KWAME NKRUMAH UNVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF HEALTH SCIENCES

SCHOOL O F MEDICAL SCIENCES

DEPARTMENT OF COMMUNITY HEALTH

MATERNAL FACTORS AND THE NUTRITIONAL STATUS OF CHILDREN UNDER FIVE YEARS IN THE ASANTE-AKIM NORTH MUNICIPALITY

BY

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COLLINS MENSAH (B.ED. HEALTH, PHYSICAL EDUCATION AND RECREATION)

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OCTOBER, 2014

DECLARATION

I hereby declare that, except for references to other people's works, opinions and observations which have duly been acknowledged, this work is the result of my own original research. I hereby declare that, this has neither in whole nor in part been presented for a degree here or elsewhere.

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DEDICATION

To my mother Mad. Mercy Mensah, My wife Irene Afrifa Mensah .and the memory of my father Mr. Anthony Mensah.

ACKNOWLEDGEMENT

Glory be to God for giving me the strength, support, and the vision to enroll in this study.

I am most grateful to Dr. A. K. Edusei my academic supervisor for his direction, supervision, contribution and constructive criticisms. He was a mentor and a father whose contributions made this work a reality. I also express my sincere heartfelt appreciation and gratitude to all my Lecturers on this course, especially Dr. Easmon Otupiri, Dr. Ellis Owusu- Dabo, Professor E.A. Addy, Dr. Henry Tagbor, Mr. Emmanuel Nakuah and Mrs. Rose Odotei Adjei.

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God richly bless you all.

ABSTRACT

Malnutrition is among the leading cause of deaths in children below age five in the developing countries. For MDG goal to be met, under five malnutrition is to be reduced to the barest minimum if not eradicated. The purpose of this study was to determine the nutritional status of children under five years and maternal factors influencing the children nutritional status in the Asante-Akim North Municipality. The Asante-Akim North Municipality was chosen because of increased child aneamia and mortality. In addition, the municipality is mostly rural with low socio-economic status of the people.

The study was a community-based descriptive cross sectional design that collected data from 322 mothers with children under age five. Also, the anthropometric data (weight, height and age) of the children were taken. Data collections were done by the use of questionnaire, weighing scale, tape measure and infantometer. The questionnaire solicited information from the mothers on child feeding practices, breastfeeding practices, child immunization status, mother's education among others. A multi-stage sampling technique, comprising cluster sampling, simple random sampling and purposive sampling were used. Frequency counts, percentage analyses, and linear logistic regression analyses were used to determine the prevalence of under five malnutrition and the maternal factors influencing this malnutrition. The malnutrition status of the children was determined using the WHO Child Growth Standard 2000, 2006. The result indicated that out of 42.7% underweight under five children, 22.7% were boys with 20% being girls. Also, of 30.3% wasted under five children, 16.3% and 14.0% were boys and girls respectively. Moreover, out of 47.3% stunted under five children, 25.3% were boys while 22.0% were girls.

Logistic analyses results showed that maternal education (χ^2 = 4.07, *df* = 1, *p* = .04; OR = .59) and income (χ^2 = 4.73, *df* = 1, *p* = .03; OR = .24) were significant in determining the height-for-age status of the children at C.I. 95%. In addition, breastfeeding status was a significant predictor of weight-for-age status (χ^2 = 9.44, *df*= 1, *p* = .002) at C.I. = 1.31-3.36 and height-for-age status (χ^2 = 14.34, *df*= 1, *p* = .001) at C.I. = 1.55-3.96 status but not weight-for-height status (χ^2 = .12, *df* = 1, *p* = .92) among the children under five years.

There is a high prevalence of under five malnutrition with more boys being malnourished than the girls. Moreover, under five malnutrition is age dependent as the under five children grow older they turn to be malnourished more than younger ones. Moreover, exclusive breastfeeding, income are protective factors to underweight and/or being stunted among the under five children in Asante-Akim North Municipality. There is an urgent for the municipal assembly, regional directorate of health and the government of Ghana to embark on child health education among mothers in the municipality.

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CHAPTER ONE

1.1 INTRODUCTION

Malnutrition is the condition that results from taking unbalanced diet in which certain nutrients are lacking or in excess (too high) or in the wrong proportions. Proper nutrient is a powerful or a good catalyst for growth and proper development, especially in children. People who are well nourished are more likely to be healthy, productive and able to learn. Good nutrient benefit families, their communities and the world as a whole (Otoo, 2008). Malnutrition is perhaps the leading cause of death in children below age five in the developing countries including those in sub-Saharan Africa, Asia and Latin America (Awatef, *et al.*, 2011).

Malnutrition develops in children whose consumption of protein and energy are insufficient to satisfy their body's nutritional needs. Malnutrition may also occur in children who are unable to absorb vital nutrients or convert them to energy essential for healthy tissue formation and organ function (Awatef, *et al.*, 2011). Available research indicates that factors such as family size, parental educational level and occupation, infants and young feeding practices, age and gender of the child grossly affect childhood nutrition (Maia *et al.*, 2008; Van de Poel *et al.*, 2007). Statistics indicate that globally, nearly 53.0% of all deaths in young children in 2003 were attributable to undernutrition. The malnutrition condition, especially among children under age five, affects their physical growth, mental development and capacity (Caulfield, *et al.*, 2004). Besides, worldwide efforts are being made to reduce malnutrition prevalence to 17.6% by 2015, and in the developed nations, a decline from 1.6% to as low as 0.9% is the set target (de Onis, *et al.*, 2004).

