Eastern Region of Ghana.

Quantitative data on household, maternal and child-related factors were collected by administering a questionnaire to a sample of 935 mothers with children under two years old who accessed Child Welfare Clinics (CWCs) for growth monitoring and promotion (GMP) services. Qualitative data on socio-cultural factors that influence IYCF practices were collected by conducting focused group discussions involving grandmothers, community health workers (CHWs) and community health volunteers (CHVs). To analyze the qualitative data, thematic analysis which entailed the use of Interpretative Phenomenological Analysis (IPA), by which data collected was transcribed, and emerging themes were abstracted and documented, was employed. Emerging themes from the transcriptions were identified, grouped, documented and used in writing a narrative account. The anthropometric data (weight and height) of children were analyzed using the WHO Anthro software. Bivariate and multivariate logistic regression analyses were used to analyze the association between the maternal and household factors and the outcome variables (feeding practice indicators and the nutritional status of children). The results of the study were presented in tables and charts. This chapter highlights the key findings, conclusions, contribution to knowledge and recommendations of the study.

Summary of Main Findings

This section presents a summary of the main findings of the study. First, a summary of the state of the feeding practices and nutritional status of the children who participated in the study is presented below.

With respect to the feeding indicators, only 37.0 percent of the children had the minimum dietary diversity score (DDS). However, a significant majority (59.6%) met the requirements of the minimum feeding frequency (MFF) recommended for their age. Taking both the DDS and MFF into consideration, only 22.1 percent of the children received a minimum acceptable diet (MAD). Regarding the nutritional status of the children, the prevalence of stunting, wasting and underweight were approximately 20.4 percent, 19.1 percent and 29.5 percent respectively. On the basis of the WHO cut-off point for undernutrition among children under two years, the prevalence of wasting, stunting and underweight can be described as critically high, medium and high respectively in the Kwahu Afram Plains districts. The other key findings highlighted below are presented under the objectives of the study.

Generally, from the responses of both the grandmothers and health workers, certain cultural practices and beliefs prevent mothers from exclusively breastfeeding their babies for the first six months of their lives. For instance, long-standing cultural norms that encourage mothers to give their babies water and herbal concoctions, even immediately after birth, still persist, due to the belief that they protect babies against evil spirits and diseases like measles, diarrhoea, fever, malaria and convulsion.

According to the health workers, another cultural practice that prevents exclusive breastfeeding is the giving of corn flour mixed with water or light maize porridge to new-born babies during the first few days after birth to welcome them. It is believed that new-born babies travel over a long distance into this world and, for that matter are usually born hungry and must be fed immediately after birth.

In addition, some cultural beliefs and misconceptions result in certain food prohibitions during the complementary feeding stages of life in infants. For example, children in some communities were not given the white-part (albumen) of boiled eggs, because it was believed to delay speech or make children dumb. Some children were also prohibited from eating the gizzard of fowls in order to protect them from certain stomach infections. Some grandmothers also indicated that they did not give catfish to children because they believed if children ate it their skin would peel off. There is also another cultural belief associated with either giving honey alone or mixing it with mud from the dauber wasps' nest to boost brain development in children.

Furthermore, to increase the blood levels of children, plant-based food sources such as turkey berries (locally called "*kantosi"*) and jute leaves ("*ayoyo"*) are given to children in these districts.

With respect to the association between the household factors with the feeding practices and the nutritional status of children, the results showed the following associations: (i) The larger the household size, the less likelihood there was that children would be fed on diversified meals and a minimum acceptable diet. (ii) As the income level of a household increases, the probability that children would be fed meals prepared from different food groups and on an adequate MAD increase. (iii) Access to a toilet facility by a household predicts the likelihood that a child would be fed on meals prepared from various food groups and on a minimum acceptable diet. (iv) Ownership of the current place of dwelling and access to improved sources of drinking water implied the likelihood that a child would be fed on meals with a good DDS. (v) Children from households that use firewood and charcoal as their main sources of cooking fuel were less likely to receive a minimum acceptable diet. (vi) Children residing in houses with large households were at a higher risk of becoming stunted than those who lived in houses with smaller households. (vii) A higher likelihood of wasting and underweight was observed among children belonging to households with poor socio-economic status and among those who earned a lower estimated monthly income.

With regard to the association between maternal factors and the feeding practices and the nutritional status of children, the findings revealed the following: (i) Children whose mothers had attained a higher educational level and were currently employed were more likely to be fed on diversified meals and on minimum acceptable diets, compared with those whose mothers were unemployed and had no formal education or a low educational level. (ii) Children whose mothers were married, worked throughout the year and were financially independent were more likely to have diversified meals prepared from at least four out of the seven major food groups, compared with those whose mothers were single, did not work throughout the year and had a low financial independence. (iii) A child whose mother had an average decision-making autonomy at the household-level had better chances of being fed on an adequate MAD, compared with children whose mothers had low decision-making autonomy.

(iv) Children of mothers who had 2 or 3 children under two years were at a higher risk of becoming stunted and underweight compared with children who were the only child under two years of age of their mother. (v) Children of mothers who were employed at the time of the study and had a high financial independence were less likely to become stunted, compared with their counterparts whose mothers were not employed and who had low financial independence. (vi) Higher odds of wasting and underweight were observed among children whose mothers had no formal education, compared with those whose mothers had a higher educational level. (vii) Children of mothers with a high decision-making power at the household level were less likely to become wasted, compared with those whose mothers had a low decision- making power. (viii) The children of mothers who had more than 6 children were at a higher risk of becoming underweight than those of mothers with fewer (between 1 and 3) children.

Regarding the association between the feeding indicators and the nutritional status of children, the results revealed the following: (i) Having a good DDS reduced the odds of underweight and stunting in children by 40 and 36 percent respectively. (ii) Children who had an adequate MAD were 46 percent less likely to become underweight, compared with their counterparts who received an inadequate MAD. (iii) Low weight-for-age (underweight) was the only anthropometric indicator that was significantly associated with the composite infant and child feeding index (ICFI). Specifically, children who had a high ICFI score were 36 percent less likely to be underweight, compared with those who had a low or medium ICFI.

Conclusions

The study revealed that socio-cultural factors including long-standing cultural norms of giving new-born babies corn flour mixed with water and herbal concoctions influence exclusive breastfeeding practices of mothers. The study also concluded that grandmothers do not support the recommendations on exclusive breastfeeding of infants. Grandmothers influence their daughters by exerting pressure on them to feed their babies on other foods in addition to breastmilk during the first six months of a child’s life. In addition, it was found that certain beliefs and misconceptions affect complementary feeding practices by depriving young children above 6 months of age of some nutritious foods such as eggs and catfish. The findings revealing that socio-cultural factors influence breastfeeding and complementary feeding practices of children aligns with the WHO conceptual framework that underpinned the study. The WHO conceptual framework portrays a multifaceted relationship between contextual factors prevailing in a community, such as access to social support networks, cultural beliefs, misconceptions and norms and how they influence feeding of children (Stewart et al., 2013). The findings also provide evidence that are corroborated by both Pierre Bourdieu's social theory of practice (1984) and Urie Bronfenbrenner's social-ecological theory, (1992, 1994) which shed light on how social and cultural factors within the external environment of infants and children influence their feeding practices as became evident in this study.

Another conclusion of the study is that the four null hypotheses suggesting no relationships between household and maternal factors and the feeding practices and nutritional status of children were rejected. It was found that a high average monthly income, belonging to households with small sizes (< 4 members) and having access to improved toilet facilities can contribute to children's nutritional status and health in general which aligns to Becker's Microeconomic theory of the household and nutrition and the adapted WHO conceptual framework that underpinned the study. Concerning mothers, the conclusion is that a high educational level, having a stable means of employment throughout the year and having a high decision-making power at the household-level can contribute to the likelihood of feeding children on a minimum acceptable diet. Again, in relation to mothers, the study revealed that not having more than one child under two years of age, being employed, having a high financial independence status and a high participation level in the household decision-making can contribute to a reduced risk of stunting and wasting in children. Also, high parity and having no formal education are risk factors for underweight in children.

In addition, the null hypothesis that there is no association between the feeding practices and the nutritional status of children was also rejected. It was found that children who ate diversified meals prepared from at least four out of the seven food groups were less likely to become stunted and underweight. Finally, children who had a high composite feeding index were less likely to become underweight.

Recommendations for Policy and Practice

On the basis of the conclusions of the study, the following recommendations are made.

Community-Based Recommendation:

i. Child nutrition education programmes in the form of health talks and community outreach programmes should be implemented through the District Health Management Tean (DHMT), Community Health Workers and Volunteers to help sensitize and correct misconceptions, superstitions and cultural beliefs associated with EBF and disabuse the minds of community members about prohibiting children from eating certain nutritious foods, such as eggs and some species of fish, because they delay development.

The District health management teams (DHMTs) can take advantage of the flourishing community information centres, to provide informal education on child nutrition using the local dialects, especially in rural settings in Ghana.

Facility-Based Recommendations:

i. In respect of mothers' perceptions that HWs themselves do not practise EBF, healthcare providers, such as nurses and midwives, could consider becoming role-models, by using their own children to demonstrate that EBF has numerous benefits to children. This role-modelling may have a positive impact on pregnant women and mothers who are still at the stage of getting breastfeeding established, enabling them to gain confidence in breastfeeding information communicated to them.

ii. Since children who belong to large households were at a high risk of not being fed on meals with a high DDS and an adequate MAD, thus becoming stunted and underweight, it is recommended that interventions should be implemented by Community Health Workers and Volunteers working at Reproductive and Child Health (RCH) deparments in health facilities and during their community health outreach programmes in the districts to promote the adoption of family planning methods to help improve the nutritional status of children.

iii. Other anthropometric indicators such as taking of height measurements should be considered in activities of GMP services at CWCs inorder to early identify children who are at a higher risk of becoming stunted and wasted.

Programme-Based Recommendations

i. Since the study area is a major farming district, the Ministry of Agriculture and NGOs working directly in the agricultural sector, such as the Global Forum for Rural Advisory Services (GFRAS) and the Centre for Agricultural and Rural Development Financial NGO (CARD-FNGO), can promote Nutrition-sensitive Agriculture by supporting rural mothers especially to embark upon group farming and agro-processing ventures by providing them with financial aid and supervisory expertise.

ii. Conducting regular nutrition surveillance surveys, spearheaded by the Nutrition Department of the District Health Directorate, to identify vulnerable households (low income-earners, without access to improved toilet facilities and sources of drinking water) in order for children in such households to be given special attention by enrolling them in Targeted Supplementary Feeding programmes to protect them from becoming malnourished.

Policy-Based Recommendations

i. The findings suggest that maternal education plays a significant role in improving the dietary intakes of children. This implies that the free basic education, in addition to the policy of free senior high school education by the Ministry of Education, may hold some promise in addressing child undernutrition. In other words, government policies which ensure that girls remain in school and attain higher levels of education, translate into additional gains in addressing poor dietary intakes among children in rural settings.

Contribution to Knowledge

This study was conducted to explore maternal, household and socio-cultural factors that influence the feeding practices and nutritional status of children under two years of age, in the Kwahu Afram Plains North and South Districts. Previous studies that explored how socio-cultural factors influence child nutrition focused only on breastfeeding, and explored the views of mothers. This study has provided evidence on how socio-cultural factors influence both breastfeeding and complementary feeding of children in Ghana, from the perspectives of grandmothers (who are described as culture custodians) and health workers and volunteers. In addition, to the best of the researcher's knowledge this is the first study to explore socio-cultural practices influencing the feeding practices of children, from the viewpoints of community health workers and community health volunteers in Ghana.

Again, past studies in Ghana solely focused on how single feeding indicators, such as breastfeeding, affect the growth (nutritional status) of children. However, the current study computed a composite feeding index which contributes to our understanding of the phenomenon of child feeding in a holistic way.

In addition, existing studies on infant feeding practices in Ghana have focused largely on maternal factors influencing only breastfeeding in child nutrition. This study contributes to the literature on both maternal and household factors associated with different aspects of child feeding practices. Concerning maternal factors, little research has been conducted to explore the various dimensions of mothers' autonomy at the household-level and how they relate to IYCF practices. Besides, previous studies on maternal autonomy and child nutrition in Ghana were mainly based on secondary data collected not for testing the exact hypothesis of these studies. Therefore, this study has added to the body of knowledge on how mothers' autonomy (participation in decision-making and financial independence) influences the feeding practices and the nutritional status of children.

Strengths and Limitations of the Study

This study has the strength of estimating an infant and child feeding index (ICFI) which is now being emphasized worldwide by taking into consideration all the core feeding indicators of children. The estimation of the ICFI enabled the researcher to obtain a holistic overview of how feeding practices as a whole (summarized as a composite feeding index) determine the growth (nutritional status) of children. Another strength of this study is that it assessed how socio-cultural factors influence complementary feeding, apart from breastfeeding, which has not been studied to a large extent in Ghana.

The main limitation of this study was the cross-sectional nature of the survey which limits inferences about causality from the analyses. As with any cross-sectional analysis, causal influences can only be inferred from observed relationships. One disadvantage of cross-sectional studies is that it is not possible to know whether the outcome followed the exposure in time or the exposure resulted from the outcome, since information on both exposure and outcome is collected at the same single point in time. For exposures that do not change over time, such as sex of a child, it is obviously not a problem to employ cross-sectional surveys. To address exposures that are likely to change over time, such as feeding practices, the study included questions to assess both past as well as current feeding practices of a child.

The study was health facility-based. Therefore, it is possible that children from health-conscious caregivers attending CWCs/RCHs for immunization were those mainly included in this study; and this presents biases which would, in some way, affect the possibility to generalize the findings to the entire population. In other words, the clinic-based nature of this study limits the study's representativeness. Despite this limitation, to the best of the researcher's knowledge, this study is the first study to assess maternal, household and socio-cultural factors associated with the feeding practices and nutritional status of children under two years in the two districts. This study, therefore, serves as a preliminary study providing baseline information for conducting further extensive studies at the community level, drawing on lessons learnt from this clinic-based study.

Also, the study focused on infants and child feeding practices reported by caregivers, to the neglect of actual observations, which is likely to either underestimate or overestimate the associations observed from the study. Mothers may be informed about appropriate infant and child feeding practices and may answer questions that are asked accordingly, without practising what they report. In other words, there is a possibility of getting socially-desirable responses from mothers. However, this is an unavoidable challenge with self-report surveys. Nevertheless, there are studies which have shown that self-reported child feeding practices by mothers are valid and reliable (Bergmeier, Skouteris, Haycraft, Haines & Hooley, 2015; Mazariegos, Slater & Ramirez-Zea, 2016).

Furthermore, some indicators, such as the initiation of breastfeeding within one hour after birth, were based on mothers' memory recall, with a longest recall time of 23 months, which might have introduced a recall bias in this study. Assessing dietary intakes of children using the 7-days food frequency questionnaire (7-D FFQ) and the 24-hour dietary recall (24-HDR) methods is prone to recall bias since respondents would have to recall foods consumed, their quantities and frequencies, over a period of one week prior to data collection. To minimize recall bias and the likelihood of getting socially-desirable responses, the interviewer, with the approval of the mother, requested a family/household member who was usually present when the mother was feeding the child to join in the interview during the dietary assessment session, to help in recalling foods consumed by the child. In this study, the majority of the mothers only provided some background information at the CWC; and the anthropometric data of the child and mother was also taken at the CWC, while responses to household and dietary assessment questions were provided in the various homes of the caregivers after working hours.

In order to minimize the biases associated with the study, the following measures were taken before as well as during data collection. Field assistants were taken through an intensive training and given the opportunity to practise interviewing mothers during the pre-testing stage of the research instruments. Three supervisors with backgrounds in health promotion, community nutrition and public health nutrition, who are also in charge of conducting health research in the two districts, participated in the training sessions and assisted the researcher to supervise data collection in the field, in order to minimize anthropometric measurement errors and interviewer bias.

Suggestions for Further Research

This study presents opportunities for further research in advancing knowledge in the field of child health and nutrition. These are discussed in this section.

First, further study could compute the ICFI from feeding practice data collected on the same subjects at different time points, such as monthly from birth till 23 months of age, to evaluate the cumulative impact of feeding behaviours as they change with increasing age of children on their growth or nutritional status in the long-term.

Second, in future studies, a form for recording the dietary intakes of children could be given to individuals in selected households who can read and write to assist mothers to complete, particularly in cases where mothers are unable to read or write. By employing such a method, recall bias and memory lapses of mothers who have to recall previously consumed foods, sometimes spanning a period of previous 7-days, would be minimized; and more precise estimates of food intakes of children can be obtained.

Further research that explores the views of fathers, opinion leaders and other influential persons in the area of socio-cultural practices that act as barriers and enablers of feeding children under- two years of age will "throw more light" on this aspect of child nutrition. In addition, the views of opinion leaders and other influential persons, such as queen mothers, assembly men, chiefs and leaders of women's associations can be obtained, with respect to measures that can be employed to persuade their people to correct certain misconceptions, beliefs and superstitions that do not encourage appropriate and optimal child feeding practices.

Lastly, although the sample size was relatively large, it was not representative of the population of children under-two years in Ghana. Further research could involve nationally representative samples of under-two-year-old children and their mothers, to explore maternal and household factors related to the feeding practices and nutritional status of children in order to obtain a nationwide perspective of the phenomenon.

BIBILOGRAPHY

Aaron, G. J., Strutt, N., Boateng, N. A., Guevarra, E., Siling, K., Norris, A., ... & Foriwa, E. (2016). Assessing program coverage of two approaches to distributing a complementary feeding supplement to infants and young children in Ghana. *PloS one*, *11*(10), e0162462.

Abang, C. (2013). *Association between breastfeeding and complementary feeding practices and infant growth in the Builsa District*, Doctoral dissertation, University of Ghana.

Abate, K. H., & Belachew, T. (2017). Women's autonomy and men's involvement in child care and feeding as predictors of infant and young child anthropometric indices in coffee farming households of Jimma Zone, South West of Ethiopia. *PloS one*, *12*(3), e0172885.

Abdulla, C. O., Ayubi, A., Zulfiquer, F., Santhanam, G., Ahmed, M. A. S., & Deeb, J. (2012). Infant botulism following honey ingestion. *BMJ case reports*, *2012*, bcr1120115153.

