

**SCHOOL OF PUBLIC HEALTH**

**COLLEGE OF HEALTH SCIENCES**

**UNIVERSITY OF GHANA**



**ASSESSMENT OF FACTORS ASSOCIATED WITH UNDER FIVE MALNUTRITION**

**IN CHILDREN IN ASHIEDU KETEKE SUB METRO IN GREATER ACCRA**

**BY**

**JONATHAN YEBOAH ANSAH**

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**DECLARATION**

I hereby declare that with the exception of references cited to other people's work which has been duly acknowledged, this work is the result of my own research work done under supervision and has neither in part or whole been presented elsewhere for another

.....

Ansah Jonathan Yeboah

(Student- 10224818)

Date.....

.....

Dr Samuel Sackey

(Academic Supervisor)

Date.....

**DEDICATION**

I dedicate this work to my lovely mother Mrs Agartha Yeboah Ansah and my Family.

### **ACKNOWLEDGEMENT**

I thank God for his grace that has brought me this far in my academics.

I wish to express my sincere gratitude to my academic supervisor, Dr. Samuel Sackey of School of Public Health for his guidance, contribution and mentorship.

My sincere thanks go to Princess Marie Louis hospital administration and nurses for the assistance and support showed to me during the period of my data collection.

I thank my parents and siblings for their support during this period.

May God richly bless you all, I would not have come this far without you.

## ABSTRACT

Malnutrition continues to be a significant public health and development concern globally. It is a serious problem because it is causing the deaths of 3.5 million children under 5 years old per-year. Its magnitude is still high in sub Saharan countries including Ghana.

The main objective of this study therefore, was to assess associated factors of malnutrition in under five years children in Ashiedu Keteke sub metro in the Greater Accra region.

A hospital based cross-sectional study was conducted in July 2018 to assess the nutritional status of children aged zero to fifty-nine (0-59) months in the facility to identify factors leading to malnutrition in the community. A total of three hundred and twenty-eight (328) children and their caregivers participated. A pre-tested, structured, interviewer administered questionnaire consisting of mothers' childcare practices, mother and child socio-demographic factors and anthropometric measurement was used to gather data. A systematic sampling method was used in sampling the caregivers over a three-week period. Nutritional indices measured were height, weight and mid upper arm circumference.

Data was entered into Microsoft Excel 2013. WHO Anthro Plus software version 3.2.2 was used in determining the z-scores and STATA 15 was used to perform univariate and multiple logistic regression analysis.

The prevalence of malnutrition was 78.05%. The prevalence of stunting and underweight were 55.7% and 31.7% respectively. Also, 3.85% had severe acute malnutrition and 15.85% had moderate acute malnutrition. 6.71% of mothers were less than 20 years (teenagers), which was quite significant percentage of teenage mothers and 93.29% were adult mothers.

The following factors were found to be associated and contributed to the development of malnutrition among under five in the study area. These factors were: maternal age, hygiene practice of the mother, sanitation factors, source of drinking water, recent medical history of diarrhea or respiratory tract infection. It was also noticed that the highest proportion of malnourished children were in age group 6-20 months.

From the multivariate analysis, older mothers were less likely to have a stunted child than a young mother for all various age groups in reference to age less than 20 years. Though the lowest prevalence of underweight was seen in those who were 0-6 months (6.45%), there was no pattern in the prevalence of underweight with increasing age

These findings suggest that education on infant and young child care and feeding practices need to be re-structured to suit the population. In addition, more efforts such as periodic assessments need to be put into existing interventions to help reduce the prevalence of malnutrition.

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## LIST OF ABBREVIATIONS

AOR	- Adjusted Odds Ratio
COR	- Crude Odds Ratio
FAO	- Food and Agriculture Organization of the United Nations
GDHS	- Ghana Demographic and Health Survey
GHS	- Ghana Health Service
GSS	- Ghana Statistical Service
HA	- Height – for – Age
HAZ	- Height – for – Age Z - Score
MUAC	-Mid Upper Arm Circumference
MAM	- Moderate Acute Malnutrition
OR	- Odds Ratio
SAM	- Severe Acute Malnutrition
UNICEF	- United Nations Children’s Fund
WA	- Weight – for – Age
WAZ	- Weight – for – Age Z – Score
WFP	- World Food Program
WHO	- World Health Organization

## DEFINITIONS OF TERMS

**Household:** A person or a group of persons, who lived together in the same house or compound and shared the same house-keeping arrangements.

**House:** Structurally separate and independent place of abode such that a person or group of persons can isolate themselves from the hazards of climate such as storms and the sun

**Mid Upper Arm Circumference:** Imaginary midpoint between the shoulder tip and the elbow of the arm.

**Stunted:** Height-for-age below minus two standard deviation of the median

**Underweight:** Weight-for-age below minus two standard deviation of the median

**Under-five:** A child between the ages of 0 to 59 months

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

Malnutrition in children is a major public health problem, especially in many low-income and middle-income countries. It adversely affects the productivity of nations as well as creating economic and social challenges among vulnerable groups. Poor nutrition is associated with suboptimal brain development, which negatively affects cognitive development, educational performance and economic productivity in adulthood. (Coulter,2014)

Malnutrition is a broad term and it is usually referred to as undernutrition and it encompasses all forms of nutritional disorders and includes both overnutrition and undernutrition (WHO Nutrition 2016)

WHO defines malnutrition as; the cellular imbalance between the supply of nutrients and energy the body demands to ensure growth maintenance and specific functions. Malnutrition can be termed as chronic malnutrition (stunting) and acute malnutrition (underweight and wasting). It can be termed as macronutrient deficiency malnutrition (Protein-Energy Malnutrition) or micronutrient deficiency malnutrition e.g, iron etc. There are two main forms of acute malnutrition, which are marasmus and kwashiorkor(WHO Nutrition, 2016).

Child growth is the most widely used measure of children's nutritional status. The first 1000 days of life, (0-23months) is a very critical phase in a child's life during which rapid physical and mental development occurs (Walker et al. (2007)

The new SDGs state that eradication of extreme poverty and hunger by halving the number of people living on less than \$1.25 a day and the number of people suffering from hunger.

Of even more significance are the uneven rates of achievement in different parts of the globe. For instance, the largest decline in the prevalence of malnutrition has been in East Asia, especially in China, while substantial improvements have been made in Latin America and the Caribbean. However, less progress was seen in South Asia, where the prevalence of underweight remains very high, while sub-Saharan Africa saw little or no change over the period 1990-2011.

Undernutrition during this critical phase can have irreversible consequences on the child's growth leading to an increased risk of morbidity and mortality in children (Murray-Kolb., et al 2013). Undernutrition is commonly assessed through the measurement of a child's anthropometry (height, weight), as well as through screening for biochemical and clinical markers. Wasting, stunting and underweight are expressions of undernutrition and the anthropometric indicators for the assessment (Duggan et al., 1999).

## **1.2 Problem Statement**

In 2015, globally about 7.7% of children were wasted, 24.5% were stunted and 15% were underweight. In that same year, malnutrition contributed to about 45% of deaths in children below five years. The African region and South-East Asia have reported the highest prevalence of undernutrition, with the former accounting for about 39.4% of the stunted, 24.9% of the underweight and 10.3% of the wasted children under-5 years of age. (Sulaiman et al., 2018).

According to the 2015 Millennium development goal (MDG) report, sub-Saharan Africa (SSA) accounts for one third of all undernourished children globally, with West Africa and East Africa having the highest prevalence, highlighting that malnutrition still remains a major health concern for children under 5 years in the sub-region, thus buttressing the need for urgent intervention (Luchuo et al. 2013).

Over nutrition on the other hand is not really a problem of Africa. However, it is increasing gradually in southern part of Ghana. A study conducted in 2015 by UNICEF in Ghana indicated that 23% are stunted (7% severely); and 6% are wasted (1% severely), 13% of children under five are underweight (3% severely). These figures show that malnutrition is still high in the country or the Sub-Saharan region (UNICEF 2015).

Despite interventions like school feeding program, improved primary health care and many more, malnutrition is still high. Malnutrition has been directly linked to low socio-economic status studies done in Ethiopia (Bantamen et al. 2014)