Malnutrition is by the same logic devastating. It plays a part in more than a third of all child deaths in the developing countries (de Onis, *et al*., 2004; Maia *et al*., 2008). One in three pre-school children in the developing world is undernourished. As a consequence, their human rights are violated. In addition, they are more likely to have impaired immune systems, poorer cognitive development, and lower productivity as adults and greater susceptibility to diet-related chronic diseases such as hypertension and coronary heart disease later in life where malnutrition becomes over nutrition especially.

Globally, malnutrition plays a role in the deaths of about 16,000 young children every day, with almost all of them in the developing world (Awatef, *et al*., 2011; de Onis, *et al*., 2004). That is, a yearly death toll of about six million children. By weakening resistance to infection and disease, malnutrition contributes to more than half of the deaths of children under 5, worldwide. Malnutrition has been a persistent problem for young children in sub-Sahara Africa. A high percentage of children fail to reach the normal international standard height-for-age; that is, they are stunted (Nti, & Lartey, 2008).

Malnutrition or micronutrient deficiencies continue to be a major health burden in developing countries. It is globally the most important risk factor for morbidity and mortality, with hundreds millions of pregnant women young children particularly affected (Saloojee, *et al*., 2007). Apart from underweight, wasting, stunting, marasums and kwashiorkor, deficiencies in iron, iodine, vitamin A and zinc are also manifestations of malnutrition in developing countries (Caulfield, *et al*., 2004). Interventions to prevent malnutrition range from promoting breast- feeding to food supplementation schemes, whereas micronutrient deficiencies would best be addressed through food–based strategies.

These strategies include dietary diversification through home gardens and small scale livestock to minimize the burden on public health (de Onis, *et al.*, 2004).

The sub-Sahara African region has now the world highest rate of stunting among children with 43% and has shown little improvement over the past fifteen years. Ghana has not seen much improvement in childhood malnutrition and mortality even with the remarkable gains in health infrastructure and investment since independence. Previous studies show a trend of increases in the malnutrition rate among children in Ghana. For instance malnutrition rate among children under-two years recorded 2.3% in 2003, 5.4% in 2004, and 7.5% in 2005 (Nti, & Lartey, 2007). The situation is not different in the Asante-Akim North Municipality. An interview with the district nutritionist and the Municipal health director indicate that malnutrition is on the increase in the district. Reducing these unacceptable high numbers remains a tremendous challenge to public policy. It is against this background that this study is being carried out to generate the necessary data for proper measures to be taken to save the lives of these young ones (who hold the future of this country) within the Asante-Akim North Municipality.

1.2 STATEMENT OF THE PROBLEM

Malnutrition situation in Ghana is a serious public health problem among pre-school children. Nearly two out of every 10 babies born die before their 5th birthday according to Ministry of Health (Asenso-Okyere, *et al*., 1997).

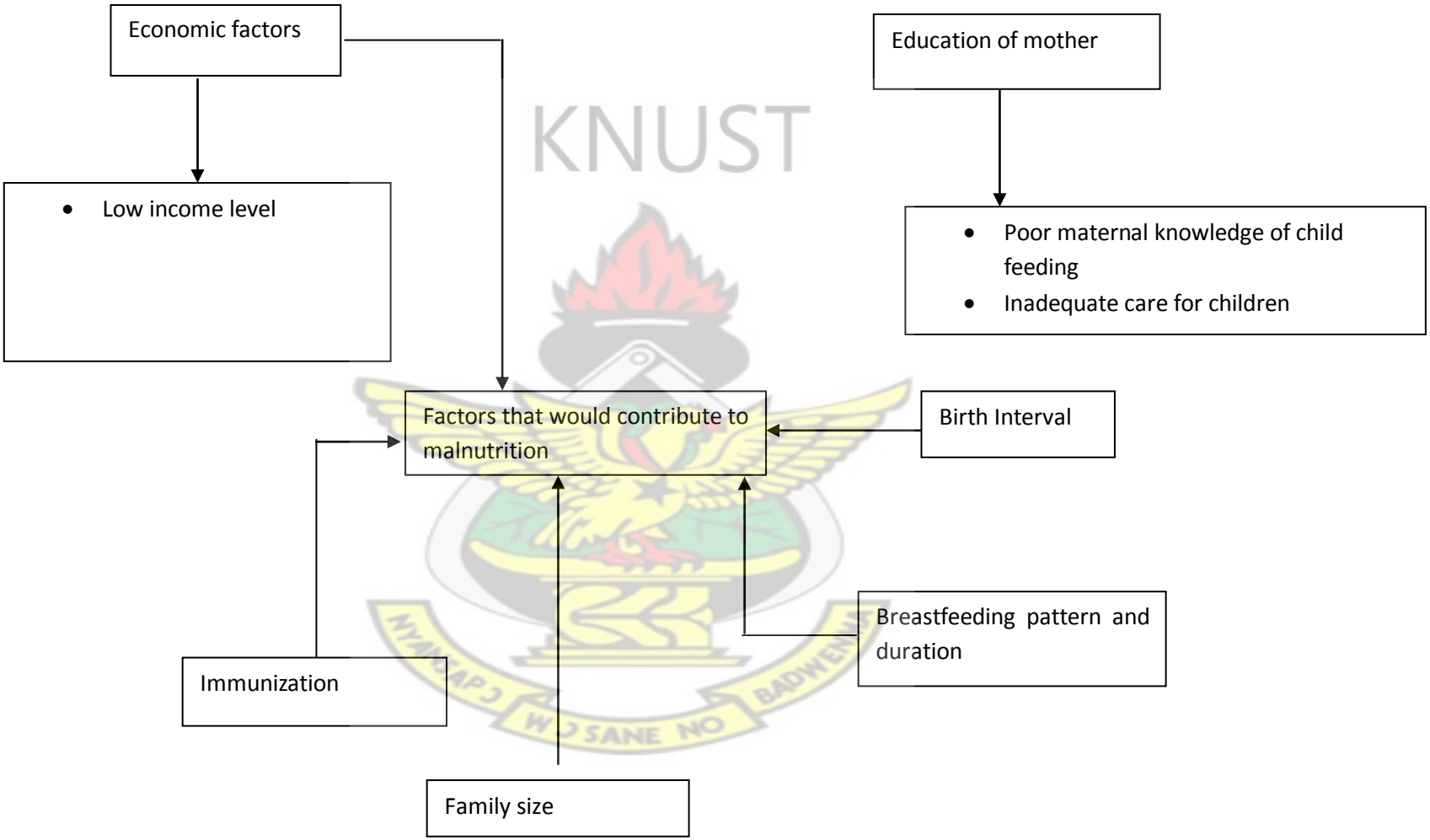
There are about 7.6 million children under the age of five years who die every year, and nearly 900 of them every hour (Awatef, *et al*., 2011; de Onis, *et al*., 2004). The loss of a child is a tragedy, families suffer and human potential is wasted. WHO is improving child

