

KWAME NKRUMAH -UNIVERSITY OF SCIENCE AND TECHNOLOGY

KUMASI, GHANA

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH EDUCATION AND PROMOTION

**MALNUTRITION AMONG CHILDREN 6-59 MONTHS IN ATWIMA
KWANWOMA DISTRICT, ASHANTI REGION-GHANA**

BY

FELIX DELLE



JUNE, 2016

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

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KWANWOMA DISTRICT, ASHANTI REGION-GHANA**

BY

FELIX DELLE (BSC PUBLIC HEALTH)

A THESIS SUBMITTED TO THE DEPARTMENT OF HEALTH PROMOTION
AND EDUCATION, COLLEGE OF HEALTH SCIENCE, SCHOOL OF PUBLIC
HEALTH, IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE
DEGREE OF MASTER OF PUBLIC HEALTH IN HEALTH EDUCATION AND
PROMOTION

JUNE, 2016

DECLARATION

I hereby declare that this submission is my own work towards the MPH (Health Education and Promotion) and that, to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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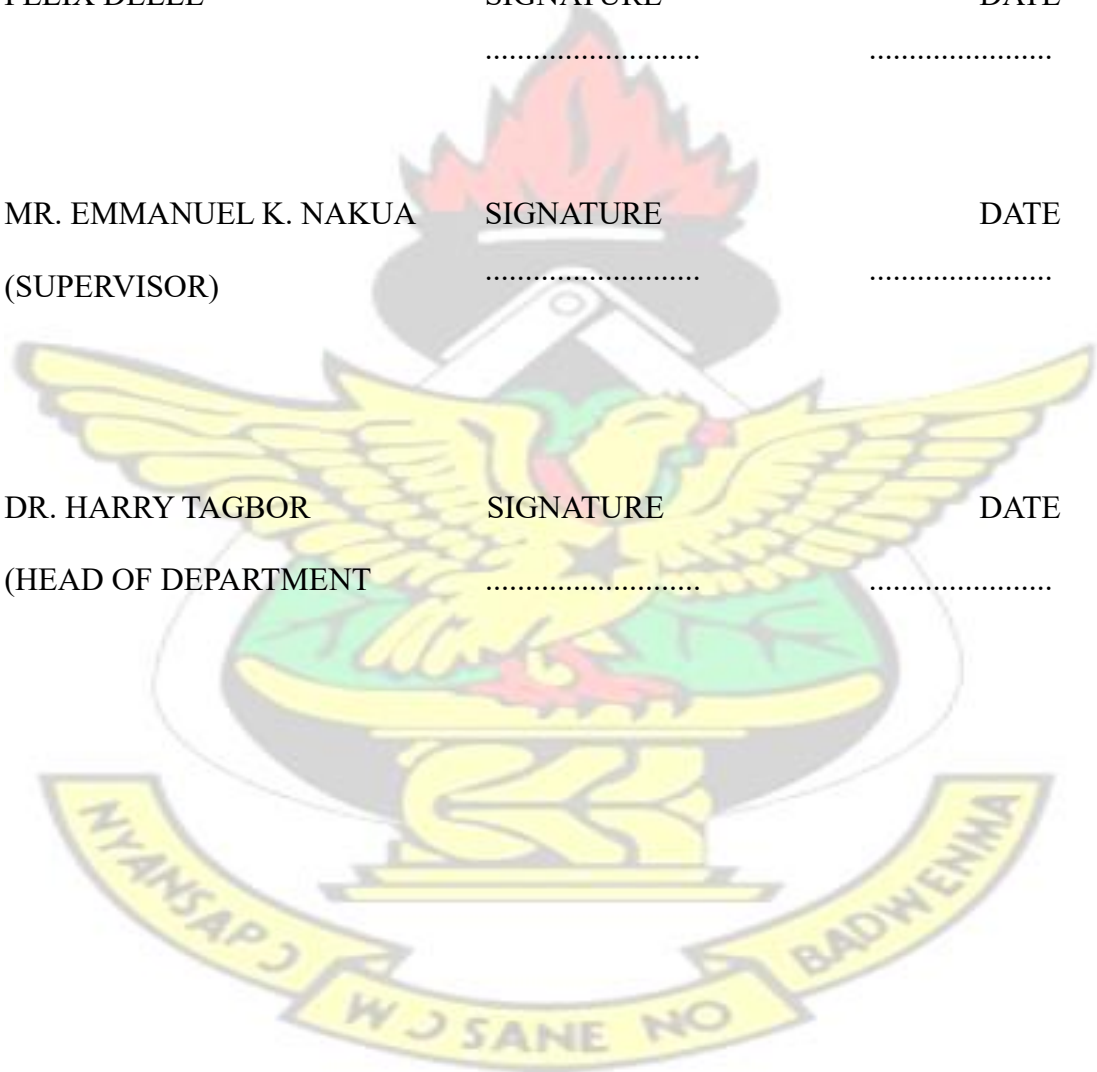
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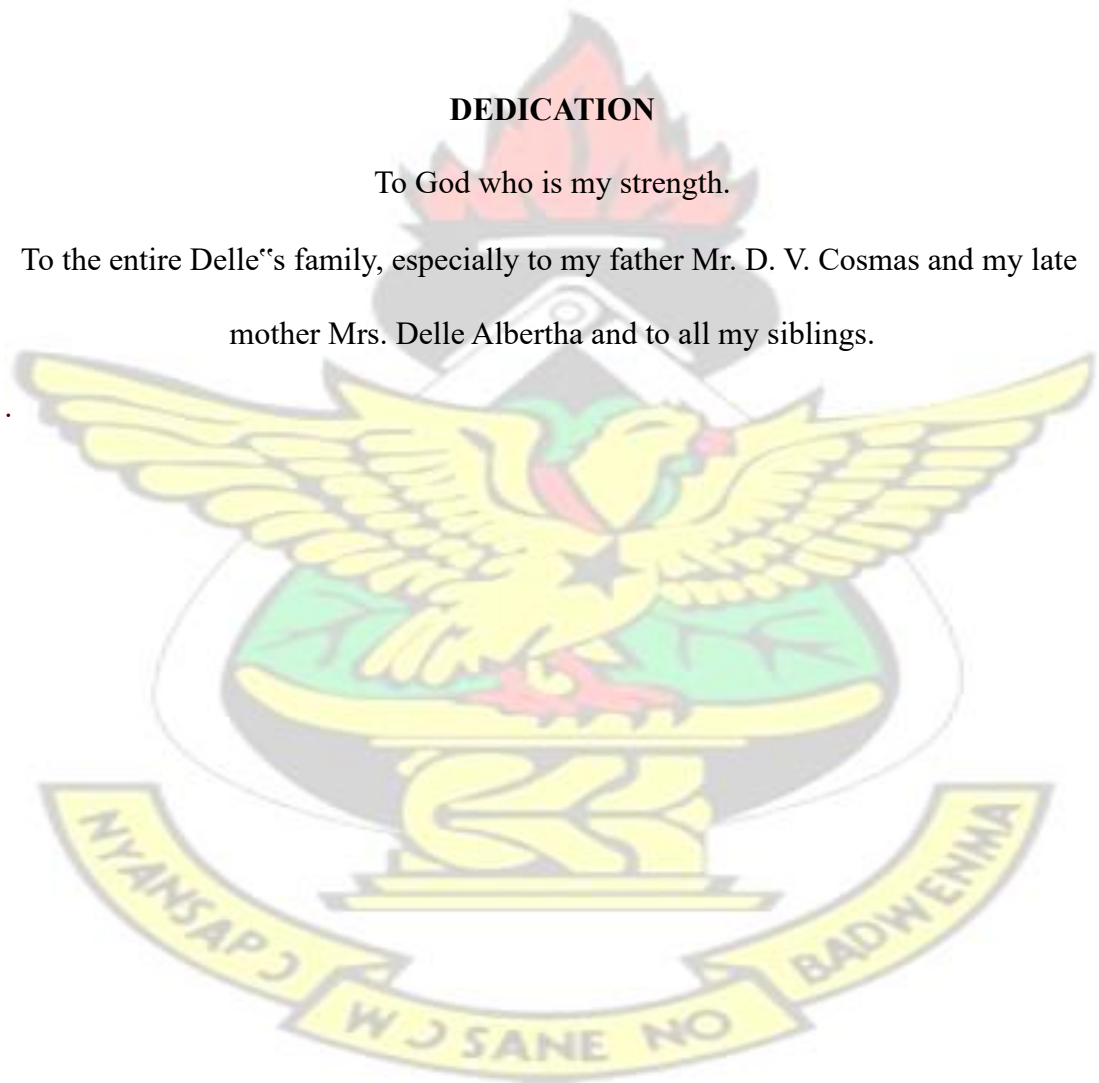


KNUST

DEDICATION

To God who is my strength.

To the entire Delle's family, especially to my father Mr. D. V. Cosmas and my late mother Mrs. Delle Albertha and to all my siblings.



ACKNOWLEDGEMENT

I would like to express my heartfelt appreciation to all whose contribution made the completion of this thesis possible. This thesis is a product of efforts by several people whom I may not mention by name. First, I am grateful to God for enabling me to complete this work through the help of several other people who deserve special recognition.

I wish to thank my supervisors, Mr. Nakua Emmanuel for his keen and tireless supportive supervision, encouragement and sustained interest throughout my study. Many thanks to the Dean (Dr. Easmon Otupri), School of Public Health, KNUST for his leadership role.

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I also thank the Atwima Kwanwoma District Director of Health Services, Ms Comfort Suglo for her kind gesture extended to me and supervising me during my data collection and attachment period. My regards to all those who have contributed in many ways to support this worthy course, may the Almighty God bless you all.

KNUST DEFINITION OF TERMS

Food security: having both physical and economic access to food that meets people's dietary needs and their food preferences, as well as having appropriate food use based on knowledge of basic nutrition and care

Malnutrition: when a person is not getting the required food or right sort of food in their right quality and quantity

Under-nutrition: When the right requirements of food needed for growth and development are lacking

Over nutrition: When the right requirements of food needed for growth and development are in excess

Height-for-age: This index provides an indicator of linear growth retardation.

Weight-for-height: This measure body mass in relation to body length.

Height-for-age: This index provides an indicator of linear growth retardation.

Mid-Upper-Arm-Circumference: the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow

Deficiency: a lack or shortage

Micronutrient Deficiency: a lack of essential vitamins and minerals required in small amounts by the body for proper growth and development

Macronutrient Deficiency: a lack of nutrients required in large amounts normal

growth and development **ABBREVIATION/ACRONYMS**

ACC/SCN	:	Administrative Committee on Co-ordination, sub-Committee on Nutrition of the United Nations
AIDS	:	Acquired Immunodeficiency Syndrome
ARI	:	Acute Respiratory Infections
CHPS	:	Community Health Planning and Services
CWC	:	Child Welfare Clinic
EPI	:	Expanded Programme on Immunisation
FAO	:	Food Agriculture Organisation
GDHS	:	Ghana Demographic Health Survey
GHS	:	Ghana Health Service
HAZ	:	Height for Age Z-scores
HIV	:	Human Immunodeficiency Virus
MDG	:	Millennium Development Goals
NE	:	Nutrition Education
RDA	:	Recommended Daily Allowance
UN	:	United Nations
UNICEF	:	United Nations International Children's Education Fund
USAID	:	United
WAZ	:	Weight for Age Z-score
WFP	:	World Food Programme
WHO	:	World Health Organisation
WHZ	:	Weight for Height Z-score

ABSTRACT

Background: Malnutrition is one of the leading nutrition- related conditions among children under five years. Child malnutrition leads to extreme weight loss, stunted growth, weakened resistance to infections and death. About 60 million children in the world have moderate acute and also 13 million are suffering from severe acute malnutrition. In African children almost 9% suffer from moderate acute malnutrition, whilst 2% accounts for severe acute malnourished children in the developing world. Death is closely linked to the severity of the malnutrition, given a severe wasting mortality rate of 73- 187 per 1000 children per year.

The study was to establish malnutrition level among children 6 to 59 months old in Atwima Kwanwoma district.

Methods: descriptive cross sectional study design involving 172 children aged 6-59 months and below who attended child health clinics were randomly sampled, measurements were taken on weight, length and mid upper arm circumference of these children. Prevalence and type of malnutrition were established using z scores.