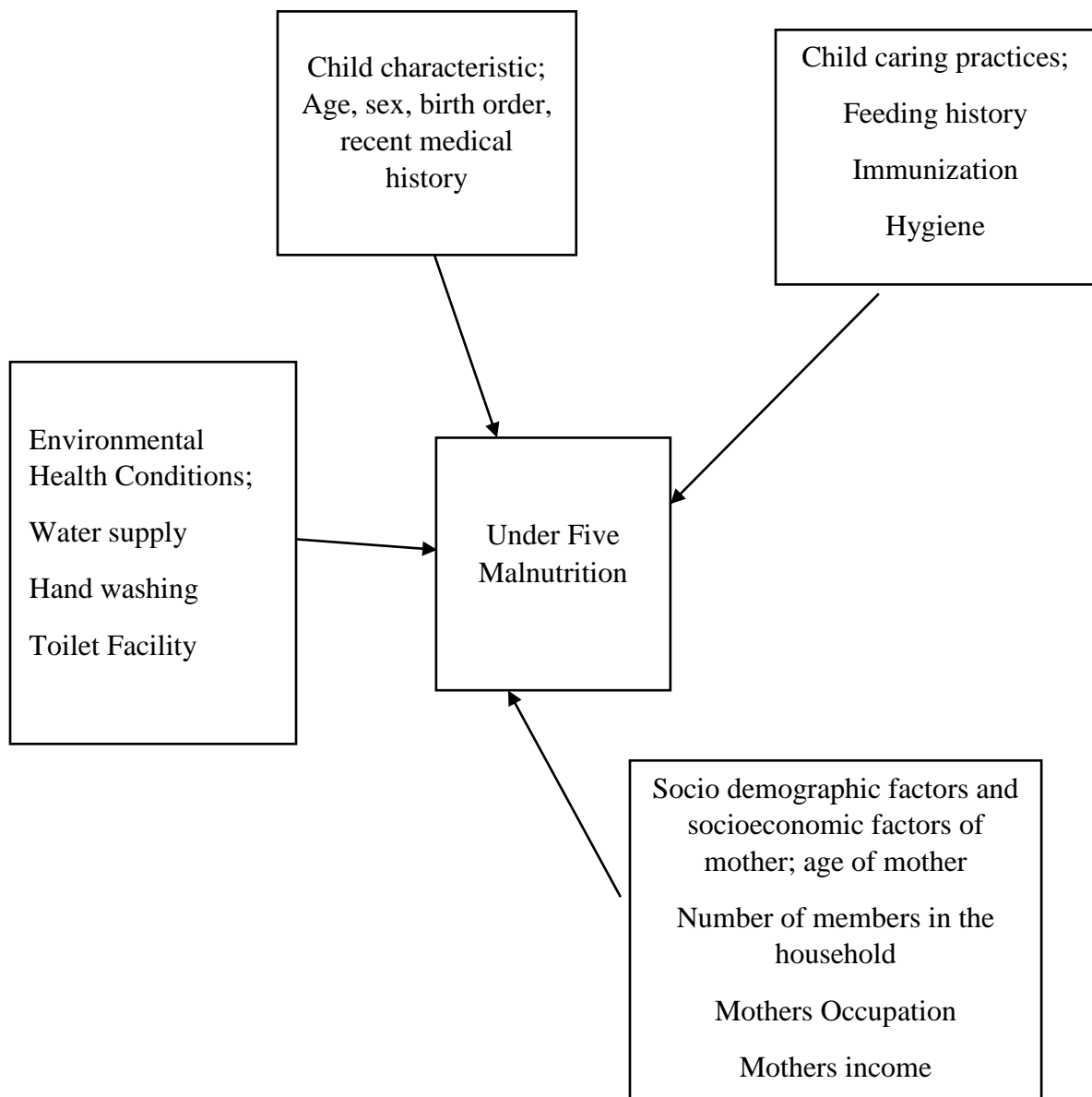
Malnourished children usually share common factors. They are typically from low socio-economic communities in resource poor countries (Bantamen et al. 2014).

This study seeks to assess factors associated with malnourished children and the extent to which they contribute to the condition or its complications.

### **1.3 Justification**

It was important to undertake this study because of the numerous benefits to has offered for improving good nutrition among children. The study provides information on prevalence and associated risk factors of child malnutrition in Aseidu Keteke district. It has helped in identifying factors that are barriers to good nutrition practice, and translate each guideline into specific recommendations that health care providers, mothers, non-governmental organizations (NGOs) and agencies such as Ministry of Health (MoH) and Ghana Health Service (GHS) needs to develop the right measures of improving and eradicating malnutrition among children. The information provided in this study would also be used in planning interventions concerning malnutrition, particularly child malnutrition.

### 1.5 Conceptual Framework



**Figure 1. Conceptual framework on factors associated with child malnutrition: (Self-construct, 2018)**

### **Conceptual framework explained**

Figure 1 above conceptualizes factors associated with child malnutrition as defined by most theories. The conceptualization was adopted and detailed explanation has been given here. Malnutrition can be described as the entire range of problems that occur when nutrient intake from our diet is insufficient or excessive for our bodies (FAO, 2010). It can be caused by a lot of factors which are interconnected. For the purpose of this study, only a few of the factors have been selected to be assessed. These include the following: **Socio demographic and socio-economic status of mother.**

The mother plays a very important role in the determination of the nutritional status of her child. Nti & Lartey (2006) reveals that there is a significant relationship between the two. In most cases, the mother is the primary care giver of the child in the early years of its life and thus has a lot of influence on what the child feeds on. The mother can affect the nutritional status of her child with her own nutritional status. This could be because she spends most of her time with the child and feeds the child what she eats.

Older mothers are more knowledgeable in caring for their children than the younger mothers (Akorede & Abiola, 2013; Nyaruhucha et al., 2006). In the same way, the mother's occupation can have an effect on the nutritional status of the growing child (Akorede & Abiola (2013).

### **Child characteristics:**

There are critical ages in a child development, that they become vulnerable to malnutrition, especially after 6mths (Jayatissa et al 2012). A lot of malnourished children suffer diarrhoea or have had diarrhea in their recent history.

Diarrhea is the leading cause of morbidity and mortality of children through dehydration and malnutrition. High magnitude of malnutrition observed among children who had diarrhea in the recent medical history. This is clear because there is a reciprocal relationship with diarrhea leading to malnutrition and malnutrition predispose to diarrhea (Bantamen et al 2014).

**Child Caring Practice:** A mother's knowledge on how to feed the child well in terms of nutritious foods and also the essence of immunization and exclusive breast feeding goes a long way to contribute to the nutritional state of the child. Studies by Oyekale & Oyekale, (2005), showed that education of women also have positive effects on the quality of care rendered to children since women are the main caretakers of children. For instance, educated mother's may have good paid jobs, thus be able to earn higher income and take better care of their children, be resident in urban areas, where there are functioning social infrastructure, possess commendable culture of hygiene needed to protect children from diseases, be more likely to participate in child health enhancing programs like immunization and child care talks and be able to benefit maximally from nutrition and other health related programs. The mother's ability to process information, acquire skills and positive behaviours improves with education.

**Environment Health Conditions:**

Aside these major factors, the environment of the child may indirectly affect its nutritional status. Access to primary health care may positively affect the child if the mother pays frequent visits to the facility and/ or practice what she is taught at the facility.

Cultural norms and traditions of the community may indirectly affect the child's nutritional status. In the same way the nature of the community whether rural, urban or peri-urban may also determine the nutritional status of the child. The rate of malnutrition is generally higher in rural areas than in urban areas (GSS et al., 2009).

The sanitation and healthcare practices of the community could also have an impact on the nutritional status of the child.

### **1.6 Research Questions**

- What influence mother's socio demographic and socio-economic factors have on under five child malnutrition?
- What is the association between a child characteristic and under five-year malnutrition?
- Does a child care practice have an influence on under five-year malnutrition?
- What is the relationship between environmental conditions of a child and under five malnutrition?

### **1.5 Objectives**

#### **General Objective;**

To assess the various factors associated with malnutrition in under five children in Ashiedu–Keteke Sub Metropolis.

#### **Specific Objectives;**

- To determine the socio demographic factors of mothers associated with under five malnutrition
- To assess the relationship between children characteristics and under five malnutrition
- To determine the association between children caring practices and under-five malnutrition

- To determine the association between environmental conditions and under five malnutrition

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This section provides detailed literature review on the subject matter from various authors globally and locally. Malnutrition is still a serious public health concern. Where most cases are reported in most lower resource countries.

#### 2.2 Malnutrition

WHO defines malnutrition as deficiencies, excesses or imbalances in intake of energy, protein and other nutrients. This is the effect of being unable to meet ones' nutrient needs continually over a period of time. Child malnutrition has been and is still a major problem in the world. Various studies have been conducted on the problem of malnutrition. In spite of all these efforts, each year, 4.6 million children under-five die due to malnutrition (World Health Organisation "WHO", 2009).

#### 2.3 Trends in child malnutrition

According to UNICEF (2014) report there has been a 37% drop in stunting worldwide since 1990. The Ghana Demographic and Health Survey (GDHS) 2008, also reported that there has been a steady decrease in the rate of malnutrition in Ghana over the years. However, an evaluation of child malnutrition trends over the years done by UNICEF-WHO- The World Bank (2012), points out that the progress made is insufficient and millions of children still have low chances of survival if the current trends continue. de Onis et al., (2004) had early observed an uneven progress in the trend, with Africa showing very little improvement compared to Eastern and South-Eastern Asia. Therefore, new ways of tackling the malnutrition in Africa need to be

looked into to help eradicate the problem and save millions of innocent lives. Akorede & Abiola (2013) in their recommendation on solving the problem on malnutrition suggested that periodically, nutritional assessments should be conducted to help track the progress being made to solve the malnutrition problem. Thus, there is the need to assess nutritional status of communities.

#### **2.4.0 Nutritional status**

This refers to one's state of health as depicted by the quality of nutrient intake and the body's ability to utilize them for metabolic needs (Amosu et al., 2011). The nutritional status gives an indication of the health of an individual in terms of what they consume or better still one's current state of health after the body has made use of the food they take. The evidence of the effect of our dietary intake is visible on the human

##### **2.4.1 Nutritional status of under-fives**

In children under-five, nutritional status is a reflection of the child's overall health (GSS, 2011). It is also an accepted indicator for nutritional wellbeing and health of their community (WFP & CDC, 2005). It is not surprising most studies seek to assess the nutritional status of children under-five.

##### **2.4.2 Assessment of nutritional status**

Assessment of one's nutritional status tries to give an interpretation of what the body lacks, has in right amounts or has in excess. It helps in identification of people with nutritional deficiencies and the type of deficiencies they have. Nutritional status can be determined by either one of the following method or a combination of them. According to Maqbool et al. (2008), every nutritional assessment requires one or more of these for better interpretations since no single method provides an adequate assessment of nutritional status. They include anthropometry,

biochemical analysis, clinical assessment and dietary assessment. The gold standard for assessing nutritional status of a population is by combining all four methods; anthropometry, biochemical, clinical and dietary methods (Wasantwisut et al., 2007).

#### **2.4.3 Dietary assessment**

This involves a measure of dietary intake and one's feeding ability. It can be used to measure both nutrient and food intake. Dietary assessment involves different methods. It includes individual dietary assessments, food frequency questionnaires, household survey methods and simple food list. It is an essential component of nutritional assessment because it provides information about the amount, and quality of food consumed and also eating patterns and behaviours of the family (Maqbool et al., 2008). In nutritional assessments of children, it gives an idea of the child's intake over a specified time period. It is most at time used as a reflection of the child's diet.