health by helping countries to deliver integrated, effective care in continuum, starting with healthy pregnancy for the mother, through birth and care up to five years of age, yet malnutrition among children under five in Ghana is still high. If this trend continues, Ghana cannot meet the MDG4 which aims at ensuring child survival and a reduction in malnutrition among children under five by at least 1/3 and to reduce mortality by 2/3 by the year 2015 with special attention to children less than two years of age. Therefore, it is imperative to determine the nutritional status among children under 5 in the Asante-Akim North Municipality and explore the maternal factors affecting malnutrition status in this age group.

1.3 RATIONALE OF THE STUDY

All over the world especially in the developing countries, government agencies and researchers are working seriously to improve nutritional status among human being with special attention on children under five. Malnutrition is a major contributing factor to child mortality which every country or community is trying hard to reduce in other to meet the goal 4 of the MDGs. Therefore the rationale for the study is to generate the necessary data on the nutritional status of children under five within the Asante-Akim North Municipality and the maternal factors contributing to malnutrition among these children. This is to enable the Municipal Health Directorate and health related N.G.Os to develop interventions to reduce malnutrition, thus contributing to achieving MDG 4 in Ghana.

1.4 CONCEPTUAL FRAMEWORK



It is evidence that child nutritional status is influence by immunization, family size, birth interval, education of the mother, income level and breastfeeding pattern and duration.

1.5 RESEARCH QUESTIONS

1. What is the nutritional status of children under five years in the Asante-Akim North Municipality?
2. What maternal factors determine nutritional status of children under five years in the Municipality?
3. What is the effect of exclusive breastfeeding on the nutritional status of children under five years in the Asante-Akim North Municipality?
4. What is the relationship between immunization status and the nutritional status of children under five years in the Asante-Akim North Municipality?

1.6 GENERAL OBJECTIVE

To determine the nutritional status of children under five years, and maternal factors influencing the children nutritional status in the Asante-Akim North Municipality.

1.7SPECIFIC OBJECTIVES

1. To determine the nutritional status of children under five years in the Asante-Akim North Municipality?
2. To determine the maternal factors and influencing the nutritional status of children under five years in the Municipality.
3. To determine the relationship between immunization and exclusive breastfeeding and nutritional status of children under five years in the municipality.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODCUTION

Malnutrition is considered to be one of the most devastating illnesses which affect children especially those under the age of five years. The problem of malnutrition is a serious burden on public health to reduce under five mortality (de Onis, *et al.*, 2004; WHO Multicentre Growth Reference Study Group, 2006). Therefore, the purpose of this study is to determine the prevalence of malnutrition (undernutrition) among the children under age five in the Asante-Akim North Municipality. Additionally, the study aims at exploring the possible factors affecting the malnutrition status of these children. This chapter deals with review of related literature. The review of the related literature is done under the following sub headings which form the major constructs in the study;

1. Measurement of Malnutrition Status in Children Under Age Five
2. The Prevalence of Malnutrition among Children Under Age Five
3. Factors Associated with Malnutrition Status among Children Under Age Five

a. Level of Income
b. Mother's Education Level
c. Breast Feeding
d. Family Size
e. Immunization

2.2 MEASUREMENT OF MALNUTRITION STATUS IN CHILDREN UNDER AGE FIVE

Malnutrition is without doubt one of the major public health problems affecting children, especially under the age five in the third world nations (Singh *et al.*, 2006; WHO Multicentre Growth Reference Study Group, 2006). Malnutrition can be described as overnutrition or undernutrition (Blössner, & de Onis, 2005).

Malnutrition usually refers to a state imbalance in energy or specific nutrients such as protein, iodine, vitamin A or iron. Malnutrition is also synonymous with protein-energy malnutrition, which signifies an imbalance between the supply of protein and energy and the body's demand for them to ensure optimal growth and function (Blössner, & de Onis, 2005; WHO, 2004). This imbalance includes both inadequate and excessive energy intake. The inadequate intake of energy normally leads to undernutrition, in the form of wasting, stunting and underweight. The excess energy intake on the other hand, results in overweight and/or obesity (overnutrition) (de Onis, & Blössner, 1997; Singh, *et al.*, 2006).

Wasting, measured as the weight-for-height, and its prevalence is defined as the proportion of under-five falling below minus 2 and/or minus 3 standard deviations from the median weight-for-height of the WHO/NCHS. Also, stunting- is measured as the height-for-age and its prevalence; is defined as the proportion of children under-five that falls below minus 2 and/or minus 3 standard deviations from the median height-for-age of the WHO/NCHS. Underweight is measured as weight-for-age and its prevalence is defined as the proportion of children under-five years who fall below minus 2 and minus 3 standard deviations from the median weight-for-age of the WHO/NCHS (de Onis *et al.*, 2006; WHO Multicentre Growth Reference Study Group, 2006).