Abera, L., Dejene, T., & Laelago, T. (2017). Prevalence of malnutrition and associated factors in children aged 6–59 months among rural dwellers of damot gale district, south Ethiopia: community based cross sectional study. *International journal for equity in health*, *16*(1), 1-8

Abeshu, M. A., Lelisa, A., & Geleta, B. (2016). Complementary feeding: Review of recommendations, feeding practices, and adequacy of homemade complementary food preparations in developing countries–lessons from Ethiopia. *Frontiers in nutrition*, *3*, 1-9

Aborigo, R. A., Moyer, C. A., Rominski, S., Adongo, P., Williams, J., Logonia, G., ... & Engmann, C. (2012). Infant nutrition in the first seven days of life in rural northern Ghana. *BMC pregnancy and childbirth*, *12*(1), 1-12

Abuya, B. A., Ciera, J., & Kimani-Murage, E. (2012). Effect of mother's education on child's nutritional status in the slums of Nairobi. *BMC pediatrics*, *12*(1), 1-10.

Afaya, A., Fuseini, K. J., Anaman-Torgbor, J. A., Salia, S. M., Adatara, P., & Afaya, R. A. (2017). *Family belief systems and practices that influence exclusive breastfeeding in Sagu, Ghana*. NUMID.

Agbadi, P., Urke, H. B., & Mittelmark, M. B. (2017). Household food security and adequacy of child diet in the food insecure region north in Ghana. *PloS one*, *12*(5), e0177377.

Agho, K. E., Ogeleka, P., Ogbo, F. A., Ezeh, O. K., Eastwood, J., & Page, A. (2016). Trends and predictors of prelacteal feeding practices in Nigeria (2003–2013). *Nutrients*, *8*(8), 1-13

Agize, A., Jara, D., & Dejenu, G. (2017). Level of Knowledge and Practice of Mothers on Minimum Dietary Diversity Practices and Associated Factors for 6–23-Month-Old Children in Adea Woreda, Oromia, Ethiopia. *BioMed Research International*, *7*, 1-9

Aguayo, V. M., Nair, R., Badgaiyan, N., & Krishna, V. (2016). Determinants of stunting and poor linear growth in children under 2 years of age in India: an in-depth analysis of Maharashtra's comprehensive nutrition survey. *Maternal & child nutrition*, *12*, 121-140.

Agunbiade, O. M., & Ogunleye, O. V. (2012). Constraints to exclusive breastfeeding practice among breastfeeding mothers in Southwest Nigeria: implications for scaling up. *International breastfeeding journal*, *7*(1), 5-9

Akombi, B. J., Agho, K. E., Merom, D., Renzaho, A. M., & Hall, J. J. (2017). Child malnutrition in sub-Saharan Africa: A meta-analysis of demographic and health surveys (2006-2016). *PloS one*, *12*(5), e0177338.

Alamu, E. O., Gondwe, T., Akello, J., Sakala, N., Munthali, G., Mukanga, M., & Maziya-Dixon, B. (2018). Nutrient and aflatoxin contents of traditional complementary foods consumed by children of 6–24 months. *Food Science & Nutrition*, *6*(4), 834–842.

Alaofè, H., Zhu, M., Burney, J., Naylor, R., & Douglas, T. (2017). Association Between Women's Empowerment and Maternal and Child Nutrition in Kalalé District of Northern Benin. *Food and nutrition bulletin*, *38*(3), 302-318.

Alderman, H., & Headey, D. D. (2017). How important is parental education for child nutrition? *World Development*, *94*, 448-464.

Ali, A. M., Batu, M. M., & Kaushik, K. K. (2016) Socio-Economic Determinants of Nutritional Status of Children in Ethiopia. *International Journal of Scientific and Research Publications*, *6*(3), 166-176.

Ali, Z., Abu, N., Ankamah, I. A., Gyinde, E. A., Seidu, A. S., & Abizari, A. R. (2018). Nutritional status and dietary diversity of orphan and non–orphan children under five years: a comparative study in the Brong Ahafo region of Ghana. *BMC Nutrition*, *4*(1), 1-8

Ali, Z., Saaka, M., Adams, A. G., Kamwininaang, S. K., & Abizari, A. R. (2017). The effect of maternal and child factors on stunting, wasting and underweight among preschool children in Northern Ghana. *BMC Nutrition*, *3*(1), 1-13

Aliyu, A. A., Bello, M. U., Kasim, R., & Martin, D. (2014). Positivist and non-positivist paradigm in social science research: Conflicting paradigms or perfect partners. *J. Mgmt. & Sustainability*, *4*(3), 79-88

Almalki, S. (2016). Integrating Quantitative and Qualitative Data in Mixed Methods Research--Challenges and Benefits. *Journal of Education and Learning*, *5*(3), 288-296.

Ameyaw, R., Ameyaw, E., Acheampong, A. O., & Appiagyei, P. (2017). Diarrhoea among Children Under Five Years in Ghana. *Global Journal of Research and Review*, *4*(2), 1-11

Amir, L. H. (2011). Social theory and infant feeding. *International Breastfeeding Journal*, 6(7). doi:10.1186/1746-4358-6-7.

Amugsi, D. A., Mittelmark, M. B., & Oduro, A. (2015). Association between maternal and child dietary diversity: an analysis of the Ghana demographic and health survey. *PloS one*, *10*(8), e0136748.

Annim, S. K., Awusabo-Asare, K., & Amo-Adjei, J. (2015). Household nucleation, dependency and child health outcomes in Ghana. *Journal of biosocial science*, *47*(5), 565-592.

Apurva, P. A., Pangerkar, P., Padmini, G., & Shobha, A. U. (2018). Dietary diversity and anthropometric status of 6–36 months old children of Mumbai city. *Indian Journal of Child Health*, *5*(2), 89-94.

Aryeetey, R. N. O., & Goh, Y. E. (2013). Duration of exclusive breastfeeding and subsequent child feeding adequacy. *Ghana medical journal*, *47*(1), 24-29.

Asare, B. Y. A., Preko, J. V., Baafi, D., & Dwumfour-Asare, B. (2018). Breastfeeding practices and determinants of exclusive breastfeeding in a cross-sectional study at a child welfare clinic in Tema Manhean, Ghana. *International breastfeeding journal*, *13*(1), 12-18

Asfaw, M., Wondaferash, M., Taha, M., & Dube, L. (2015). Prevalence of undernutrition and associated factors among children aged between six to fifty nine months in Bule Hora district, South Ethiopia. *BMC Public health*, *15*(1), 41-49.

Atsu, B. K., Guure, C., & Laar, A. K. (2017). Determinants of overweight with concurrent stunting among Ghanaian children. *BMC pediatrics*, *17*(1), 1-13.

Ayawine, A., & Ayuurebobi, K. (2015). Determinants of exclusive breastfeeding: a study of two sub-districts in the Atwima Nwabiagya District of Ghana. *The Pan African medical journal*, *22*, 1-13.

Barrios, P. L. (2012). *Relationship between household structure, maternal autonomy and undernutrition in Brazilian children*. Doctoral dissertation, Rutgers University-Graduate School-New Brunswick.

Baškarada, S., & Koronios, A. (2018). A philosophical discussion of qualitative, quantitative, and mixed methods research in social science. *Qualitative Research Journal*, *18*(1), 2-21.

Bazzano, A. N., Kaji, A., Felker-Kantor, E., Bazzano, L. A., & Potts, K. S. (2017). Qualitative Studies of Infant and Young Child Feeding in Lower-Income Countries: A Systematic Review and Synthesis of Dietary Patterns. *Nutrients*, *9*(10), 1140- 1143.

Beal, T., Tumilowicz, A., Sutrisna, A., Izwardy, D., & Neufeld, L. M. (2018). A review of child stunting determinants in Indonesia. *Maternal & child nutrition*, *14*(2), 1-10.

Becker, G. S. (1981). *Treatise on the Family*. Cambridge: Harvard University Press.

Becker, G.S. (1965): A Theory of the Allocation of Time. In: *The Economic Journal* 75, 493-517.

Benson, T. D. (2008). *Improving nutrition as a development priority: addressing undernutrition within national policy processes in Sub-Saharan Africa*. Intl Food Policy Res Inst.

Bentil, H. J., Steiner-Asiedu, M., & Lartey, A. (2016). Comparison of the complementary feeding practices between mothers with twins and mothers with singletons. *The Pan African Medical Journal*, *24*, 1-7.

Bergmeier, H. J., Skouteris, H., Haycraft, E., Haines, J., & Hooley, M. (2015). Reported and observed controlling feeding practices predict child eating behavior after 12 months. *The Journal of nutrition*, *145*(6), 1311-1316.

Berhane, H., Ekström, E. C., Jirström, M., Berhane, Y., Turner, C., Alsanius, B., & Trenholm, J. (2018). What Influences Urban Mothers' Decisions on What to Feed Their Children Aged Under Five—The Case of Addis Ababa, Ethiopia. *Nutrients*, *10*(9), 1142-1144.

Bewket Zeleke, L., Welday Gebremichael, M., Mehretie Adinew, Y., & Abebe Gelaw, K. (2017). Appropriate Weaning Practice and Associated Factors among Infants and Young Children in Northwest Ethiopia. *Journal of nutrition and metabolism*, 8, 1-7.

Bhagowalia, P., Menon, P., Quisumbing, A. R., & Soundararajan, V. (2012). *What dimensions of women's empowerment matter most for child nutrition? evidence using nationally representative data from Bangladesh*. IFPRI Discussion Paper 01192.Washington, DC: International Food Policy Research Institute.

Bhojvaid, V., Jeuland, M., Kar, A., Lewis, J. J., Pattanayak, S. K., Ramanathan, N., ... & Rehman, I. H. (2014). How do people in rural India perceive improved stoves and clean fuel? Evidence from Uttar Pradesh and Uttarakhand. *International journal of environmental research and public health*, *11*(2), 1341-1358.

Bi, J., Liu, C., Li, S., He, Z., Chen, K., Luo, R., ... & Xu, H. (2019). Dietary Diversity among Preschoolers: A Cross-Sectional Study in Poor, Rural, and Ethnic Minority Areas of Central South China. *Nutrients*, *11*(3), 558-563.

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis, M., ... & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *The lancet*, *382*(9890), 427-451.

Blüher, S. (2015). Obesity Prevention in Childhood and Cardiovascular Health Later in Life: We Need to Get the Ball Rolling. *Journal of Adolescent Health*, *56*(6), 582-583.

Boatbil, C. S., & Guure, C. B. (2014). Implication of cultural factors in spatial patterns of stunting among the three main Frafra groups in Upper East Region of Ghana. *Int. J. Nutr. Food Sci*, *3*(2), 37-43.

Bogale, T. Y., Bala, E. T., Tadesse, M., & Asamoah, B. O. (2018). Prevalence and associated factors for stunting among 6–12 years old school age children from rural community of Humbo district, Southern Ethiopia. *BMC public health*, *18*(1), 653-657

Boralingiah, P., Polineni, V., Kulkarni, P., & Manjunath, R. (2017). Study of breastfeeding practices among working women attending a tertiary care hospital, Mysore, Karnataka, India. *International Journal of Community Medicine and Public Health*, *3*(5), 1178-1182.

Bourke, C. D., Berkley, J. A., & Prendergast, A. J. (2016). Immune dysfunction as a cause and consequence of malnutrition. *Trends in immunology*, *37*(6), 386-398.

Brannen, J. (2017). *Mixing methods: Qualitative and quantitative research*. Routledge Idowu, O. E. (2017). Positivism versus Interpretivism: Firewar on the Methodological Approach in the Study of Organisational Culture. *International Journal of Human Resource Studies*, *6*(4), 178-187.

Bronfenbrenner, U. (1992). *Ecological systems theory*. In R. Vasta (Ed.), Annals of child development. Six theories of child development: revised formulations and current issues. Jessica Kingsley Publishers, London, 187–249.

Bronfenbrenner, U. (1994). Ecological models of human development. *Readings on the development of children*, *2*(1), 37-43.

Bunniss, S., & Kelly, D. R. (2010). Research paradigms in medical education research. *Medical education, 44*(4), 358-366.

Burns, J., Emerson, J. A., Amundson, K., Doocy, S., Caulfield, L. E., & Klemm, R. D. (2016). A qualitative analysis of barriers and facilitators to optimal breastfeeding and complementary feeding practices in South Kivu, Democratic Republic of Congo. *Food and nutrition bulletin, 37*(2), 119-131.

Cai, X., Wardlaw, T., & Brown, D. W. (2012). Global trends in exclusive breastfeeding. *International breastfeeding journal*, *7*(1), 12-16

Capanzana, M. V., Aguila, D. V., Gironella, G. M. P., & Montecillo, K. V. (2018). Nutritional status of children ages 0–5 and 5–10 years old in households headed by fisherfolks in the Philippines. *Archives of Public Health*, *76*(1), 24-32

Carlson, G. J., Kordas, K., & Murray-Kolb, L. E. (2015). Associations between women's autonomy and child nutritional status: a review of the literature. *Maternal & child nutrition*, *11*(4), 452-482.

Carter, I. (2017). *Human behavior in the social environment: A social systems approach*. Routledge, Chicago.

Caswell, J. A., Yaktine, A. L., & National Research Council. (2013). Individual, Household, and Environmental Factors Affecting Food Choices and Access. In *Supplemental Nutrition Assistance Program: Examining the Evidence to Define Benefit Adequacy*. National Academies Press, US.

Chakona, G., & Shackleton, C. M. (2018). Household Food insecurity along an agro-ecological gradient influences children's nutritional status in South Africa. *Frontiers in Nutrition*, *4*, 72-79.

Chaudhary, S. R., Govil, S., Lala, M. K., & Yagnik, H. B. (2018). Infant and young child feeding index and its association with nutritional status: A cross-sectional study of urban slums of Ahmedabad. *Journal of Family & Community Medicine*, *25*(2), 88- 95.

Chea, N., & Asefa, A. (2018). Prelacteal feeding and associated factors among newborns in rural Sidama, south Ethiopia: a community based cross-sectional survey. *International breastfeeding journal*, *13*(1), 7-12

Chege, P. M., & Kuria, E. N. (2017). Relationship Between Nutrition Knowledge of Caregivers and Dietary Practices of Children Under Five in Kajiado County, Kenya. *Women's Health Bulletin*, *8*(3), 1-5.

Chege, P. M., Kimiywe, J. O., & Ndungu, Z. W. (2015). Influence of culture on dietary practices of children under five years among Maasai pastoralists in Kajiado, Kenya. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1), 131-138.

Chernichovsky, D., & Zangwill, L. (1990). Micro-economic theory of the household and nutrition programmes. *Food and Nutrition Bulletin*, *12*(1), 1-19.

Chirande, L., Charwe, D., Mbwana, H., Victor, R., Kimboka, S., Issaka, A. I., ... & Agho, K. E. (2015). Determinants of stunting and severe stunting among under-fives in Tanzania: evidence from the 2010 cross-sectional household survey. *BMC pediatrics*, *15*(1), 165-171

Chowdhury, M. F. (2014). Interpretivism in aiding our understanding of the contemporary social world. *Open Journal of Philosophy*, *4*(03), 432-434.

Chowdhury, T. R., Chakrabarty, S., Rakib, M., Saltmarsh, S., & Davis, K. A. (2018). Socio-economic risk factors for early childhood underweight in Bangladesh. *Globalization and health*, *14*(1), 54-62.

Codjoe, S. N. A., Okutu, D., & Abu, M. (2016). Urban household characteristics and dietary diversity: An analysis of food security in Accra, Ghana. *Food and nutrition bulletin*, *37*(2), 202-218.

Cook, J., Kimuyu, P., & Whittington, D. (2016). The costs of coping with poor water supply in rural Kenya. *Water Resources Research*, *52*(2), 841-859.

Creswell, J.W. & Plano Clarke, V.L. (2011). *Designing and conducting mixed research methods*. Thousand Oaks, California: SAGE.

Cuinhane, C. E., Coene, G., Roelens, K., & Vanroelen, C. (2017). Exploring perceptions and practices of biomedical norms during exclusive breastfeeding among HIV-positive lactating mothers in Mozambique. *Journal of AIDS & Clinical Research*, *8*(4), 1-10.

DaCosta, S. (2012). *Ethno-Cultural Factors That Influence Infant Feeding Among South Asians in The Region of Peel: Findings from Stakeholder Consultations*. Peel Region.

Dako-Gyeke, P. (2015). *Exclusive Breastfeeding Practices among First-Time Mothers in Kassena-Nankana Municipality*. Doctoral dissertation, University of Ghana.

De Beer, H. (2012). Dairy products and physical stature: a systematic review and meta-analysis of controlled trials. *Economics & Human Biology*, *10*(3), 299-309.

De Onis, M., & Branca, F. (2016). Childhood stunting: a global perspective. *Maternal & child nutrition*, *12*, 12-26.

De Onis, M., Borghi, E., Arimond, M., Webb, P., Croft, T., Saha, K., ... & Hayashi, C. (2019). Prevalence thresholds for wasting, overweight and stunting in children under 5 years. *Public health nutrition*, *22*(1), 175-179.

Demaio, A. R., & Branca, F. (2018). Decade of action on nutrition: our window to act on the double burden of malnutrition. *BMJ global health*, *3*(Suppl 1), e000492.

Demilew, Y. M., & Abie, D. D. (2017). Undernutrition and associated factors among 24–36-month-old children in slum areas of Bahir Dar city, Ethiopia. *International journal of general medicine*, *10*, 79-84.

Denzin, N.K. & Lincoln, Y.S. (2011). Introduction: *The Discipline and Practice of Qualitative Research.* (In Denzin, N.K. & Lincoln, Y.S. 4th Edition ed. The SAGE Handbook of Qualitative Research: London.

Derso, T., Tariku, A., Biks, G. A., & Wassie, M. M. (2017). Stunting, wasting and associated factors among children aged 6–24 months in Dabat health and demographic surveillance system site: A community based cross-sectional study in Ethiopia. *BMC pediatrics*, *17*(1), 96-101.

Development Initiatives, (2018). *Global Nutrition Report: Shining a light to spur action on nutrition*. Bristol, UK: Development Initiatives Poverty Research Ltd.

Dewana, Z., Fikadu, T., Facha, W., & Mekonnen, N. (2017). Prevalence and Predictors of Stunting among Children of Age between 24 to 59 Months in Butajira Town and Surrounding District, Gurage Zone, Southern Ethiopia. *Health Sci J, 11*(4), 518-523.