#### **2.4.4 Biochemical assessment**

Biochemical assessment is used in the assessment of the nutrients in the body. It involves collection of laboratory samples to assess nutritional status. Samples such as blood and urine are taken from the individual. These tests are done to assess the level of biological markers in the body. These markers are used to determine levels of nutrients the body contains ((Maqbool et al., 2008).

#### **2.4.5 Clinical assessment**

Signs of malnutrition may be seen on the body of the individual. These signs can be seen by close observation. Maqbool et al. (2008) elaborates on clinical assessment; it involves the close examination of ones' physical body such as skin, hair and teeth. This is done to find evidence of

specific nutritional deficiencies. Clinical assessment serves as a valuable aid in detecting nutritional deficiency since it requires little expertise.

#### **2.4.6. Anthropometry**

Duggan (2010), describes anthropometry as a useful tool for monitoring growth and nutritional assessment which has been used for a long time as a diagnostic tool for grading malnutrition. He further describes it as a simple tool for nutritional assessment of individuals because of its objectivity and relatively low technology required in its usage. Anthropometric measurements are most widely used indicators for nutritional status in a community. It can be used to determine prevalence of malnutrition in a survey population (WFP & CDC, 2005). It is also used to assess growth and development especially in young children.

Anthropometry involves taking body measurements such as weight, height, mid-upper arm circumference and comparing them to the WHO growth standards. These body measures are used to formulate indicators that give some information on the nutritional status of the child. There are three main indicators used in assessing nutritional status of children by anthropometry which are height-for age, weight-for-height and weight –for-age.

#### **2.4.7. Anthropometric Indices**

Height -for-age

It measures linear growth. Faltering in linear growth is detected as low height for age and is referred to as stunting. It reflects chronic malnutrition (malnutrition over a long period of time) which results from prolonged inadequate nutrient intake (GSS, 2011). Stunting is the greatest problem of the three indicators and can also result in underweight. Thirty-one (31%) of children in low and middle-income countries are stunted (Prentice et al., 2008). Even in Ghana, stunting

has been the greatest problem, twenty-eight (28%) of the children under-five are reportedly stunted (GSS et al., 2009).

### **Weight -for -height**

This measures the child's weight versus their height. A child with a low weight for height is referred to as wasted. This is a measure of acute malnutrition (malnutrition of a short period of time) that is recent nutrition deficiency (Prentice et al., 2008). This indicator shows significant changes associated with the availability of food or disease prevalence (GSS, 2011).

### **Weight -for -age**

This assess the weight of the child for his age and is a measure of long and short-term malnutrition (Prentice et al., 2008). A child with a low weight-for-age is referred to as underweight (GSS, 2011).

## **2.5 Factors leading to malnutrition**

Malnutrition is caused by multiple and interrelated factors. According to Iram & Butt (2006), food issues are just one aspect of the multiple factors that lead to malnutrition.

Thus, malnutrition causes of malnutrition may include food factors and non-food factors. Different studies have come up with various factors leading to malnutrition

### **2.5.1 Maternal factors**

Nyaruhucha et al (2006), in a study assessing the nutritional status of children under-five in Tanzania revealed that mother's age, educational level, marital status was significantly linked with the child's nutritional status. Akorede & Abiola (2013) and Iram & Butt (2006) in similar studies done in Nigeria and Pakistan respectively also confirm that maternal factors such as age

and level of education are important determinants of the child's nutritional status. Younger mothers are more likely to have undernourished children due to their inexperience and inability to take good care for the child (Akorede & Abiola, 2013; Nyaruhucha et al., 2006). Contrary to this, Nikoi (2011) found that in Ghana, paternal education and maternal occupation had no significant relation with child nutritional status.

### **2.5.2 Child factors**

The age of a child is an important factor in nutrition especially after six months. This is the stage where the child is introduced to complementary food and is later weaned off breast milk. Inability of a child to adjust to intake of solid foods could prevent the them child from meet their nutrient needs during this stage and this can lead to malnutrition (Macharia et al., 2005). They also add that previous exposure to infection in children may lead to reduced dietary intake, reduced health and eventually malnutrition. According to (Prentice et al., 2008), infections lower the child's resistance to diseases and act hand-in-hand with malnutrition. Thus, the child's current health state can affect their nutritional status.

### **2.5.3 Child Caring Practice**

In a study done in Ethiopia, Bantamen et al (2014) revealed that inappropriate child carrying and feeding practice were strongly associated with under five malnutrition. Studies by Oyekale & Oyekale, (2005), also showed that education of women also have positive effects on the quality of care rendered to children since women are the main caretakers of children. For instance, educated mother's may have good paid jobs, thus be able to earn higher income and take better care of their children, be resident in urban areas, where there are functioning social infrastructure, possess commendable culture of hygiene needed to protect children from diseases,

be more likely to participate in child health enhancing programs like immunization and child care talks and be able to benefit maximally from nutrition and other health related programs. The mother's ability to process information, acquire skills and positive behaviours improves with education.

#### **2.5.4 Socioeconomic status of household:**

The economic status of a household or care givers of a child has been identified as one of the key determinants of a child's nutritional status. It is also an indicator of access to adequate food supply, use of health services, availability of improved water sources and sanitation facilities which are prime determinants of child nutrition. Studies by Smith et al, (2005) stated that household economic status significantly affects access to food (a necessary condition for food security). It also indicates possession and utilization of child care resources on a sustainable basis. In addition, it allows a more diversified diet and effective child care arrangements. A study by Yimer, (2000), also showed that the higher the level of economic status of the house hold, the lower the level of child stunting. Increase in household income at the community level leads to improved access to quality of health care, improved water and sanitation systems and access to information.

#### **2.5.5 Hygiene, sanitation, water supply and other environmental health factors:**

Bantamen et al (2014) in a case control study done in Ethiopia revealed that those children whose family use drinking water from unprotected source were 3 times more likely to have malnutrition as compared to those children whose family use drinking water from protected source. Duggan (2010) reveals that the environment has a greater impact on early child growth than genetics. Thus, the environment in which the child grows cannot be overlooked when

determining factors which may lead to malnutrition in children. Nikoi (2011), also found out that household water supply, and percentage of district residents in rural or urban area location have a positive correlation with the nutritional status of the child. In agreement with this, Iram and Butt (2006) confirmed by their findings that nutritional status depends on sanitary conditions in which the child lives. They explain that sanitary conditions influence the prevalence of diseases and infections. In his work on sanitation environment and its implications on child health, Bутtenheim (2008), emphasized that improved sanitation positively affects the health of the child. Since Malnutrition and infections interact closely, poor sanitation would invariably lead to malnutrition and even child mortality. Access to and use of safe water, sanitation facilities and good hygiene have the potential to positively impact on nutritional outcomes by addressing both direct and underlying causes of malnutrition. Washing of hands with soap, treatment and safe storage of drinking water, and sanitary disposal of human feces, have been shown to effectively reduce the prevalence of diarrhea, a major contributor of malnutrition. Lack of sanitation in particular is strongly correlated to stunting and even in absence of diarrhea. Essential food hygiene actions include maintenance of clean food preparation area, separation of raw and cooked food, cooking food thoroughly, strong food safety (time, temperature, covered containers and use of safe water and fresh raw ingredients prevents infants and young children from infections (USAID, 2013).

Studies by the World Bank (2006), stated that improving access and quality of water source not only reduces transmission of water borne diseases but also saves women the extra time they spend on carrying water which can be allotted to child care and feeding or income generating activities.

## **2.6 The effects or consequences of malnutrition:**

Children in sub-Saharan Africa and South Asia face a higher risk of dying before their fifth birthday (UNICEF, 2013). Poor diet, frequent illness, and inadequate or inattentive care of young children can lead to malnutrition (WHO, 2002). Between five and six million under-fives die each year from diseases which are from malnutrition (Wadhvani, 2011). Globally, nearly half of all deaths among children under five are attributable to under nutrition (UNICEF, 2013).

The 2008 Copenhagen Consensus estimated that under nutrition causes 35% of the disease burden in children younger than 5 years old, and that the nutrition of children at 5 years and younger depends strongly on the nutritional level of their mothers during pregnancy and breastfeeding (Sue-Horton et al., 2008).

Malnutrition at an early age leads to reduced physical and mental development and affects school performance (WFP, 2013). Malnutrition increases the risk of infection and infectious disease, weakens every part of the immune system, lowers energy and impairs function of the brain (Stillwaggon, 2008). The World Health Organization estimates that malnutrition accounts for 54% of child mortality worldwide (Walker and Watkins, 2008). Even mild degrees of malnutrition double the risk of mortality for respiratory and diarrheal disease mortality and malaria (Walker and Watkins, 2008).

## **2.7 Community Perception of Malnutrition:**

A study carried out in the Upper East Region of Ghana, to ascertain the perception of malnutrition in terms of the management and causes, stated that most mothers believe that malnutrition comes about as a result of mother's disregard of traditional norms and beliefs. To

them, the treatment of malnutrition should also incorporate traditional medicine (Akparibo, 2013).

A study conducted in Dhaka Bangladesh in 2011, where it is perceived that having many brothers and sisters and also parents of large families were unable to provide adequate physical comfort. It is also perceived that neglect by sick or working mothers resulting in malnourishment in children. Sick mothers feel weak and exhausted and therefore lacked the physical energy and motivation to provide adequate care to their children which lead to poor health and malnutrition.

In many developing countries particularly in Africa, tradition has laid the responsibility of child care on women saying the place for women is in the kitchen. Therefore, women are the key players in the growth of and development of children (Oyekale & Oyekale, 2005).

However, it is not until recently that the role of mother's education in enhancing the quality of care and nutritional status of children is being emphasized in empirical research (Smith et al, 2004). Maternal education is one of the most important resources that enable women to provide appropriate care for their children.