Nutritional deficiency resulting from either inadequate energy (caloric) or protein intake manifests in either marasmus or kwashiorkor, wasting, stunting and underweight (Blössner, & de Onis, 2005; WHO, 2004). Marasmus is characterized by wasting of body tissues, particularly muscles and subcutaneous fat, usually as a result of severe restrictions in energy intake. Kwashiorkor, on other hand, affects mainly children, is characterized by oedema, generally as result of severe restrictions in protein intake. However, marasmus and kwashiorkor can be present simultaneously, that gives rise to marasmic-kwashiokor that evidence in the presence of oedema. Malnutrition is often a synergistic factor underlying deaths in children in many developing countries but can also directly result in death (Blössner, & de Onis; WHO, 2000).

Many authors (de Onis, *et al*., 2006; de Onis, & Blössner, 1997; WHO, 2004; WHO/UNICEF, 2003) suggested that the use of anthropometric data (height, weight, fat fold at triceps [FFT], BMI and upper arm circumference) is one of the most appropriate methods of estimating childhood malnutrition. According to WHO (2004) the 'gold standard' in anthropometric assessment of children is weight-for-length/height, with the usual practice being to measure the length of children under 2 years of age and the height of older children.

2.3 THE PREVALENCE OF MALNUTRITION AMONG CHILDREN UNDER FIVE YEARS

The prevalence of underweight was projected to decline from 26.5% in 1990 to 17.6% in 2015, a change of –34% worldwide (de Onis, *et al*., 2006; 2004). In developed countries, the prevalence was estimated to dwindle from 1.6% to 0.9%, a change of –41%. In developing regions in total, the prevalence was forecasted to decline from 30.2% to 19.3%,

a change of –36%. Unfortunately, the prevalence of underweight in Africa was forecasted to increase from 24.0% to 26.8%, a change of plus 12%.

Meanwhile, the prevalence was estimated to decrease from 35.1% to 18.5%, a change of –47% in Asia. In addition, the number of underweight children was projected to decline from 163.8 million in 1990 to 113.4 million in 2015, a change of −31% in the whole world (de Onis, *et al.*, 2004). Numbers are projected to decrease in all sub-regions except the sub-regions of sub-Saharan, Eastern, Middle and Western Africa, which are expected to experience substantial increases in the number of underweight children (de Onis, *et al.*).

The Ghana Health Service (GHS), has reported an increasing trend of malnutrition over the past five years. According to the agency's annual report, 2006, the malnutrition trends in children 0-11, 12–23 and 24–59 months have shown an increase over the period 2003-2006. The trend is high in mostly the three northern regions of Ghana. Ashanti region, recorded a low malnutrition rate among the 0-11 and 24–59 months groups. These were 1.8% and 2.3% respectively. The region recorded 3.3% among the 12–23 months age group.

According to UNICEF, (2008) stunting or low height-for-age is caused by long-term insufficient nutrient intake and frequent infections. This generally occurs before age two and its effects are largely irreversible. These effects include delayed motor development, impaired cognitive function and poor school performance. Nearly one third of children under five in the developing world are stunted yet there are certain countries where the prevalence exceeds this estimation. A study conducted in Malawi revealed that stunting prevalence was 50% (UNICEF, 2008).

However, in Ghana, the rates of children under five years are moderately and severely stunted to 22.4% and 7.4% respectively (UNICEF, 2008). Stunting begins at birth and

continues through 40 months but after 24 months it cannot be reversed (WHO, 2006). In Botswana, stunting prevalence was 38.7% (Mahgoub, & Bandeke, 2006). However, a study conducted in the Manya Krobo a district in Ghana revealed that 20% of the children less than 5 years of age were stunted (Nti, & Lartey, 2007).

Wasting or low weight-for-height is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage and/or diseases. Wasting proportion of under-five falls below minus 2 and minus 3 standard deviations from the median weight-for-height of the WHO/NCHS. There are 24 developing countries with wasting rates of 10 per cent or more, indicating a serious problem urgently requiring a response (UNICEF, 2007).

Underweight or weight-for-age prevalence is usually the proportion of less than five falling below minus 2 standard deviations (This is termed as moderate underweight) and 3 standard deviations (severe underweight) from the median weight-for-age of the WHO/NCHS (UNICEF, 2008). Underweight is reversible and it reflects either acute or chronic malnutrition. This implies that weight gain can be adequate even while the process of stunting continues. Usually weight faltering concentrates between 3 and 12 months. However, after 12 months the child can be stunted and underweight but his/her weight-for-height ratio can improve (WHO, 2006; UNICEF, 2007). On the average, children in the rural areas are twice as likely to be underweight as those in the urban areas (UNICEF, 2008). The prevalence of underweight in Ghana goes to confirms this. The rates are 11.5% and 21.4% for rural and urban, respectively. Besides, boys and girls usually have similar prevalence rates. In Ghana the prevalence is 18.3% and 17.1% for boys and girls respectively (UNICEF, 2008). However, in Botswana, malnutrition is significantly higher among boys than girls (Mahgoub, *et al*., 2006).

In Bangladesh and other developing countries such as India, the prevalence of underweight is 48% and 45.5%, respectively (Rayhan, 2006; ANON, 2006). Again, severe degree of malnutrition is high in children under two years. This is confirmed by a study done in India where the proportions of underweight (65.5%) and stunting (81.8%) were found maximum among children aged 13-24 months (Ray, 2001). A study done in Aydin province of Turkey showed that the prevalence of malnutrition in children under five years was found as 10.9% for stunting, 4.8% for underweight and 8.2% for wasted (Ergin *et al*., 2007).