Results: Results from the study showed an overall point prevalence of malnutrition of 21.00%. However, the point prevalence of malnutrition in the district for the various types of malnutrition were as follows; 22.7%, 37.8% and 21.0% of the children were wasted, stunted and undernourished respectively.

A detailed examination of malnutrition indicated that more males were affected than females. All the three degrees of malnutrition were not prevalent in children of all age groups and that different determinants may be at play. The following variables were associated with malnutrition: marital status, knowing the type of food that the child should consume, treat water before drinking, child craves for certain food, source of drinking water and type of toilet.

Conclusion: Malnutrition level among children between 6-59months in the district was very high 21.0% and was associated with the age of the children rather than their sex group. The younger the child the more likely they are susceptible to malnutrition.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The complex nature of food security makes it a serious issue in the world. Food security is defined as having both physical and economic access to food that meets people's dietary needs and their food preferences, as well as having appropriate food use based on knowledge of basic nutrition and Care (WHO, 2012). There has been a growing interest in food security and nutrition in the globe, due to food shortages, rising food prices, increasing cases of obesity, and persisting problems of hunger have spurred on widespread concern and action (WHO, 2011). More than one billion people globally out of which 200 million are children, sleep hungry every night USAID (US Agency for International Development).

Eating food which does not contain adequate nutrients in terms of quality and quantity can be termed malnutrition. Eating enough food is not a guarantee for good nutrition if the food short in providing adequate amounts of micronutrients to meet daily nutritional requirements (World food programme, 2013).

Malnutrition can be grouped into two namely, over- and under-nutrition. When the right requirements of food needed to grow and develop are deficient, the negative effect is under-nutrition (Merten, 2008). Macronutrient deficiency is used to refer to as Protein Energy Malnutrition (PEM). Micronutrient deficiencies, wasting, stunting and being underweight are the categorization of under-nutrition (Merten, 2008, WHO, 2003).

Under-nutrition is a condition caused by a lack of food of good nutritional value combined with further interaction from infections. Micronutrient deficiency occurs as

a result of poverty, food insecurity, lack of knowledge, and unequal distribution of resources (Nagati et al., 2003).

WHO came out with principles to evaluate the development of a child using the median for measuring the child's nutritional status with the Standard Deviation (SD) value in 2007. Under-nutrition has association with deficit in behaviour and development of the brain's anatomy, neurochemistry, and metabolism (Black et al., 2013, Hurley et al., 2008).

The United Nations Children's Fund (UNICEF) (2004), has categorized the causes of malnutrition as basic (poor economic and political structures), immediate (poor dietary intake, psycho-social stress and trauma and diseases such as diarrhoeal and acute respiratory conditions), which further complicate malnutrition and underlying causes (household food insecurity, lack of knowledge and education, caring practices and health services, as well as an unhealthy environment). Hunger and undernutrition stems out of poor food consumption, poor care as well as unhealthy facilities, and indirectly, through agricultural barriers, lack of employment opportunities and women's status in society (Phometsi et al., 2006, Levin et al., 2003, Allen, 2002).

Children are more vulnerable due to the effect nutrition has on development and generations. As a result death, sickness, disability, metabolic and cardiovascular conditions, decreased reproductive performance, and decreased economic productivity can arise. These cost of under nutrition drain financial, physical, and social capital, further aggravating the cycle of under nutrition, poverty, and unhealthy household environment that most food-insecure families already have

(UNICEF, 2013).

About one quarter of children below five years are stunted in the whole world. Again, 150 million children have been estimated as underweight and 182 million as stunted (Lim et al., 2013). It's been established base on available data that stunting and its

effects are pervasive whilst a little is known about the dietary causes in children (Esfarjani et al., 2013).

Iodine Deficiency Disease (IDD), Iron (Fe) Deficiency Anaemia (IDA) and Vitamin A Deficiency (VAD) (Nagati et al., 2003, Altman et al., 2009) are the common micronutrients deficiencies. According to the WHO, World Food Programme (WFP) and UNICEF (2007), about two billion people worldwide have deficiency in key minerals and vitamins (WHO and UNSCN, 2007).

Using the levels of micronutrients in assessing malnutrition is critical in Africa.

The load of condition attributable to micronutrient deficiency is termed “hidden hunger”. Subclinical levels of deficiency can have serious and irreparable consequences on health, mortality, and economic productivity. There are four principal micronutrient deficiencies of public health concern in Africa: vitamin A, iron, zinc, and iodine (Wagstaff and Watanabe, 2000, Arjmandi et al, 2005, Zere and McIntyre, 2003).

Other indicators of nutritional status overall, a child under age five, under five mortality and prevalence of underweight at birth are proxy measures of nutritional security. Underweight reflects stunted and fetal due to poor health and nutrition of mother and serves as an indicator of the risk of infant mortality and the poor condition of health in the future. A cycle of life perspective on nutrition and the intergenerational transmission of poverty in society is the critical measurement.

Generally, moderately underweight children have weight-for-age below the median 2SD, Where as ratios below the median -3SD, is regarded as severely underweight (WHO 2007, UNICEF 2009). According to the WHO classifications of childhood

malnutrition: weight for age, refers to as underweight; the height for age, refers to as stunting; and BMI for age to be underweight. Underweight defines acute malnutrition, while stunting defines chronic malnutrition. It also implies severe malnutrition and acute malnutrition in the definition of wasting of a child (Altman et al., 2009). Worldwide, 23% children is moderately underweight base on the standards of the WHO. Low height for age is known as delayed growth and when it is lower than the midpoint more than -2 (WHO 2007). Stunting as it is widespread is the inability to reach linear growth in children with insufficient price long-term nutrient and infection. A child, stunted in growth for two years can suffer irreversible effects of low cognitive and motor development. Prevalence of stunting occurs between one-third of the world's children (UNICEF 2007; WHO 2004).

Each and every one of our greatest measure of anthropometric indices gives an important child's nutritional status. The combination of weight, length of spine, age data are the basis for determining the nutritional status of children (GSS, 2003).

Height-for-age: This index provides an indicator of linear growth delay. Children with height for age below minus two standard deviations (-2SD) of the median reference population are considered short, by age. Children less than three standard deviations (-3) to the median of the reference population heavily short. Growth retardation in children, due to little nutritive value has a consequence and effect of chronic illness over a long period. Under-nutrition is a long time phenomenon which measures height for age and does not move at the time of data (GSS, 2003) **Weight-for-age:** This indicator describes children with weight for age measuring less than -2 standard deviation from the median of that population, technically called

„under weight for age“ whilst those measuring less than minus three standard deviation (-3SD) from that particular population are seriously underweight. Age, underweight may mean that children stunted or wasted, or obstruction and wasted (GSS, 2003)

Weight-for-height: This measure of body weight relative to the length of the body.

Children whose weight for height below minus two standard deviations measure (2SD) from the median of the reference population, is far too thin for their height or lose, and those measures under minus three (-3SD) reference population is seriously wasted (GSS, 2003).

1.2 Problem statement

Malnutrition is one of the leading nutrition- related conditions among children under five years (Haddad et al., 2003) (World Bank, 2002; APHRC, 2002). Child malnutrition leads to extreme weight loss, stunted growth, weakened resistance to infections and death (WHO, 2003; Aluanga, 2006).

The world has around sixty and thirteen million children suffering from moderately and severely acute malnutrition. Approximately half (10-11million) of these under five aged children do not live to celebrate their fifth birth day as a result of preventable causes. Out of the total number of children who die, under developed countries record 99% of these deaths (Asfaw et al., 2015). Almost one-tenth of all children located in Sub-Saharan Africa suffer from moderately acute malnutrition. Another two percent are severely malnourished in under developed countries. Death is closely connected to the harshness of undernourishment, as a result of severe wasting mortality of 73-187/1000 children per year (Collins et al., 2006).

A third of the population globally are affected by micronutrients deficiency and its dyer consequences according to CDC (Lim et al., 2013). This study defines

malnutrition as inadequate or deficient nutrients, occasioned primarily by unavailability of food or the inability to utilize food consumed.

The World Health Organization has estimated about 150 and 156 million children living in under developed countries and between the ages 1-5 years are presenting with underweight and stunting respectively (Black et al., 2013, Caulfield et al., 2004) There is therefore the need to identify some of the factors that contribute directly to malnutrition. The knowledge of these factors would guide Ghanaian policy makers on the types of policies and investments that are likely to have the greatest impact on dealing with under-nutrition among children in the under-five age group.

The 2008 Ghana Demographic and Health Survey (GDHS) reported that, 11% of women in the reproductive age group suffer from malnutrition, 10% of children under five have been born as babies with low birth weight. Obviously, mothers' nutrition status have consequential effects on the fetus, and a low birth weight child would show greater vulnerability to disease, and delayed physical and mental growth in the most decisive years of life, and tend to become a woman anemic in subsequent years, if the child happens to be a woman. Hence a vicious cycle of malnutrition is formed.

Ghana Malnutrition in all age groups of children under five in the last ten years has increased. According to the (GDHS, 2014), the highest malnutrition rate occurred in the 18-23 months growth. In 2014, nearly thirty-one percent (30.4%) children were found within the 0-11 months age group as malnourished. It shows a sharp increase of 4.9% in 2006 to about 30.4% currently. For children 12 to 23 months 44.7% were undernourished in 2014 compared with 10.1% in 2007. The highest rate of 43.8 % was recorded in the Northern region, while Greater Accra registered the lowest rate of 11.9%. The rate of malnutrition among children 24-35 months age group was 34.8% in 2014 compared to 7.3 % in 2007

Ghana is ranked 74th in the world in the prevalence of mortality rates of under-fives, with a figure of 43/1000 in 2010. undernourishment has been the fundamental cause in more than 50% of these mortality (Liu et al., 2012).

1.3 Rationale for the study

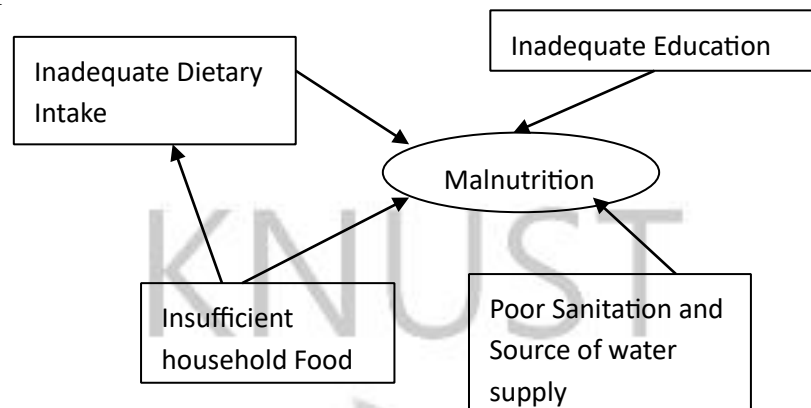
Bad feeding practices are usually linked to inadequate intake of food and unhygienic dietary customs. The risk of food safety are occasioned by nutrition ignorance, budgeting, food shopping and methods used in preparation (Silangwe, 2012, Senoelo, 2013). Education is very important in bettering levels of income, which will eventually lead to a better health and proper nutrition choices (Dixon, 2009, Ramnauth et al., 2008). Nutrition education can stimulate people to make better quality food choices only if the resources and opportunity exist (Koenig et al., 1998). FAO (2005), many people throughout the world, do not eat well, because of poverty and poor nutrition education (FAO, 2005). To practically deal with malnutrition, people must understand the requirements of a proper diet and the ability as well as the desire to make better food choice. NE is committed to reducing poverty, improving agricultural infrastructure, and ultimately to improve living conditions (FAO, 2009).

This study is to determine malnutrition level of children 6-59 months and give sound knowledge of nutrition, in the ultimate improvement of their lives into adulthood.

This study will also be used to promote healthy food choices to reduce malnutrition.

1.4 Conceptual Framework

Figure 1: Conceptual Framework



Source: Author, (2015)

Malnutrition: this is as a result of inadequate nutrition and the inability of the body to utilize food consumed due to unavailability of food and infection.

Inadequate food consumption: This refers to inappropriate feeding techniques, premature weaning, and delayed beginning of complementary and enough proteins intake.

Insufficient household food: inadequate amount of food staff available to the household as a result of poor yield or inability to procure food staff for the household.

Poor Sanitation: No proper place of convenience (KVIP, WC, Pit Latrine) and therefore resorting to free range.

Source of water supply: this is refers to water from either protected or unprotected sources.