Dewey, K. G. (2013). The Challenge of Meeting Nutrient Needs of Infants and Young Children during the Period of Complementary Feeding: An Evolutionary Perspective–3. *The Journal of nutrition*, *143*(12), 2050-2054.

Dewey, K. G., & Begum, K. (2011). Long-term consequences of stunting in early life. *Maternal & child nutrition*, *7*, 5-18.

Doracaj, D., Grabocka, E., and Hallkaj, E. (2014). Relationship between infant and child feeding practices and nutritional status: A cross-sectional study among children in Diber, Albania. *Albanian Medical Journal*, 3,14-22.

Dorsey, J. L., Manohar, S., Neupane, S., Shrestha, B., Klemm, R. D., & West Jr, K. P. (2018). Individual, household, and community level risk factors of stunting in children younger than 5 years: Findings from a national surveillance system in Nepal. *Maternal & child nutrition*, *14*(1), e12434.

Dunn, R. L., Kalich, K. A., Fedrizzi, R., & Phillips, S. (2015). Barriers and contributors to breastfeeding in WIC mothers: A social ecological perspective. *Breastfeeding Medicine*, *10*(10), 493-501.

Ekwochi, U., Osuorah, C. D., Ndu, I. K., Ifediora, C., Asinobi, I. N., & Eke, C. B. (2016). Food taboos and myths in South Eastern Nigeria: the belief and practice of mothers in the region. *Journal of ethnobiology and ethnomedicine*, *12*(1), 7-13.

El-Gilany, A. H., & Abdel-Hady, D. M. (2014). Newborn first feed and prelacteal feeds in Mansoura, Egypt. *BioMed Research International*, *7*,1-9.

Endris, N., Asefa, H., & Dube, L. (2017). Prevalence of malnutrition and associated factors among children in rural Ethiopia. *BioMed research international*, *9*, 1-13.

Engebretsen, I. M., Moland, K. M., Nankunda, J., Karamagi, C. A., Tylleskär, T., & Tumwine, J. K. (2010). Gendered perceptions on infant feeding in Eastern Uganda: continued need for exclusive breastfeeding support. *International breastfeeding journal*, *5*(1), 13-19.

Engle, P. L., Bentley, M., & Pelto, G. (2000). The role of care in nutrition programmes: current research and a research agenda. *Proceedings of the Nutrition Society*, *59*(1), 25-35.

Engle, P. L., Menon, P., & Haddad, L. J. (1999). Care and nutrition: concepts and measurement. *World Development*, *27*(8), 1309-1337.

Erismann, S., Knoblauch, A. M., Diagbouga, S., Odermatt, P., Gerold, J., Shrestha, A., ... & Cissé, G. (2017). Prevalence and risk factors of undernutrition among schoolchildren in the Plateau Central and Centre-Ouest regions of Burkina Faso. *Infectious diseases of poverty*, *6*(1), 17-24.

Ersino, G., Henry, C. J., & Zello, G. A. (2016). Suboptimal Feeding Practices and High Levels of Undernutrition among Infants and Young Children in the Rural Communities of Halaba and Zeway, Ethiopia. *Food and nutrition bulletin*, *37*(3), 409-424.

Eshete, H., Abebe, Y., Loha, E., Gebru, T., & Tesheme, T. (2017). Nutritional status and effect of maternal employment among children aged 6–59 months in Wolayta Sodo town, southern Ethiopia: a cross-sectional study. *Ethiopian journal of health sciences*, *27*(2), 155-162.

Ezeogu, A. (2017). *Water is the greatest barrier to exclusive breastfeeding*. Retrievedfrom: https://www.vanguardngr.com/2017/08/water-greatest-barrier-exclusive-breastfeeding-ada-ezeogu-unicef-nutritionist/

Fanzo, J., Hawkes, C., Udomkesmalee, E., Afshin, A., Allemandi, L., Assery, O., ... & Corvalan, C. (2018). *Global Nutrition Report: Shining a light to spur action on nutrition*. North Quay House, Temple Back, Bristol, UK.

FAO, IFAD, UNICEF, WFP and WHO. 2017. *The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security*. Rome, FAO.

Fentaw, R., Bogale, A., & Abebaw, D. (2013). Prevalence of child malnutrition in agro-pastoral households in Afar Regional State of Ethiopia. *Nutrition research and practice*, *7*(2), 122-131.

Ferreira, T. D. M., Piccioni, L. D., Queiroz, P. H. B., Silva, E. M., & Vale, I. N. D. (2018). Influence of grandmothers on exclusive breastfeeding: cross-sectional study. *Einstein (São Paulo)*, *16*(4), 1-8.

Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs—principles and practices. *Health services research*, *48*(6pt2), 2134 -2156.

Fife, B. (2000). *The healing miracles of coconut oil*. Piccadilly Books Ltd, Colorado Springs, USA.

Fife, B. (2013). *The coconut oil miracle*. Penguin, Westminster, UK.

Frempong, R. B., & Annim, S. K. (2017). Dietary diversity and child malnutrition in Ghana. *Heliyon*, *3*(5), e00298.

Furman, L. M., Banks, E. C., & North, A. B. (2013). Breastfeeding among high-risk inner-city African-American mothers: A risky choice? *Breastfeeding Medicine*, *8*(1), 58-67.

Gadegbeku, C., Wayo, R., Ackah–Badu, G., Nukpe, E., & Okai, A. (2013). Food taboos among residents at Ashongman-Accra, Ghana. *Food Science and Quality Management*, *15*, 21-29.

Gakidou, E., Afshin, A., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., ... & Abu-Raddad, L. J. (2017). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, *390*(10100), 1345-1422.

Galgamuwa, L. S., Iddawela, D., Dharmaratne, S. D., & Galgamuwa, G. L. S. (2017). Nutritional status and correlated socio-economic factors among preschool and school children in plantation communities, Sri Lanka. *BMC public health*, *17*(1), 377-381.

García Cruz, L. M., Gonzalez Azpeitia, G., Reyes Suarez, D., Santana Rodríguez, A., Loro Ferrer, J. F., & Serra-Majem, L. (2017). Factors associated with stunting among children aged 0 to 59 months from the central region of Mozambique. *Nutrients*, *9*(5), 491- 497.

Geberselassie, S. B., Abebe, S. M., Melsew, Y. A., Mutuku, S. M., & Wassie, M. M. (2018). Prevalence of stunting and its associated factors among children 6-59 months of age in Libo-Kemekem district, Northwest Ethiopia; A community based cross sectional study. *PloS one*, *13*(5), e0195361.

Gebreyesus, H., Girma, E. & Cherie, N (2017). Colostrum Avoidance and Associated Factors Among Mothers of Children Aged Less Than 12 Months in Kombolcha Town, South Wollo Zone, Ethiopia. *Medico Research Chronicles, 4* (5), 545-559.

Ghana Statistical Service (GSS), Ghana Health Service (GHS), ICF International. Demographic and health survey (2015). Rockville: GSS, GHS, ICF International.

Gibson, R. S., Perlas, L., & Hotz, C. (2006). Improving the bioavailability of nutrients in plant foods at the household level. *Proceedings of the Nutrition Society*, *65*(2), 160-168.

Glover-Amengor, M., Agbemafle, I., Hagan, L. L., Mboom, F. P., Gamor, G., Larbi, A., & Hoeschle-Zeledon, I. (2016). Nutritional status of children 0–59 months in selected intervention communities in northern Ghana from the Africa RISING project in 2012. *Archives of Public Health*, *74*(1), 12-20.

Goldman, R. (2016). *Sugar Water for Babies: Benefits and Risks.* Retrieved from: https://www.healthline.com/health/parenting/sugar-water-for-babies

Gongwer, C. R., & Aryeetey, R. (2014). Implementing nutrition interventions in Ghana at district level: Gaps and opportunities. *African Journal of Food, Agriculture, Nutrition and Development*, *14*(2). 1-8.

Graham, J. P., Hirai, M., & Kim, S. S. (2016). An analysis of water collection labor among women and children in 24 sub-Saharan African countries. *PloS one*, *11*(6), e0155981.

Gray, D. E. (2013). *Doing research in the real world*. Sage, Thousand Oaks, California, USA.

Guirindola, M. O., Maniego, M. L. V., Silvestre, C. J., & Acuin, C. C. S. (2018). Determinants of Meeting the Minimum Acceptable Diet Among Filipino Children Aged 6-23 Months. *Philippine Journal of Science*, *147*(1), 75-89.

Gupta, A. (2017). Infants' Consumption of Cow Milk and Anemia. In *Nutritional Anemia in Preschool Children* (pp. 215-222). Springer, Singapore.

Habaasa, G. (2014). *Determinants of malnutrition among under-five children in Nakaseke and Nakasongola Districts, Uganda*. Doctoral dissertation, Makerere University.

Haddad, L., Achadi, E., Bendech, M. A., Ahuja, A., Bhatia, K., Bhutta, Z., ... & Eriksen, K. (2015). The Global Nutrition Report 2014: Actions and Accountability to Accelerate the World's Progress on Nutrition–. *The Journal of nutrition*, *145*(4), 663-671.

Hansen, E., Tesch, L., & Ayton, J. (2018). 'They're born to get breastfed'-how fathers view breastfeeding: a mixed method study. *BMC pregnancy and childbirth*, *18*(1), 238-244.

Harding, K. L., Aguayo, V. M., & Webb, P. (2018). Factors associated with wasting among children under five years old in South Asia: Implications for action. *PloS one*, *13*(7), e0198749.

Haroon, S., Das, J. K., Salam, R. A., Imdad, A., & Bhutta, Z. A. (2013). Breastfeeding promotion interventions and breastfeeding practices: a systematic review. *BMC public health*, *13*(3), 20 -29.

Harris-Fry, H., Azad, K., Kuddus, A., Shaha, S., Nahar, B., Hossen, M., ... & Fottrell, E. (2015). Socio-economic determinants of household food security and women's dietary diversity in rural Bangladesh: a cross-sectional study. *Journal of Health, Population and Nutrition*, *33*(1), 2-8.

Hawkes, C., Demaio, A. R., & Branca, F. (2017). Double-duty actions for ending malnutrition within a decade. *The Lancet Global Health*, *5*(8), e745-e746.

Heinrich, C. J. (2014). Parents' employment and children's wellbeing. *The future of children*, *8*, 121-146.

Hirvonen, K., & Hoddinott, J. (2017). Agricultural production and children's diets: evidence from rural Ethiopia. *Agricultural Economics*, *48*(4), 469-480.

Huang, J., Zhang, Z., Wu, Y., Wang, Y., Wang, J., Zhou, L., ... & Yang, X. (2018). Early feeding of larger volumes of formula milk is associated with greater body weight or overweight in later infancy. *Nutrition journal*, *17*(1), 12-18.

Hwang, A. E., Mack, T. M., Hamilton, A. S., James Gauderman, W., Bernstein, L., Cockburn, M. G., ... & Cozen, W. (2013). Childhood infections and adult height in monozygotic twin pairs. *American journal of epidemiology*, *178*(4), 551-558.

Iannotti, L. L., Lutter, C. K., Bunn, D. A., & Stewart, C. P. (2014). Eggs: the uncracked potential for improving maternal and young child nutrition among the world's poor. *Nutrition reviews*, *72*(6), 355-368.

Ickes, S. B., Hurst, T. E., & Flax, V. L. (2015). Maternal literacy, facility birth, and education are positively associated with better infant and young child feeding practices and nutritional status among Ugandan children. *The Journal of nutrition*, *145*(11), 2578-2586.

Ickes, S. B., Wu, M., Mandel, M. P., & Roberts, A. C. (2018). Associations between social support, psychological well-being, decision making, empowerment, infant and young child feeding, and nutritional status in Ugandan children ages 0 to 24 months. *Maternal & child nutrition*, *14*(1), e12483.

Ickes, S., Mandel, M. P., & Roberts, A. (2016). The maternal domain: social support, decision-making, psychological health and child feeding and anthropometry in Uganda. *The FASEB Journal*, *30*(1 Supplement), 891-896.

Iftikhar, A., Bari, A., Bano, I., & Masood, Q. (2017). Impact of maternal education, employment and family size on nutritional status of children. *Pakistan journal of medical sciences*, *33*(6), 1401-1403.

Ihekuna, D., Rosenburg, N., Menson, W. N. A., Gbadamosi, S. O., Olawepo, J. O., Chike-Okoli, A., ... & Ezeanolue, E. E. (2018). Male partner involvement on initiation and sustainment of exclusive breastfeeding among HIV-infected post-partum women: Study protocol for a randomized controlled trial. *Maternal & child nutrition*, *14*(2), e12545.

Issaka, A. I., Agho, K. E., & Renzaho, A. M. (2017). Prevalence of key breastfeeding indicators in 29 sub-Saharan African countries: a meta-analysis of demographic and health surveys (2010–2015). *BMJ open*, *7*(10), e014145.

Issaka, A. I., Agho, K. E., Burns, P., Page, A., & Dibley, M. J. (2015). Determinants of inadequate complementary feeding practices among children aged 6–23 months in Ghana. *Public health nutrition*, *18*(04), 669-678.

Jacobson, D., Mavrikiou, P. and Minas, C. (2010). Household size, income and expenditure on food: The case of Cyprus. *The Journal of Socio-Economics*, 39, 319-328.

Jadhav, A. (2018). *Cooking imposes heavy burden on rural women. Village Square.* Retrieved from: https://www. villagesquare.in/2018/01/01/ cooking-imposes-heavy-burden-rural-women/

Jama, N. A., Wilford, A., Haskins, L., Coutsoudis, A., Spies, L., & Horwood, C. (2018). Autonomy and infant feeding decision-making among teenage mothers in a rural and urban setting in KwaZulu-Natal, South Africa. *BMC pregnancy and childbirth*, *18*(1), 52-58.

Jama, N. A., Wilford, A., Masango, Z., Haskins, L., Coutsoudis, A., Spies, L., & Horwood, C. (2017). Enablers and barriers to success among mothers planning to exclusively breastfeed for six months: a qualitative prospective cohort study in KwaZulu-Natal, South Africa. *International breastfeeding journal*, *12*(1), 43-49.

Jemide, J. O., Ene-Obong, H. N., Edet, E. E., & Udoh, E. E. (2016). Association of maternal nutrition knowledge and child feeding practices with nutritional status of children in Calabar South Local Government Area, Cross River State. Nigeria. *Int J Home Sci*, *2*(1), 293-298.

Jimoh, A. O., Adaji, S. E., Adelaiye, H. A., Olorukooba, A. A., Garba, C., Mfuh, A. L., ... & Shittu, O. S. (2018). Factors associated with prelacteal feeding practices in a rural northern Nigerian setting. *South African Journal of Clinical Nutrition*, *31*(2), 37- 42.

John, M. E., Nsemo, A. D., John, E. E., Opiah, M., Robinson-Bassey, G. C., & Yagba, J. (2015). Indigenous Child Care Beliefs and Practices in the Niger Delta Region of Nigeria: Implications for Health Care. *International Journal of Health Sciences and Research (IJHSR)*, *5*(11), 235-247.

Jones, A. D., Ickes, S. B., Smith, L. E., Mbuya, M. N., Chasekwa, B., Heidkamp, R. A., ... & Stoltzfus, R. J. (2014). World Health Organization infant and young child feeding indicators and their associations with child anthropometry: a synthesis of recent findings. *Maternal & child nutrition*, *10*(1), 1-17.

Joshi, N., Agho, K. E., Dibley, M. J., Senarath, U., & Tiwari, K. (2012). Determinants of inappropriate complementary feeding practices in young children in Nepal: secondary data analysis of Demographic and Health Survey 2006. *Maternal & child nutrition*, *8*(s1), 45-59.

Kabir, A., & Maitrot, M. R. L. (2017). Factors influencing feeding practices of extreme poor infants and young children in families of working mothers in Dhaka slums: A qualitative study. *PloS one*, *12*(2), e0172119.

Kalra, N., Pelto, G., Tawiah, C., Zobrist, S., Milani, P., Manu, G., ... & Parker, M. (2018). Patterns of cultural consensus and intracultural diversity in Ghanaian complementary feeding practices. *Maternal & child nutrition*, *14*(1), e12445.

Kamiya, Y., Nomura, M., Ogino, H., Yoshikawa, K., Siengsounthone, L., & Xangsayarath, P. (2018). Mothers' autonomy and childhood stunting:

evidence from semi-urban communities in Lao PDR. *BMC women's health*, *18*(1), 70-76.

Karigi, L.N., Mutuli, L.A. & Bukhala, P. (2016). Socio-Cultural Practices and Beliefs Influencing Infant and Young Child Feeding in Lubao Sub-Location Kakamega County. *J Nutr Health Food Eng 5*(1): 00160. DOI: 10.15406/jnhfe.2016.05.00160.

Kayom, V. O., Kakuru, A., & Kiguli, S. (2015). Newborn care practices among mother-infant dyads in urban Uganda. *International journal of pediatrics*, *9*, 1-8.

Kemunto, M. L. (2013). *Dietary Diversity and Nutritional Status of Pregnant Women Aged 15-49 Years Attending Kapenguria District Hospital West Pokot County*. Doctoral dissertation, Kenayatta University.

Kendall, P., Medeiros, L. C., Hillers, V., Chen, G., & Dimascola, S. (2003). Food handling behaviors of special importance for pregnant women, infants and young children, the elderly, and immune-compromised people. *Journal of the American Dietetic Association*, *103*(12), 1646-1649.

Khan, G. N., Ariff, S., Khan, U., Habib, A., Umer, M., Suhag, Z., ... & Khan, A. A. (2017). Determinants of infant and young child feeding practices by mothers in two rural districts of Sindh, Pakistan: a cross-sectional survey. *International breastfeeding journal*, *12*(1), 40-46.

Khatoon, T., Mollah, M. A. H., Choudhury, A. M., Islam, M. M., & Rahman, K. M. (2011). Association between infant and child-feeding index and nutritional status: results from a cross-sectional study among children in relation to fever and grade of malnutrition among malnourished children in Ethiopia. *Public health action*, *1*(1), 16-18.

Khattak, U. K., Iqbal, S. P., & Ghazanfar, H. (2017). The role of parents' literacy in malnutrition of children under the age of five years in a semi-urban community of Pakistan: a case-control study. *Cureus*, *9*(6), 1-11.