2.4 FACTORS ASSOCIATED WITH MALNUTRITION IN UNDER FIVE CHILDREN

In exploring the complex web of causes for child undernutrition, the observation that 'not all poor children are malnourished' has led to investigations of other factors such as the level of family income, cost and access to food, mother's educational level, birth interval, breast feeding practices, family size, and immunization of the children (Blössner, & de Onis, 2005; Mason, *et al*. 2001; WHO, 2005) as factors affecting the nutritional status of children under five years.

According to Lipton and De-Kadt, (1998), a World Food Programme (WFP) survey conducted in 1987 in Ghana shows significant correlation among three indicators of malnutrition and a number of variables relating to income, food supply, environment, social and health status. A high socio-economic standing of a house-hold will determine the nutritional status of a child. The level of income is by far the greatest single cause of variability in food intake although income is not the only measure of poverty. Many other social and environmental factors contribute to malnutrition and are closely linked to the poverty levels of individuals and countries.

A low socio-economic status has adverse effects on the food security, access to health care, environmental sanitation and personal hygiene (WHO, 1999). In developing countries income from home-produced food and payment received in kind are generally more important than cash income in the determination of food availability in a household in a rural community, however, food availability is determined primarily by cash income. De Boer (2000) also stated that meals in most northern communities (Northern, Upper East and Upper West) are known to be either monotonous with hardly any variety or are low in terms of protein and micronutrient contents. The nutritional status of a person depends largely on the quantity and quality of food available on the market, purchasing power of the household that would determine the accessibility to food and the distribution of food within the household.

Although food intake influences the nutritional status of an individual to a great extent, it is not the only critical factor responsible for malnutrition particularly in the case of children under five years of age. Living standards, birth weight, birth interval, sex of child, weaning practices and mothers certification are a few of the important contributory factors which have been identified from research stages carried out on the subject in the recent past, However, dietary inadequacy is certainly the basic cause of malnutrition in pre-school children and many of the above identified factors directly or indirectly contribute to the incidence of malnutrition (Raheela, 1994).

2.4.1 Level of income and malnutrition status among under five children

Addressing problems of household income status is suggested to be a means to curbing the problem of stunting and underweight among under five children (Zere, & McIntyre, 2003). Zere and McIntyre (2003) found the rate of stunting to be the highest followed by

underweight among the children in South Africa. The rate of stunting was significantly higher in male children (26.8 vs. 22.2 percent; $\chi^2 = 10.6$, $p = 0.001$). Their finding also revealed that while stunting and underweight were responsive to improvements in the socio-economic status of the household, wasting does not appear to be sensitive. Additionally, the rates of stunting and low weight-for-age are highest among the African population group. Wasting which is a manifestation of acute and short-lived malnutrition, however, does not exhibit significant socio-economic differentials.

It is noted that income-related inequalities are the strongest in stunting (an indicator of chronic malnutrition that is often associated with socio-economic deprivation). The poorest bear the heaviest burden of stunting and underweight. It is further observed that although the rates of stunting and underweight are highest among African children, the pro-rich concentration indices are more pronounced for Coloured children. Stunting and underweight concentration indices for White children do not manifest statistically significant socio-economic inequalities.

According to Thomas, Strauss, and Henriques (1990), family income has significant positive correlation on child survival. Their study to investigate the impact of household characteristics on child survival, using household survey data from Brazil concluded that child health status depends on the income status of the family. Increases in income at the household and national levels imply similar rates of reduction in malnutrition (Haddad, *et al*., 2003). Using a nutrition index based on weight-for-age of children in rural India, they revealed that higher per capita current income improves the nutritional status of both boys and girls. He pointed that the impact is higher for boys that in girls. However, effect of income is not independent but in association with other factors such as mother's educational level and food availability (Sarmistha, 1998).

2.4.2 Mother's education level and malnutrition status among under five children

According to Biswas, and Bose, (2010) stunting (a form of undernutrition) is one of the greatest problems still confronting the third world countries in the 21st centuries. Their study investigated the prevalence of stunting and its predictor(s) among the children in Bengalee, India with a cross-sectional study and a randomly selected sample of 673 preschool children (323 boys and 350 girls), age 1-5 years. They observed a high stunting 39.2% among the children with age and sex combined. The results showed that father and mother educational status (FES and MES) and birth order (BO) were significantly associated with the prevalence of stunting among the girls. With logistic regression analyses, they found that both FES (Wald =19.97) and MES (Wald=13.95) were strong predictors of stunting among the girls. Similarly, they BO (Wald=13.71) to be a strong predictor of stunting among the girls. In addition, girls with ≥ 3rd BO had significantly higher risk (OR=2.49, Cl=1.54-4.03) higher than those with ≤ 2nd BO.

Moreover, girls with FES lower than secondary level had significantly (OR=3.30, Cl=1.96-5.58) high rate of stunting than those with FES ≥ secondary level. Likewise, girls with MES secondary level had significantly (OR=2.5, Cl=1.54-4.03) higher rate of stunting than those with FES ≥ secondary level. They concluded that parents' educational status and birth order were strong factors associated with stunting among girls but not in boys, especially in the developing countries.

Education provides the opportunity for girls to become more empowered and self-confident as they acquire knowledge, skill, attitudes and values critical for negotiating an equal place in society. Across the developing world, women play key roles in maintaining household food security, and in caring for children on a day-to-day basis, both of which are extremely important factors influencing a Childs nutritional status. Women, depending on

the region are highly involved in food production and acquisition, thus boosting food security (Smith, & Haddad, 2000).