Inadequate Education: this refers to caretakers who have acquired no education at all or have acquired basic education or have little or no education on nutrition.

1.5 Research Questions

1. What socioeconomic characteristics of parents are significantly linked to children's (6-59 months) nutritional status in the Atwima Kwanwoma district?
2. What is the association between household feeding practices, water sources and sanitation on the incidence of malnutrition in the district?
3. What is the malnutrition level among children 6-59 months in the district.
4. What are some of the signs of malnutrition among children under five years?

1.6 Main Objective

The general objective of this research was to determine the level of malnutrition among children 6-59 months in the Atwima Kwanwoma district.

1.7 Specific Objectives

1. To assess the socio demographic status of subjects' caretakers and their associated role in malnutrition.
2. To determine household feeding practices, water sources and refuse disposal and how these relate to the nutritional status of children 6-59 months in the district.
3. To determine the malnutrition level among children 6-59 months in the district
4. To report any clinical signs of malnutrition.

1.8 Profile of the study area

The Atwima Kwanwoma District Assembly was established in November, 2007 by Legislative Instrument (L I 1853). The district is found in the middle portion of

Ashanti region, bounded on the north by Kumasi Metropolitan Assembly, Amansie west to the South, to the east and west by Bosomtwi and Atwima Nwabiagya Districts respectively. The district has a total area of 340.9 meters square Km, which constitutes 1.4% of the totalland area of the Ashanti region. The district capital (Foasi) is about 20km from Kumasi . Other important settlements include Ahenema Kokoben, Trede, Twedie Trabuom, Nweneso and Kromoasi

CURRENT STATUS OF HEALTH FACILITIES

Health care services are being delivered in 13 health institutions in the District with a total capacity of one hundred and twenty-three health personnel. These institutions are five(5) governments, two(2) CHAG or Mission Health facilities, one(1) private facility and three(3) Community Health Planning Services (CHPS) compounds as indicated in the table below

SUB-DISTRICT	NO.	FACILITY	OWNERSHIP	STATUS
Foase	1	Foase Health Centre	Government	Operational/Reporting
	2	Aburaso Methodist Clinic	Mission	Operational/Reporting
	3	Apemenim CHPS	Government	Operational/Reporting
	4	Millennium Hospital	Private	Operational/Reporting
	5	Yabi CHPS	Government	Operational/Reporting
	6	Trinity Hospital	Private	Operational/Not reporting
	7	Dufie Memorial Clinic	Private	Operational/Not Reporting
	8	Kokoben Health Centre	Government	Operational/Reporting
	9	Gary Marvin Hospital	Private	Operational/Reporting
	10	Emmanuel Methodist Clinic	Mission	Operational/Reporting

	11	Asafo-Boakye Hospital	Private	Operational/Not Reporting
	12	Eye Adom Clinic	Private	Operational/Reporting
	13	Trabuom Health Centre	Government	Operational /Reporting
	14	Nweneso No.2 Health Center	Government	Not Operational
	15	Nweneso No. 3 CHPS	Government	Operational/Reporting
	16	Trede Health Centre	Government	Operational/Reporting
	17	Kwanwoma Health Centre	Government	Operational/Reporting

Source: DHMT, (2015)

There are however two private hospitals, which are situated a few kilometers from Kumasi, but their locations have no bearing in terms of accessibility for the eastern part of the district. In addition, the western part of the district is more deprived as compared to the eastern part.

Services provided in relation to health within the district are tailored towards integrated, preventive and curative services with emphasis on primary health care.

The main services provided are:

- General medical care
- Maternal and child health care and family planning
- Nutrition and health education
- Disease control
- Environmental health care

HEALTH SERVICE DELIVERY

The district has 54 outreach points where Reproductive and Child Health Services are rendered including health promotion. The strength espoused by the district is the community supervision programs. Over Sixty (60) people are trained and working as active volunteers (CBSVs) to promote community health activities in the field. CBSVs document and report on all health events in the communities including diseases, deliveries, deaths and referrals for all health activities.

One hundred and eighty three (183) community based volunteers (CBAs) have been trained in home base care to manage malaria, ARI and diarrhea in the communities.

The sixty (60) community volunteers are inclusive of the 183 CBAs.

Table 1.3: Sub District population distribution over three year period

Sub District	%	2013	2014	2015
Foase		33747	34721	35902
Trabuom		17253	17789	18446
Ahenema Kokoben		27345	28184	29236
Trede		25697	26469	27763
District		104042	107163	111347

Source: DHMT, (2015)

Table 1.4: Children 0 – 11 months for EPI and Expected pregnancies (ANC)

SUB DISTRICT	2013	2014	2015
Foase	1350	1389	1436
Trabuom	690	712	738
Ahenema Kokoben	1094	1127	1169
Trede	1028	1059	1111
District	4162	4287	4454

Source: DHMT, (2015)

Table 1.5; WIFA (24.0%) of the total population for the family planning

SUB DISTRICT	2013	2014	2015
Foase	8099	8333	8616
Trabuom	4141	4127	4427
Ahenema Kokoben	6563	6539	7017
Trede	6167	6353	6663
District	24970	24862	26723

Source: DHMT, (2015)

Table 1.6: Children 0-59 months (16.5%) for growth monitoring programmes

SUB DISTRICT	2013	2014	2015
Foase	5568	5729	5924
Trabuom	2848	2935	3044
Ahenema Kokoben	4512	4650	4824
Trede	4240	4367	4581
District	17167	17682	18372

Source: DHMT, (2015)

Table 1.6: Children 6 – 59 months (14.5%) for vitamin A supplementation

SUB DISTRICT	2013	2014	2015
Foase	4893	5035	5206
Trabuom	2502	2579	2675
Ahenema Kokoben	3726	4087	4239
Trede	3965	3838	4026
District	15086	15539	16145

Source: DHMT, (2015)

Table 1.7: STAFF STRENGTH

CATEGORY	No.	%
----------	-----	---

District Director of H. Service	1	0.6
Medical Officers	1	0.6
Dist. Public Health Nurse	1	0.6
Midwives	6	3.8
General Nurses	6	3.8
Technical Officer	3	1.9
Medical Assistant	3	1.9
Community Health Nurse	51	32.7
Field Technician	4	2.6
Lab Assistant	1	0.6
Labourer	1	0.6
Orderlies	2	1.3
Health Extension Workers	20	12.8
Ward Assistants	6	3.8
Secretarial class	0	0.0
Pharmacist	0	0.0
Pharmacy Technician	2	1.3
Store Keeper	0	0.0
Accountant	1	0.6
Executive Officer	1	0.6
Accounts Officer	2	1.3
Driver	1	0.6
Biost. Assistant	2	1.3
Watchman	1	0.6
Casuals	5	3.2
Internal Auditor	1	0.6
Enrolled Nurse	33	21.2
Total	156	100.0

Source: DHMT, (2015)

Table 1.8: CHPS

SUB DISTRICT	NO. OF COMMUNITIES	NO. OF CBVS	NO. OF OUTREACH SITES	NO. OF DEMARCATED COMPOUNDS	NO. FUNCTIONAL
TREDE	18	18	17	1	1
FOASE	14	15	13	2	2
AHENEMA KOKOBEN	15	15	14	1	0
TRABUOM	11	11	10	1	1
TOTAL	58	59	54	5	4

Source: DHMT, (2015)

1.9 Scope of the Study

This report is mainly focusing on household characteristics and more special attention to physical signs of malnourished children under five years. These characteristics include socio-demographic, economic, food availability, educational level among others.

In other words, the impact of health, agricultural, educational and leadership structures and their influences on the nutritional status of the child, were not directly examined under this study.

1.10 Organization of Work

This report is organized in six chapters. The first chapter described the background, problem statement, identified the objectives and the scope of the study. The second

section reviewed related literature on malnutrition generally and examines findings made from other authors on the subjects. The third section provided a description of the methods, materials, tools and procedures used in gathering information and analyzing the results. It highlighted the ethical and assumptions underpinning the conduct of this study. The fourth chapter focused on presentation of results in the forms of tables and charts arranged in accordance with the objectives of the study. The fifth and sixth chapters are on the discussion, conclusions and recommendations respectively. The discussion session detailed what could account for the observations made and in furtherance to that, its implication on the management of undernourishment among children below five years. Additionally, it does so by examining other findings relative to other settings especially those in Ghana. The conclusion and recommendation session of the report would bullet issues noted in the findings and also suggest what can be done by an identifiable agency to solve the problem.

CHAPTER: TWO

LITERATURE REVIEW

2.0 Introduction

Child growth is internationally recognized as an important indicator of health for monitoring the nutritional status and health in populations. The growth and development of children are delayed, as a result of infection and bad eating habits and tend to have more frequent episodes of variety of infectious diseases such as diarrhea, malaria, meningitis and pneumonia. A number of studies (Benson, 2005) (Brown, 1998, Ojeifeitimi et al, 2003, Cicero et al 2004) confirmed the growing severity lack of anthropometry and mortality. There is a strong evidence which suggest that, reduced growth is associated with reduced intellectual capacity and delay the progress of the mind (WFP, 2005). This chapter therefore seeks to determine malnutrition level, and

other related factors of social, economic, and nutritional benefits that children under five years can derive for better health.

2.1 Socio-Economic factors

Conclusions from the Studies investigating the association between knowledge of nutrition and nutritional status of children showed incoherence. According to Appor and Kreklong, (2005) there exist a significant association of maternal nutrition knowledge and nutritional status of the child, the social characteristics of parents, especially mothers, are the same by some researchers as related to nutritional status of children (Appoh and Kerkling, 2005) a study conducted in KWA-ZULU natal on the social and cultural manipulations on newborn nourishing judgment among two men indicated that mothers age has a superior influence on food practices and choices for the kids 0-59 months. Older mothers demonstrate the ability to be independent as to the choice of food given to their children than those of younger age (Thairu et al, 2005). Mothers' socio-demographic and economic characteristics play an integral part to influence children's state with respect to nutrition, especially children 0-59 months. After McKeever and Miller (2004), the extension of the nutritional status of the child has a correlation to the background characteristics of the mothers, including age, occupation and education level.

A study conducted in a rural Nigeria, assessed the determinants of malnutrition level of children age 0-59 months. A strong relationship exist between age, employment status and employment of mother and the risk of malnutrition in children. It was explained that the extent of independence of women partner is a resulting consequence to the state of nutrition among children (Ojeifeitimi et al, 2003).

A study in the Volta region has demonstrated that knowledge about nutrition mother and socioeconomic status influence the nutritional status of children. The study showed that there is a close link between mother's marital status and child nutritional status. In addition, the knowledge and breastfeeding practices are important indicators of the nutritional status of children (Appoh and Krekling, 2005), in particular marital status, education level, economic and social status were significantly association with the nutritional status of children.

In Nigeria, findings from research work on the basis of malnutrition arising from inadequate consumption of the protein among children below 5 years. He concluded that poverty, insufficient foodstuff cultivation, lack of knowledge in addition to unequal allocation of resources also contribute to under five malnutrition (Bhavsar et al., 2012)

A study in Kenya case-control performed to determine the socio-economic factors predisposing fewer than five children in severe malnutrition attributable to protein.

The result indicated that social risk factors were single mothers (OR14.93), young mothers (OR 3.95), living in temporary house (OR3.627), and the concierge who was married not to the child's parent (OR 0.10).

Poverty, social conditions, single mothers, incomplete vaccination and sex of child were the socio economic factors contributing to protein malnutrition was the conclusion for the study. (Toteja et al., 2006).

A study to investigate the effect of drought on childhood diseases and nutrition in children under five of the rural population in Rajasthan concluded that the comparison of results of current drought with previous studies in normal and drought showed a

higher prevalence of PEM and deficiencies in calories and proteins in food (Singh et al., 2006).

A survey conducted in order to check whether economic inequality is associated with chronic PEM of childhood, the study found that inequality of wealth is related in the midst of persistent childhood malnutrition and stressed that, the reduction of poor quality along side improving service for the poor can achieve better living conditions for the total well being of under five children in Cambodia (Saito et al., 1997).

Repeated cross-sectional study was conducted to young children born us Latinos of Mexican immigrant parents compared to non-Latino immigrants not in clinic low income population determine the toll that the individual is burdened with as a consequence of non-availability of food and starvation. It found that children in families of Mexican refugees have a higher risk of starvation and household dietary security and malnutrition sequentially (Liaquat et al., 2007).