## **2.8 Prevalence of Malnutrition**

Another study was done among the sub Saharan countries between 2006-2016. A cross sectional study using data from various demographic health surveys from the sub Saharan countries; Akombi et al. (2017) The study provided the prevalence of malnutrition using the various indicator among the various countries in the various sub regions of the sub saharan

The findings of the research were; Stunting was highest in Burundi 57.7% and Malawi (47.1%) in East Africa; Niger (43.9%), Mali (38.3%), Sierra Leone (37.9%) and Nigeria (36.8%) in West

Africa; Democratic Republic of Congo 42.7% and Chad 39.9% in Central Africa. Wasting was highest in Niger (18.0%), Burkina Faso (15.50%) and Mali (12.7%) in West Africa; Comoros (11.1%) and Ethiopia (8.70%) in East Africa; Namibia (6.2%) in Southern Africa; Chad (13.0%) and Sao Tome & Principe (10.5%) in Central Africa. Underweight was highest in Burundi (28.8%) and Ethiopia (25.2%) in East Africa; Niger (36.4%), Nigeria (28.7%), Burkina Faso (25.7%), Mali (25.0%) in West Africa; and Chad (28.8%) in Central Africa.

The findings showed that the prevalence of malnutrition was highest within countries in West Africa and East Africa compared to the WHO Millennium development goals target for 2015.

In Bangladesh, undernutrition continues to be a serious public-health problem. Although over nutrition is still not a large problem, the prevalence of overweight among under-five children and woman is increasing. The percentage of children with weight-for-height or body mass index (BMI) z-scores  $\geq 3$  was 0.1 in 1995, which has increased to 0.5% according to a national survey.

### **2.8 Recommended feeding Practices:**

In 2002, the World Health Organization and UNICEF adopted the Global Strategy for infant and young child feeding (WHO/UNICEF, 2003). The strategy was developed to revitalise world attention to the impact that feeding practices have on the nutritional status, growth and development, health, and survival of infants and young children. WHO and UNICEF's global recommendations for optimal infant feeding as set out in the Global Strategy are: (i) Exclusive breastfeeding for 6 months and; (ii) nutritionally adequate and safe complementary feeding starting from the age of 6 months with continued breastfeeding up to 2 years of age or beyond.

**i. Exclusive breastfeeding:** This means that an infant receives only breast milk from his or her mother or a wet nurse, or expressed breast milk, and no other liquids or solids, not even water, with the exception of oral rehydration solution, drops or syrups consisting of vitamins, minerals supplements or medicines (WHO, 2008).

The advantages of exclusive breastfeeding compared to partial breastfeeding were recognised in 1984, when a review of available studies found that the risk of death from diarrhoea of partially breastfed infants 0–6 months of age was 8.6 times the risk for exclusively breastfed children. For those who received no breast milk the risk was 25 times that of those who were exclusively breastfed (Feachem and Koblinsky, 1984). A study in Brazil in 1987 found that compared with exclusive breastfeeding, partial breastfeeding was associated with 4.2 times the risk of death, while no breastfeeding had 14.2 times the risk (Victora et al., 1987).

More recently, a study in Dhaka, Bangladesh found that deaths from diarrhea and pneumonia could be reduced by one third if infants were exclusively instead of partially breastfed for the first 4 months of life (Arifeen et al., 2001). Exclusive breastfeeding for 6 months has been found to reduce the risk of diarrhea (Kramer et al, 2003) and respiratory illness (Chantry et al., 2006) compared with exclusive breastfeeding for 3 and 4 months respectively.

**ii. Complementary feeding:** This is defined as the process starting when breast milk is no longer sufficient to meet the nutritional requirements of the child and therefore other foods and liquids are needed, along with breast milk. The target range for complementary feeding is generally taken to be 6 to 23 months of age, even though breastfeeding may continue beyond two years (PAHO/WHO, 2010). From the age of 6 months, an infant's need for energy and nutrients starts exceed what is provided by breast milk, and complementary feeding becomes necessary to fill the energy and nutrient gap (Dewey and Adu-Afarwuah, 2008).

## **CHAPTER THREE**

### **METHODS**

#### **3.1 Study Design**

A cross sectional study was used, involving children 0-59 months and their care givers. Variables of respondents were obtained over a three-week period and analysis done on the variables to determine its contribution to under five malnutrition.

#### **3.2 Study Area**

The Princess Maria Louise (PML) hospital (children hospital) in Ashiedu Keteke sub-metro was the study area. PML hospital was chosen since it is in the center and main hospital for children of Ashiedu-keteke sub metro. PML runs a special treatment care for malnourished children and rehabilitation for malnourished children as well.

##### **3.2.1 Background of the PML Hospital:**

Princess Marie Louise (PML) hospital is a Ghana health service healthcare institution located in Accra, within the Ashiedu Keteke sub metro of the Greater Accra region that provides medical care services, pursues diseases control and offers reproductive and child health (RCH), family planning(FP).

In 1915, Dr F.V Nanka-Bruce an imminent Gold Coast Physician and statesman brought to the attention of the government the very high infant and maternal mortality in the country. The necessity for a specialist children hospital was proposed to curb the high infant mortality.

It was after a decade (1915) when the Governor of the Gold Coast, Sir Gordon Guggisberg, took a stand and considered the importance of a children's hospital. In the process, her Highness Princess Marie Louise, granddaughter Queen Victoria, queen of the British Empire visited the Gold Coast colony. During her visit, her royal highness, Princess Marie Louise laid the foundation stone for the specialist children hospital, which was consequently named after her when the hospital was commissioned.

Over the years, the Princess Marie Louise Hospital attracted renowned western physician who worked diligently in the prevention of infant and maternal mortalities. Notably, Dr. Cicely from Oxford University pioneered the studies in nutritional disorders in children, which involved an exceptional contribution that led to the description of Protein Deficiency Syndrome, also known as kwashiorkor. This was published by PML in 1933 and which as such, projected PML and the Gold Coast on to the global medical map.

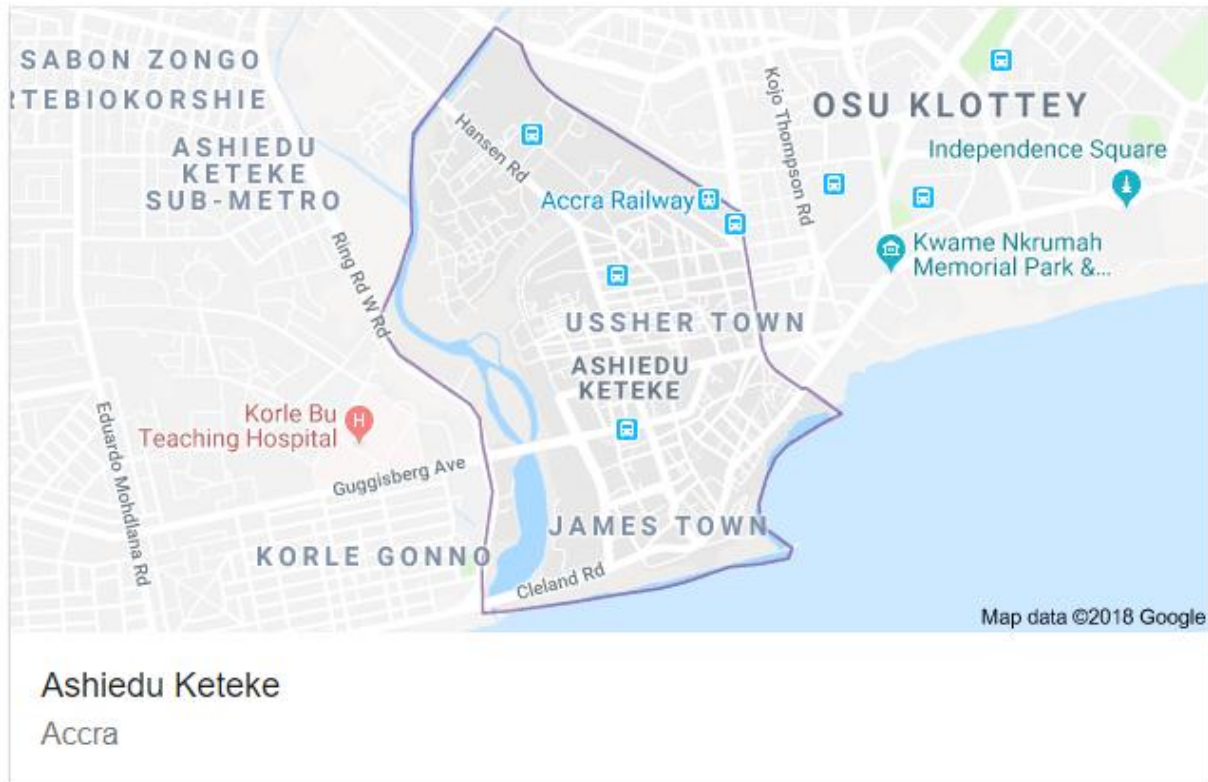


Figure 2. Map of Ashiedu Keteke Submetro

Source: Google Map image, 2018

### 3.3 Study Variables

1. The dependent variable was under 5 malnutrition
2. Independent variables;
  - Socio demographic and socio-economic factors of mother
  - Child characteristics (socio demographic factors of child)
  - Environmental conditions
  - Child caring practices

### **3.4 Study Population:**

Children between age 0months-59 months coming with mothers at the child welfare clinic and who actually live within the Ashiedu Keteke sub metro area.

### **3.5 Sampling**

**3.5.1 Sample Size:** Using the formula  $n = \frac{z^2 pq}{d^2}$  or  $n = \frac{(4z pq)^2}{w^2}$  and using a prevalence of 23 percent for chronic malnutrition in Ghana, a confidence level of 95% and alpha level of 0.05 a sample size of 280 was obtained, which approximated with 15 percent increment to 328 to compensate for the issue of non-respondents.