Women's disempowerment as a result of exclusion from education therefore results in their limited access and that of their children to basic health services and information. Women's education relative to men's has been found to be strongly associated with child malnutrition in developing countries. Improvements in female secondary school enrolment rates are estimated to be responsible for 43% of the total of 15.5% reduction in child underweight rates in developing countries during the 1970–1995 periods (IFPRI, 2000; WHO, 1992). Maternal literacy and level of education impact on the human and economic empowerment of women (WHO, 2005). Maternal education is also supposed to improve the health seeking and child caring practices of the mother. Maternal education and maternal nutritional knowledge are significantly but independently associated with child nutrition outcomes (Webb, & Lapping, 2002).

Women are naturally the primary caregivers at the beginning of a child's life, carrying out such functions such as breastfeeding. Women are most often the people who feed and bath children, seek health care for the children when they are sick, protect them from exposure to danger, and support their cognitive and social development. Given these roles, women's knowledge and abilities and their own physical well-being and decision-making power are crucial to children's health (Smith, *et al*., 2000).

This report therefore finds women's education and status relative to men's to be strongly associated with child malnutrition in developing countries. It is estimated that improvements in female secondary school enrolment rates are responsible for 43% of the total 15.5% reduction in the child underweight rate of developing countries during the period 1970 to 1995. Furthermore, most mothers in general do not seem to be adequately

aware of the amounts of food that children should eat or should be eating. While the frequency of feeding is low, the quality and amount of meals also tend to be low, so that the diet of most children across the country is inadequate in every respect to maintain health and growth (Smith, *et al*., 2000).

In India, it was discovered that they have the largest population of non-school-going working girls. Women and girls receive far less education than men, due both to social norms and fears of violence. Constitution guarantees free primary school education for both boys and girls up to age 14. This goal has been repeatedly reconfirmed, but primary education in India is not universal. Overall, the literacy rate for women is 39 percent versus 64 percent for men. According to Mapping Progress, educational funds were cut by 801.3 million rupees in the 1991-92 budgets. Funds for the mass literacy movement, in which women participate enthusiastically, have been reduced by 5 percent from the previous year. Budgetary provisions for non-formal education have been cut by 17 percent, leading to closure of many night schools and adult education programs in which working-class women participate. Reduction in government expenditures on higher education and encouragement to private colleges will reduce women's opportunities for higher education since privatization in education promotes only male-dominated professional and technical courses, as they are lucrative.

2.4.3 Breastfeeding and malnutrition status among under five children

It has been established that breastfeeding is one of the main determinants of child malnutrition (Brakohiapa, *et al*., 1988; Briend, & Bari, 1989). Breastfeeding a child19 month was found to be associated with malnourished children who visited a children's hospital in the city of Accra, Ghana (Brakohiapa, *et al*., 1988).

The association between breastfeeding, nutritional status and survival was investigated in a cohort of 1087 children aged 12-35 months from rural Bangladesh followed monthly during 2 years. Mean weight-for-age of breastfed children was 69.6 per cent per cent) compared to 70.6 per cent for non-breast fed children. Despite this difference in nutritional status, risk of dying, after adjusting for age, was six times higher in non-breastfed malnourished children than in similarly malnourished breastfed children. The study revealed that breastfeeding beyond 1 year has positive impact on children nutritional status. Therefore, breastfeeding should be encouraged in communities with a high prevalence of malnutrition, despite the frequently observed association between prolonged breastfeeding and malnutrition (Briend, & Bari, 1989).

Nguyen, and Kam, (2008) concluded that maternal, socio-economic and environment factors such as weight of the child at birth and duration of exclusive breastfeeding were found to be significant factors for malnutrition among children under five. With a structured questionnaire, they aimed to assess the nutritional status and characteristics related to malnutrition in children less than five years of age in Nghean, Vietnam. Anthropometric measurement, underweight (weight-for-age), wasting (weight-for-height) and stunting (height-for-age) of the children was determined based on reference data from the National Center for Health Statistics (NCHS). Hierarchical Logistic regression analysis indicated that the mean Z-scores for weight-for-age, height-for-age and weight-for-height were -1.46 (95% CI=-1.57, -1.35), -1.44 (95% CI=-1.56, -1.32) and -0.71 (95% CI=-0.82, -0.60), respectively. One hundred and ninety three (31.8%), 269 (44.3%) 72 (11.9%) were underweight, stunting and wasting respectively. Furthermore, the mother's level of education and occupation, household size, number of children in the family, weight at birth and duration of exclusive breastfeeding were found to be significantly related to

malnutrition. Exclusive breastfeeding was independently positively significant to underweight, stunting and wasting.

A similar study (Kumar, *et al.*, 2006) concluded that delayed initiation of breast-feeding, and deprivation from colostrum are significant risk factors for undernutrition among under-five children. Kumar, *et al.*, (2006) aimed to determine the prevalence of nutritional status of under-five children and to assess whether infant feeding practices are associated with the undernutrition in Anganwari (AW) areas of urban Allahabad. They revealed that 36.4% were underweight (<2SD weight- for-age), 51.6% were stunted (<2SD height- for-age), and 10.6% were wasted (<2SD weight- for-height). Proportions of underweight (45.5%) and stunting (81.8%) were found maximum among children aged 13–24 months. Wasting was most prevalent (18.2%) among children aged 37–48 months. Initiation of breast-feeding after six hours of birth, and deprivation from colostrum were found significant risk factors for underweight. However, wasting was not significantly associated with any infant feeding practices studied.