A study of 90 mothers weaning age performed on infant feeding among Pakistani mothers in England and Pakistan. The study found that the more confident mothers of Pakistan were as compared to mothers from England due to experiences with other siblings and counsel from parents. More health advice has been sought for a decade , and all the children of parents who were well nourished had improvement through weaning practices (Taneja et al., 2003, Rahi et al., 2006).

A study to determine whether the prevalence and risks issues linked to PEM are connected to the age of under five in the province of Luang Prabang, Laos. It was found that children aged 12-23 months, the prevalence of stunting and Khmu ethnic also had a higher (65 % and 66 %) and underweight (45 % and 40 %), but also showed that boys were more likely to be underweight and stunting. Low food and vegetables

consumption when mother is taken ill were some of the risk factors in child (Fon et al., 2014).

A study to investigate factors leading to malnutrition in Bangladesh among the under five, the main factors of under five malnutrition are obvious interval of birth ,birth size, body mass index of the mother at birth and parental education were found (Kumar et al., 2006, Saha et al., 2008).

2.2 FEEDING PRACTICES AND DIATARY CONSUMPTION AND MALNUTRITION

Healthy food for good nutrition prolongs life. The reason is that, what you eat determines what you are, but most people eat food on accounts of several reasons rather than its nutrients and more so that food choices are a custom . Some factors that may influence food choices may include taste, availability, race, health status, location and nutrition. Eating habits are affected by the number of reasons and the health of the people to determine their nutritional status (Krause and Mahan, 1984), irrespective of the conditions affecting our attitude towards food consumption, sufficient food consumption is crucial in the maintenance and promotion of health. The way food is consumed can predispose an individual to diet related conditions thereby affecting sickness and death in a positive or negative manner. In addition, the state of health of the mother being the primary care provider has the tendency to influence the mother's ability to care for her children properly or other wise (Plante et al., 2001).

Turun and others found that productivity is lowered as a result of deficit in energy hence altering the habits of physical activity. It was also concluded that slightly malnourished persons have a propensity to become over socially interactive including unrestricted behavior, child care (Torun et al., 1989).

A study in Kenya and Egypt came out with an association between the ability to treat and how well nourished a care giver is. It was also found out that, a strong link exist between low hemoglobin, low vitamin B₆, poor dietary consumption with caregiver child interaction in three to six months in Egypt (Ruel et al., 1998). The effects were that, inadequate time for the child, lackadaisical response to the infant and excessive use of older siblings.

equally in Kenya, lower maternal caloric intake associated with physical activities resulted in less contact with their infants (Wachs et al., 1992), given the important role we play practical dietary health and nutrition of the individual especially the mother, a study was conducted to assess household food practices, food quality and nutritional status in rural Ghana using the mother as the unit of analysis.

Essential nutrients to meet the nutritional need are not all in one food (except breast milk in the first month of life),but come from a diet composed of a number of foods (Wahlqvist and Hsu-Hage, 1996), healthy diets are said to be those that are the most varied. Various schemes have been shown to protect against chronic diseases such as cancer (Franceschi et al., 1997), while being associated with extended longevity (Kant et al., 1995) and the improved health status (Hodgson et al., 1994), several dietary guidelines have long emphasized the value of eating a variety of foods (Grinder-Pedersen et al., 2003, Drewnowski et al., 1997). A measure of the nutritional quality of the diet may therefore be its diversity.

After 6 months of age when breast milk alone becomes increasingly short in providing the sufficient amounts of micronutrients to sustain growth and development, the need for complimentary foods becomes evident. The term complimentary foods has in this theses a broad definition, including both foods that are given in addition to breast milk

(Dewey and Brown, 2003) and all other foods that are used during the transition from liquid diet typical of small infants to family foods. Complementary foods may consist of transitional foods, i.e foods specially designed to meet the nutritional needs of infants and young children or family foods, meeting the infant consumes the same food as the rest of the family.

The composition of complimentary foods and how they are used vary with country and culture but there are some universal aspects. One aspect, common to both low income and high income settings, is that they are often plant based (Carruth and Skinner, 2002, Gibson et al., 2010) although plants are excellent sources of energy and nutrients, plant constituents can also greatly affect nutrients bioavailability, i.e the fraction of a particular nutrients or other substance that is actually available for absorption by the body. Polyphenols, for example, food in many vegetable inhibit iron absorption (Peerson et al,1998), another aspect of complimentary foods is that the content of meat and other sources of animal protein tends to be low ,also in the most affluent settings (Carruth and Skinner, 2002), meats and other animal protein sources are not only excellent sources of protein and energy, but also contain many essential nutrients and increase the absorption of others, example animal protein enhances zinc absorption. The intestinal absorption of micronutrients thus is affected by composition of the diet with factors both enhancing and inhibiting absorption. There are also many differences among complimentary foods particularly between high income and low income settings. Whereas in the former setting it is common to give industrially manufactured, fortified and nutritionally balanced foods, in the latter it is more often home-produced from locally available staples. Although studies of complimentary foods in developing countries indicate that the energy and protein content may be adequate, they may be short in micronutrients; in most low income settings intakes of

iron zinc and vitamin b6 are inadequate and in some populations the same is true for riboflavin, niacin calcium, thiamin, foliate, vitamin c and vitamin a (Gibson et al., 2010, Lutter and Dewey, 2003, Adu-Afarwuah et al., 2008). Although providing adequate amounts of energy and some nutrients, diets may contain low absolute amounts of other nutrients, or nutrients may have low bioavailability, leaving the infant or child at risk of specific nutrients deficiencies. The symptoms of these micronutrient deficiencies may appear subtle, although the impact on health both in the short and long run is substantial. Such vitamin and mineral malnutrition, sometimes called hidden hunger is amongst the most common nutritional disorder in infancy and childhood world wide these thesis concerns two of these micronutrients, iron and zinc, how they affect health and wellbeing of items infants, and how two different nutrient interventions can influence iron and zinc nurture during the second half of infancy and early childhood.

Malnourished children are at risk of poor physical and cognitive growth, learning capacity, school performance and educational outcomes (Mora and Nestel, 2000). long-term effects of malnutrition in adulthood include reproductive problems, decreased physical and mental work capacity and chronic disease (Mora and Nestel, 2000, Pelletier and Frongillo, 2003).

Sigh, 2003 lists omega 3 fatty acids, docosahexaenoic and arachidonic acids as essential for brain development. Other nutrients needed for optimal brain development are the b-vitamin, folate, vitamin c, vitamine, iodine, iron, zinc, selenium, essential amino acids, taurine, choline and anti-oxidants (Singh, 2004), undernourished children may have a smaller brain and remain intellectually inferior to well-nourished children. Decreased cognitive aptitude and underdeveloped motor function were shown to significantly correlated with malnutrition in a study involving Filipino children (Allen

and Gillespie, 2001), a study in a Guatemala showed preliminary positive effects on child and adult educational achievements from nutrition intervention at 6 to 24 months of age (Zabel et al., 2008)

Relatively few studies have assessed dietary variety or addressed its effect on the total diet (Drewnowski et al., 1997). The few existing studies have mainly been carried out in rich countries (Drewnowski et al., 1997, Kant et al., 1995). Conventional dietary studies are time consuming and costly and under certain conditions almost impossible to conduct. There is therefore a need for simple, low cost methods for the assessment of the nutritional quality of diets. The challenge is to find out tools that are precise enough to give the information needed and simple enough to be used in large field-surveys. The challenges are even bigger when dealing with an illiterate population eating from shared bowls as is the situation in many African countries. Proper methods are lacking for this kind of survey. This paper is to determine the nutritional status of children 0-59 month in the Atwima Kwanwoma district

2.3 Malnutrition Level of Children 6 to 59 months

Malnutrition is plainly an indication of “bad nutrition” which can broadly be grouped into over and under – nutrition. The relationship of malnutrition trends among nations indicates that the later is much prevalent in developing countries of which Ghana cannot be left out. The world food programmed (WFP) in her definition of malnutrition has said it is a state in which the physical function of a person is impaired to the point where he or she can no longer maintain adequate bodily processes such performance as growth, pregnancy, lactation, physical work and resisting and recovering from disease (WFP, 2005). Malnutrition occurs due to lack of macronutrients (carbohydrates, protein and fat), micronutrients (vitamins and minerals) or both.

Macronutrients deficiencies occur when the body adapts to a reduced intake of macronutrients by a corresponding decrease in activity and an increased use of energy reserves (muscle and fat) or decrease growth. Thus individual suffering from malnutrition may become shorter than normal (growth reduction over a prolonged period of time) and/ or thinner than their well-fed counterparts. Hidden hunger or micronutrients malnutrition is widespread in sufficient quantity in the diet. Micronutrient deficiencies are commonly known as iron (anemia) vitamin A (xerophthalmia, blindness), and iodine (goiter and cretinism). Others such as vitamin C (scurvy), niacin (pellagra) and thiamine or vitamin B1 (beriberi) may also occur during acute and protracted crises where populations depend on a source limited food unchanged.

Measuring the nutritional status of children less than 5 years anthropometric measurements provide one of the most important indicators of nutritional status of children. The effect of combining the spine length, weight and the age of infant data, culminating in the three indices of physical growth used in description of nutritional status of children which are height –for-age, weight for age and weight for height.

Height-for-age: this is linear growth retardation indicator. Children with height for age below minus two standard deviation ($-2SD$) of the median of the reference population are severely stunted. Stunting in children can be the result of inadequate nutrition over a long period of time or the effects of recurrent or chronic illness. Height-for-age is therefore a measure of the outcome of under nutrition in a population over a long period and does not substantially vary with the season data.

Weight-for-age: this is composite index of height-for-age. Children whose height for height measurement below minus two standard deviations ($2SD$) from the median of

the reference population are considered under the weight of their age, while those with measurements below three std dev type (-3SD) of the reference population are seriously inadequate. Under weight for her age, could mean that the child is stunted or wasted or squandered and growth retardation (GSS, 2003).

Weight-for-height: this measurement body mass with respect to the body length. Children whose measurement PF weight for height is below minus two standard deviation(2SD)from the median of the reference population, are too thin for their height or wasted, while those with the measures is less than three(-3sd)of the reference population are severely wasted.

2.4 The Signs of Malnutrition

The increase in total body water is found in kwashiorkor. Plasma volume expands when expressed in proportion to the body weight, and perpendicular to the surface of the child. The total water content in the muscle, skin, liver and leucocytosis increases. Increase of extracellular space and edema is a major feature of kwashiorkor, and its pathogenesis is uncertain (Smith et al, 2004)

The dominant feature is a soft deployment, painless swelling of the legs and feet, perineum, upper limbs and face (Torun Andchew, 1994 P.961; Torun, 2006, P.892). Inflammation of the feet is first recognized in the child and as the child grows, it then spread to the legs, thighs and stomach, until the child is completely swollen. Edema is gravitational, with only the hands and forearms bulging, while the shoulders and arms are extremely thin and bony. These features distinguish them from children with nephrotic syndrome. Ascites is predominant in a child with edema.(Borelli Et al,2007). Edema had a strong relationship with hypoalbumineamia . Other things can cause edema including: potassium deficiency, leading to water and sodium retention ,

excessive use of water and sodium and water loss due to the higher capillary permeability . Disease and inflammatory response produced by the toxins cause edema (Torun And Chew, 1994 Torun, 2006). Retention of sodium and water is about 10-30% of body weight and can even reach 50% in serious condition(bakalemwa, 2014) and tighten jowls were associated with edematous (bakalemwa, 2014) .The cheeks designated as the "moon face" .purpuric spots can be seen on the cheeks of children with severe malnutrition(Pereira, 1991) .In the doldrums children are wasted and coarsely without edema underweight, liver and skin changes (strobe and Ferguson, 2005).Patients with non edematous PEM have skin with centralized nature muscles wasting and lack of subcutaneous fat-cutanee (Berdanier Et Al2008, size Et Al 2012 Witney Rolfes 2007).The slump can easily be identified on a patient due to the emaciated appearance of the body (leadership, 2006). Muscle loss is usually in the buttocks and shoulders (bakalemwe, 2012) .Children with marasmus have prominent ribs, and a very thin branches with less muscle or fat tissue (Berdanier Et Al, 2008, Shetty et al, 2002). The bichat fat pads are the new subcutaneous fat deposits to disappear, leaving hollow cheeks. It gives the child face marasmic shape or monkey face (monckeberg, 1991)

The most obvious clinical sign is the height and weight and delays in some cases, growth can only come to complete stop (Berdanier Et Al, 2008, Piercecchi-Marti Et Al, 2006) .Marasmic patients less than 60% of the expected weight for their height and longitudinal growth delay (Torun And Chew, 1994 Torun, 2006).