#### **3.5.2 Sampling Method/Procedure:**

The questionnaire was designed for 328 persons.

Sampling method employed was systematic sampling. The sample frame was women at OPD or coming for child welfare clinic with children under five years. Over a three-week period, 100 women were recruited each week for the first two weeks and 128 in the last week. Twenty women on each day from Monday to Friday for the first two weeks. The last week 20 women were interviewed from Monday to Friday and extended to Saturday to interview the last 28 participants for the week.

The 20 women were chosen by selecting the first N number of women with children under five years who were present in the morning between 9am -10am. That number by 20 to get a kth interval for picking the subsequent woman until the number 20 was obtained. The first woman to be interviewed was done by balloting among the first 10 women with children under five years.

This was carried for the entire three weeks except the last day (Saturday) of the third week, where 28 women were sampled by dividing the number present between 9am-10am by 28 and getting a kth interval for picking the subsequent woman. The first woman to be picked was again balloted among the first 10 women present.

The weight, height, and mid-upper arm circumference were measured for each child in the study.

### **3.5.3 Anthropometric Measurement:**

Anthropometric measures (weight, height and mid upper arm circumference) were taken twice and recorded on the questionnaires. All children were cladded in only underwear or light clothing during measurements. The measurements were taken using WHO standard procedure.

**Weight measurement:** For children below 24 months, mothers were made to stand on the scale bare footed after all heavy objects she was holding or adorned with had been collected. The scale was then tarred and the child handed to the mother on the scale. The difference in weight was that of the child. Children above 24 months stood by themselves on the scale and their feet positioned slightly apart. They were asked to stand still and the reading was taken and recorded on the questionnaire.

**Length:** Recumbent length was taken for children below 24 months. It was measured with the infantometer. The child was gently placed on the infantometer with his/her head against the head board. The child's head was held in place by cupping the ears. It was ensured that the vertical line formed from the ear canal to the lower border of the eye socket of the child was perpendicular to the horizontal board. This is referred to as the Frankfort vertical plane. The other fieldworker ensured that the child's trunk was straight and flat on the board. The foot board

was gradually pushed to the feet of the child with the left hand while the right was used to hold the legs together in place. The length was recorded on the questionnaire.

Height was taken for children above 24 months. It was taken with a stadiometer. The child was asked to stand on the footboard with their back against the back board. It was to make sure that the back of their head, shoulder blade, back, buttocks calf and their heel touched the back board of the stadiometer. The head was positioned so that the horizontal line connecting the upper ear opening and lower edge socket of the eye ball run parallel to the base board. This formed the Frankfort horizontal plane. The tummy was pushed in gently to help the child to stand straight and the head board pressed firmly on the top of the head. The reading was then taken and recorded.

**Mid Upper Arm Circumference:** The measurement was taken using a shakirs tape. The left arm was used. Imaginary mid upper arm point was obtained by estimating the mid distance between the tip of the shoulder and the elbow. The shakirs tape was folded round that estimated mid-point and the measurement read.

### **3.6 Data Collection Techniques and Tools/Instruments**

**3.6.1 Training of enumerators** To ensure the quality of data, three days training was given to both the data collectors and supervisors on the objective of the study and methods of data collection, anthropometric measurement and data recording.

**3.6.2 Pre-Testing and Review of Instrument:** The questionnaire was pre-tested on 10% of the sample size out of study area on population with similar characteristics. The result of pre-test was analysed and necessary modification made prior to the actual data collection. The

supervisors and principal investigator closely followed the data collection process and ensure completeness and consistency of the collected questionnaires on a daily basis.

### **3.6.3 Data Collection**

Four enumerators who are final year students in community health nursing school in Korle Bu and two supervisors who are final year students in dietetics in Korle Bu were recruited. All six were fluent in both Ga and Twi in addition to English languages and had an experience in data collection and public health research. Interview was conducted with mothers of the children to fill the questionnaire, for those who could not write the supervisors had to fill the questionnaire on their behalf based on the answers given.

### **3.7 Quality Control**

The principal investigator supervised all the research assistants. Each questionnaire had the interviewer's initials and code to facilitate cross checking of the completed questionnaire. The completed questionnaire was checked for completeness and any inconsistencies on the field.

### **3.8 Data Processing and Analysis**

Data was entered into Microsoft Excel 2016. The data was exported to Stata 15. Data were recoded, categorized and sorted to facilitate analysis. Anthro Plus software was used to categorize anthropometric measurements into z scores.

Descriptive analysis was used to describe the percentages and number distributions of the respondents by socio-demographic characteristics and other relevant variables in the study. Logistic regression was used to fit the data to identify factors associated with malnutrition. All

exposure variables that were associated with the outcome variable in bivariate analysis with p-value of less than 0.05 included in the logistic models of multivariable analysis and the various adjusted odds ratios with their corresponding confidence interval obtained. A univariate analysis was also used to obtain the various crude odds ratio for the exposure variables and their corresponding confidence interval.

### **3.9 Ethical consideration**

#### **3.9.1 Permission to Proceed**

The study focused on under five malnutrition and the assessment of factors associated with malnutrition among children under 5 years old. Ethical clearance was obtained from the Ghana Health Service Ethical Review Committee on Research Involving Human Subjects. Permission to carry out the research was obtained from the Greater Accra Regional Health Directorate and the Director of the (PML) hospital.

#### **3.9.2 Privacy**

The researcher ensured that the interview was conducted in a secure place free from interaction of other ongoing activities and ensuring respondents privacy. The participation to these interviews was voluntary with a free will from the participants. Participants were given additional option to be able to opt out at any point of the interview without any implications of their decision.

#### **3.9.3 Informed consent**

Consent of the participants was sought before data was collected. This was given verbally or signed. The purpose of the study, the benefits and rights of the subjects and the procedure involved was explained to all participants. They were assured of confidentiality and a voluntary informed consent was obtained from all participants. Voluntary participation was indicated by signing a consent form.

#### **3.9.4 Anonymity and Confidentiality**

All information provided by the respondents were kept confidential and data have been locked in a cabinet and on computers protected by passwords. Questionnaires will be destroyed after five years of the study.

The name and identity of the respondent was not needed for the study. The information provided was only identified by a code number and treated with strict confidentiality. Respondents' name did not appear or was not mentioned in any part of the report of this study.

The respondent's involvement in this study was only through an interview and was not exposed to any form of risks. The subjects' participation in the study was voluntary and was not given any monetary or any kind of reward. All the information provided by the respondents was used for the study.

#### **3.9.5 Risk and benefits of the study**

This research had no risks to the participants apart from social related risks and shame associated with bad nutritional status and care practices of caregivers. However, participants were assured of the other ethical principles of confidentiality and anonymity as discussed earlier. Respondents were not paid for direct involvement in the research since this could be regarded as an incentive.

#### **3.9.6 Data storage and usage**

Electronic data files were secured by a password known by only principal investigator. All hard copies of data sheets were kept in a locked file cabinet that could only be accessed by the principal investigator. Research assistants could only access them only when they have been given permission. Data files will be kept for five years after which they will be destroyed.

## **CHAPTER FOUR**

### **RESULTS**

#### **4.1 Demographic characteristics**

This section provides the demographic characteristics of study participants who are mainly mothers and their children under five years.

##### **4.1.1 Background Characteristics of Mothers**

A total of 328 children between the ages of 0- 59 months with their caregivers, which comprised of mothers living in Ashiedu-Keteke Sub Metro during the period of data collection were sampled and their data analyzed. The youngest mother was 15 years and the oldest, 44 years. Most of the caregivers were between the ages of 20-30 years. The modal level of education was secondary school education. The main occupation was trading, Table 4.1

**Table 4.1: Socio Demographic Characteristics of Mothers**

<b>Variable</b>	<b>Freq.</b> <b>N=328</b>	<b>Percent</b>
<b>Age (years)</b>		
<20	22	6.71
20-30	144	43.90
30-40	126	38.41
>40	36	10.98
<b>Level of education of mothers</b>		
No formal education	22	6.71
Primary	98	29.88
Secondary	160	48.78
Tertiary	48	14.63
<b>Mothers Occupation</b>		
Unemployed	52	15.85
Trader	164	50.00
Security Personnel	8	2.44
Daily Labourer	16	4.88
Civil Service	30	9.15
others	58	17.68

Source: field survey, 2018

#### **4.1.2 Characteristics of Children**

About half of the children surveyed were males, 54.57%. The predominant age group was between 6-20 months, they were 54.88%. Majority of them (46.27%) have had respiratory tract infection in their recent history, (34.33%) have had diarrhea in their recent history. About 6.0% had malaria in their recent history, Table 4.2.

**Table 4.2: Characteristics of children**

<b>Variable</b>	<b>Freq.</b>	<b>Percent</b>
<b>Sex of Child</b>		
male	179	54.57
female	149	45.43
<b>Age of Child</b>		
0-5	20	6.10
6-20	180	54.88
20-34	58	17.68
35-49	70	21.34
<b>Recent Medical History</b>		
Diarrhoea	92	34.33
Malaria	16	5.97
Respiratory tract infection	124	46.27
others	36	13.43

Source: field survey, 2018

#### 4.2 Prevalence of Malnutrition among the children

Table 4.3:Prevalence of Malnutrition among the children using anthropometric measurements

Category	Frequency	Percent
<b>Acute Malnutrition (MUAC)</b>		
Severe acute malnutrition(<11cm)	12	3.66
Moderate acute malnutrition (11-12.5)	52	15.85
Mildly acute Malnutrition (12.5-13.5)	74	22.56
Normal (>13.5)	190	57.93
<b>Acute Malnutrition(underwgt/WFA)</b>		
Severe underweight(<-3SD)	62	18.90
Moderate underweight(<-2SD)	42	12.80
Normal(>-2SD)	224	68.29
<b>Chronic Malnutrition (HFA)</b>		
Severe stunting(<-3SD)	127	39.08
Moderate stunting(<-2SD)	54	16.62
Normal(>-2SD)	144	44.31

Source: Field survey, 2018

Categorising the children in terms of duration of the malnutrition (acute and chronic).22.56% had their MUAC measurement between 12.5-13.5 (Table 4.3) as in mildly acutely malnourished or at risk of developing malnutrition, hence mothers needed to be advice regarding the feeding of

the child. Also, 15.85% had moderate acute malnutrition (MAM) and Only 3.66% had severe acute malnutrition(SAM).Almost half of the children in the study were normal with regards to MUAC measurements.