2.4.4 Family size and malnutrition status among under five children

Research evidence point out household structure, including family size, resources, care-giving, has effects on child nutritional status and infant mortality. Family size for instance is said to influence the use of family resources. The larger family dilutes family resources more than smaller family size if the income levels are the same (Heaton, Forste, Hoffmann, & Flake, 2005). Comparisons of nutritional status of children from monogynous households and those from polygynous households revealed that boys have better nutrition in monogamous households—40.8% stunted and 24.5% underweight compared to 62.5% stunted 42.5% underweight inpolygynous households. But female stunting does not differ

significantly by household type (40.4% monogamous, 42.3% polygynous). Furthermore, girls have better physical status than boys in polygynous households. Additionally, the study found that children in the monogynous households have better nutritional status than their counterparts in the polygynous households (Gillett-Netting, & Perry, 2005).

2.4.5 Immunization and nutritional status among under five children

Immunization or vaccination is known to significantly protect a child from many childhood killer diseases such as measles, respiratory tract infections, whopping cough, poliomyelitis, and cholera among others (Abedi, & Srivastava, 2012; Santosh, *et al*., 2013). According to Abedi, and Srivastava (2012), childhood vaccination may protect children's nutritional status and lead to improved child growth in developing countries where most child killer diseases are preventable with vaccination.

Abedi, and Srivastava observed that of 402 studied children, 176 (43.8%) were fully immunized, 168 (41.8%) and 58 (14.4%) were partially immunized and unimmunized, respectively. The authors observed that fully immunized children had better nutrition status. For example, significant association was found with immunization status of the children in relation to underweight. The study indicated that majority of children were malnourished and most of them were unimmunized. Abedi and Srivastava also revealed that immunization status of urban children was better than rural children. Das and Hossain (2008) in Bangladesh studied of 6005 children aged 12-59 months noted that those children who did not receive any vaccines, over one-fifth and two-fifths were found severely and moderately undernourished. Furthermore, the proportion of underweight was found significantly higher among partially immunized children (60.0%) than that of fully immunized children (52.0%).Similarly, Ray (2000) in Siliguri, India found a significantly

higher prevalence of malnutrition children amongst partially immunized and non-immunized children (81.3% and 88.2%) in comparison to fully immunized children (62.1%). This implies that partially and non-immunized children were at higher risk of malnutrition as they were not protected against the vaccine preventable diseases.

Santosh, *et al*. (2013) study of 600 under five children revealed that 560 (93.3%) had received primary immunization, while 40 (6.7%) children were partially immunized. Accordingly, prevalence of malnutrition was significantly higher in children who were partially immunized compared to fully immunized ones. With high prevalence of underweight (119; 53.6%), stunting (120; 54.1%) and wasting (38; 17.1%), Santosh, *et al*. (2013) revealed that stunting, wasting and acute respiratory infections were significantly lower in fully vaccinated children than in partially vaccinated ones. Thus, frequent vaccination protects the child against infections. Incomplete vaccination leads to worm infestation, an important predisposing factor for childhood malnutrition (Bhavsar, *et al*., 2012; Sengupta, *et al*., 2010). Sengupta and colleagues also observed that underweight, stunting and wasting were significantly higher in the incomplete immunized children than the completely immunized under five children. Therefore, the protective potentials of immunization cannot be under estimated and must be implemented to the benefits the children.

The current study focused on exploring maternal factors and malnutrition among children of under five years. It is been anticipated that there will be high degree of malnutrition among the children. And that the condition will affect will be severe as the children age. More girls are also envisaged to be more malnourished as compared to their counterpart boys. Maternal education, age, level of income, and child breastfeeding and immunization status are also expected to be significant determinants of the children's nutritional status.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The purpose of this study was to determine the nutritional status of children under five years and maternal factors influencing the children nutritional status in the Asante-Akim North Municipality. This chapter covers how the actual study was conducted, study design, study population, sample and sampling procedure, instruments used for collecting data, data collection procedure and how data collected was analyzed.

3.2 STUDY METHOD AND DESIGN

The study used a descriptive cross sectional design which was community based. According to Babbie (2007), surveys are useful in describing a large population with accurate representative sample. Surveys are also flexible where many variables and questions can be asked on a topic, making analysis also flexible. In addition, surveys make measurement of opinions, beliefs and attitudes standardized (Nwadinigwe, 2002).

3.3 DATA COLLECTION TECHNIQUES

Two data collection techniques were used for the study. Mothers of the under five were made to answer some questions and anthropometric measurements based on age, weight and height were made. The anthropometric measurements made were used to determine indexes like weight-for-age, weight-for-height, and height-for-age which were used to classify the children as underweight, wasted and stunted.

3.4 DATA COLLECTION TOOLS

The data collection tools used was questionnaire, weighing scale, tape measure and infantometer.

3.5 STUDY AREA PROFILE

The Asante-Akim North Municipal is one of the 27 districts in the Ashanti Region. The Municipal covers about 5.6% of the total land area of the Ashanti Region. The municipal shares boundaries with Ejisu-Juaben district on the west, Sekyere East district on the north, Kwahu South district on the east and Asante- Akim South on the south. The Municipal covers an area of 1361 sq.km with an estimated population of 182,701 (projection from 2000 population census). There are 118 communities and 18 CHPS zones in the Municipal. The Afram Plains covers about 40% of these communities (land mark).The five (5) Sub Municipals in Asante-Akim North are as follows

Table 1: Population Distribution per Sub-Municipal Health Areas – 2010

Sub-Municipal	Estimated Population	% of the Total
Konongo-Odumase	68,695	37.6
Agogo	64,859	35.5
Juansa	19,549	10.7
Dwease-Praaso	15,347	8.4
Amantenaman	14,251	7.8