The skin is dry, wrinkled and thin and tends to crack because it is less elastic.childrens hair is sparse, thin, and dry and is easily torn (Monckeberg, 1991 Sizer Et Al, 2012 Witney And Rolfes, 2007).

Inadequate nutrition or malnutrition CSN lead to changes in immune function and cause secondary immunodeficiency (Strobe and Ferguson, 2005).in the liquid PEM liquid is essential due to the high capillary permeability of the infection. Infection and inflammatory response caused by toxins contribute to edema (Torun 1994) Torun and Chew, 2006). Retention of sodium and water is about 10-30% of the body weight but can still get 50% of cases of grave (Bakalemwe, 2014). Tissues and cells of the immune system are reduced in size and number which renders the body susceptible to infection (Bentley et al, 2002). The infections are characterized by fever, leukocytosis, tachycardia, pus formation, tachypnea and local inflammation, but when these responses are not seen, deadly infections will be undiagnosed (Golden, 1998).

In kwashiorkor, it is common to find hair root atrophied. The hair is plucked easily and without pain, and the patient can go bald. The hair becomes thin (few) right and without life, without its normal brightness. Straight hair raises the loops and gives the appearance of trees with straight trunks. This is called “canopy” or “sign of the forest” (Golden, 1998) (Torun And Chew, 1994 Torun, 2006).

Texture, color and hair strength are also affected. black, curly hair becomes silky ,dull hair color and brown/red-brown and others may change to red, brown, gray or blonde(Berdanier Et Al ,2008,Witney And Rolfes 2007).Tyrosine shortage can cause the melanin to change hair color(pereira,1991, torun and chew.1994, torun, 2006), whereas in the slump hair appears to have a normal color (Berdanier et al, 2008)

The hair is brittle, dry and without its normal brightness. Periods on the alternating bands nutrition produce good and bad of depigmented and normal hair which is called “flag” or “belt” “sign”pereira,1991;torun and chew,1994,turun2006).the skin is thin and smooth with little elasticity and wrinkled easily when Pinched (Monckeberg,

1991, Morgan and Weinsier,1998) m and is located in folds (Golden,1998). Skin changes include dermal atrophy, bruising, ulcers and hyperkeratosis scaling. The loss of the thickness of the fold the fold of skin is associated with a loss of energy reserves (Monckerberg, 1991 Weinsier And Morgan, 1998).

Crazy floor dermatitis is characterized by dark reddish or purple spots in the body folds which take off leaving oozing and first surfaces which resemble burns (pereira,1991;gold and gold,2000).the skin lesions are usually observed in areas of edema such as the back and buttocks and perineum and thighs(Jackson And Golden,1991;Torun And Chew,1994,Torun,2006) and depigmentation usually appears on the back of the legs, groin and elbows where there is friction (Berdanier Et Al 2008;Witney And Rolfes,2007;Katz Et Al ,2005).Oxidative lesions may appear in the openings of the skin folds (Piercchi-Marti Et Al 2006).

None of the skin changes are only related to PEM (Monckeberg, 1991 Weinsier And Morgan,1998) except for the flaky-paint dermatosis. Flaky-paint dermatosis is developing rapidly and a few days before death (pereira, 1991) the skin lesions are different from deficiency and pellagra vitamin b12, owing to the presence of edema, hepatic steatosis, bleached hair and irritability (WHO, 2000). Pellagra present as dermatitis very similar to PEM. Pellagra can be considered as areas of sunburn especially the parts of the body exposed to sunlight, dermatitis on exposure points, burning and itching of these areas, the scale and exfoliation and skin thickening (WHO, 2000)

Other clinical signs include breaking the skin and delayed wound healing(heimburger,2006)in adequate protein synthesis leaves uneven skin, scaly and wounds that fail to heal (Shetty Et Al 2002;Whitney And Rolfes 2007). Dry skin,

cracked and peels off layer of thin skin leaving hypo pigmented thin skin. The skin ulcerates easily, particularly in the flexures, perineum and behind the ears. The skin becomes darker especially over pressure and bony areas which is technically known as pressure necrosis (Pereira, 1991; Golden And Golden, 2000)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Study Method and Design

The study was a descriptive cross sectional design conducted to determine the level of malnutrition in the Atwima Kwanwoma district between 1st August and 30th August, 2015. Quantitative method was used to determine the level of malnutrition in the district. Quantitative methods require that data be statistically analysed on the basis of the characteristics of the kind, scale group, and variables of the data

3.2 Target Population

All children 6-59 months of age within the study catchment area, who were regular attendants and have been registered in the child welfare clinic register. The study included children who showed evidence of a child health record book.

3.3 Sampling Technique

Atwima Kwanwoma district was conveniently selected among districts in the Ashanti region. All four sub-districts were selected for the study. Out of the total number of villages or communities in each of the sub-districts, four communities were selected randomly. Systematic sampling technique was employed to select the sample from the

population. A systematic random Sampling method was used to select 172 children between 6-59 months as participants. Names of children in the child welfare register were listed not in any particular order and numbers assigned, with the first name being one, second name being two and in that other on till the last name. Subsequently, names were selected by calculating the sampling fraction which is ten (actual sample size for the community) divided by sixty-two (total population in the community). The sample fraction was $1/6.2$, which meant that one name was selected in every 6.2 names. Simple random sampling technique was again employed to select the first participant from the list upon which the rest of the names were then selected using the interval. The simple random sampling was done by writing the numbers on sheets of paper cut to the same size and shaped to prevent biases and squeezed individually until all writings were covered before placing in a bucket, the number picked randomly automatically became the first name. The procedure was repeated in all 16 communities to arrive at the total sample size of 172. It provides a useful approach once there is adequate list of the individuals in a population. A list of all children under five years which was available from the child welfare clinic register within the study area was used. Systematic sampling technique was used to select children under five years between the ages of 6-59 months.

3.4.0 Data Collection Tools

3.4.1 Data Collection Procedures

Eight community health workers assisted the researcher to collect data on the field. Training was organized for them on interview techniques and fundamental steps to take weight and size. Translations issues in the Ghanaian language "Twi", the local language was agreed to ensure consistency before the start of data collection. A data

capture sheet (the questionnaire) was used to extract information on the sociodemographic data of caregivers, food consumption and the presence of signs of malnutrition among children aged 6-59 months.

KNUST



3.4.2 Structured Interview

A pre-tested questionnaire was administered to caregivers with children age 6-59 months through structured interviews. The information gathered covered demographic characteristics and socio-economic factors. Data on child's age, sex, diet and nutritional status were also collected.

3.4.3 Measurements (Anthropometric Technique)

Weight and height measurements were taken on all the children selected one after the other using WHO standard techniques. The weight measurements were made of all children aged 6-59 months with Salter hanging scale. The weight measurements were taken for 0.1 kg.

Standing height was measured using a secure "Microtoise" a smooth and straight wall. The children were made to stand barefoot with feet at right angles, with the flat against the wall, eyes looking backward. They were asked to stand as straight as possible, with the heels on the floor. The cover of "Microtoise" was then lowered grinding smooth the hair and contact with the top of the head. The size was noted at 0.1 cm. Length was recorded from less than 2 years in subjects using infantometer a length of wood. The head was placed fixed vertically against the fixed head with eyes looking. The knees were extended by the fixed pressure sets foot right angle with the lower leg. Similar to standing height, length was recorded at 0.1 cm

3.5 Study variables

3.5.1 Dependant variable

The outcome variable is malnutrition

3.5.2 Independent Variables

Table 1: Independent Variables

VARIABLES	OPERATIONAL DEFINITION SCALE OF	MEASUREMENT
Socio-demographic characteristics	Responses to specific questions	
age of child	age at last birth day	Discrete
religion	religious affiliation	Nominal (Christian, Moslem, traditional)
Educational level	level of formal education completed	Nominal (None, Basic, SHS etc)
Occupation	Type of occupation	Nominal (None, Formal, Informal etc)
Number of dependants	total number dependant in household	Discrete
Marital status	marriage rites performed	Nominal (single, married and divorce)
Feeding practices	Number of times food is given to children	Ordinal scale
		4times a day= satisfactory
		3times a day=satisfactory
		2times a day= unsatisfactory
Adequate sanitation and water supply	Availability of good drinking water, toilet facility, good drainage system, clean environment	Nominal scale (e.g.water available, water not available)
	Availability of good drinking water,	Pipe-borne water= satisfactory
	Availability of toilet facility	KVIP=satisfactory
Clinical signs of malnutrition	Physical presence of signs of malnutrition	Nominal (e.g colour of hair, pallor, odema etc.

3.6 Sample Size

Using the sample size calculation formula below a sample size of 172 has been calculated

$$N = \frac{Z^2(pq)}{d^2} = 172$$

Where,

P (proportion of malnourished children)= 0.5

(precision) = 0.06292

Z (95% level of confidence) = 1.96

3.7 Pre-testing of Tools

The tools for this study were pre-tested using similar population. The necessary modifications were made to enhance the reliability, validity and clarity of the research instruments. Pre-testing was done at the district because it has the same characteristics as Atwima Kwanwoma district.

3.8 Data Handling

Child Welfare clinic data was used to identify respondents. Data entry was double entered by two entry clerks into the Microsoft Excel worksheet to reduce errors. The two spreadsheet were later compared and discrepancies rectified. The database was restricted by a password to prevent third parties access.

3.9 Data Analysis

Data collected were cleaned and analysed using Stata version 11.1. A template was designed and data entered. The data entered was run in frequencies and variables cross

tabulated for purposes of estimating descriptive and inferential statistics. For the latter, Chi square was used and p-values estimated appropriately. A probability value (p-value) < 0.05 was considered to be statistically significant at 95% confidence interval.

3.10 Ethical Considerations

A permit letter was obtained from the institutional review board, Kwame Nkurumah University of Science and Technology. A research permit was obtained from the District Health Directorate, Atwima Kwanwoma to carry out the research. Prior to data collection, the community leadership such as the chief and elders were informed about the study in order for it to be conducted within their community.

Confidentiality was maintained during and after the study. Consent was obtained from the respondents after explaining the purpose of the study. There was no leakage of information to third parties either than the research team.

3.11 Limitation

Firstly, the potential exists for inconsistencies in the data, which may influence the outcome of the study.

Secondly, the issue of malnutrition is an extremely complex issue; this assessment focuses on food consumption without considering breast milk, disease and infections that could limit nutrient absorption.

3.12 Study assumptions

The following assumptions were made:

1. Respondents demonstrated objectivity in their answers.
2. Sample size is a true representation of the study population.
3. Respondents responses represented the true situation in the district.

4. 100% of response rate in the study.

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CHAPTER FOUR

RESULTS

4.0 Result

This section of the study covers the findings. The findings are shown based on the predetermined objectives as indicated in chapter one. They are presented in tables.

Table 2: Demographic data of mother

Variable	Category	Freq.	Percent
Age of mother	16-20	9	5.2
	21-25	51	29.7
	26-30	49	28.5
	31-35	43	25.0
	36-40	18	10.5
	41-45	2	1.2
	Total	172	100.0
Ethnicity	Akan	122	71.0
	Northern languages	23	13.4
	Ewe	18	10.5
	Ga	9	5.2
	Total	172	100.0
Religion	Christian	150	87.2
	Muslim	13	7.6
	Traditional	9	5.2
	Total	172	100.0
Marital status	Divorce/ Separated/ Widowed	25	14.5
	Married	93	54.1
	Single	54	31.4
	Total	172	100.0
Level of Education	No Education	40	23.3
	Primary School	23	13.4

	JHS	65	37.8
	SHS	27	15.7
	Higher Than SHS	17	9.9
	Total	172	100.0
Employment	Seamstress	4	2.3
	Farmer	63	36.6
	Food Vendor	3	1.7
	Formally Employed	30	17.4
	Hairdresser	5	2.9
	Student	5	2.9
	Trader	28	16.3
	Unable to work	1	0.6
	Unemployed	33	19.2
	Total	172	100.0

Source: Author's field data, 2015

Sixty-three percent (63.4%) of the respondent had age below 30 years and a mean age of 28.6, with a standard deviation of 5.6. Fifty three percent (54.1%) of them were married with 31.4% been single mothers. On educational level of respondents, 23.3% had no formal education, 13.4% primary education, 37.8% Junior Higher School, 15.7% Senior High School and 9.9% had education above Senior High School. These results reflect more mothers with lower level of education as opposed to those who had achieved higher levels. More than one-fifth of them had no formal education (23.3%). Out of the 172 respondents, 30 representing 17.4% were formally employed and 108 representing 62.8% were engaged in own trade. Farming, formal employment, trading and tradesman-ship were the income earning employment engaged by the respondent forming 37.4%, 17.0%, 15.8% and 5.3% respectively.