In the underweight category which also represents acute malnutrition, using their weight measurements and interpreting it on the z score using anthro plus software,18.90% had severe wasting with z score  $<-3SD$ .12.80% had moderately wasted (z score  $<-2SD$ ).Majority (68.29%) were normal( z score  $>-2SD$ ).

In the stunting category which represents those who were chronically malnourished, 39.08% were severely stunted, 16.62% were moderately stunted and 44.31% were normal.

**Table 4.4: Nutritional Status of Children**

<b>Overall Nutritional Status</b>	<b>Freq.</b>	<b>Percent</b>
Normal	72	21.95
Overall	256	78.05
Malnourished		

Source: Field survey, 2018

Majority of the children in the study were malnourished (78.05%).

**Table 4.5: Categorisation of nutritional status by age group**

<b>WAZ</b>				<b>HAZ</b>		
<b>N=328, Frequency (%)</b>				<b>N=328, Frequency (%)</b>		
<b>Age(month)</b>	<b>Severe</b>	<b>Moderate</b>	<b>Normal</b>	<b>Severe</b>	<b>Moderate</b>	<b>Normal</b>
0-5	4(6.45)	2(4.76)	14(6.25)	6(4.72)	11(20.37)	3(2.08)
6-20	30(48.39)	16(38.10)	134(59.82)	66(51.97)	21(38.89)	93(64.58)
20-34	12(19.35)	6(14.29)	40(17.86)	19(14.96)	13(24.07)	24(16.67)
35-49	16(25.81)	18(42.86)	36(16.07)	36(28.35)	9(16.67)	24(16.67)

Source: Field survey, 2018

NB: WAZ (Weight-for-Age Zscore), HAZ (Height-for-Age Zscore)

**Table 4.6: Nutritional status by gender**

<b>WAZ, frequency (%) N=328</b>				<b>HAZ frequency (%) N=328</b>		
<b>Sex</b>	<b>Severe</b>	<b>moderate</b>	<b>normal</b>	<b>Severe</b>	<b>Moderate</b>	<b>Normal</b>
<b>Male</b>	38(61.29)	22(52.38)	119(53.13)	67(52.76)	33(61.11)	79(54.86)
<b>Female</b>	24(38.71)	20(47.62)	105(46.88)	60(47.24)	21(38.89)	65(45.14)

Source: Field survey, 2018. NB: WAZ (Weight-for-Age Zscore), HAZ (Height-for-Age Zscore)

Age group 6-20 had the highest percentage (48.39) of those who had severe underweight, followed by age group (35-49) 25.81%. Age group (6-20) again had the second highest proportion (38.10) of children who were moderately underweight. Age group (35-49) had the

highest proportion of children who were moderately underweight. Age group 0-5 had the lowest proportion severe underweight (6.45%), moderate underweight (4.76%).

Age group (6-20) again had the highest proportion (51.97%) of children who were severely stunted. Also, among those with moderate stunting, it had the highest proportion (38.89%). Among severe stunting age group (0-5 months) had the lowest proportion (4.72%), among moderate stunting age group (35-49 months) had the lowest (16.67%) proportion of children (Table 4.5).

### 4.3 Demographic factors associated with child's Nutritional status

Table 4.7: Mothers' demographic factors associated with child's Nutritional status

Factors	Overall		Chi square	p-value
	Normal	Malnourished		
<b>Mothers Age(yrs)</b>			9.62	0.022*
<20	0(0.00)	22(8.63)		
20-29	39(53.42)	105(41.18)		
30-40	24(32.88)	102(40.00)		
>40	10(13.70)	26(10.20)		
<b>Educational Level</b>			6.92	0.074
No formal education	0(0.00)	22(8.63)		
Primary	22(30.14)	76(29.80)		
Secondary	39(53.42)	121(47.45)		
Tertiary	12(16.44)	36(14.12)		
<b>Occupation</b>			4.56	0.472
Unemployed	12(16.44)	40(15.69)		
Trader	35(47.95)	129(50.59)		
Security Personnel	0(0.00)	8(3.14)		
Daily Labourer	2(2.74)	14(5.49)		
Civil Service	8(10.96)	22(8.63)		
Others	16(21.92)	42(16.47)		

NB: Statistical significance was observed at p-value 0.05; \*statistically significant; %: presented in column; test of significance: chi square.

Source: Field survey, 2018

In the bivariate analysis in Table 4.7, between overall nutritional status and mothers age gave a p value of 0.022, which is significant. Hence, there is association between mothers age and overall nutritional status of the child. Overall nutritional status and occupation of mothers gave a p-value of 0.472, which was not significant. Hence, there is no association between overall nutritional status and occupation of mothers.

**Table 4.8: Children demographic factors associated with child’s Nutritional status**

Child Factor	Overall Nutritional Status		Chi-Square	p-value
	Normal	Malnourished		
<b>Age(months)</b>			6.005	0.11
0-5	1(1.37)	19(7.45)		
6-20	38(52.05)	142(55.69)		
20-34	13(17.81)	45(17.65)		
35-49	21 (28.77)	49(19.22)		
<b>Sex</b>			1.664	0.20
Male	35 (47.95)	144 (56.47)		
Female	38 (52.05)	111 (43.53)		
<b>Immunization Status</b>			5.541	0.02*
Fully Immunized	67(91.78)	249(97.65)		
Partially Immunized	6(8.22)	6(2.35)		

NB: Statistical significance was observed at p-value 0.05; \*statistically significant; %: presented in column; test of significance: chi square.

A bivariate analysis above (Table 4.9) between overall nutritional status and age of child showed a p-value of 0.11, which is not significant. Hence, there is no association between overall nutritional status and age of child. A bivariate analysis between overall nutritional status and sex of a child showed a p-value of 0.20, which is also not significant. A bivariate analysis between overall nutritional status and immunization status of the child showed a p-value of 0.02, which is significant. Hence, there is an association between overall nutritional status and immunization status of the child.

#### 4.4 Environmental and Hygiene Factors

Table 4.9: Environmental and Hygiene Factors influencing Malnutrition

Variables	Number	Percent
<b>When mothers wash hands</b>		
After toilet	58	17.68
Food preparation	6	1.83
After all the above	264	80.49
<b>What mothers wash hands with</b>		
Water only	6	1.83
Sometime with soap and water	106	32.32
Always with soap and water	216	65.85
<b>Source of drinking water</b>		
Pipe borne	80	24.39
River side	2	0.61
Pure water	246	75.00
<b>Toilet Facility</b>		
Pit latrine	52	15.85
KVIP	112	34.15
Water Closet	164	50.00

Source: Field survey, 2018.

Table 4.10: Environmental and hygiene factors associated with child's Nutritional status

<b>Factors</b>	<b>Overall Normal</b>	<b>Nutritional Status Malnourished</b>	<b>Chi- square</b>	<b>p-value</b>
<b>When is hand washed</b>			3.552	0.17
After toilet	17(23.29)	41(16.08)		
Before food preparation	0(0.00)	6(2.35)		
All the time	56(76.71)	208(81.57)		
<b>How is hand washed</b>			8.379	0.015*
Water only	0(0.00)	6(2.35)		
Sometimes soap and water	15(20.55)	91(35.69)		
Always soap and water	58(79.45)	158 (61.96)		
<b>Source of water</b>			16.970	<0.0001*
Pipe borne	31(42.47)	49(19.22)		
River side	0(0.00)	2(0.78)		
Pure water	42(57.53)	204(80.0)		
<b>Toilet Facility</b>			7.923	0.02*
Pit latrine	4(5.48)	48(18.82)		
K.V.I. P	30(41.10)	82(32.16)		
Water closet	39(53.42)	125(49.02)		

NB: Statistical significance was observed at p-value 0.05; \*statistically significant; %: presented in column; test of significance: chi square.

Source: Field survey, 2018

The bivariate analysis between overall nutritional status and when hand is washed showed a p-value of 0.75, (Table 4.10) which is not significant. Hence there is no association between when hand is washed and overall nutritional status.

A bivariate analysis between overall nutritional status and how hand is washed showed a p-value of 0.015, which is significant.

A bivariate analysis between overall nutritional status and source of water showed a p-value of  $<0.0001$ , which is significant. Hence there is an association between overall nutritional status and source of water.

A bivariate analysis between overall nutritional status and toilet facility showed a p-value of 0.02, which is significant. Hence there is an association between overall nutritional status and toilet facility.

#### 4.5 Logistic regression analysis of factors associated with child’s nutrition

**Table 4 11: Logistic Regression analysis of factors associated with child’s nutritional status**

<b>Variables</b>	<b>Crude OR</b>	<b>95%CI</b>	<b>Adjusted OR</b>	<b>95% CI</b>
<b>Maternal Factors</b>				
Mothers Age group	0.87	0.62-1.21	0.99	0.68-1.43
<b>Child Factors</b>				
Vaccination	0.27	0.08-0.86	0.40	0.12-1.32
<b>Environmental Factors</b>				
How hand is washed	0.42	0.23-0.77	0.57	0.30-1.07
Source of drinking water	1.75	1.32-2.31	1.59	1.19-2.13
Toilet Facility	0.71	0.49-1.03	0.71	0.47-1.07

Source: Field survey, 2018

NB: A measurement is statistically significant at p-value<0.05; AOR: Adjusted odds ratio;

COR: Crude odds ratio\*: statistically significant; 95%CI: confidence interval

The bivariate analysis that generated some significant associations were mothers age, child’s immunization status, how hand is washed, source of drinking water and toilet facility. Further analysis of these variables were performed using a logistic regression model were presented.