Khor, G. L., Tan, S. Y., Tan, K. L., Chan, P. S., & Amarra, M. S. V. (2016). Compliance with WHO IYCF Indicators and Dietary Intake Adequacy in a Sample of Malaysian Infants Aged 6–23 Months. *Nutrients*, *8*(12), 778- 782.

Kia, A. A., Rezapour, A., Khosravi, A., & Abarghouei, V. A. (2017). Socioeconomic Inequality in Malnutrition in Under-5 Children in Iran: Evidence From the Multiple Indicator Demographic and Health Survey, 2010. *Journal of Preventive Medicine and Public Health*, *50*(3), 201-209.

Kimani-Murage, E. W., Wekesah, F., Wanjohi, M., Kyobutungi, C., Ezeh, A. C., Musoke, R. N., ... & Griffiths, P. (2015). Factors affecting actualisation of the WHO breastfeeding recommendations in urban poor settings in Kenya. *Maternal & child nutrition*, *11*(3), 314-332.

Kimiywe, J., & Chege, P. M. (2015). Complementary feeding practices and nutritional status of children 6-23 months in Kitui County, Kenya. *Journal of Applied Biosciences*, *85*(1), 7881-7890.

Kio, J. O. (2015). Factors influencing breastfeeding initiation and continuation among nursing mothers in Nigeria: Evidence from Lagos State. *Journal of Nursing and Health Sciences*, *4*(2), 1-7.

Kostakis, I. (2014). The Determinants of Households' food Consumption in Greece. *International Journal of Food and Agricultural Economics*, *2*, 17-21.

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International, Darya Ganj, New Delhi.

Krebs, N. F., Mazariegos, M., Tshefu, A., Bose, C., Sami, N., Chomba, E., ... & Hambidge, K. M. (2011). Meat consumption is associated with less stunting among toddlers in four diverse low-income settings. *Food and nutrition bulletin*, *32*(3), 185-191.

Kuo, A. A., Inkelas, M., Slusser, W. M., Maidenberg, M., & Halfon, N. (2011). Introduction of solid food to young infants. *Maternal and child health journal*, *15*(8), 1185-1194.

Lamichhane, D. K., Leem, J. H., Kim, H. C., Park, M. S., Lee, J. Y., Moon, S. H., & Ko, J. K. (2016). Association of infant and young child feeding practices with under-nutrition: evidence from the Nepal Demographic and Health Survey. *Paediatrics and international child health*, *36*(4), 260-269.

Laraia, B. A., Leak, T. M., Tester, J. M., & Leung, C. W. (2017). Biobehavioral factors that shape nutrition in low-income populations: a narrative review. *American Journal of Preventive Medicine*, 52(2), 118-126.

Larson, L. M., & Yousafzai, A. K. (2017). A meta-analysis of nutrition interventions on mental development of children under-two in low-and middle-income countries. *Maternal & child nutrition*, *13*(1), e12229.

Legesse, M., Demena, M., Mesfin, F., & Haile, D. (2014). Prelacteal feeding practices and associated factors among mothers of children aged less than 24 months in Raya Kobo district, North Eastern Ethiopia: a cross-sectional study. *International breastfeeding journal*, *9*(1), 189-196.

Legesse, M., Demena, M., Mesfin, F., & Haile, D. (2015). Factors associated with colostrum avoidance among mothers of children aged less than 24 months in Raya Kobo district, North-eastern Ethiopia: community-based cross-sectional study. *Journal of tropical pediatrics*, *61*(5), 357-363.

Lentz, E. C. (2018). Complicating narratives of women's food and nutrition insecurity: Domestic violence in rural Bangladesh. *World Development*, *104*, 271-280.

Leroy, J. L., Ruel, M., Frongillo, E. A., Harris, J., & Ballard, T. J. (2015). Measuring the food access dimension of food security: A critical review and mapping of indicators. *Food and nutrition bulletin*, *36*(2), 167-195.

Li, W., Liu, E., & BeLue, R. (2018). Household water treatment and the nutritional status of primary-aged children in India: findings from the India human development survey. *Globalization and health*, *14*(1), 37-43.

Lohia, N., & Udipi, S. A. (2014). Infant and child feeding index reflects feeding practices, nutritional status of urban slum children. *BMC pediatrics*, *14*(1), 290-297.

López-Laso, E., Roncero-Sánchez-Cano, I., Arce-Portillo, E., Ley-Martos, M., Aguirre-Rodríguez, J., García-Ron, A., ... & Camino-León, R. (2014). Infant botulism in Andalusia (Southern Spain). *european journal of paediatric neurology*, *18*(3), 321-326.

Ma, J. Q., Zhou, L. L., Hu, Y. Q., Liu, J. R., Liu, S. S., Zhang, J., & Sheng, X. Y. (2012). A summary index of infant and child feeding practices is associated with child growth in urban Shanghai. *BMC public health*, *12*(1), 568-573.

Maalouf-Manasseh, Z., Oot, L., & Sethuraman, K. (2016). *Giving children the best start in life: integrating nutrition and early childhood development programming within the first 1000 days.* Technical brief of Food and Nutrition Technical Assistance III Project, Washington, DC.

Maduforo, A. N. (2010). Superstitions and nutrition among pregnant women in Nwangele local government area of Imo state, Nigeria. *Journal of Research in national development*, *8*(2), 1-7.

Mahmoud, A. O., Zayed, K. M., Arafa, N. A., Mahmoud Eid, A. I. (2016). Stunting among Children Attending a Pediatrics Outpatient Clinic in Cairo, Egypt. *The Egyptian Journal of Community Medicine*, 35(3), 33-42.

Mahmudiono, T., Sumarmi, S., & Rosenkranz, R. R. (2016). Household dietary diversity and child stunting in East Java, Indonesia. *Asia Pacific Journal of Clinical Nutrition*, 8, 1-9.

Makoka, D. (2013). *The impact of maternal education on child nutrition: evidence from Malawi, Tanzania, and Zimbabwe*. Calverton, Maryland, USA: ICF International.

Malapit, H. J. L., & Quisumbing, A. R. (2015). What dimensions of women's empowerment in agriculture matter for nutrition in Ghana? *Food Policy*, *52*, 54-63.

Malapit, H. J. L., Kadiyala, S., Quisumbing, A. R., Cunningham, K., & Tyagi, P. (2015). Women's empowerment mitigates the negative effects of low production diversity on maternal and child nutrition in Nepal. *The Journal of Development Studies*, *51*(8), 1097-1123.

Martin, C. R., Ling, P. R., & Blackburn, G. L. (2016). Review of infant feeding: key features of breast milk and infant formula. *Nutrients, 8*(5), 279-286.

Mayen, A. L., Marques-Vidal, P., Paccaud, F., Bovet, P., & Stringhini, S. (2014). Socioeconomic determinants of dietary patterns in low-and middle-income countries: a systematic review–. *The American journal of clinical nutrition*, *100*(6), 1520-1531.

Mazariegos, M., Slater, C., & Ramirez-Zea, M. (2016). Validity of Guatemalan mother's self-reported breast-feeding practices of 3-month-old infants. *Food and nutrition bulletin*, *37*(4), 494-503.

Meerman, J., & Aphane, J. (2012). *Impact of high food prices on nutrition*. Proceedings on "Expert Consultation on Policy Responses to High and Volatile Food Prices", FAO, Rome, Italy.

Mekonnen, H., Tadesse, T., & Kisi, T. (2013). Malnutrition and its correlates among rural primary school children of Fogera district, northwest Ethiopia. *Journal of Nutritional Disorders and Therapy*, *12*, 2161-2167.

Mekonnen, T. C., Workie, S. B., Yimer, T. M., & Mersha, W. F. (2017). Meal frequency and dietary diversity feeding practices among children 6–23 months of age in Wolaita Sodo town, Southern Ethiopia. *Journal of Health, Population and Nutrition*, *36*(1), 18, 1-10.

Mensah, K. A., Acheampong, E., Anokye, F. O., Okyere, P., Appiah-Brempong, E., & Adjei, R. O. (2017). Factors influencing the practice of exclusive breastfeeding among nursing mothers in a peri-urban district of Ghana. *BMC research notes*, *10*(1), 466 - 472.

Mensah, P. (2015). *Community Perceptions and Management of Malnutrition in Children Under Five Years in the Central Tongu District*. Doctoral dissertation, University of Ghana.

Mgongo, M., Chotta, N. A., Hashim, T. H., Uriyo, J. G., Damian, D. J., Stray-Pedersen, B., ... & Vangen, S. (2017). Underweight, Stunting and Wasting among Children in Kilimanjaro Region, Tanzania; a Population-Based Cross-Sectional Study. *International journal of environmental research and public health*, *14*(5), 509-516.

Mitchodigni, I. M., Hounkpatin, W. A., Ntandou-Bouzitou, G., Avohou, H., Termote, C., Kennedy, G., & Hounhouigan, D. J. (2017). Complementary feeding practices: determinants of dietary diversity and meal frequency among children aged 6–23 months in Southern Benin. *Food Security*, *9*(5), 1117-1130.

M'Kaibi, F. K. (2014). *The role of agricultural biodiversity, dietary diversity, and household food security in households with and without children with stunted growth in rural Kenya*. Doctoral dissertation, Stellenbosch: Stellenbosch University.

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, *7*(1), 23-48.

Morrison, J., Dulal, S., Harris-Fry, H., Basnet, M., Sharma, N., Shrestha, B., ... & Saville, N. (2018). Formative qualitative research to develop community-based interventions addressing low birth weight in the plains of Nepal. *Public health nutrition*, *21*(2), 377-384.

Mosites, E. M., Rabinowitz, P. M., Thumbi, S. M., Montgomery, J. M., Palmer, G. H., May, S., ... & Walson, J. L. (2015). The relationship between livestock ownership and child stunting in three countries in eastern Africa using national survey data. *PloS one*, *10*(9), e0136686.

Mshana, N. R. (2000). *Traditional medicine and pharmacopoeia: contribution to the revision of ethnobotanical and floristic studies in Ghana*. Organization of African Unity/Scientific, Technical & Research Commission, Lagos, Nigeria.

Mukuria, A. G., Martin, S. L., Egondi, T., Bingham, A., & Thuita, F. M. (2016). Role of Social Support in Improving Infant Feeding Practices in Western Kenya: A Quasi-Experimental Study. *Global Health: Science and Practice*, *4*(1), 55-72.

Mulu, E., & Mengistie, B. (2017). Household food insecurity and its association with nutritional status of under five children in Sekela District, Western Ethiopia: a comparative cross-sectional study. *BMC Nutrition*, *3*(1), 35-42.

Mwaseba, D. J., Kaarhus, R., & Mvena, Z. S. (2016). Food culture and child-feeding practices in Njombe and Mvomero districts, Tanzania. *Journal of Eastern African Studies*, *10*(2), 325-342.

Myatt, M., Khara, T., Schoenbuchner, S., Pietzsch, S., Dolan, C., Lelijveld, N., & Briend, A. (2018). Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries. *Archives of Public Health*, *76*(1), 28-35.

Nabuuma, D., Ekesa, B., & Kennedy, G. (2018). Dietary diversity among smallholder households in Bukoba district, Tanzania and Kiboga district, Uganda. *African Journal of Food, Agriculture, Nutrition and Development*, *18*(1), 1-8.

Ndekugri, J. (2017). *Socio-Cultural Factors Influencing Exclusive Breastfeeding Practices Among Women in The Bawku West District, Ghana.* Doctoral dissertation, University of Ghana.

Negin, J., Coffman, J., Vizintin, P., & Raynes-Greenow, C. (2016). The influence of grandmothers on breastfeeding rates: a systematic review. *BMC pregnancy and childbirth*, *16*(1), 91- 108.

NEOVITA Study Group. (2016). Timing of initiation, patterns of breastfeeding, and infant survival: prospective analysis of pooled data from three randomised trials. *The Lancet Global Health*, *4*(4), 266-275.

Nikièma, L., Huybregts, L., Martin-Prevel, Y., Donnen, P., Lanou, H., Grosemans, J., ... & Kolsteren, P. (2017). Effectiveness of facility-based personalized maternal nutrition counseling in improving child growth and morbidity up to 18 months: A cluster-randomized controlled trial in rural Burkina Faso. *PloS one*, *12*(5), e0177839.

Nkurunziza, S., Meessen, B., & Korachais, C. (2017). Determinants of stunting and severe stunting among Burundian children aged 6-23 months: evidence from a national cross-sectional household survey, 2014. *BMC pediatrics*, *17*(1), 176 -184.

Novignon, J., Aboagye, E., Agyemang, O. S., & Aryeetey, G. (2015). Socioeconomic-related inequalities in child malnutrition: evidence from the Ghana multiple indicator cluster survey. *Health economics review*, *5*(1), 34 - 45.

Ntenda, P. A. M., & Chuang, Y. C. (2018). Analysis of individual-level and community-level effects on childhood undernutrition in Malawi. *Pediatrics & Neonatology*, *59*(4), 380-389.

Ocampo-Guirindola, M. L., Garcia-Malabad, C. J., Valdeabella-Maniego, M. L. M., & Punzalan, S. L. M. (2016). Association between dietary diversity score and nutritional status of filipino children aged 6-23 months. *Philippine Journal of Science*, *145*(1), 57-69.

Ochieng, J., Afari-Sefa, V., Lukumay, P. J., & Dubois, T. (2017). Determinants of dietary diversity and the potential role of men in improving household nutrition in Tanzania. *PloS one*, *12*(12), e0189022.

Oddo, V. M., & Ickes, S. B. (2018). Maternal employment in low-and middle-income countries is associated with improved infant and young child feeding. *The American journal of clinical nutrition*, *107*(3), 335-344.

Odom, E. C., Li, R., Scanlon, K. S., Perrine, C. G., & Grummer-Strawn, L. (2013). Reasons for earlier than desired cessation of breastfeeding. *Pediatrics*, 12, 1-14.

Ofori-Attah, P. (2013). *A focus on the plight of malnourished children in sub-Saharan Africa*. Retrieved from: www.moteclife.co.uk.

Ogbo, F. A., Page, A., Idoko, J., Claudio, F., & Agho, K. E. (2015). Trends in complementary feeding indicators in Nigeria, 2003–2013. *BMJ open*, *5*(10), e008467.

Oh, H. K., Kang, S., Cho, S. H., Ju, Y. J., & Faye, D. (2019). Factors influencing nutritional practices among mothers in Dakar, Senegal. *PloS one*, *14*(2), e0211787.

Okeyo, D. O., & Kirabira, P. (2016). Household and Food Sensitive Critical Correlates as Predictors of Child Nutritional Status. *Food and Public Health*, *6*(5), 123-129.

Olodu, M. D., Adeyemi, A. G., Olowookere, S. A., & Esimai, O. A. (2019). Nutritional status of under-five children born to teenage mothers in an urban setting, south-western Nigeria. *BMC research notes*, *12*(1), 116-126.

Onyeneke, R. U., Nwajiuba, C. A., Igberi, C. O., Umunna Amadi, M., Anosike, F. C., Oko-Isu, A., ... & Adeolu, A. I. (2019). Impacts of Caregivers' Nutrition Knowledge and Food Market Accessibility on Preschool Children's Dietary Diversity in Remote Communities in Southeast Nigeria. *Sustainability*, *11*(6), 1688- 1693.

Onyesom, I., Onyesom, C., Ofili, M. I., Anyanwu, B. E., & Uzuegbu, U. (2008). Effect of cultural beliefs and forbidden foods on the ABCD parameters of nutrition among some children in Nigeria. *Middle-East J Sci Res*, *3*(2), 53-59.

Owais, A., Schwartz, B., Kleinbaum, D. G., Suchdev, P. S., Faruque, A. S. G., Das, S. K., & Stein, A. D. (2016). Minimum acceptable diet at 9 months but not exclusive breastfeeding at 3 months or timely complementary feeding initiation is predictive of infant growth in rural Bangladesh. *PloS one*, *11*(10), e0165128.

Paciorek, C. J., Stevens, G. A., Finucane, M. M., Ezzati, M., & Nutrition Impact Model Study Group. (2013). Children's height and weight in rural and urban populations in low-income and middle-income countries: a systematic analysis of population-representative data. *The Lancet Global Health*, *1*(5), 300-309.

Pagui, P. C. (2015). *The Association Between an Infant And Young Child Feeding Index, The Nutritional Knowledge Of The Care-Giver And The Nutritional Status Of Children 6-23 Months In The Upper-Manya Krobo District*. Doctoral dissertation, University of Ghana.

Pan American Health Organization (PAHO)/World Health Organization (WHO). 2003. *Guiding Principles for Complementary Feeding of the Breastfed Child.* Washington, DC/Geneva, Switzerland: PAHO/ WHO.

Pearce, J., Taylor, M. A., & Langley-Evans, S. C. (2013). Timing of the introduction of complementary feeding and risk of childhood obesity: a systematic review. *International journal of obesity*, *37*(10), 1295-1309.

Pedovoah, J. F. B. (2015). *Assessing Infant and Young Child Feeding Practices on Nutritional Status of Children (0-23 Months) In the Kumbungu District of Ghana*. Doctoral dissertation, University of Ghana.

Pelletier, D., Haider, R., Hajeebhoy, N., Mangasaryan, N., Mwadime, R., & Sarkar, S. (2013). The principles and practices of nutrition advocacy: evidence, experience and the way forward for stunting reduction. *Maternal & child nutrition*, *9*(S2), 83-100.

Pelto, G. H., Levitt, E., & Thairu, L. (2003). Improving feeding practices: current patterns, common constraints, and the design of interventions. *Food and nutrition bulletin*, *24*(1), 45-82.

Pemunta, N. V., & Fubah, M. A. (2015). Socio-cultural determinants of infant malnutrition in Cameroon. *Journal of biosocial science*, *47*(4), 423-448.

Poda, G. G., Hsu, C. Y., & Chao, J. C. J. (2017). Factors associated with malnutrition among children< 5 years old in Burkina Faso: evidence from the Demographic and Health Surveys IV 2010. *International Journal for Quality in Health Care*, *29*(7), 901-908.

Posadzki, P., Watson, L. K., & Ernst, E. (2013). Adverse effects of herbal medicines: an overview of systematic reviews. *Clinical medicine*, *13*(1), 7-12.

Power, E. M. (1999). An introduction to Pierre Bourdieu's key theoretical concepts. *Journal for the Study of Food and Society*, *3*(1), 48-52.