Table

3: Child's Demographic Data

Variable	Category	Freq.	Percent
Child's Gender	Female	94	54.7
	Male	78	45.4
	Total	172	100.0
Child's Age in months	6-11months	53	30.8
	12-23months	77	44.8
	24-36months	18	10.5
	36-47months	12	7.0
	48-59months	12	7.0
	Total	172	100.0
		Mean	Std. Dev.
Height		74.2	18.4
Weight		10.44	3.4
MUAC		15.25	8.4

Source: Author's field data, 2015

54.7% of the subjects in the study were female and 45.4% were male. Most of the children were between 12-23months (44.8%). The mean measurement of weight, height and MUAC of the children included in the study represents 10.48kg, 77.77cm and 15.26cm respectively.

Table

4.1.0 The association between socio-economic characteristics of caretakers and children malnutrition

Marital status was significantly associated with malnutrition $p < 0.05$ for only weight-for-height and the remaining two indicators showed no significant association.

4: Association between child malnutrition and mother's education

Education				
Indicator	Nutritional Status	yes	no	P Values
WHZ	Malnourished	53	13	0.462
	Well Nourished	80	26	
WAZ	Malnourished	69	20	0.948
	Well Nourished	64	19	
HAZ	Malnourished	94	29	0.654
	Well Nourished	39	10	

Source: Author's field data, 2015

Table 5: Association between religion and child malnutrition

Religion					
Indicator	Nutritional Status	Christian	Muslim	Traditional	P Values
WHZ	Malnourished	56	6	4	0.627
	Well Nourished	95	6	5	
WAZ	Malnourished	78	7	4	0.818

Table

	Well Nourished	73	5	5	
	Malnourished	106	9	8	
HAZ	Well Nourished	45	3	1	0.465

Source: Author's field data, 2015

6: Association between marital status and child malnutrition

Marital Status						Source: e: Aut hor “s fiel d data, 2015
Indicator	Nutritional Status	Divorce	Married	Single	P Values	
WHZ	Malnourished	11	28	27	0.047	
	Well Nourished	14	65	27		
WAZ	Malnourished	12	44	33	0.250	
	Well Nourished	13	49	21		
HAZ	Malnourished	14	73	36	0.055	
	Well Nourished	11	20	18		

Table 9: Association between age of mother and child malnutrition

Age of mother							
Indicator	Nutritional Status	18-19	20-25	26-30	31-35	36-41	P Values
WHZ	Malnourished	2	21	24	14	5	0.347

Table

	Well Nourished	3	34	25	29	15	
	Malnourished	2	26	32	20	11	
WAZ	Well Nourished	3	29	17	23	11	0.271
	Malnourished	5	41	38	24	15	
HAZ	Well Nourished	0	14	11	19	5	0.077

Source: Author's field data, 2015

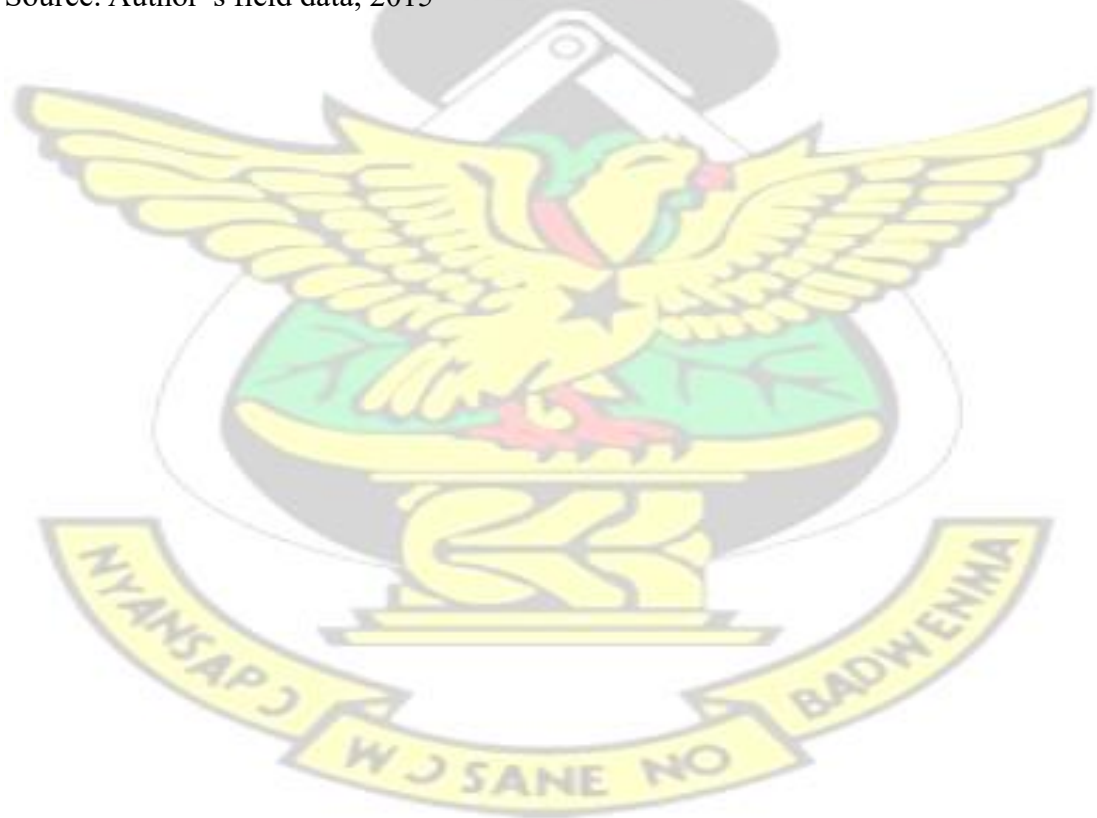


Table 10: Household characteristics

Variable		Frequency	Percent
Source of Drinking Water	Protected Dug or Tube Well	138	80.2
	Buy Water	28	16.3
	Unprotected Sources, eg.surface water	6	3.5
	Total	172	100.0
Treat water before drinking	No	48	28.1
	Not aware of any hazards	25	14.6
	Yes	98	57.3
	Total	172	100.0
Storage of water	Covered with lid	165	95.9
	Just buy and drink	2	1.2
	Uncovered	5	1.9
	Total	172	100.0
Availability of water all year round	No	6	3.5
	Yes	166	96.5
	Total	172	100.0
Type of Toilet	KVIP	55	32.0
	Bucket latrine	1	0.6
	Free range	10	5.8
	Pit latrine	62	36.1
	Water closet	44	25.6
	Total	172	100.0
Amount of Income spent on food	0-35%	26	15.1
	35-50%	64	37.2
	50-65%	51	29.7
	65-80%	27	15.7
	More than 80%	4	2.3
	Total	171	100.0

Source: Author's field data, 2015

Over eighty percent (80.2%) of households had their source of water from protected dug or tub well, 16.3% buy water and 3.5% had their water from unprotected sources. Out of one hundred and seventy-two households, ninety-eight (98) (57.3%) treat water before they drink, 25(14.6) was not aware there is the need to treat water before

drinking and 48(28.1) said they do not treat their water. More than ninety-five percent had their water covered and less than five percent do not cover their water.

With respect to water availability all year round, 6 (3.5) and 166 (96.5) said no and yes respectively. Responses by respondents on the type of toilet facility used by households indicated that, 62 (36.1%), 55 (32.0%), 44 (25.6), 10 (5.8%), 1 (0.6%) used pit latrine, KVIP, water closet, free range and bucket latrine respectively. On household income spent on food, about eighty-two respondents representing 47.8 spent more than 50% of their income on only food and 90 (52.3%) spent below 50% of their income on food.

4.1.1 Association between water source and sanitation on child malnutrition The following variables have association with child malnutrition variables source of drinking water and type of toilet facility.

Table 7: Association between source of drinking water and child malnutrition

		Source of water			P Value
		Buy water	Protected or dug well	unprotected water	
WHZ	Malnourished	11	52	3	0.591
	Well Nourished	17	87	2	
WAZ	Malnourished	12	73	4	0.284
	Well Nourished	16	66	1	
HAZ	Malnourished	15	106	2	0.015
	well Nourished	13	33	3	

Source: Author's field data, 2015

Table 8: Association between Type of Toilet and child malnutrition

		Type of Toilet					P Value
		KVIP	Bucket Latrine	Free range	Pit Latrine	Water Closet	
WHZ	Malnourished	19	0	4	26	17	0.860
	Well Nourished	36	1	6	36	27	
WAZ	Malnourished	22	0	6	42	19	0.017
	Well Nourished	33	1	4	20	25	
HAZ	Malnourished	38	1	7	47	30	0.850
	well Nourished	17	0	3	15	14	

Source: Author's field data, 2015

Table 9: Nutrition data

Variable	Options	Freq.	Percent
No. of meals eaten by child per/day	One	1	0.6
	Two	7	4.1
	Three	46	26.9
	Four	45	26.3
	Five	21	12.3
	More than five	52	30.4
	Total	172	100.0
Preparing special	No	108	62.8

meals for children	Yes	64	37.2
	Total	172	100.0
Caretaker knowing which type of food child should consume	No	46	26.7
	Yes	126	73.3
	Total	172	100.0
Child craves for certain food	No	93	54.1
	Yes	79	45.9
	Total	172	100.0
Consumption of animal products components of a meal during one week	Often (more than 10 times)	38	22.1
	Rarely (1-2 times)	42	24.4
	Sometimes (3-10 times)	92	53.5
	Total	172	100.0
Access to supplement/fortified food	No	54	31.4
	Yes, purchasable at local markets	55	32.0
	Yes, supported by government	63	36.6
	Total	172	100.0
Shortage of food	No	139	80.8
	Yes	33	19.2
	Total	172	100.0
Hunger crisis	No	152	88.4
	Yes	20	11.6
	Total	172	100.0
Reasons for hunger	Crop pests	1	5.0

crisis	Drought	1	5.0
	Flooding of agricultural land	1	5.0
	High food prices	6	30.0
	Illness of household member	1	5.0
	Job losses	8	40.0
	Livestock disease	2	10.0
	Total	20	100.0

Source: Author's field data, 2015

Almost five percent (4.7%) of the respondents said they fed their children one/two times a day. The rest are 26.9%, 26.3%, 12.3% and 30.4% fed their children three, four, five and more than five times respectively. Majority of the children (53.5%) consumed animal product 3-10 times per week. 31.4% of children had no access to supplements or fortified food. 68.7% of the children had access to fortified food. Out of 118 (68.7%), 46.6% had access to supplements from the local markets and 53.4% received their supplements from government and other institutions support. 19.2% of respondents were worried of having shortage of food for the past four months and the remaining 80.8% were not worried. From the data table above 20 (11.6%) of households indicated they were affected by hunger crisis for the last one year. Out of the 20 households, the reasons they gave as responsible for the hunger crisis are: crops affected by pests, drought, flooding of agricultural land, illness of household member especially bread winner, livestock disease, high food prices and job losses

4.2.0 Association of feeding practices and child malnutrition

Caretaker knowing which type of food child should consume, child craves for certain foods and treat water before drinking had significant association with child malnutrition $p < 0.05$ for height for age and weight for age. There was no association for weight-for-height

Table 10: Association between Caretaker knowing which type of food child should consume and child malnutrition

Indicator	Nutritional Status	Caretaker knowing which type of food		P Values
		yes	no	
WHZ	Malnourished	49	17	0.818
	Well Nourished	77	29	
WAZ	Malnourished	65	24	0.946
	Well Nourished	61	22	
HAZ	Malnourished	84	39	0.020
	Well Nourished	42	7	

Source: Author's field data, 2015

Table 11: Association between No. of meals eaten by child per/day and child malnutrition