Univariate analysis showed with maternal age (COR=0.87, CI:0.62-1.21) which is not significant and adjusting for the other variables showed an odds ratio of (AOR=0.99 CI:0.68-1.43).

The univariate analysis with child vaccination status showed an odds ratio (COR=0.08 CI:0.08-0.86), which is significant. Adjusting for the other variables in multiple logistic regression analysis showed an odds ratio (AOR=0.40 CI: 0.12-0.32) which is also significant. This implies older age mothers have 60% reduction in odds of having a malnourished child as compared to younger age group mothers.

A univariate analysis with how hand is washed gave an odds ratio (COR=0.42 CI: 0.23-0.77), which is significant. Adjusting for the other variables gave an odds ratio (AOR=0.57 CI: 0.30-1.07), which is not significant. Which suggests for mothers who wash their hands always with water and soap, there is 43% reduction in odds of having a malnourished child as compared to all those who engage in other alternative practice of hand washing. However, this odds observed is not statistically significant.

A univariate analysis with source of drinking water gave an odds ratio (COR=1.75 CI: 1.32-2.31), which is significant. Adjusting for the other variables gave an odds ratio (AOR=1.59 CI: 1.19-2.13), which is significant.

The univariate analysis with toilet facility showed an odds ratio (COR=0.71 CI: 0.49-1.03), which is not significant. Adjusting for all the other variables in multiple logistic regression analysis showed an odds ratio (AOR=0.71 CI: 0.47-1.07) which is also not significant. It was observed that both the crude and the adjusted were the same, hence the other variables controlled for couldn't have masked the measure of association between type of toilet facility and nutritional status. The odds imply that there is 29% reduction in odds of mothers who use water

closet of having malnourished child as compared to mothers who use other toilet facilities. However, the odds is not statistically significant.

Table 4.12: Logistic regression analysis of the various indicators

Variables	Stunting ( HFA)				Underweight (WFA)			
	Crude OR	95%CI	Adjusted OR	95%CI	Crude OR	95%CI	Adjusted OR	95%CI
<b>Mothers Age</b>								
20-29	3.16	1.28-7.77	3.22	1.25-8.31	3.53	1.45-8.59	3.15	0.23 -8.05
30-40	2.58	1.05- 6.37	2.15	0.82- 5.63	3.36	1.37-8.27	3.62	1.37- 9.54
>40	7.21	2.43-21.37	7.94	2.42-26.04	2.68	0.96-7.53	2.54	0.82 -7.92
<b>Income Level</b>								
1000-5000	1.22	0.78-1.92	0.98	0.60- 1.60	0.96	0.59-1.57	0.81	0.47-1.39
<b>Sex</b>								
Male	1.06	0.70-1.60	1.13	0.69- 1.84	0.80	0.51 - 1.27	0.94	.057 -1.58
<b>Immunization</b>								
Fully immunized	0.16	0.04-0.77	0.13	0.02-0 .66	5.13	1.45-7.61	2.54	0.68-3.82

Source: Field survey, 2018

NB: WAZ (Weight-for-Age Zscore), HAZ (Height-for-Age Zscore)A sub- analysis of the anthropometric indices and some factors associated to malnutrition in a logistic regression model revealed the following: A significant relationship was observed between the caregivers' age group and child stunting among two age groups using a logistic regression analysis and using age<20 as the reference group. The odds for a mother in older age group having a normal height child is higher compared to women of age group <20yrs, as shown in the various age groups

above. In age group 20-29 the odds were 3.22 times the odds for women age group < 20 (AOR 3.22 CI:1.25-8.31). In women 30-40, the odds were 2.15times but was not significant (AOR:2.15 CI:0.82-5.63). Among age group > 40yrs the odds were 7.94times and significant (AOR 7.94 CI:2.42-26.04).

In relation to income level category, in the same logistic regression model using <1000 as the reference group. The odds of having a normal height child is 2% reduced in those with income level < 1000 (AOR: 0.98 CI: 0.60-1.60) but was not significant. Its association with underweight too was not significant (AOR: 0.81 CI: 0.47-1.39).

Among the sex category, using female as the reference group, odds of having normal height is 13% increase in males as compared to females (AOR: 1.13 CI: 0.69-1.84), but it's not significant. Also, is not significantly associated with underweight.

With regards to immunization and making partially immunized as the reference group, there is 87% reduction in odds of a fully immunized child having normal height as compared to partially immunized and was significant (AOR:0.13 CI:0.02-0.66). The odds of having a normal weight child in fully immunized children is 2.54times the odds of partially immunized child (AOR: 2.54 CI: 0.68-3.82), which is not significant (Table 4.12).

## CHAPTER FIVE

### DISCUSSIONS

#### 5.1 Introduction

This chapter provides the discussions of the study in relation to other studies.

In order to understand under five malnutrition problems in Ashiedu Keteke in general and in the present study area (children hospital), there appears a need to investigate the contribution of a number of factors influencing malnutrition. Accordingly, this study has tried to look into factors associated with malnutrition in the study area by incorporating as many risk factors as possible.

#### 5.2 Main Discussion

In this study, the indicators used in the assessment of malnutrition were height for age, weight for age and mid upper arm circumference measurement. A total of 328 children were assessed. The findings of the study showed that 78.05% were malnourished. About 3.66% had severe acute malnutrition and 15.85% had moderate acute malnutrition. Also 18.90% were severely underweight or wasted and 12.80% were moderately underweight or moderately wasted. Again 39.08% were severely stunted and 16.62% were moderately stunted.

The United Nations Division for Sustainable Development (2007) and Macharia et al. (2005) describe stunting as the reflection of the cumulative effects of under-nutrition and infections. It serves as an indication of poor environmental conditions and long-term chronic restriction of a child's growth potential. It was observed that the prevalence of stunting was lower in the first 6 months of life. The prevalence increased through 6-20 months and peaked (51.97%). This is in

consonance with earlier work done by Badake et al. (2014) and Jayatissa et al. (2012). Badake et al, 2014 attributes this pattern to poor weaning and complementary feeding practices leading to inadequate protein and energy intake in the child. This can be caused by the caregiver's lack of knowledge about proper infant and young feeding practices.

The prevalence of stunting was higher in males than females. This is a confirmation to the report of the GDHS 2008 that males are more likely to be stunted than females (GSS et al., 2009).

There was a significant association between stunting (height for age) in children and caregiver's age. From the multivariate analysis, older mothers were less likely to have a stunted child than a young mother for all various age groups in reference to age less than 20 years. Reports by Fall et al. (2015) in a similar study done in some selected low and middle-income countries revealed that the age of the mother was associated with stunting. Children with young mothers were more disadvantaged in childhood nutrition than those with older mother.

Though the lowest prevalence of underweight was seen in those who were 0-6 months (6.45%), there was no pattern in the prevalence of underweight with increasing age. This is similar to an earlier finding by Jayatissa et al. (2012) in a similar study in Sri Lanka.

Children between the ages of 6-20 months had the highest prevalence (48.39%) of underweight. This could be because during this stage, exclusive breastfeeding has stopped and complementary foods introduced may be inadequate for the child or previous infection may have resulted in reduction in food intake of the child. This is likely the case since the median duration of exclusive breast feeding was 6months and also maternal antibodies clears after 6 months, hence the child would have been easily prone to infection during that time, Ajaio et al. (2010) associates these reasons to households which might have food insecurity.

Similar to the findings of Akorede & Abiola, (2013), Asfaw et al. (2015) and Hailemariam, (2014) that some maternal, child and environmental factors were significantly associated with nutritional status, significant association was seen between some of these factors and nutritional status in the present study. Similarly, significant association were seen between child underweight or weight for age and some of the exposure variables, just as in Asfaw et al., (2015) and Mengistu et al. (2013) found them to be significantly associated.

Linking the results of the study to conceptual framework, some children and environmental factors were seen to be significantly associated to the child's nutritional status as expected; and also, some maternal factors (caregiver age group) were seen to be associated with child nutritional status.

Knowledge on malnutrition, some good hygiene practices and available healthcare services in the community could have helped in improving the nutritional status of the children under-five. The study also showed quite significant number of the children had diarrhea (34.33%) and respiratory tract infection in their recent medical history (46.27%). Diarrhea is the leading cause of morbidity and mortality of children through dehydration and malnutrition. High magnitude of malnutrition observed among children who had diarrhea in the recent medical history. This is clear because there is a reciprocal relationship with diarrhea leading to malnutrition and malnutrition predispose to diarrhea (Bantamen et al 2014). The result of this study may suggest that children suffered from longer and repeated episodes of diarrhea, which determined their nutritional status. Diarrheal diseases in children under the age of five are an indicator of lack of basic sanitation.

A bivariate analysis between overall nutritional status and maternal educational and occupational showed that, there is no association between overall nutritional status and maternal educational

level and occupation, contrary to a similar study done in Ethiopia using a case control approach, ( Bantamen et al 2014) which revealed that parental illiteracy was significantly associated with the risk to develop malnutrition in children under the age of five. Similar to this study, Nikoi (2011) found that in Ghana, parental education and occupation had no significant relationship with child nutritional status.

A bivariate analysis of source of drinking water showed a significant association with nutritional status that was similar to a study done in Ethiopia by (Bantamen et al 2014).

How hand is washed and use of toilet facility, which forms part of the mothers' hygiene practices and sanitation factors respectively were significantly associated with nutritional status. These two factors synergistically contribute to diarrhoeal conditions in the child.

A very high percentage of the children had been fully immunized (96.34%) and 3.66% had been partially immunized. However, bivariate analysis with nutritional status showed no association.