Prado, E. L., & Dewey, K. G. (2014). Nutrition and brain development in early life. *Nutrition reviews*, *72*(4), 267-284.

Pravana, N. K., Piryani, S., Chaurasiya, S. P., Kawan, R., Thapa, R. K., & Shrestha, S. (2017). Determinants of severe acute malnutrition among children under 5 years of age in Nepal: a community-based case–control study. *BMJ open*, *7*(8), e017084.

Pridmore, P., & Carr-Hill, R. (2009). *Addressing the underlying and basic causes of child undernutrition in developing countries: what works and why?* Ministry of Foreign Affairs of Denmark, Copenhagen: Ministry of Foreign Affairs of Denmark.

Qu, P., Mi, B., Wang, D., Zhang, R., Yang, J., Liu, D., ... & Yan, H. (2017). Association between the Infant and Child Feeding Index (ICFI) and nutritional status of 6-to 35-month-old children in rural western China. *PloS one*, *12*(2), e0171984.

Radwan, H., & Sapsford, R. (2016). Maternal perceptions and views about breastfeeding practices among Emirati mothers. *Food and nutrition bulletin*, *37*(1), 73-84.

Radzyminski, S., & Callister L.C. (2015). Health professionals' attitudes and beliefs about breastfeeding. *The Journal of Perinatal Education*, 24(2), 102-108.

Rah, J. H., Cronin, A. A., Badgaiyan, B., Aguayo, V. M., Coates, S., & Ahmed, S. (2015). Household sanitation and personal hygiene practices are associated with child stunting in rural India: a cross-sectional analysis of surveys. *BMJ open*, *5*(2), e005180.

Raju, D., & Dsouza, R. (2017). *Child undernutrition in Pakistan: what do we know?* (No. 8049). The World Bank, Geneva.

Raman, S., Nicholls, R., Ritchie, J., Razee, H., & Shafiee, S. (2016). Eating soup with nails of pig: thematic synthesis of the qualitative literature on cultural practices and beliefs influencing perinatal nutrition in low- and middle-income countries. *BMC Pregnancy and Childbirth*, *16*(1), 192-206.

Ramos, C. V., Dumith, S. C., & César, J. A. (2015). Prevalence and factors associated with stunting and excess weight in children aged 0-5 years from the Brazilian semi-arid region. *Jornal de Pediatria (Versão em Português)*, *91*(2), 175-182.

Rao, N. D., & Pachauri, S. (2017). Energy access and living standards: some observations on recent trends. *Environmental Research Letters*, *12*(2), 1-12.

Reeves, E. A., & Woods-Giscombé, C. L. (2015). Infant-feeding practices among African American women: Social-ecological analysis and implications for practice. *Journal of Transcultural Nursing*, *26*(3), 219-226.

Reinbott, A., Kuchenbecker, J., Herrmann, J., Jordan, I., Muehlhoff, E., Kevanna, O., & Krawinkel, M. (2015). A child feeding index is superior to WHO IYCF indicators in explaining length-for-age Z-scores of young children in rural Cambodia. *Paediatrics and international child health*, *35*(2), 124-134.

Reinhardt, K., & Fanzo, J. (2014). Addressing chronic malnutrition through multi-sectoral, sustainable approaches: a review of the causes and consequences. *Frontiers in nutrition*, *1*, 13- 19.

Rhodes, B., & McKenzie, T. (2018). To what extent does socio-economic status still affect household access to water and sanitation services in South Africa? *Journal of Economic and Financial Sciences*, *11*(1), 9-17.

Rogers, E., Bell, L., & Mehta, K. (2019). Exploring the Role of Grandparents in the Feeding of Grandchildren Aged 1–5 Years. *Journal of nutrition education and behavior*, *51*(3), 300-306.

Rohner, F., Bradley, A. W., Grant, J. A., Elizabeth, A. Y., Lebanan, M. A. O., Rayco-Solon, P., & Saniel, O. P. (2013). Infant and young child feeding practices in urban Philippines and their associations with stunting, anemia, and deficiencies of iron and vitamin A. *Food and nutrition bulletin*, *34*(2), 17-34.

Roshita, A., Schubert, E., & Whittaker, M. (2013). Child feeding practices in families of working and nonworking mothers of Indonesian middle-class urban families: what are the problems? *Ecology of food and nutrition*, *52*(4), 344-370.

Rovai, A. P., Baker, J. D., & Ponton, M. K. (2013). *Social science research design and statistics: A practitioner's guide to research methods and IBM SPSS*. Watertree Press LLC.

Saaka, M., & Galaa, S. Z. (2017). How is dietary diversity related to haematological status of preschool children in Ghana? *Food & nutrition research*, *61*(1), 1-13.

Saaka, M., Larbi, A., Mutaru, S., & Hoeschle-Zeledon, I. (2016). Magnitude and factors associated with appropriate complementary feeding among children 6–23 months in Northern Ghana. *BMC Nutrition*, *2*(1), 1-8.

Safon, C., Keene, D., Guevara, W. J. U., Kiani, S., Herkert, D., Muñoz, E. E., & Pérez-Escamilla, R. (2017). Determinants of perceived insufficient milk among new mothers in León, Nicaragua. *Maternal & child nutrition*, *13*(3), e12369.

Sarma, H., Khan, J. R., Asaduzzaman, M., Uddin, F., Tarannum, S., Hasan, M. M., ... & Ahmed, T. (2017). Factors influencing the prevalence of stunting among children aged below five years in Bangladesh. *Food and nutrition bulletin*, *38*(3), 291-301.

Sayed, N., & Schönfeldt, H. C. (2018). A review of complementary feeding practices in South Africa. *South African Journal of Clinical Nutrition,* 7, 1-8.

Schönfeldt, H. C., Pretorius, B., & Hall, N. (2016). Bioavailability of nutrients. *Caballero, B, P Finglas and F Toldrá, F (eds) The Encyclopedia of Food and Health*, *1*, 401-406.

Schoonenboom, J., & Johnson, R. B. (2017). How to construct a mixed methods research design. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie*, *69*(2), 107-131.

Sharma, S., Van Teijlingen, E., Hundley, V., Angell, C., & Simkhada, P. (2016). Dirty and 40 days in the wilderness: Eliciting childbirth and postnatal cultural practices and beliefs in Nepal. *BMC Pregnancy and Childbirth*, *16*(1), 147-152.

Shekar, M., Kakietek, J., Dayton Eberwein, J., & Walters, D. (2017). *An investment framework for nutrition: reaching the global targets for stunting, anemia, breastfeeding, and wasting*. The World Bank, Geneva.

Shroff, M. R., Griffiths, P. L., Suchindran, C., Nagalla, B., Vazir, S., & Bentley, M. E. (2011). Does maternal autonomy influence feeding practices and infant growth in rural India? *Social science & medicine, 73*(3), 447-455.

Shubha, D. B., Angadi, N., & Nagarajachari, A. (2016). Infant and young child feeding practices of working and nonworking mothers in urban slums of Davangere city. *International Journal of Medical Science and Public Health*, *5*(3), 420-424.

Shuhaimi, F., & Muniandy, N. D. (2012). The association of maternal employment status on nutritional status among children in selected kindergartens in Selangor, Malaysia. *Asian J. Clin. Nutr*, *4*(2), 1-10.

Sika-Bright, S., & Oduro, G. Y. (2013). Exclusive breastfeeding practices of mothers in Duakor, a traditional migrant community in Cape Coast, Ghana. *Journal of Global Initiatives: Policy, Pedagogy, Perspective*, *8*(1), 6-14.

Singh, K. D., Alagarajan, M., & Ladusingh, L. (2015). What explains child malnutrition of indigenous people of Northeast India? *PloS One*, *10*(6), e0130567.

Smith, J. A., & Osborn, M. (2004). Interpretative phenomenological analysis. *Doing social psychology research*, 5, 229-254.

Sobgui, C. M., Fezeu, L. K., Diawara, F., Diarra, H., Afari-Sefa, V., & Tenkouano, A. (2018). Predictors of poor nutritional status among children aged 6–24 months in agricultural regions of Mali: a cross-sectional study. *BMC Nutrition*, *4*(1), 18-25.

Sola, P., Ochieng, C., Yila, J., & Iiyama, M. (2016). Links between energy access and food security in sub Saharan Africa: an exploratory review. *Food Security*, *8*(3), 635-642.

Solomon, D., Aderaw, Z., & Tegegne, T. K. (2017). Minimum dietary diversity and associated factors among children aged 6–23 months in Addis Ababa, Ethiopia. *International journal for equity in health*, *16*(1), 181-189.

Som, S. V., Prak, S., Laillou, A., Gauthier, L., Berger, J., Poirot, E., & Wieringa, F. T. (2018). Diets and Feeding Practices during the First 1000 Days Window in the Phnom Penh and North Eastern Districts of Cambodia. *Nutrients*, *10*(4), 500-511.

Spiteri Staines, S. (2011). Herbal medicines: adverse effects and drug-herb interactions. *Journal of the Malta College of Pharmacy Practice*, *17*,38-42.

Sraboni, E., & Quisumbing, A. R. (2018). *Women's empowerment in agriculture and dietary quality across the life course: Evidence from Bangladesh* (Vol. 1709). International Food Policy Research Institute, Washington DC, USA.

Ssemukasa, E. L., & Kearney, J. (2014). Complementary feeding practices in Wakiso district of Uganda. *African Journal of Food, Agriculture, Nutrition and Development*, *14*(4), 9085-9103.

Stewart, C. P., Iannotti, L., Dewey, K. G., Michaelsen, K. F., & Onyango, A. W. (2013). Contextualising complementary feeding in a broader framework for stunting prevention. *Maternal & child nutrition*, *9*(2), 27-45.

Sudfeld, C. R., McCoy, D. C., Danaei, G., Fink, G., Ezzati, M., Andrews, K. G., & Fawzi, W. W. (2015). Linear growth and child development in low-and middle-income countries: a meta-analysis. *Pediatrics*, *135*(5), 1266-1275.

Sun, K., Chen, M., Yin, Y., Wu, L., & Gao, L. (2017). Why Chinese mothers stop breastfeeding: Mothers' self-reported reasons for stopping during the first six months. *Journal of Child Health Care*, *21*(3), 353-363.

Tahsina, T., Ali, N. B., Siddique, M. A. B., Ahmed, S., Rahman, M., Islam, S., ... & El Arifeen, S. (2018). Determinants of hardship financing in coping with out of pocket payment for care seeking of under five children in selected rural areas of Bangladesh. *PloS one*, *13*(5), e0196237.

Talbert, A. W., Ngari, M., Tsofa, B., Mramba, L., Mumbo, E., Berkley, J. A., & Mwangome, M. (2016). "When you give birth you will not be without your mother" A mixed methods study of advice on breastfeeding for first-time mothers in rural coastal Kenya. *International breastfeeding journal*, *11*(1), 10-18.

Tampah-Naah, A. M., & Kumi-Kyereme, A. (2013). Determinants of exclusive breastfeeding among mothers in Ghana: a cross-sectional study. *International breastfeeding journal*, *8*(1), 13-18.

Tariku, A., Biks, G. A., Wassie, M. M., Gebeyehu, A., & Getie, A. A. (2016). Factors associated with prelacteal feeding in the rural population of northwest Ethiopia: a community cross-sectional study. *International breastfeeding journal*, *11*(1), 14-23.

Tariku, A., Woldie, H., Fekadu, A., Adane, A. A., Ferede, A. T., & Yitayew, S. (2016). Nearly half of preschool children are stunted in Dembia district, Northwest Ethiopia: a community based cross-sectional study. *Archives of Public Health*, *74*(1), 13-19.

Tariq, J., Sajjad, A., Zakar, R., Zakar, M. Z., & Fischer, F. (2018). Factors Associated with Undernutrition in Children under the Age of Two Years: Secondary Data Analysis Based on the Pakistan Demographic and Health Survey 2012–2013. *Nutrients*, *10*(6), 676-682.

Tassew, A. A., Tekle, D. Y., Belachew, A. B., & Adhena, B. M. (2019). Factors affecting feeding 6–23 months age children according to minimum acceptable diet in Ethiopia: A multilevel analysis of the Ethiopian Demographic Health Survey. *PloS one*, *14*(2), e0203098.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of medical education*, *2*, 53-60.

Tegegne, M., Sileshi, S., Benti, T., Teshome, M., & Woldie, H. (2017). Factors associated with minimal meal frequency and dietary diversity practices among infants and young children in the predominantly agrarian society of Bale zone, Southeast Ethiopia: a community based cross sectional study. *Archives of Public Health*, *75*(1), 53-58.

Tekaly, G., Kassa, M., Belete, T., Tasew, H., Mariye, T., & Teshale, T. (2018). Pre-lacteal feeding practice and associated factors among mothers having children less than two years of age in Aksum town, Tigray, Ethiopia, 2017: a cross-sectional study. *BMC pediatrics*, *18*(1), 310-317.

Tette, E. M., Sifah, E. K., Nartey, E. T., Nuro-Ameyaw, P., Tete-Donkor, P., & Biritwum, R. B. (2016). Maternal profiles and social determinants of malnutrition and the MDGs: What have we learnt? *BMC public health*, *16*(1), 214-221.

Thanh, N. C., & Thanh, T. T. (2015). The interconnection between interpretivist paradigm and qualitative methods in education. *American Journal of Educational Science*, *1*(2), 24-27.

The American Academy of Pediatrics. (2012). Policy Statement: Breastfeeding and the Use of Human Milk. *Journal of American Academy of Pediatrics*, 3, 129-134.

Thet, M. M., Khaing, E. E., Diamond-Smith, N., Sudhinaraset, M., Oo, S., & Aung, T. (2016). Barriers to exclusive breastfeeding in the Ayeyarwaddy Region in Myanmar: Qualitative findings from mothers, grandmothers, and husbands. *Appetite*, *96*, 62-69.

Thorne, S. (2016). *Interpretive description: Qualitative research for applied practice*. Routledge, Abingdon, Oxfordshire.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and applications*, *5*, 147-158.

Tosheno, D., Mehretie Adinew, Y., Thangavel, T., & Bitew Workie, S. (2017). Risk Factors of Underweight in Children Aged 6–59 Months in Ethiopia. *Journal of Nutrition and Metabolism*, *7*, 1-9.

Udoh, E. E., & Amodu, O. K. (2016). Complementary feeding practices among mothers and nutritional status of infants in Akpabuyo Area, Cross River State Nigeria. *SpringerPlus*, *5*(1), 1-6.

UNICEF (1990) *Strategy for improved nutrition of children and women in developing countries*. UNICEF Policy Review 1990. UNICEF: New York.

UNICEF (2016b), UNICEF: *Collecting water is often a colossal waste of time for women and girls, Press release*. Retrieved From: https://www. unicef.org/media/ media92690.html

UNICEF (2018). *Global databases, based on MICS, DHS and other nationally representative surveys, 2013-2018.* UNICEF: New York.

UNICEF. (2013). *Improving child nutrition: the achievable imperative for global progress*. United Nations Children's Fund, UNICEF: New York.

UNICEF. (2016). *From the first hour of life: Making the case for improved infant and young child feeding everywhere*. UNICEF: New York.

UNICEF/WHO/World Bank Group (2019). *Joint child malnutrition estimates: key findings of the 2019 edition*. UNICEF/WHO/World Bank Group, Geneva.

Vaida, N. (2013). Impact of Maternal Occupation on Health and Nutritional Status of Preschoolers. (In Srinagar City). *IOSR Journal of Humanities and Social Science (IOSR-JHSS), 7*(1), 9-12.

Van Ansem, W. J., Schrijvers, C. T., Rodenburg, G., & van de Mheen, D. (2014). Maternal educational level and children's healthy eating behaviour: role of the home food environment (cross-sectional results from the INPACT study). *International Journal of Behavioral Nutrition and Physical Activity*, *11*(1), 113-119.

Victora, C. G., Bahl, R., Barros, A. J., França, G. V., Horton, S., Krasevec, J., ... & Group, T. L. B. S. (2016). Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The Lancet, 387* (10017), 475-490.

Victora, C. G., de Onis, M., Hallal, P. C., Blössner, M., & Shrimpton, R. (2010). Worldwide timing of growth faltering: revisiting implications for interventions. *Pediatrics*, 9, 1-17.

Walsh, A., Kearney, L., & Dennis, N. (2015). Factors influencing first-time mothers' introduction of complementary foods: a qualitative exploration. *BMC Public Health*, *15*(1), 939-944.

Walson, J. L., & Berkley, J. A. (2018). The impact of malnutrition on childhood infections. *Current opinion in infectious diseases*, *31*(3), 231-238.

Wanjohi, M., Griffiths, P., Wekesah, F., Muriuki, P., Muhia, N., Musoke, R. N., ... & Kimani-Murage, E. W. (2016). Sociocultural factors influencing breastfeeding practices in two slums in Nairobi, Kenya. *International breastfeeding journal*, *12*(1), 5-12.

WHO (2013). *Definition of key terms Consolidated ARV guidelines, Definitions of Age groups and populations*. World Health Organization, Geneva, Switzerland.

WHO, UNICEF (2010) Operational guide enhancing optimal infant and young child feeding practices through the public health system. World Health Organization, Geneva, Switzerland.

WHO, UNICEF, IFPRI, UC Davis, USAID, FANTA, Macro International (2008). *Indicators for assessing infant and young child feeding practices*. Geneva: World Health Organization.

Williams, L., Campbell, K., Abbott, G., Crawford, D., & Ball, K. (2012). Is maternal nutrition knowledge more strongly associated with the diets of mothers or their school-aged children? *Public health nutrition, 15*(08), 1396-1401.

Wolde, M., Berhan, Y., & Chala, A. (2015). Determinants of underweight, stunting and wasting among schoolchildren. *BMC Public Health, 15*(1), 8-15.

Wondafrash, M., Huybregts, L., Lachat, C., Bouckaert, K. P., & Kolsteren, P. (2017). Feeding practices and growth among young children during two seasons in rural Ethiopia. *BMC Nutrition, 3*(1), 39-46.

Wood, C. T., Skinner, A. C., Yin, H. S., Rothman, R. L., Sanders, L. M., Delamater, A. M., & Perrin, E. M. (2016). Bottle size and weight gain in formula-fed infants. *Pediatrics, 138*(1), e20154538.