		No. of meals eaten by child per day						
Indicator	Nutritional Status	1	2	3	4	5	6	P Value
	Malnourished	0	2	14	15	11	24	

	Well Nourished	1	5	32	30	10	28	
WAZ	Malnourished	1	4	23	23	13	25	0.817
	Well Nourished	0	3	23	22	8	27	
HAZ	Malnourished	1	5	31	33	15	38	0.969
	well Nourished	0	2	15	12	6	14	

Source: Author's field data, 2015

Table 12: Association between preparing special meals for children and child malnutrition

		preparing special meals for children		P Values
Indicator	Nutritional Status	yes	no	
WHZ	Malnourished	26	40	0.640
	Well Nourished	38	68	
WAZ	Malnourished	36	53	0.363
	Well Nourished	28	55	
HAZ	Malnourished	44	79	0.537
	Well Nourished	20	29	

Source: Author's field data, 2015

Table 17: Association between child craves for certain food and child malnutrition

	child craves for certain food	
--	-------------------------------	--

Indicator	Nutritional Status	yes	no	P Values
WHZ	Malnourished	27	39	0.297
	Well Nourished	52	54	
WAZ	Malnourished	33	56	0.016
	Well Nourished	46	37	
HAZ	Malnourished	52	71	0.128
	Well Nourished	27	22	

Source: Author's field data, 2015

Table 18: Association between treat water before drinking and child malnutrition

Indicator	Nutritional Status	treat water before drinking			P Value
		no	Not aware of any hazard	yes	
WHZ	Malnourished	19	8	38	0.774
	Well Nourished	29	17	60	
WAZ	Malnourished	31	16	41	0.021
	Well Nourished	17	9	57	
HAZ	Malnourished	39	20	63	0.152
	Well Nourished	9	5	35	

Source: Author's field data, 2015

4.3 Profile of Malnutrition

Table 13: Distribution of type of Malnutrition by locality

Indicator	Nutritional Status	Frequency	Percent
Weight-for-Age	Severe underweight	13	7.6
	Underweight	10	5.8
	Moderate underweight	66	38.4
	Normal weight	46	26.7
	Moderate overweight	33	19.2
	Overweight	4	2.3
	Total	172	100.0
Weight-for-Height	Severe wasting	15	8.7
	Wasting	9	5.2

	Moderate wasting	42	24.4
	Normal height-for-weight	46	26.7
	Moderate height-for-weight	40	23.3
	Too long-for-weight	20	11.6
	Total	172	100.0
Height-for-Age	Severely stunted	22	12.8
	Stunted	21	12.2
	Moderate stunting	80	46.5
	Normal height-for-age	23	13.4
	Moderate height-for-age	17	9.9
	Too long-for-age	9	5.2
	Total	172	100.0

Source: Author's field data, 2015

Three forms of malnutrition are presented based on the variables that were determined apriori and they are: Height for age Index (stunting), weight for age index (underweight) and weight for height (wasting).

Height for Age Index (stunting)

Sixty five (37.79%) out of 172 of the children studied were found to be stunted. Within this population N = 172, n = 22 fell within <-3 z- score (severely stunted) whereas n = 43 fell within <-2 z-score (stunted) and n = 80 were below -1sd.

Therefore, the point prevalence for stunting in this study was 37.79%.

Weight for Age Index (underweight)

Weight for age as used was an indicator for underweight signaling both severe underweight and underweight. Eighty nine children from the study were found to be underweight. Within the population N = 172, n = 13 (7.6%) fell within <-3 zscore (severely underweight) whereas n = 23 (13.4%) fell within <-2 z-score (underweight). The point prevalence for underweight in this study was 21.0%.

Weight for Height (Acute malnutrition or wasting)

Weight for age as used was indicated for wasting or thinness in the population. Thirty nine of the children studied were found to be wasted. Within the population N = 172, n = 15 fell within <-3 z-score (severely wasted) whereas n = 24 (14.0%) fell within <-2 z-score (wasted). The point prevalence for wasting in this study was therefore 22.7%. So we can say that about one fifth of children in the study area were suffering from acute malnutrition.

Table 14: Distribution of Malnutrition by Z score indices across sex

	Nutritional Status	female	male	Total
Weight-for-Age	Severe underweight	6	7	13
	Underweight	5	5	10
	Moderate underweight	30	36	66
	Normal weight	29	17	46
	Moderate overweight	22	11	33
	Overweight	2	2	4
	Total	94	78	172
Weight-for-height	Female	Male	Total	
	Severe wasting	7	8	15
	Wasting	5	4	9
	Moderate wasting	20	22	42
	Normal height-for-weight	25	21	46
	Moderate height-for-weight	24	16	40
	Too long-for-weight	13	7	20

	Total	94	78	172
Height/Age	Severe stunting	9	13	22
	Stunting	13	8	21
	Moderate stunting	47	33	80
	Normal height-for-age	8	15	23
	Moderate height-for-a	12	5	17
	Too long-for-age	5	4	9
	Total	94	78	172

Source: Author's field data, 2015

The three degrees of malnutrition were prevalent in children of all age groups and that different determinants may be at play, however the prevalence was more prominent in the male children.

Table 15: Distribution of Malnutrition by Z score indices across age

Indicator	Nutritional Status	6-11m	12-23m	24-36m	36-47m	48-59m	Total
Weight-for-Age	Severe underweight	4	9	0	0	0	13
	Underweight	3	7	0	0	0	10
	Moderate underweight	24	24	4	5	9	66
	Normal weight	15	18	5	6	2	46
	Moderate overweight	6	17	9	1	0	33
	Overweight	1	2	0	0	1	4
	Total	53	77	18	12	12	172

Weight/Height	Severe wasting	3	9	1	1	1	15
	Wasting		2	6	1	0	9
	Moderate wasting	17	17	2	2	4	42
	Normal height-for-weight	11	19	3	7	6	46
	Moderate height-for-weight	15	16	7	2	0	40
	Too long-for-weight	5	10	4	0	1	20
	Total	53	77	18	12	12	172
Height/Age	Severe stunting	5	16	1	0	0	22
	Stunting	9	11	1	0	0	21
	Moderate stunting	29	27	8	6	10	80
	Normal height-for-age	8	9	5	4	0	23
	Moderate height-for-age	3	9	2	1	2	17
	Too long-for-age	2	5	1	1	0	9
	Total	53	77	18	12	12	172

Source: Author's field data, 2015

4.4.0 Signs and Symptoms of Malnutrition

Table 16: Signs and symptoms of malnutrition

Variable	Sign/symptom	Freq.	Percent
Hair	Dyspigmented	6	3.5
	Easily plugged (no pain)	7	4.1
	Lack of natural shine, dull and dry	16	9.3

	None	143	83.1
	Total	172	100.0
Face	None	151	87.8
	Paleness	14	8.1
	Rashes on the skin	2	1.1
	Scaling	2	1.1
	Swollen face	3	1.7
	Total	172	100.0
Eyes	Dryness of the eye	11	6.4
	None	147	85.5
	Pale conjunctiva	13	7.6
	Redness and fissuring of eyelid corners	1	0.6
	Total	172	100.0
Lips	None	159	92.4
	Red tongue	2	1.2
	White or pink lesions at corners of mouth	11	6.4
	Total		
Glands	Front of neck swollen	4	2.3
	None	165	95.9
	Swollen cheeks	3	1.7
	Total	172	100.0

Source: Author's field data, 2015

Observing some clinical signs of malnutrition, it was found that 16.3% of the children had signs of malnutrition on their hair. Out of the 16.3%, 3.5%, 4.1% and 9.3% had dyspigmented, easily plucked hair without pain and deficient in normal shine, dull and dry hair. 21 (12.1%) of the respondents had malnutrition signs on their faces which are linked to protein energy malnutrition while the remaining 14.5%, 7.6 and 4.1% were

signs of malnutrition observed around the eyes, mouth and glands of respondents respectively which may be occasioned by micronutrient deficiencies. The visible signs observed on the faces of children include: paleness 14 (66.7%), rashes on the skin 2 (9.5%), scaling of skin around the nostril 2 (9.5%) and swollen face 3 (14.3%). Out of the 25 (14.5%) with visible signs of malnutrition on the children eyes, 11 (4%) had dryness of the eye, 13 (5%) had pale conjunctiva and 1 (4%) had redness and fissuring of eyelid corners. Red tongue 2 (15.4%) and white or pink lesions 11 (84.6%) whilst swollen cheeks 3 (42.9%) and swollen neck 4 (57.1%) were signs on the mouth and the neck respectively.

CHAPTER FIVE

DISCUSSIONS

5.0 Discussion

This chapter looks at the significance of the interpretation made from the study and its consequence on the malnutrition status of children below five years. The findings are discussed in relation to available literature on the subject and also based on policy guidelines. It also thatches on the social and economic implication to the children at Atwima Kwanwoma District and similar settings.

5.1 Background characteristics

Mothers who have children between 6- 59months in the Atwima Kwanwoma district are relatively young, educated, active and engaged in farming and trading. Their independence brings hope to their children as they contribute immensely towards proper care of their children. Having had some primary education is an indication that they have acquired some basic skills of improving life style anchored by better nutritional and sanitation care. The Millennium Development Goal Report, in the assessment of its fourth objective of child mortality reduction documented the

significance of maternal education and income levels doubles children survival (UN, 2006), since such parent can perform the protective role to children less than five years. Farming being engaged by mothers also reflects the level of food security at home and therefore its implication for the availability of quality food to the children. Caring for the children could be influenced by having a permanent partner who is employed and also educated. Since most (54.1%) of the women were married, partners of the women could provide additional supportive roles to ensure food and financial security required to improve the nutritional status of the children are secured. Evidence from the study suggest that, the collaborative efforts of both parents of children between 0-59months has yielded results and in most jurisdiction provided adequate food security for the household which was observed. The parents are able to earn enough income to meet other needs for the household.

5.2 Association between socio- economic characteristics and nutritional status of the child

It was evident from the findings that, marital status had an association with the nutritional status of the child.

Its worth noting that majority of women who had malnourished children were between 26-30 years. In fact, 65.3% of women within this age group had malnourished children. This is a source of worry as this age group can be said to be the ideal age for reproduction for women.

Educational level, religion and ethnicity did not show any significant association with the nutritional status of the child. The level of enlightenment of the educated had not been applied to meeting the nutritional need of their children so as to differentiate them

from those who had not had formal education therefore the manifestation of this observation might have come from the backdrop of socialization concept of infant feeding. In many cultures, feeding practices and habits connote the indigenous practices which usually are en-culturated without regards to the educational level. Low levels of formal education of majority of the mothers may influence to large extent, their inability to reappraise these practices to the benefits of the children but only to be engulfed by what pertains. The suggestion here is not that the feeding culture of children is poor but, only to highlight the uniformity and no difference of the nutritional status of children between zero and fifty nine months among educated and non-educated mothers. The input occasioned by the district health administration, in educating and promoting proper food habits does not seem to influence differently, the practices of both educated and non-educated mothers in the district.

5.3 Association of feeding practices, water source and sanitation on child malnutrition

Good feeding practices have the tendency to significantly reduce exposure to infection by children below fifty nine months. Its negative practice coupled with poor water sources and sanitary conditions only increases the susceptibility levels of the child to malnutrition. The commonly served food in the Atwima Kwanwoma district include fufu and soup, banku and soup, porridge, rice and stew, kenkey and fish and ampesi. Plantain, Maize and cassava are the main farm crops in the districts. These crops provide a readily available food for the family and the child less than five years. They are high in carbohydrate content and in most rural settings little protein is added to complement for a nutritionally adequate diet. The number of times and the presence

of protein in the diet had no association with the nutritional status of children aged 6-59 months. However there was significant association between the following variables: knowing which food the child should consume, treat water before drinking and child craves for certain food; and child malnutrition

The source of water and type of toilet had strong association with malnutrition status of the child. The MDG report in 2006, estimated that about 25% of people in Ghana do not have access to quality waters. The trend observed in this study suggest that, the use of wells and pipe borne is more than (80%) against the estimated percentage of 50-75% as indicated in the MDG report (UN, 2006). Even though, stream is less used, hand dug wells and boreholes could serve as a source of contamination and subsequently infections leading to malnutrition. Water from these sources is wrongfully presumed to be wholesome by the mothers because its colourless nature hence not boiled before used for the complementary feeding. This exposes the children to infection, as early on alluded to in this paper and consequently malnutrition. Faeco-oral transmission of organisms to children is a contributory factor to the manifestation of malnutrition among them. Poor toileting practices, where children are not well cleaned after toileting and hands washed thoroughly exposes them to infection. At the younger age of less than five, the oro-anal development results in putting hands in mouth to and from part of the body and from outside environment.