More than half (54.44%) earned income <1000ghs and 45.56% earned income between 1000-5000ghs. However, income was not significantly associated with nutritional status of the child.

The rate of malnutrition in under-fives in the community, were higher (76.05%) than expected and quite a significant number of mothers were teenagers (6.71%). This is an indication that to some extent, the community intervention must be put in place to reduce or end teenage pregnancy and improve sanitation factors and hygiene practices.

## **Limitations**

This study had some limitations, which include some of the following. The study was a cross-sectional study so it was difficult to examine any potential temporal relationships or causal associations. In addition, hygiene practices were determined based on self-reported data from the caregivers, as well as other sanitation factors and socio-economic variables like level of income.

Most mothers did not carry along their record to health chart book, hence it was difficult confirming the immunization status of the child.

## CHAPTER SIX

### 6 CONCLUSION AND RECOMMENDATIONS

#### 6.1 Conclusion

The following factors were associated with and contributed to the development of malnutrition among under five children in the study area. These factors are maternal age, hygiene practice of the mother, sanitation factors, source of drinking water, recent medical history of diarrhea or respiratory tract infection.

It was also noticed that higher proportion of malnourished children were in age group 6-20 months. Almost all the children had been fully immunized.

#### 6.2 Recommendations

Malnutrition program should be strengthened and expanded by Ministry of Health. Mothers should be taught very nutritious meals to introduce as complementary meals when exclusive breast-feeding is stopped (after 6 months).

Measures should be put in place to reduce teenage pregnancy in the community by the Ministry of Gender, Women and Social Protection.

Good source of water by Ghana Water Company should be made available to all homes.

Caregivers should be educated on the need to wash their hand with clean water and soap before preparing food, cleaning the child and after toilet Government should make it a policy for all homes to have good toilet facilities.

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**APPENDICES**

**SCHOOL OF PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCES  
UNIVERSITY OF GHANA, LEGON**

**Appendix A: QUESTIONNAIRE**

<p><b>QUESTIONNAIRE ON ASSESSMENT OF FACTORS ASSOCIATED WITH UNDER FIVE MALNUTRITION IN CHILDREN IN THE ASHIEDU KETEKE SUBMETRO IN THE GREATER ACCRA REGION, GHANA</b></p>
<p>The study tries to find out the various factors that influence malnutrition in children under five years. You are required to share your experience by responding to the following questions.</p>

	QUESTIONS	CODING CATEGORIES	SKIP TO	CODES
<b>1. CHILD CHARACTERISTICS</b>				
a.	Sex	<b>Male.....1</b> <b>Female.....2</b>		sex
b.	Age (State child's age at last birthday )	.....		age
c.	Birth Order	1 2 3 4 >4		b_order

d.	Duration of Breastfeeding (in months)	.....	breast_d
e.	When was your child born?	<b>At term</b> .....1 <b>Preterm</b> .....2	term
f.	Type of birth weight	<b>Overweight (&gt;4.2kg)</b> .....1 <b>normal weight (2.5-4.2kg)</b> .....2 <b>Underweight(&gt;2.5 kg)</b> .....3	b_weight
g	Immunization status (penta 3 as proxy)	<b>Fully Immunized</b> (received penta 3).....1 <b>Partially immunized</b> (started vaccination but dropped out before penta3).....2 <b>Unimmunized</b> (received no vaccination at all).....3	immune
h	Recent medical history	<b>Diarrhoea</b> .....1 <b>Malaria</b> .....2 <b>Respiratory tract infection</b> .....3 <b>Others specify</b> .....4	Rmhx
i	How would you describe the Health status of your child?	<b>Healthy</b> .....1 <b>Unhealthy</b> .....2	ch_status

j	Researcher's observation of child's health status	<b>Healthy.....1</b> <b>Unhealthy.....2</b>		r_chstatus
<b>2. SOCIODEMOGRAPHIC AND SOCIOECONOMIC</b>				
k	Mother's Age (state your age at last birthday)	..... ....		m_age
l	type of diet	Vegetarian.....1 Normal diet.....2		diet
m	Do have any food taboos?	Yes.....1 No.....2	Skip <b>m.</b> if No	food_taboo
m.	If you have food taboos, please state	1..... .... ..... .... 2..... .... ..... .... 3..... .... .....		

		...		
n.	Religion	Christian.....1 Muslim.....2 African Traditional.....3 Other (state).....4		reli
o.	How many pregnancies have you carried beyond 20 weeks?	.....		parity
p.	Do you decide on your own how you use money?	<b>Yes</b> ..... <b>1</b> <b>No</b> ..... <b>2</b>		auto_money
q.	How would you describe your health status?	<b>Healthy</b> ..... <b>1</b> <b>Unhealthy</b> ..... <b>2</b>	Skip <b>o.</b>	mh_status
r.	Researcher's observation of mother health status	<b>Healthy</b> ..... <b>1</b> <b>Unhealthy</b> ..... <b>2</b>		r_mhstatus
s.	Mother's Occupation	Unemployed .....0 Trader.....1 Security Personnel.....2 Daily laborer .....3		m_occp

		Civil service.....4 Other (state)..... 5		
t.	Father's Occupation	Unemployed .....0 Trader.....1 Security Personnel.....2 Daily laborer .....3 Civil service.....4 Other (state)..... 5		f_occp
u.	Mother's educational level	No formal education.....0 Primary..... 1 Secondary..... 2 Tertiary..... 3		meduc
v.	Father's educational level	No formal education.....0 Primary..... 1 Secondary..... 2 Tertiary..... 3		feduc

w.	Family Income (monthly)	<1000 ghc 1000-5000 ghc >5000 ghc		income
x.	How many are you in your family?	Please state ..... ....		f_size

**D. ENVIRONMENTAL HEALTH CONDITIONS**

1. When do you wash hand?

- a. after use of toilet
- b. before food preparation
- c. after cleaning child
- d. mostly after lunch
- e. After all the above

2. What do you wash hands with?

- a. only with water
- b. sometimes with soap
- c. always with soap

3. Source of drinking water

- a. pipe borne
- b. river side
- c. pure water
- d. bore hole

4. What toilet facility do you use?  
 a. pit latrine  
 b. K.V.I.P  
 c. water closet  
 d. others specify.....

**E. ANTHROPOMETRIC MEASUREMENTS**

	Height in cm	..... ....		Height
	Weight in kg	.....		Weight
	Mid upper arm circumference	.....		Muac

## **INFORMATION SHEET AND INFORMED CONSENT**

### **APENDIX B: INFORMATION SHEET**

#### **Introduction**

I am **JONATHAN YEBOAH ANSAH**, and I'm conducting a study on the under 5 malnutrition in children in the **Ashiedu Keteke Sub-Metro in Greater Accra**. I will be explaining all about the study to you, and you will also receive a copy of the leaflet that explains all about this study that you are being asked to partake in. Please take all the time you need to read it carefully. You may ask me any questions about anything you do not understand at any time. You are a volunteer. You can choose not to take part and if you join, you may quit at any time. There will be no penalty if you decide to do so.

#### **Why you are being asked to participate**

You have been asked to take part in this study because you reside in the Ashiedu Keteke Submetro, which is my study community of interest. I am also interested in taking information from mothers with children between ages 0-59 months, who reside in the Ashiedu Keteke Submetro and are coming for child welfare clinic, and in all I plan to ask such people to participate in the study.

#### **Procedures**

If you agree to be part of the study, a trained project staff, will ask you to fill a questionnaire alone or with assistance for approximately 10 - 30 minutes. As a participant, if you agree to participate in this study, data from your responses may be used as part of my assessment of the factors associated with under five malnutrition among the children.

### **Risk and Benefits**

I anticipate minimal or no risk to you. There is no direct benefit to you for being in the study; however, the study outcomes may lead to better understanding of the nutritional status of children 0-59 months in the sub metro, which may help in health policy development and programs planning to improve the health status of such children.

### **Confidentiality**

All data will be anonymous and will be kept private. Your identifiable data such as name or date of birth will not be used in documents, reports, or publications related to this research. I will keep all documents secured and under lock in a wooden cabinet.

When typing your survey responses into the computer, all data will be entered without any information that will make it possible for your identity to be known. The information you provide will be kept strictly confidential and will be available only to persons related to the study (the researcher and the supervisors).The School of Public Health, University of Ghana, Legon, may also have access to study records upon their request.

Your responses will not be shown to other participants . The original paper survey forms will be destroyed once data entry is complete.

### **Voluntariness and Withdrawal**

Your participation in the study is completely voluntary and you reserve the right not to participate, even after you have taken part, to withdraw. This is your right and the decision you take will not be disclosed to anyone. Please note however, that some of the information that may have been obtained from you without identifiers, before you chose to withdraw, may be used in analysis reports and publications.

**Cost/Compensation**

Your participation in this study will not lead to you incurring any monetary cost during or after the study.

**Who to contact**

If you have any concern about the conduct of this study, your welfare or your rights as a research participant or if you wish to ask questions, or need further explanations later, you may contact me on (Tel: 0543145119, Email: Roosty87@gmail.com).

Thank

you!

**APPENDIX C: CONSENT DECLARATION**

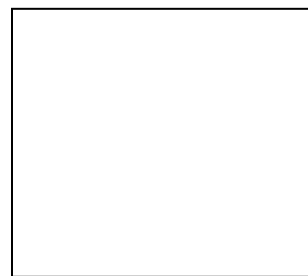
I have read the information given above, or the information above has been read to me.

I have been given a chance to ask questions concerning this study; questions have been answered to my satisfaction. I now voluntarily agree to participate in this study knowing that I have the right to withdraw at any time without affecting future health care services

Name of **Participant** \_\_\_\_\_

Signature of **Participant** \_\_\_\_\_

Date:        /        /        /



Left thumbprint  
of participant

Name of **investigator** \_\_\_\_\_

Signature of **investigator** \_\_\_\_\_

Date:        /        /        /