World Health Organization (2014). *Targets, Global Nutrition" 2025: Wasting policy brief. Retrieved from: http://www.who.int/nutrition/ publication ns/globaltargets2025_policybrief_wasting/en/.*

World Health Organization (2014b). *Targets, Global Nutrition (2014). 2025: Stunting Policy Brief. Retrieved From: http://www.who. int/nutrition/topics/global targets_stunting_ policybrief. pdf.*

World Health Organization (2016). *Infant and young child feeding*. Retrieved from: http://who.int/mediacentre/factsheets/fs342/en/

World Health Organization (2018). *Botulism and Infant Botulism*. World Health Organization, Geneva, Switzerland

World Health Organization (2018). *Infant and Young Child Feeding Key Facts.* Retrieved From: http://www.who.int/news-room/fact-sheets/ detail/infant-and-young-child-feeding.

World Health Organization (WHO) (2017). *Infant and Young Child feeding facts Sheet.* Retrieved From: http://www.who.int/mediacentre/ factsheets/fs342/en/

World Health Organization (WHO). (2008). *Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held 6-8 November 2007.* Washington DC, USA. World Health Organization (WHO).

World Health Organization, & UNICEF. (2003). *Global strategy for infant and young child feeding*. World Health Organization, Washington DC, USA.

World Health Organization. (2006). *WHO child growth standards: length/height for age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age, methods and development*. World Health Organization, Washington DC, USA.

World Health Organization. (2007). *Global Database on Child Growth and Malnutrition: Growth Reference Data for 5-19 Years*. Retrieved From: *http://www. who. int/growthref/en/*.

World Health Organization. (2014). *WHO recommendations on postnatal care of the mother and newborn*. World Health Organization, Washington DC, USA.

World Health Organization. (2015). *Child growth indicators and their interpretation.* World Health Organization, Washington DC, USA.

World Health Organization. (2018). *The double burden of malnutrition: policy brief* (No. WHO/NMH/NHD/17.3). World Health Organization, Washington DC, USA.

Wren, H. M., Solomons, N. W., Chomat, A. M., Scott, M. E., & Koski, K. G. (2015). Cultural determinants of optimal breastfeeding practices among indigenous Mam-Mayan women in the Western Highlands of Guatemala. *Journal of Human Lactation*, *31*(1), 172-184.

Yawson, A. E., Amoaful, E. O., Senaya, L. K., Yawson, A. O., Aboagye, P. K., Mahama, A. B., ... & Ngongalah, V. (2017). The lancet series nutritional interventions in Ghana: a determinants analysis approach to inform nutrition strategic planning. *BMC Nutrition*, *3*(1), 27-34.

Yimer, N. B., & Liben, M. L. (2018). Effects of home delivery on colostrum avoidance practices in North Wollo zone, an urban setting, Ethiopia: a cross sectional study. *Journal of Health, Population and Nutrition*, *37*(1), 4-10.

Yotebieng, M., Chalachala, J. L., Labbok, M., & Behets, F. (2013). Infant feeding practices and determinants of poor breastfeeding behavior in Kinshasa, Democratic Republic of Congo: a descriptive study. *International breastfeeding journal*, *8*(1), 11-17.

APPENDICES

APPENDIX A

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF POPULATION AND HEALTH

TOPIC: FEEDING PRACTICES AND NUTRITIONAL STATUS OF INFANTS UNDER-TWO YEARS IN SELECTED DISTRICTS IN THE EASTERN REGION OF GHANA

QUESTIONNAIRE FOR MOTHER AND CHILD

INTRODUCTION

The main objective of the study is to investigate maternal-related, socio-cultural, household and health services-related factors that influence infant and young children feeding practices and their nutritional status in selected districts in the Eastern Region of Ghana. This research is part of the academic requirements for the award of a PhD. You are assured that all responses provided would be strictly confidential and used for academic purposes only. Please, your anonymity is guaranteed and your participation in this study is voluntary; however, your decision to participate will be highly appreciated. Thank you for your cooperation. For further enquiries, please contact Christiana Nsiah-Asamoah on 0249943297 or 0502157527.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF CHILD AND PRIMARY CAREGIVER

Serial Number _____ Questionnaire Status _______ (1=complete; 2= partially complete)

Interviewer ID ______ Date of Interview ____/____/___ Primary Caregiver/Child dyad Number___ ___

Instructions: Where applicable; Circle the appropriate response or fill responses in the provided spaces.

No	Question	Code	Options
A1	Informant	1 2 3 4 9	Mother Father Grandparent Sibling Other(s), specify----------------------------

A2	Infant's Primary Caregiver	1 2 3 4 5 9	Mother Father Grandparent Sibling House help Other(s), specify------------------------------
A3	Head of household	1 2 3 4 5 9	Mother Father Grandparent Sibling House help Other(s), specify------------------------------
A4	Age of Mother (in completed years)		--
A5	Maternal marital status	1 2 3 4 5 9	Single (Never Married) Cohabiting Married Separated/ Divorced Widowed Other, specify-------------------------------
A6	Number of Living Children	1 2 3 4 5 6 9	1 2 3 4 5 6 >6 children
A7	How many children **under two** years of age do you have?	1 2 3 9	1 2 3 Others……………………………….
A8	Religion	1 2 3 4 5 9	Islamic Christianity Traditionalist/ Spiritualist Hindu No religion Other, specify------------------------------
A9	Ethnicity	1 2 3 4 9	Akan Ewe Krobo

			Fulani Other, specify----------------------------
A10	Mother's Employment status	1 2 3	Not employed in the last 12 months before the survey (*skip to A13*) Not currently employed, but worked in past 12 months (*skip toA14*) Currently employed (*proceed with A11*)
A11	Do you usually work throughout the year, or do you work seasonally, or only once in a while?	1 2 3	work throughout the year work seasonally/part of the year only once in a while
A12	Are you paid in cash or kind for this work or are you not paid at all?	1 2 3 4	Cash only Cash and in Kind In Kind only Not paid
A13	Mother's highest level of education attained	1 2 3 4 5 6 7 8 9 10	None Lower Primary (1-3) Upper Primary (4-8) JHS/JSS Secondary (Completed) Secondary (Not Completed) Vocational/Technical institute College/ University University Other, specify-------------------------------

ASSESSMENT OF MOTHER'S AUTONOMY

Autonomy variable 1: DECISION-MAKING POWER, Participation in decisions regarding Household matters			
A14	Who usually decides how the money you earn will be used: you, your (husband/partner), or you and your (husband/partner)	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify …………………………. ………………………………………..

	jointly?		
A15	Who usually makes decisions about health care for yourself: you, your (husband/partner), you and your (husband/partner) jointly, or someone else?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..
A16	Who has the last word regarding what to do if a member of household is sick?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..
A17	Who usually makes decisions about making major household purchases?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..
A18	Who usually makes decisions about your own healthcare?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..
A19	Who usually makes decisions about whether to purchase major goods for the household such as a TV?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..
A20	Who usually makes decisions about whether to purchase small household items such as a table,chair,utensils?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ………………………….. ………………………………………..

A21	Who usually makes decisions about making household purchases for daily needs?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A22	Who usually makes decisions about your desire to visit your family or relatives?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A23	Who usually makes decisions about what foods are to be cooked each day?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A24	Who has the last word regarding decisions on kids' schooling?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A25	Who has the last word regarding whether to have another child or not?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A26	Who usually makes decisions about whether or not you should work outside the home?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A27	Who usually makes decisions about inviting guests to your home?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………
A28	Who usually makes decisions about your visiting of or staying with parents or siblings?	4 3 2 1	Respondent Respondent and husband/partner jointly Husband/partner Other, specify ……………………………………

Autonomy variable 2: Control and access over finances (Financial independence)			
A29	Who has control of money for perishable food items like tomatoes, onion, cassava, yam?	1 0	Respondent has control [ ] No control [ ]
A30	Who has control of money for clothes?	1 0	Respondent has control [ ] No control [ ]
A31	Who has control of money for medicine?	1 0	Respondent has control [ ] No control [ ]
A32	Who has control of money for toiletries like soap for bathing?	1 0	Respondent has control [ ] No control [ ]
A33	If you wanted to buy yourself a dress, would you feel free to do it without consulting your husband?	1 0	Yes [ ] No [ ]
A34	If you wanted to buy yourself a small item of jewelry, such as a pair of earrings or bangle, would you feel free to do it without consulting your husband?	1 0	Yes [ ] No [ ]
A35	If you wanted to buy a small gift for your parents or other family members, would you feel free to do it without consulting your husband?	1 0	Yes [ ] No [ ]
A36	Are you allowed to have some money set aside that you can use as you wish?	0 1 2	No, Never Yes, Some of the time Yes, All the time
A37	When you earn money, do you usually give all of it to your husband? (**Reverse code**)	0 1 2	Yes, All the time Yes, Some of the time No, Never
A38	Do you and your husband ever talk together with each other about what to spend money on?	0 1 2	No, Never Yes, Some of the time Yes, All the time
A39	Do you have a say in how the household's overall income is spent?	0 1 2	No, Never Yes, Some of the time Yes, All the time

SECTION B: BACKGROUND INFORMATION ON INDEX CHILD

A40	Do you get any cash in hand to spend on household expenditure?	0 1 2	No, Never Yes, Some of the time Yes, All the time

No	Question	Code	
B1	What is your child's name? [*Use this NAME when you are asking remaining questions, but do not write the name]* *Please get his/her card*		
B2	Sex of Child	1 2	Male Female
B3	Child's date of birth *[If there is no documentary source, probe using memorable dates/calendar of events until a mother provides the most accurate answer]*	Date: ______ / ____ /______	
B4	Source of birth date	1 2 3	Child health card Mother/caregiver Other source (specify) …………………………
B5	Age in Months *(Confirm from immunization/weighing card)* **Record current age in months** …………………….....	1 2 3 4 5	0-6 7-8 9-11 12-17 18-23
B6	Birth Order of child	1 2 3 4 5 6 7	1st –skip to B8 2nd 3rd 4th 5th 6th >6th
B7	Age of immediate older sibling *(in completed months)*	--------	-----------------------------
B8	Desirability of pregnancy of index child	1 2	Planned Unplanned
B9	Number of Antenatal Sessions attended during pregnancy	1 2 3 4 9	None One to Two Three to Four More than Four Other, specify
B10	Place of delivery	1 2 9	Home Health facility, specify--------------------- Other, specify----------------------

B11	Assistance during delivery	1 2 3 4 5 9	Relative eg. Mother, in-law, Auntie TBA Midwife Nurse Doctor Other, specify-------------- --------------------
B12	What was the maturity of the infant at birth?	1 2 3	Preterm Term Post dates
B13	Birth Weight of Infant at Birth in Kilograms (*Confirm from immunization/Weighing card*)	-----------	1= <2.5Kg 2= 2.5 -3.0Kg 3= >3.0-3.5Kg 4=>3.5 – 4.0Kg 5=>4.0Kg
B14	Current Weight of child in Kilograms (*Confirm from immunization card/ health record book*)		----------------kg
B16	Is the child immunized as per scheduled (*Confirm from immunization/weighing card)*	1 2	Yes, (*Skip to question No. B18*) No, (*Proceed to question No. B17*)
B17	If No, Why?	1 2 3 9	Mother too busy Facility too far from place of residence Mother does not think it is important Other, specify--------------- ------------------------------ ------------------------------- ------------------------------ ------------------------------- ------------------------------
B18	Has the infant been introduced to complementary foods?	1 2	Yes, (*proceed to question No. B19*) No, (*Skip to question No. B20*)
B19	Has the infant /child had any episode of the following 1	**Condition** Diarrhoea	**No. of Episodes** -------------------------------

	conditions or illnesses since introduction of Complementary foods? (*probe and highlight code and number of episodes against each condition in list*)	Atopic Dermatitis Pneumonia	__________________________ -------------------------------
B20	Has your child been sick in the past one month?	1 2	Yes, (*Proceed with B21*) No, (*skip to SECTION C*)
B21	If Yes, what was the sickness? (*More than one responses possible*)	**Condition** 1.Malaria 2.Diarrhea 3.Shortness of breath, cough 4. Fever 9. Others, specify	**No. of times** .... ……………………… ……………………….. ………………………….. . …………………………
B22	Did you seek medical care when your child fell sick?	1 2	Yes No
B23	If yes, where did you seek medical care?	1 2 3 4 9	Own medication Traditional healer Herbal centre Hospital/health center/clinic Other, specify ------------- ------------------------------- -------------------------------
B24	If no, why did you not seek any medical care when your child fell sick?	1 2 3 4 5 9	Lack of money for transportation Mother too busy Facility too far from place of residence Thought condition was not serious No/expired NHIS card Other, specify ------------- ------------------------------- ------------------------------- ---------

SECTION C: BACKGROUND INFORMATION ON HOUSEHOLD

	Question	Code	Options	Skip
C1	Residence (Specify Area, Community, Town, Village)			
C2	**Household Size**: How many people in total live in your house?	1 2 3 4 5 6	<3 3-4 5-6 7-8 9-10 >10	
C3	How many rooms does your household occupy?	1 2 3 4 5	1-2 3-4 5-6 7-8 >8	
C4	Do you and your household own the house you live in?	1 2	Yes No	
C5	If No, what is the type of tenancy?	1 2 3 4 9	Company/government house Rented house Family house Caretaker Other, specify…………………… ………….	
C6	What type of building materials was used in the construction of your place of residence?	1 2 3 4 9	Cement blocks Wood Mud, plastered with cement Baked Bricks Other, specify…………………… …………………………….	
C7	What is your main source of drinking water?	1 2 3 4 5 6 9	River Afram Volta lake Water tap Borehole Unprotected well Protected well Other (Specify)…………………....	
C8	Where is the source of the water located?	1 2 9	Inside respondent's house Outside respondent's house Other, specify…………………… ………	
C9	Have you had water from this source in the past two weeks?	1 2	Yes No	
C1	Do you do anything to the water	1	Boiling	

0	before drinking it? (Probe for all responses) (*More than one response possible)*	2 3 4 5 6 9	Use traditional herbs Use chemicals Filters/Sieves Decant Nothing done Others (Specify)…………………. ……………………………..…….	
C1 1	Does your household have access to a toilet facility?	1 2	Yes No	
C1 2	If Yes, What type of toilet facility?(*Observe also if possible)*	1 2 3 4 9	Bucket Traditional pit latrine Ventilated improved pit latrine Flush toilet/Water Closet (WC) Other (specify)…………………..	
C1 3	If No, where do you go/use to attend to nature's call/defecate?(*probe further*)	1 2 3 4 9	Bush Open field Near the river/lake Behind the house Other, specify…………………….…….	
C14	At what occasions do you always ensure that your hands as a caregiver are washed? (*Multiple answers allowed*)	1 2 3 4 5 6 9	After defecation/visiting toilet Before feeding the child Before eating Before preparing food When I think they are dirty When water is available Others, specify…………………….……… …………………………….……………..	
C15	How does your household dispose off refuse?	1 2 3 4 9	Buried/ burn Dumped around the house or compound Dumped in a specific place far from the house Collected by a garbage collector Other, specify…………………….	

			………… …………………………… ………………..	
C16	What is the main fuel used in cooking in your household?	1 2 3 4 5 9	Gas Electricity Kerosene Firewood Charcoal Other, specify…………………… …………	
C17	Do you have a source of electricity at home?	1 2	Yes No	
C18	About how much is your **average monthly** household income?(**an estimation**)	1 2 3 4 5 6	less than GH¢100 between GH¢100 - GH¢300 between GH¢301 - GH¢500 between GH¢501 - GH¢700 between GH¢701 - GH¢900 more than GH¢900	

C19. Kindly indicate if you have any of the under-listed domestic animals in your household.

Domestic animal	Yes	**Purpose/reason for rearing animals**
Poultry		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………
Goats		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………
Sheep		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………
Pigs		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………
Cattle		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………
Rabbit		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and

		consumption [ ] 4= Other……………………………………………………………………….
Snails		1= Sale [ ] 2 = Consumption [ ] 3= Both sale and consumption [ ] 4= Other……………………………………………………………………….

C20. Kindly tell me if you have any of these items and indicate whether it is currently working.