5.4 Level of Malnutrition among children 6-59 months in the district

Using the weight-for-age as a proxy about a quarter (21.0%) of the children between 6-59 months in the district were malnourished which is slightly less than that of the national average and regional average of 23% (GHS, 2007). 7.6% were severely malnourished and 13.4% moderately malnourished. This implies that about one out of

every four children between the ages of 6 and 59 months old was malnourished which is quite high.

The high malnutrition rate has implication for the quality of social services including health and agriculture. It also has bearing on the state of economic standing among households in the districts. Poverty definitely is conceived as one of the predominant determinant of malnutrition which contributes to the vicious cycle of malnutrition for generations. Child's gender and age also had no association with children malnutrition.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

6.1.1 Influence of socio-demographic characteristics on nutritional status of the child

- a. Marital status is an indicator and had a strong association with children malnutrition in the district.
- b. Maternal education and level of education were not determinants of malnutrition; and therefore did not actually determine the distribution of nutritional status among children between 6-59 months in the district.

6.1.2 Influence of feeding practices, water source and sanitation on child malnutrition

- a. Porridge and fufu with soup is the predominant food given to children between 6-59 months years. Most of the children are fed twice or more, the quality and quantity of these food sources is a factor contributing to the malnutrition levels among this group of children in the district.

- b. Source of water, knowing which food the child should consume, treat water before drinking, child craves for certain food and type of toilet are the determinants of child malnutrition

6.1.3 Malnutrition estimate among children in the district

- a. The malnutrition level among children between 6-59 months in the district was very high 21.0% and linked to the child's age rather than their sex group.

The younger the child the more likely they are susceptible to malnutrition.

6.1.5 Clinical signs of malnutrition observed among the children

16.3% of the children had signs of malnutrition on their hair. The rest were 14.5%, 7.6 and 4.1% were signs of malnutrition observed around the eyes, mouth and glands of respondents respectively.

6.2 Recommendations

6.2.1 Community and Opinion Leaders should:

- a. Provide education and activate social services interventions and promotions on feeding children below fifty nine months with adequately nutritious diets.
- b. Encourage parents/caregivers to engage in farming more especially backyard gardening to ensure the availability of food all year round to feed children below 59 months in the district.
- c. Initiate a community action in the construction and management of water sources so as to ensure that water used for domestic purposes particular for children less than five years are safe.

6.2.2 District Health Administration should:

- a. Intensify education on proper nutritional practices especially during ANC and CWC services, in health facilities, during community durbars and at outreach

sites.

- b. Conduct in-service training for community health officers on the possible attributes of malnutrition among children 0-59 months.
- c. Support mothers/caregivers to observe proper hygienic practices during the preparation and feeding of children less than five years.

6.2.3 District Assembly should:

- a. Provide social infrastructure including wholesome water, toilet services and food demonstration centers in the communities.
- b. Enforce district assembly by-law especially on sanitation to promote good environmental hygiene in the district

6.2.4 Parents should:

- a. Observe proper hygiene especially in the use of toilet facilities and water used for children below fifty nine months.
- b. Ensure that the use of preventive tools including Insecticide Treated Nets (ITN), vaccinations and nutritional supplements to prevent malnutrition.
- c. Ensure that caretaker do not give the child food and water which are contaminated to children below 59 months in the district.

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Appendix

Appendix 1: Data Collection Tool

STRUCTURED INTERVIEW GUIDE FOR HOUSEHOLDS ESPECIALLY MOTHERS AND CARE GIVERS ON MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS

INTRODUCTION

I am Felix Delle, a postgraduate student of the School of Public Health, KNUST pursuing MPH Health Education and Promotion. This research is carried out as part of academic work. Please spare me few minutes of your time and respond to the items below as honestly as possible. Information provided will be treated as private and confidential.

SURVEY	CODE	ENTER CODE
Area	<u>Atwima Kwanwoma District</u>	
Village/town name		
Enumerators name		

KNUST

Code A

1 = male
2 = female

Code B

1 = Head
2 = Wife/Husband
3 = Son/Daughter
4 = Grandchild
5 = Brother/Sister
6 = Grandparents
7 = Nephew/Nice 8 = other,
specify: _____

Code C

1 = Akan
2 = Dagbane-Dagomba
3 = Ewe
4 = Ga
5 = Gurma
6 = other, specify: _____

Code D

1 = Christian
2 = Muslim
3 = Jewish
4 = no religion
5 = other

Code E

1 = Single
2 = Married
3 = Divorce/ separated/
widowed

* For children under the age of five have to be recorded in months.

Demographic Data										
Name / Nickname of Caregiver	Mother's Age	Gender of Child A	Age [M]* Of Child	Relation To Caregiver B	Ethnic Group C	Religion D	Marital Status E	Height [cm]** of Child	Weight [kg]** of Child	MUAC [cm]*** of child

Code F

1 = yes
2 = no

Code G

1 = primary school

2 = junior secondary school 3 = senior
secondary school
4 = higher than senior secondary school, specify
5 = other, specify
6 = no education

Code H

1 = engaged in own agriculture
(including livestock, if existing)
2 = engaged in fishing, hunting, collecting and
logging
3 = permanently employed in agriculture
4 = permanently employed in non-agriculture
5 = student/pupil
6 = child below school age (<6 years old)

7 = unemployed

8 = unable to work 9 = other, specify:

_____ 77

KNUST

Code I

1 = sale of agricultural products
(crops/livestock)

2 = sale of fished, hunted or collected products

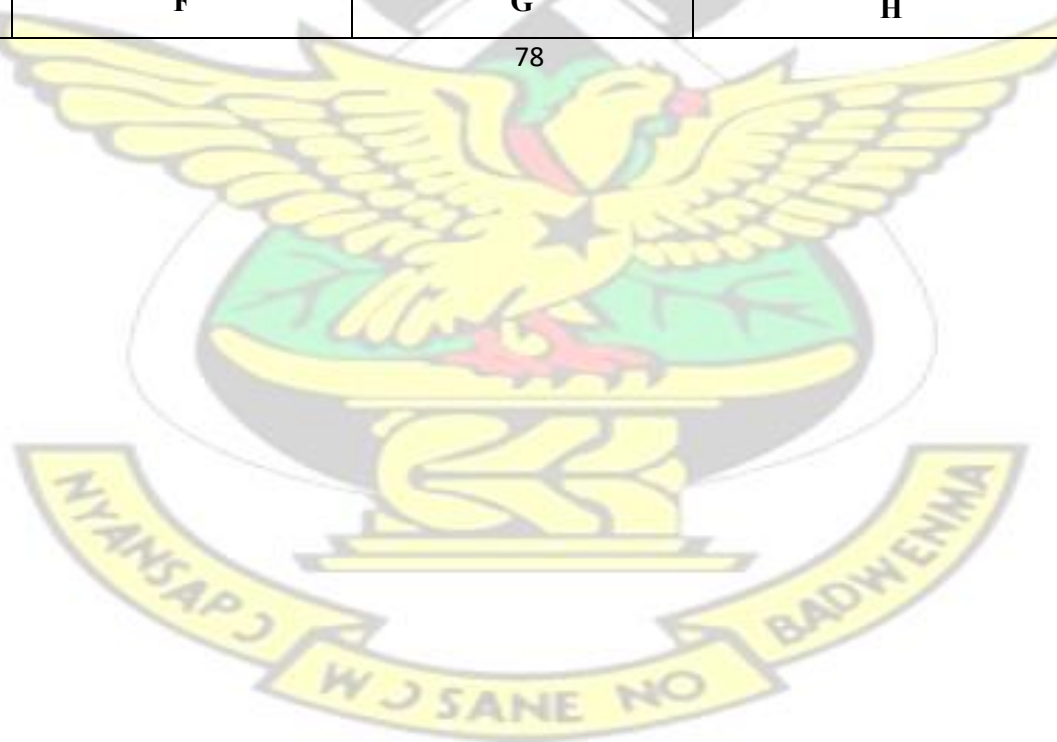
3 = employment 4 = financial support by family
members and/or friends not living in the
household 5 = financial support by the
government and/or other institutions

6 = other, specify: _____



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Education and employment of caregiver				
Name/ nickname	Is [name] currently enrolled in school or has [name] ever been to school? F	If yes: what is the highest level of school [Name] is currently enrolled or has completed? G	Main occupation according to time spent? H	What was the main source of income of [Name] during the last year? I



household feeding practices, water sources and refuse disposal		
How many meals does your child eat per day on average?	1 = one 2 = two 3 = three 4 = four 5 = five 6 = more than five	
How often are animal products components of a meal during one week?	1 = rarely (1 – 2 times) 2 = sometimes (3 – 10 times) 3 = often (more than 10 times)	
Do all household members eat at the same time?	1 = yes 2 = no	
If not: Classify the following household members in a descending order according to the privilege to eat at first?	1 = Head 2 = Wife/Husband 3 = Son/Daughter 4 = Grandparents 5 = Grandchild 8 = other, specify: _____	
Do certain household members eat more than others?	1 = yes (list the household members in a descending order according to the amount of food they eat) _____ _____ _____ _____ 2 = no	
Do you prepare any special meals for certain household members?	1 = yes, specify: _____ for whom? _____ 2 = no	
Do you know which food the child should consume to improve his/her healthiness?	List all food items mentioned _____ _____ _____	

<u>If food items were mentioned:</u> Why is the consumption of [food item] important for his/her healthiness?	List all reasons mentioned according to the respective food item	
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household feeding practices, water sources and refuse disposal		
Does the child crave for certain food?	1 = yes, which type of food (more answers possible): 2 = no	
Does the child have access to supplements or fortified food?	1 = yes, purchasable at local markets 2 = yes, supported by the government and/or other Institutions 3 = other, specify: _____ 4 = no	
Does the child or any other household member take supplements or fortified food for micronutrient supply?	1 = yes, which household member: Specify supplement or fortified food 2 = no	
What is the main source of drinking water?	1 = protected dug or tube well, protected spring rain water collector 2 = unprotected sources, e.g. surface water from rivers, lakes and/or dams 3 = buy water 4 = other, specify: _____	
Do you treat your water in any way to make it safer to drink?	1 = yes 2 = no 3 = not aware of any hazards	
<u>If yes:</u> What steps do you take to improve water quality? (more answers possible, prioritise answers)	1 = boil 2 = add bleach or chlorine 3 = filter 4 = other, specify: _____	
How do you store the collected water?	1 = covered with lid 2 = uncovered 3 = other, specify: _____	
Is the water supply during the whole year guaranteed?	1 = yes 2 = no	
<u>If no:</u> In which month(s) do you suspect a lack in water supply?	in _____ to _____ from _____	

	3 = flooding of agricultural land/unusually heavy rainfalls 4 = crop pests 5 = livestock disease 6 = lack of availability of food on the markets 7 = high food prices 8 = job losses	
What type of toilet facility	1 = Pit Latrine 2 = Bucket latrine 3 = KVIP 4 = Water closet 5 = Free range	
How much of the household income is spent to buy food?	1 = 0 – 35 % 2 = 35 – 50 % 3 = 50 – 65 % 4 = 65 – 80 % 5 = more than 80 %	
Did you worry that your household would not have enough food in the past four weeks?	1 = yes 2 = no	
Was the household affected by a hunger crisis in the last year?	1 = yes, which month: _____ 2 = no	
If yes: What was the reason which caused the hunger crisis? (more answers possible)	1 = illness of household member 2 = drought	

	Physical Signs associated with malnutrition	Enter Code
Hair	1. Lack of natural shine, dull and dry 2. Dyspigmented 3. Easily plucked (no pain) 4. None 5. Other (specify)	
Face	1. Scaling of skin around nostrils 2. Swollen face 3. Paleness 4. None 5. Other (specify)	
Eyes	1. Pale conjunctiva 2. Dryness of the eye 3. Redness and fissuring of eyelid corners 4. None 5. Other (specify)	
Lips	1. White or pink lesions at corners of mouth 2. Red tongue 3. None 4. Other (specify)	
Glands	1. Front of neck swollen 2. Swollen cheeks 3. None	

	4. Other (specify)	
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***** Thank you for your cooperation *****

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