Tick all that are applicable

Item	**Yes (currently working)**	**Yes (NOT working)**	**No**
Telephone/ mobile phone			
Refrigerator			
Solar Panels			
Generator			
Radio			
Television			
Video deck			
Multi TV			
Bicycle			
Motor cycle			
Vehicle (car, bus etc)			
Kiosk/store			
Computer/Lab top			

INFORMATION RELATED TO FEEDING IN HOUSEHOLD

C21	How do you **mainly/usually** obtain food as a household? [Probe for all responses]	1= Mainly Farming
		2=Mainly Buying
		3= Mainly Food aid/donation
		9= Any other, specify………… ……………………………… ……..
C22	Who has the primary responsibility of providing food for the household?	1= Father
		2= Mother
		3= Grandparent
		4= Other relatives
		9= Any other (specify)…………………… ……
C23	What is the estimated percentage of household income that is allocated to food?	1= Largest percentage (>50%)
		2= Medium percentage (50%)
		3= Smallest percentage (<50%)
		4= No specific allocation
		5= Do not know
C24	Who usually decides how family income should be used?	1= Husband/Partner
		2= Wife/mother
		3=Any other (specify)……….. ……………………………… …..
C25	Who usually decides on what food to be cooked each day in the household?	1= Husband/Partner
		2= Wife/mother
		3= Any other (specify)…………

SECTION D: INFORMATION ON MOTHER'S FEEDING PRACTICES OF INDEX CHILD

No	Question	Codes	Responses	Skip
D1	Did you ever breastfeed [*Name of index child*]?	1 2 3	Yes No Do Not Know	
D2	If No, why?	1 2 3 4	No milk Did not want to breast feed Traditional beliefs (*eg. child will fall sick or die*) Other (Specify)………………… …………………………………	
D3	If yes, how soon after birth did you put [*Name of index child*] to the breast?	1 2 3 4	Within 30 minutes after birth If less than 24 hours (*record number of hours*)……….hours If more than 24 hours (*record number of days*)………..days If mother does not know, record as well	
D4	During the first 3 days after delivery, Did you give [*Name of index child*] the yellowish fluid/liquid that came from your breasts?	1 2 3	Yes No Do Not Know	
D5	Yesterday during the day or at night, did [*Name of index child*] consume breast milk from you?	1 2 3	Yes No Do Not Know	
D6	Are you still breastfeeding [*Name*]?	1 2	Yes No	
D7	If No, how old (*in months*) was [*Name*] when you stopped breastfeeding?	1 2 3 4 5 6 7 9	1-3 >3-5 >5 -6 >6 -8 >8-10 >10-12 >12 Do not Know/Cannot remember	
D8	Was [*Name*] given any vitamin drops or any liquid-based micronutrient	1 2 3	Yes No Do Not Know	

	supplement yesterday during the day or at night ? *If Yes, Name of drops/supplement……* ……………………………			
D9	Was [*Name*] given ORS yesterday during the day or at night?	1 2 3	Yes No Do Not Know	

Feeding Practices of the Index Child in the First 6 months of Life

QUESTION	**RESPONSE**
D10.When did you put the child to breast for the first time? after birth	a. Within 30 minutes [ ] b. Between 30 minutes to an hour [ ] c. More than one hour on first day [ ] d. Within 24 hours [ ] e. After first day of delivery [ ]
D11. Did you introduce any other foods/drinks/herbal mixture/water to child before the 6 month of his/her life	a. YES [ ] b. NO [ ]
D12. If yes, types of foods/drinks/herbal mixture/water introduced	a. water [ ] b. Sugar/glucose solution [ ] c. Infant formula [ ] d. Herbal drink [ ]
D13. Did you practice exclusive breastfeeding on your baby?(**to be answered by interviewer based on answers given in H13 and H14**)	a. YES [ ] b. NO [ ]
D14. If yes, for how long did you breastfeed your baby solely on breastmilk.	a. 1-2 months [ ] b. > 2- 3 months [ ] c.>3- 4 months [ ] d. >4 – 5 months [ ] e. >5 – 6 months [ ] f. > 6 months [ ]

D15. Have you ever been discouraged on Exclusive Breastfeeding practice	a. YES [ ] b. NO [ ]
D16. If yes, who was the source of discouragement to you?	a. Mother/Mother-in-law [ ] b. Husband [ ] c. Both Mother and Husband [ ] d. Both Mother-In-law and Husband [ ] e. Other relatives [ ] f. Neighbours [ ]

D17. Have you introduced complementary/other foods to your child	a. YES [ ] b. NO [ ]
D18. If yes, when should a mother start introducing complementary foods to a baby?	a. 1-2 months [ ] b. > 2- 3 months [ ] c.>3- 4 months [ ] d. >4 – 5 months [ ] e. >5 – 6 months [ ] f. > 6 months [ ]
D19. In your case, when did YOU start introducing complementary foods to your baby?	a. 1-2 months [ ] b. > 2- 3 months [ ] c.>3- 4 months [ ] d. >4 – 5 months [ ] e. >5 – 6 months [ ] f. > 6 months [ ]
D20. Are you currently still breastfeeding?	a.YES [ ] b. NO [ ]
D21. How many times did you breastfeed the child in the last 24 hours?	a. = none [ ] b. = 1-5 times [ ] c. = 6 - 9 times [ ] d. = > 10 times [ ]
D22. If No, when did you stop breastfeeding?	a. before 6 months [ ] b. between 6 and 9 months [ ] c. between 9 and 12 months [ ]
D23. When should a mother stop breastfeeding her baby?	a. Before 6 months [ ] b. Before 12 months [ ] c. After 12 months -24 months (2 years) [ ] d. After 24 months(2 years) [ ]
D24. If currently breastfeeding, when do you plan/intend to stop breastfeeding?	a. Before 6 months [ ] b. Before 12 months c. After 12 months -24 months [ ] d. After 24 months (2 years) [ ]
D25. When did you give water to your child for the first time?	a. After birth [ ] b. Within the first 6 months [ ] c. At 6 months [ ]

D26. What foods do people in this community give within the first six months of their baby's life?	a. Breastmilk only [ ] b. Breastmilk and infant formula [ ] c. Breastmilk and koko [ ] d. Koko only [ ] e. Infant formula only [ ] f. Other (specify)________________ _____________________ Don't know [ ]

D27. What foods did You give to the child **within the first six months?**	a.Breastmilk only [ ] b.Breastmilk and infant formula [ ] c.Breastmilk and koko [ ] d. Koko only [ ] e. Infant formula only [ ] f. Other (specify)____
D28. Do you think it is good to give only breastmilk for the first six months?	a. Yes [ ] b. No [ ] c. Don't know [ ]
D29. If yes, why?	…………………………………………………………
D30. If no, why not?	…………………………………………………………

Complementary Feeding Practices of Index Child

D31. Are you currently breastfeeding?	a. Yes [ ] b. No [ ]
D32. When do people in this community usually start giving other foods to their	a. Before 6 months [ ] b. At 6 months [ ] c. After 6 months [ ] d. Don't know [ ]

children in addition to breastmilk ?	
D33. At what age did you begin giving your child complementary foods?	a. Before 6 months [ ] b. At 6 months [ ] c. After 6 months [ ] d. Cannot remember [ ]
D34. What food did you give to the child at the start of complementary feeding?	a= Koko [ ] b = Cerelac [ ] c = Rice water [ ] d = Tom brown [ ] e= Other(specify)…………………………………… …………………………………..
D35.How often do you feed your child in a day in addition to breastmilk ?	a.Two times a day [ ] b.Three times a day[ ] c.Four times a day [ ] d.Five times a day [ ] e.Other(specify)………………………………………………… ………………………..

SECTION E : 24 - HOUR DIETARY RECALL: For Caregivers with children aged between 0 and 23 completed months

Please tick or fill in the boxes provided to indicate answers where applicable.

Was yesterday a typical day for the child? If yes, please describe the foods (meals and snacks) that the child ate or drank yesterday during the day and night, whether at home or outside the home. Start with the first food or drink of the morning. Write down all foods and drinks mentioned including breast milk. When composite dishes are mentioned, ask for the list of ingredients. When the respondent has finished, probe for meals and snacks not mentioned.

Kindly tell me all the foods the child ate from the past 24- hours to now. For each food item, write "1" for one ladle; "2" for two ladles; "3" for three ladles, "4" for four ladles; etc in the Quantity column

Meal	Time	Description/Type of Food	Quantity
Breakfast			
Snack			
Lunch			
Snack			
Super			
Snack			

(***Interviewer***: *If infant/baby is less than 6 months, but received other foods ask questions E1and E2)*

E1. If child was given anything other than breast milk, why?
1= Started work [ ] 2= breast milk insufficient [ ] 3= Child cannot suckle [ ]
4= Painful breastfeeding [ ] 5= Maternal Illness [ ] 6= New pregnancy [ ] 7 = Other (specify)...
………………………………………………………..

E2. At what age (months) did the child receive water for the first time?
1= ≤ 3months [ ] 2= 4-5 months [ ] 3= Not yet [ ]

(***Interviewer***: *If child is above 6 months, but was not fed other foods in the preceding 24 hours ask questions E3 to E5 below).*

E3. If child did not receive other foods at all in addition to breast milk, why?
1= It is not yet time to introduce other foods [ ]
2= Child refuses to eat [ ]
3= Child was sick [ ]
4= I didn't know what to give [ ]
5= Work constraints [ ]
9= Other,
(specify)…………………………………………………………………
…

E4. At what age (months) did child receive water for the first time?
1= ≤3 months [ ]
2= 4-5 months [ ]
3= at 6 months [ ]
4= after 6months [ ]

E5. At what age (months) did child receive other foods for the first time?
1= ≤3 months [ ]
2= 4-5 months [ ]
3= at 6 months [ ]
4= after 6months [ ]

FOOD GROUP FREQUENCY QUESTIONNAIRE (FGFQ), WITHIN 24 HOURS AND PAST 7 DAYS BEFORE DAY OF INTERVIEW

Ask to find out whether each item under each food group was given at least once in the last 24 hours or 7 days before proceeding to the next food group

FOOD GROUP	**Dietary Diversity Score** Has [*Name of Child*] eaten this in the last **24 hours**?	**Food Group Frequency Score** Has [*Name of Child*] eaten this in the last **seven (7) days**?	**How many days in the last 7 days did [*Name of Child*] eat it?**
Grains, roots and tubers (rice, bread, maize, cassava, yam, plantain, etc).			
Legumes and Nuts (beans, palmnut groundnuts, peanut, soybeans etc)			
Dairy Products (milk, cow's milk butter, yoghurt and cheese)			
Flesh foods (meat, fish, poultry etc)			
Eggs			
Vitamin A rich fruits (watermelon, mangoes, carrot, sweet potatoes, dark green leafy			

vegetables such as *ayoyo, borkorbokor* etc)			
Other fruits and vegetables (oranges, banana, pineapples etc)			

SECTION F: ANTHROPOMETRIC MEASUREMENT OF MOTHER AND CHILD

Kindly measure the child's weight, length and MUAC twice and record

Age in Month	Weight (kg)	Length (cm)
	1st Reading [ ] 2ndReading [ ]	1stReading [ ] 2ndReading [ ]

Mother Anthropometric Measurements

Mother's Height (cm)…………………………………………….

Mother's Weight (Kg) ……….. ……………………………….

SECTION G: MOTHER'S NUTRITIONAL KNOWLEDGE INTERVIEW GUIDE

Kindly provide the appropriate response where applicable

G1. At what time should breastfeeding be initiated after child birth?

a. Within 30 minutes after birth [ ] b. More than 30 minutes [ ] c. On second day [ ]

G2. Should colostrum (first yellowish milk) be given to a new born baby?

1 = Yes [ ] 2 = No [ ]

G3. Do you believe that a baby (0-6 months) can survive on breast milk alone without even water?

1 = Yes [ ] 2 = No [ ]

G4. At what **age in months** should **water** be introduced to a child?

a. less than 1 month[ ] b. 1-2[ ] c. 3-4[ ] d. 5- before 6 [ ] e. From 6 [ ] f. Any age [ ]

G5. At what **age in months** should semi-solid, solid and soft foods be introduced to a child?

a. less than 1 month[ ] b. 1-2[ ] c. 3-4[ ] d. 5- before 6 [ ] e. From 6 [ ]f. Any age [ ]

G6. At least, how many times should a mother breast feed a child after 6 months?

a. 1-3 times [ ] b. 4-6 times[ ] c. 7-9 times [ ] d. 10 times and above [ ]

e. As often as baby wants to breastfeed [ ]

G7. For how long should a mother breastfeed a child before stopping?

a. Less than 6 months [ ] b. less than 1 year [ ] c. less than 2 years [ ]

d. More than 2 years [ ]

G8. Which of the following is best for infants **under or less than 6 months**?

a. Infant formula [ ] b.Breast milk [ ] c. Koko [ ] 4. Tom brown [ ]

5.Don't know [ ]

G9. Have you heard of kwashiorkor? 1 = Yes [ ] 2 = No [ ]

G9b. What are the symptoms of kwashiorkor? [Interviewer: ***Do not read the answers for the mother but just allow her to mention the symptoms she knows]***

1 = don't know [ ]

2 = child has big stomach, big head, thin legs, looks sick and unhappy, body and face swells, [ ]

3 = Others (specify) ……………………………………

G10. What are the causes of kwashiorkor?

1 = don't know [ ] 2 = evil spirits [ ] 3 = lack of the right type of food [ ]

4 = others (specify) ……………………………

G11. Which of these groups of food are good for good eye sight?

1 = plantain, maize and rice [ ]

2 = green leafy vegetables and palm oil [ ]

3 = chicken and meat [ ]

G12. Fruits and vegetables must be eaten daily? 1. Yes [ ] 2. No [ ] 3. Don't know [ ]

G13. Rickets /bow legs in children are caused by lack of …………………………………………

1. Vitamin A [ ] 2.Vitamin B [ ] 3.Vitamin C [ ] 4. Vitamin D [ ]

5.Don't know [ ]

G14. Which of the following is a rich source of iron and therefore required in the formation of blood? 1. Meat [ ] 2.Tomatoes [ ]

3.Cassava dough [ ] 4. Rice [ ] 5.Don't know [ ]

G15. Goitre (protruded thyroid gland or around the front part of the neck) is caused by lack of...

1. Iodine [ ] 2. Iron [ ] 3.Calcium [ ] 4.Vitamin A [ ] 5. Any other answer …………

6. Don't know [ ]

G16.Which of the following is a food item that protects us against goitre?

1. Sea foods [ ] 2. Beans [ ] 3.groundnuts [ ] 4.water melon [ ] 5. Don't know [ ]

G17. Which of the following local foods would you describe as a **body-building food**?

1. Plantain [ ] 2. Meat [ ] 3. Rice [ ] 4. Cassava [ ] 5. Maize [ ] 6. Don't know [ ]

G18. Which of the following local foods would you describe a an **Energy-giving food**?

1. Watermelon [ ] 2. Cassava [ ] 3. Fish [ ] 4. Milk [ ] 5. Beans [ ] 6. Don't know [ ]

G19. Which of the following local foods would you describe as a **body-Protective food**?

1. Rice [ ] 2. Plantain [ ] 3. Orange [ ] 4. Milk [ ]
5. Maize [ ] 6. 6. Don't know [ ]

G20.How often should a caregiver/mother **feed a child at age 6 months daily**? **At 6 months:**

1. 1 time [ ] 2. 2 times [ ] 3.3 times [ ] 4. 4 times [ ] 5. 5 times [
6. Other…………………..[ ]

G21.How often should a caregiver/mother **feed a child at age 6-9 months**? **At 6-9 months:**

1. 1 time [ ] 2. 2 times [ ] 3. 3 times [ ] 4. 4 times [ ] 5. 5 times [ ]
6. Other……………………………………………………….[ ]

G22. How often should a caregiver/mother **feed a child at age 9-12 months**? **At 9-12 Month:**

1. 1 time [ ] 2. 2 times [ ] 3. 3 times [ ] 4. 4 times [ ] 5. 5 times [ ]
6. Other………………………………………………………….[ ]

G23. How often should a caregiver **feed a child at age 12-24 months**?

1. 1 time [ ] 2. 2 times [ ] 3. 3 times [ ] 4. 4 times [ ] 5. 5 times [ ]
6. Other……………………………………………………….[ ]

APPENDIX B

FOCUS GROUP DISCUSSION FOR GRANDMOTHERS

TOPIC: FEEDING PRACTICES AND NUTRITIONAL STATUS OF INFANTS AND UNDER-TWO'S IN SELECTED DISTRICTS IN THE EASTERN REGION OF GHANA

INTRODUCTION

The main objective of the study is to investigate maternal-related, socio-cultural, household and health services-related factors that influence infant and young children feeding practices and their nutritional status in selected districts in the Eastern Region of Ghana. This research is part of the academic requirements for the award of a PhD. You are assured that all responses provided would be strictly confidential and used for academic purposes only. Please, your anonymity is guaranteed and your participation in this study is voluntary; however, your decision to participate will be highly appreciated. Thank you for your cooperation. For further enquiries, please contact Christiana Nsiah-Asamoah on 0249943297 or 0502157527.

<u>TOPICS</u>

A. EXCLUSIVE BREASTFEEDING KNOWLEDGE AND PRACTICES

1. What can you say about the teachings regarding breastfeeding?

[Guide the participants to talk about early initiation and exclusive breastfeeding. Probe for cultural practices that are performed before breastfeeding commences.

Probe for cultural barriers that prevent mothers' from adhering to appropriate breastfeeding practices].

2. Do you honestly believe that breastmilk alone is enough for a baby for the first six months? Tell us about your own experience. *[Guide the participants to share their experiences, both positive and negative. Give them the opportunity to give reasons why they either agree or disagree with exclusive breastfeeding of babies for the first six months of life]*

4. Are there some foods including local ones and herbs that are recommended for babies early in life, before 6 months of age?

If yes, What are some examples of foods commonly introduced to babies early in life, before 6 months of age?

[Probe further to find out why these foods are usually given to babies as their first foods before they turn 6 months? Find out whether giving these foods is a means of socializing the infant into the family's diet?]

B. COMPLEMENTARY FEEDING KNOWLEDGE AND PRACTICES

1. When was your grandchild given other foods in addition to breastmilk?
2. At what age should a mother start giving solid foods to a baby?
3. At 6 months of age, what other foods should be given to a baby?
4. What would you consider a healthy meal for a child aged 6-24 months? *[Probe for nutrient density, enriching, etc.]*
5. What do you think a mother should do to ensure that her child is healthy and well fed? *[probe to find out how the participants support their daughters/daughter-in-laws to make this possible?]*
6. Which local foods make a child grow strong?
7. Which local foods give blood or build the blood levels of children?
8. Which local foods are regarded as promoting brain development of children?
9. Which local foods are recommended to protect young children below two years against common childhood diseases and infections?

C. CULTURAL FACTORS INFLUENCING INFANTS AND YOUNG CHILDREN FEEDING

1. In your opinion, do caregivers adhere to or follow guidelines given by community health nurses/ volunteers on appropriate complementary feeding practices?

Probes [*If no, why*? *What are some barriers to adhering to appropriate complementary feeding practices?*
Are some of these barriers culturally-related?
Give the participants an opportunity to specify these cultural barriers that prevent mothers' from adhering to guidelines given on appropriate complementary feeding.]

2. What are some cultural beliefs, taboos, superstitions, norms and traditions associated with infant and young child feeding in this community?

Probes*: Emphasize and discuss extensively on cultural beliefs, taboos, superstitions norms and traditions associated with the following:*

a. Exclusively breastfeeding for first 6 months of child's life
b. Breastfeeding (eg. in public, for 2 years and beyond).
c. Cultural beliefs on when mothers should start breastfeeding (giving colostrum) or stop breastfeeding.

d. Complementary feeding/Introducing foods to infant/baby
e. Special cultural or religious celebrations/ceremonies that involve giving newborn babies any food or drinks after birth and before six months of age.
f. Recommended local foods and why they are recommended for children below two years?
g. Herbs recommended to children aged below 6 months and why they are recommended?

h. Herbs recommended to children aged above 6 months and why they are recommended?
i. Diet restrictions, prohibitions, forbidden foods for children below 6 months of age and why they are regarded as such?
j. Diet restrictions, prohibitions , forbidden foods for children above 6 months of age and why they are regarded as such?

3. What are your suggestions on how to encourage or improve appropriate infant and young child feeding in this community?
Probes [*Do some of these suggestions require addressing some culturally-related issues/factors. Which suggestions will you give on how to design culturally-relevant interventions to actively engage grandmothers to support and improve infant and young child feeding at the household and community level]*

Thank you for participating in this study.

APPENDIX C

FOCUS GROUP DISCUSSION FOR COMMUNITY HEALTH WORKERS AND VOLUNTEERS

INTRODUCTION

The main objective of the study is to investigate maternal-related, socio-cultural, household and health services-related factors that influence infant and young children feeding practices and their nutritional status in selected districts in the Eastern Region of Ghana. This research is part of the academic requirements for the award of a PhD. You are assured that all responses provided would be strictly confidential and used for academic purposes only. Please, your anonymity is guaranteed and your participation in this study is voluntary; however, your decision to participate will be highly appreciated. Thank you for your cooperation. For further enquiries, please contact Christiana Nsiah-Asamoah on 0249943297 or 0502157527.

TOPICS

CULTURAL FACTORS INFLUENCING INFANTS AND YOUNG CHILDREN FEEDING

1. What is your view on the adequacy of feeding infants and young children less than 2 years in this community?

Probes: [*The discussion should be based on the adequacy of both breastfeeding and complementary feeding practices of caregivers.*
The discussion should include why they think it is adequate or not adequate. The discussion should also include the following aspects; introduction of solid, semisolid foods and soft foods, dietary diversity, frequency of feeding and continued breastfeeding to 2 years and above.

2. On the basis of your experiences and interactions with mothers in your communities, in your opinion do you think mothers adhere to recommendations on exclusively breastfeeding their babies for the first six months of their lives.

Probes *: [If no, what are some barriers/challenges that prevents mothers from practicing appropriate breastfeeding practices? (Exclusive breastfeeding for the first 6 months of a child's life, and continue breastfeeding till 2 years and even beyond).*
Give the participants an opportunity to specify some of these cultural practices and beliefs that prevent mothers' from adhering to appropriate breastfeeding practices.
Also, probe for some misconceptions of mothers associated with not adhering to recommendations to exclusive breastfeed infants for the first six months of their lives.]

3. In your opinion, do caregivers initiate complementary feeding at the appropriate time?

Probes: [*If no, why*? *Give participants the opportunity to explain some barriers/challenges that are faced by caregivers which prevents them from initiating complementary feeding ideally after the first 6 months of a child's life.]*

4. In your opinion, do caregivers adhere to or follow guidelines given by community health nurses/ volunteers on appropriate complementary feeding practices?

Probes: [*If no, why*? *Give the participants an opportunity to explain some barriers that prevent mothers from adhering to appropriate complementary feeding practices? Find out whether some of these barriers are culturally-related?]*

5. In your opinion, do you think household members, including fathers and grandmothers; exert social influences—sometimes negative because of cultural norms—on a mother's adoption of optimal infant feeding practices?

Probe: [*If yes, specify these negative influences which have come about as a result of cultural norms and which prevents mothers' from adopting appropriate child feeding practices].*

6. What are some examples of foods commonly introduced to babies early before 6 months of age?

Probes: [*Why are these foods usually given to babies as their first foods before they turn 6 months of age?*

Find out whether giving these foods is a means of socializing the infant into the family's diet culture?

Find out whether these foods can have an effect on the growth, development and health status of infants and young children from the medical point of view.

Give specific examples of negative health effects of some of these foods that are introduced to babies early before 6 months of age.

What role can you play as Community Health Workers/Volunteers to help address this issue? Give suggestions on how mothers can be encouraged to follow recommendations given on exclusive breastfeeding.]

7. Based on your experiences during home visits and when discharging community health activities, which cultural beliefs, taboos, superstitions, norms and traditions are associated with infant and young child feeding in this community?

Probes*: [Emphasize and discuss extensively on cultural beliefs, taboos, superstitions, norms and traditions associated with the following and find out about their positive and negative implications from the point of view of the CHWs and CHVs*

a. Not exclusively breastfeeding for first 6 months of a child's life

b. Breastfeeding (eg. in public, for 2 years and beyond).

c. Cultural beliefs on when mothers' should start breastfeeding (giving colostrum) or stop breastfeeding.

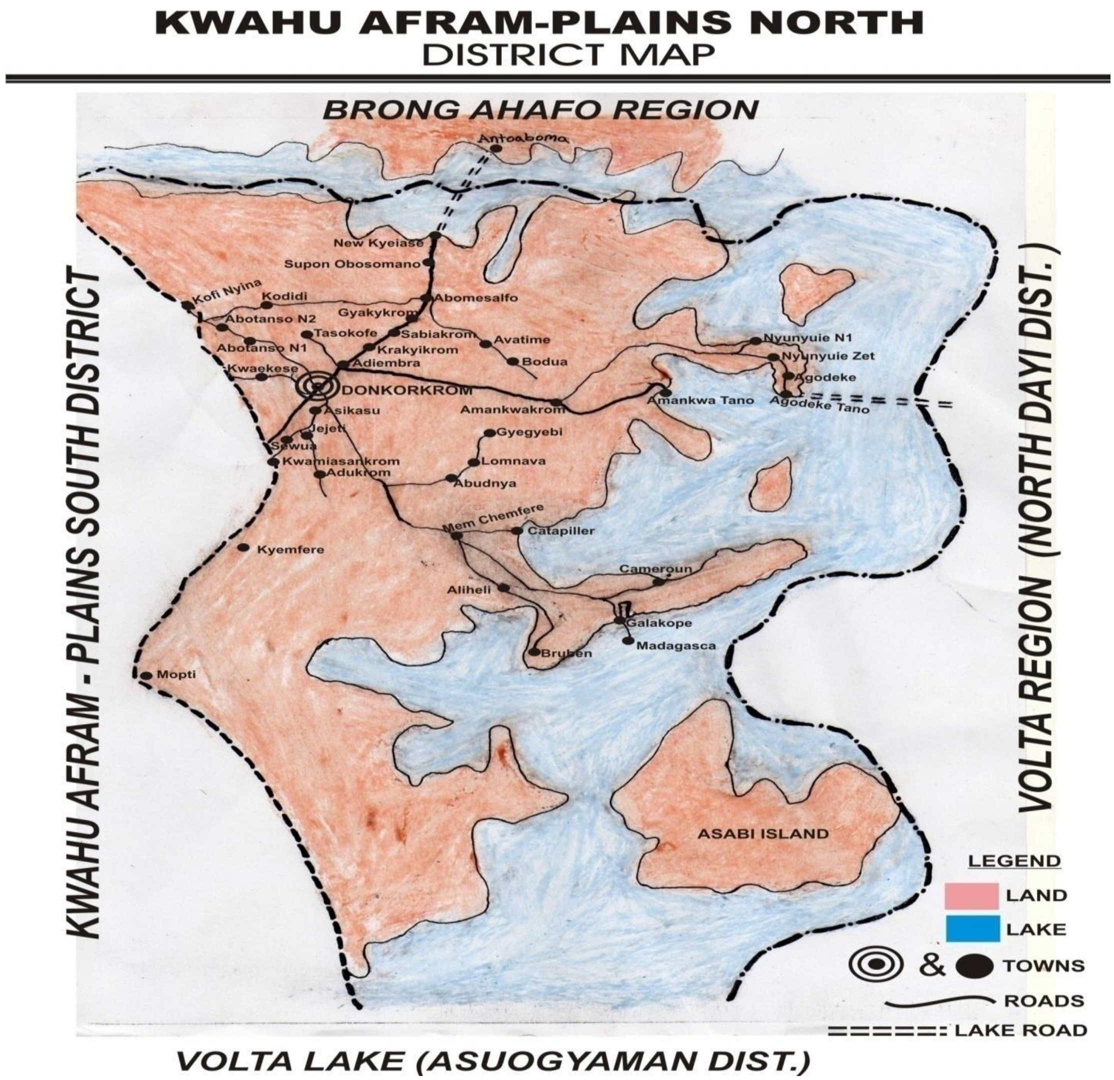
d. Complementary feeding/Introducing foods to infants
e. Special cultural or religious practices that are celebrated that involve giving new-born babies food or drinks
f. Forbidden foods and why they are considered as forbidden at that age
g. Recommended local foods and why they are recommended for children?
h. Herbs recommended to children aged below 6 months and why they are recommended?
i. Herbs recommended to children aged above 6 months and why they are recommended?
j. Diet restrictions for children below 6 months and above 6 months and why?
Are these diet restrictions culturally-determined or are they related to traditions?

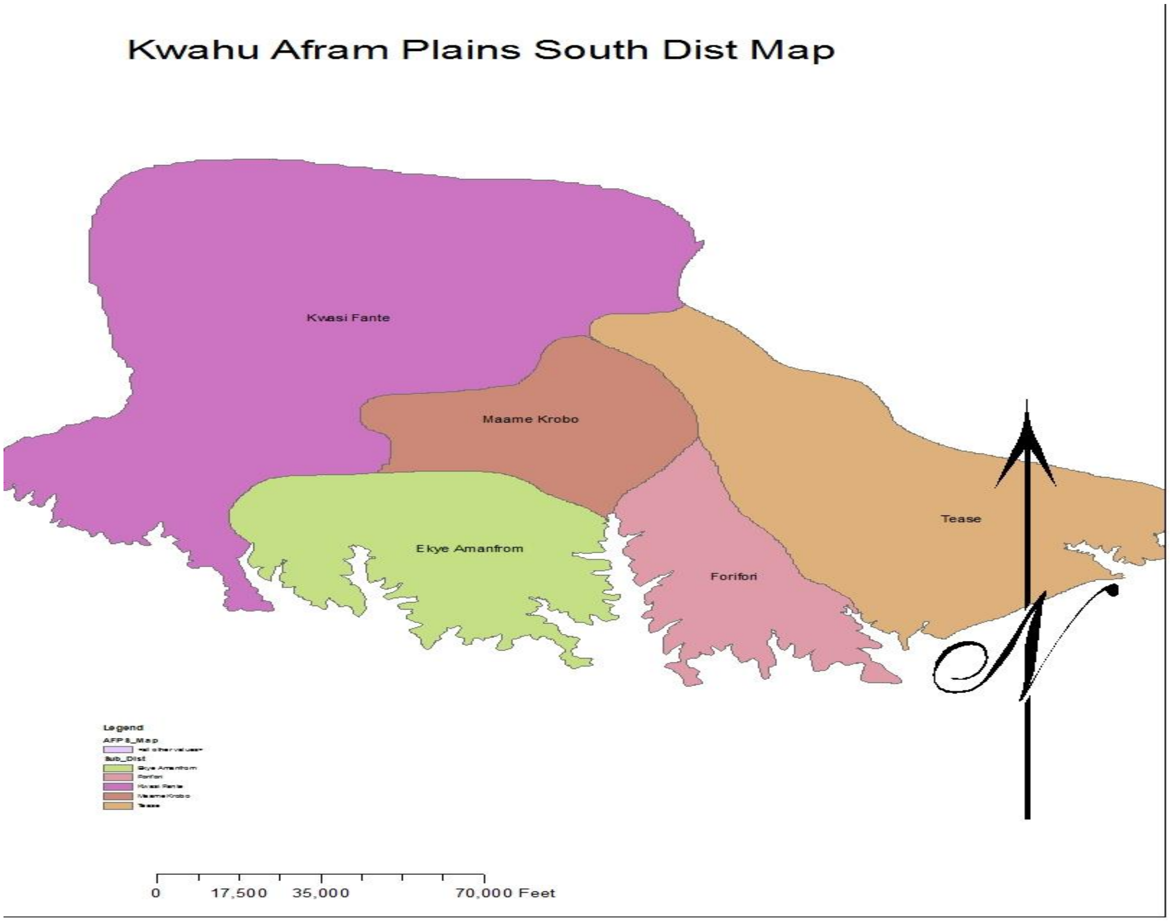
8. What are your suggestions on how to encourage or improve appropriate infant and young child feeding in this community?
Probes: [*Do some of these suggestions require addressing some culturally-related issues/factors.]*

Thank you for participating in this study.

APPENDIX D

MAP OF KWAHU AFRAM PLAINS NORTH AND SOUTH DISTRICTS




Kwahu Afram Plains South Dist Map
Kwasi Fante
Maame Krobo
Ekye Amanfrom
Forifori
Tease
Legend
0 17,500 35,000 70,000 Feet

APPENDIX E

CHI-SQUARE TEST RESULTS OF ASSOCIATIONS BETWEEN SOME HOUSEHOLD AND MATERNAL VARIABLES

Table 16: Association between main sources of drinking water, type of toilet facility, average monthly household income, house ownership and socio-economic status (SES)

	Socio-economic status			Cramér's V	p-value
	Poor	Middle	Rich		
Main source of drinking water					
Improved	136 (36.4)	238 (63.6)	135 (72.2)	0.30	<0.001
Unimproved	238 (63.6)	136 (36.4)	52 (27.8)		
Type of toilet facility					
Improved	9 (2.4)	93 (24.9)	127 (67.9)		<0.001
Unimproved	365 (97.6)	281 (75.1)	60 (32.1)	0.56	
Average month household Income					
Less than GH¢100	181 (48.4)	139 (37.2)	47 (25.1)	0.26	<0.001
Between GH¢100 - GH¢300	159 (42.5)	164 (43.8)	53 (28.4)		
Between GH¢301 - GH¢500	27 (7.2)	55 (14.7)	49 (26.2)		
More than GH¢500	7 (1.9)	16 (4.3)	38 (20.3)		
Home ownership					
Yes	131 (35.0)	135 (36.1)	70 (37.4)	0.02	0.852
No	243 (65.0)	239 (63.9)	117 (62.6)		

Source: Nsiah-Asamoah (2019)

Table 17: Association between household income and home ownership

	Home ownership		Cramér's V	p-value
	Yes	No		
Average month household Income				
Less than GH¢100	116 (31.6)	251 (68.4)	0.11	0.011
Between GH¢100 - GH¢300	159 (42.3)	217 (57.7)		
Between GH¢301 - GH¢500	41 (31.3)	90 (68.7)		
More than GH¢500	20 (32.8)	41 (67.2)		

Source: Nsiah-Asamoah (2019)

Table 18: Association between educational level of mother and employment status of mother

	Mother's Employment status			Cramér's V	p-value
	Not employed in last 12 months	Not currently employed, but worked in past 12 months	Currently employed		
Mother's highest level of education attained					
None	54 (32.5)	66 (39.8)	46 (27.7)	0.19	<0.001
Primary	99 (34.0)	125 (43.0)	67 (23.0)		
JHS/JSS	100 (31.5)	89 (28.1)	128 (40.4)		
Secondary+	29 (18.0)	40 (24.8)	92 (57.2)		

Source: Nsiah-Asamoah (2019)

Table 19: Association between employment status of mother and financial independence of mother

	Mother's Employment status			Cramér's V	p-value
	Not employed in last 12 months	Not currently employed, but worked in past 12 months	Currently employed		
Financial independence of mother					
Low	160 (32.6)	187 (38.1)	144 (29.3)	0.15	<0.001
Middle	104 (29.5)	119 (33.8)	129 (36.7)		
highest	18 (19.6)	14 (15.2)	60 (65.2)		

Source: Nsiah-Asamoah (2019)

Table 20: Association between employment status of mother and decision making power of mother

	Mother's Employment status			Cramér's V	p-value
	Not employed in last 12 months	Not currently employed, but worked in past 12 months	Currently employed		
Decision making power					
Lowest	148 (46.2)	108 (33.8)	64 (20.0)	0.22	<0.001
Middle	101 (21.1)	182 (38.0)	196 (40.9)		
Highest	33 (24.3)	30 (22.0)	73 (53.7)		

Source: Nsiah-Asamoah (2019)

APPENDIX F

ETHICAL CLEARANCE LETTER FROM INSTITUTIONAL REVIEW BOARD, UNIVERSITY OF CAPE CAOST, GHANA

UNIVERSITY OF CAPE COAST

INSTITUTIONAL REVIEW BOARD SECRETARIAT

TEL: 03321-33172/3 / 0207355653/ 0244207814
E-MAIL: irb@ucc.edu.gh
OUR REF: UCC/IRB/A/2016/121
YOUR REF:
OMB NO: 0990-0279
IORG #: IORG0009096

C/O Directorate of Research, Innovation and Consultancy

9TH MAY, 2017

Ms Christiana Nsiah-Asamoah
Department of Population and Health
University of Cape Coast

Dear Ms Nsiah-Asamoah,

ETHICAL CLEARANCE –ID :(UCCIRB/CHLS/2017/02)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted **Provisional Approval** for the implementation of your research protocol titled **' Feeding Practices and Nutritional Status of Infants and Under-5 in selected districts in the Eastern Region of Ghana.'**

This approval requires that you submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

Please note that any modification of the project must be submitted to the UCCIRB for review and approval before its implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST
Date:

Samuel Asiedu Owusu
Administrator

APPENDIX G

ETHICAL CLEARANCE LETTER FROM INSTITUTIONAL REVIEW BOARD, DODOWA HEALTH RESEARCH CENTRE, GHANA HEALTH SERVICE, GHANA

In case of reply the number and date of this letter should be quoted.

GHANA HEALTH SERVICE
GHS
Your Health - Our Concern

Dodowa Health Research Centre
Ghana Health Service
P. O. Box DD1
Dodowa

Tel: +233-50-1336188
Email: IRBdodowa@gmail.com

My Ref. DHRC/IRB/1/05/17
Your Ref. No.

11th May 2017

Ms. Christiana Nsiah-Asamoah
University of Cape Coast
Cape Coast

Dear Madam,

RE: FEEDING PRACTICES AND NUTRITIONAL STATUS OF INFANTS AND UNDER -5 IN SELECTED DISTRICTS IN THE EASTERN REGION OF GHANA : DHRCIRB/04/02/17

Reference is made to your letter dated 21st February, 2017 on the above-mentioned subject.

Upon addressing the comments raised after the initial and subsequent reviews, the IRB has approved your proposal.

The approval requires that you submit a periodic report on the progress of the project during the implementation period and a final full report to the Institutional Review Board (IRB) on completion of the study. The IRB may observe or cause to be observed procedures and records of the study during and after implementation. Please note that any modification of the project must be submitted to the IRB for review and approval before its implementation.

You are required to report all serious adverse events related to your study to the IRB where applicable within seven days verbally and fourteen days in writing. You are also to inform the IRB and your Institution before any publication of the research findings.

Please quote the protocol identification number in all future correspondence in relation to this protocol.

Yours Sincerely,

KLutterodt

The Chairperson
Institutional Review Board
Dodowa Health Research Centre
Dodowa

CC: Dr. John Williams
Director
Dodowa Health Research Centre
Dodowa