Table 2: DEMOGRAPHY OF THE MUNICIPAL

Sub-district	Chn < 1 (4%) POP for ANC/EPI	Chn 12-23m 3.9% POP.	Chn 0-23m (7.9%) POP. for GMP (CWC)	Chn 24-59m (8.6%) POP	Chn 0-59m (16.5%) POP	WIFA 15-49m (23.2%) POP	Chn 6-59m (14.5 %) for vit A	Chn 15-19yrs (9.7%) for adol health	Chn 0-14yrs (43.2%) for AFP Measles SIA	Chn 5-19yrs (36.4%)
KONONGO-ODUMASI	2657	2591	5248	5713	10962	15413	9633	6444	28700	24183
AGOGO	2509	2446	4955	5394	10350	14552	9095	6084	27098	22832
JUANSA	756	737	1494	1626	3119	4386	2741	1834	8167	6882
DWEASE-PRAASO	594	579	1173	1276	2449	3443	2152	1440	6412	5402
AMAMTEN AMAN	551	537	1089	1185	2274	3197	1998	1337	5954	5017
TOTAL	7,067	6,890	13,959	15,194	29,154	40,991	25,619	17,139	76,331	64,316

3.5.1 Ethnic groups

Majority of the people in the municipality belongs to the Akan tribe. Minority ethnic groups include Fantis, Ewes, Gas, Moshies, Sissalas,Nzemas, Dagombas and Kussasis. The predominant language is Twi.

3.5.2 Vegetation

The vegetation is mainly tropical rainforest and savannah grassland. Frequent bush fires have destroyed some of the forest vegetation and are threatening to turn the district into grassland. Due to logging activities of the timber industry, legal and illegal, the virgin forest is being depleted.

3.5.3 Rainfall

There are two main rainy seasons in the municipal between mid- March and late June and between September and November. The first dry season is from December to February with North Easterly winds (i.e. the harmattan dry winds from the Sahara desert) and the second and shorter dry season from the end of June until August.

3.5.4 Religious and group associations

The religious gruopings in the municipal include Christianity, Islam and Paganism. Majority of the people are Christians and belong to the Presbyterian Church. Other organised groups are the Carpenters Association, GPRTU, Hairdressers and Seamstress Associations and other Youth Associations.

3.5.5 Electricity and water

Hydroelectric power exists in the main towns stretching from Konongo-Odumasi through Patriensa, Nyaboo, Juansa, and Hwidiem to Agogo. Others are Dwease/Praaso and Amantenaman. Pipe-borne water exists in the main towns. Additionally there are hand-dug wells in medium-sized towns and villages especially the Afram Plains.

3.5.6 Transportation and communication

The main forms of commercial transport are passenger buses and taxis. The Municipal Administration and the decentralized departments mainly use pickups, which also exist in the municipal. Motorcycles are also used extensively. Tractors and bicycles are the main forms of transport in the Afram Plains. A first class road from Accra to Kumasi passes through Konongo-Odumasi. A second-class road stretches from Konongo to Agogo. It is

about 30 kilometres. The remaining roads are feeder roads created by vehicles. These can be found mainly in the Afram Plains. The Afram Plains is virtually inaccessible during the rainy season. Telephone services, private and commercial are available at Agogo, Konongo-OdumasiPatriensa, Hwidiem and Juansa.There are private communications centres at Agogo and Konongo-Odumasi, which offer fax services in addition to telephone services. Motorola services are available at Agogo hospital, Ghana Commercial Banks (Agogo and Konongo) the Municipal Administration, Police stations, (Konongo-Odumasi), and the Municipal Education Office (Konongo).

3.5.7 Banking services

There are two commercial banks in the Municipal and they are in Agogo and Konongo. There are also three rural banks; one at Agogo and two in Konongo-Odumasi.

3.5.8 Main economic activities

Majority of the people depends on small-scale farming. Crops produced include tomatoes, cassava, plantain, maize, cocoyam, groundnuts, and yam. Appropriate period for farming during the year is between March and September.

Sand winning, galamsey and chain saw operators operate in the Municipal. Trading in general goods is a major economic activity. Commercial farming is practised on a small scale and crops planted include cocoa and oil palm tomatoes, maize, yams. Fishing on a small scale is also practised in the Afram Plains.

Charcoal production is the main occupation of the Sissalas in the Afram Plains. However, this activity is degrading the environment on a large scale. Trading takes place all year

round but peaks between August and December. The Obenemase Gold Mine used to be a major avenue of job opportunities but it has folded up.

3.5.9 Traditional authorities

Traditionally Chiefs and Queen mothers rule the towns and villages. There are three traditional councils centred on the three main towns. They are Agogo Traditional Council, Konongo Traditional Council, and Odumasi Traditional Council.

Table 3: Educational Institutions

Institution	**NO.**
Tertiary institution	3
S H S	5
J H S	44
Preparatory sch.	8
Primary sch.	87
Kindergarten	71
Day care centers	12

3.5.10 Municipal administration

The Municipal Assembly is the highest political authority in the municipal with the Municipal Chief Executive as the head. The President of Ghana appointed him and he is re-elected every four years by the assembly members through balloting. Two thirds of the assembly members are also elected every four years through balloting. The remaining one third is appointed by the President. The Municipal Assembly is the municipal

policymaking body. It has five sub committees. They are Finance, Social Services, Public Works, Education, and Executive.

The Municipal Administration is administered by the Municipal Chief Executive and the Municipal Coordinating Director who is assisted by two deputies. The Municipal Administration has three units namely the Planning unit, Budget unit, and the Finance unit. These are managed by the Municipal Planning Officer, Municipal Budget Officer and Municipal Finance officer respectively. Under the new guidelines, as part of the decentralization process, 11 decentralized departments have been created and a director heads each. They are:

Table 4: Municipal Administration.

Decentralized department	**Constituent departments.**
Ghana Education Service	M.O.E. National youth Organising Council
Department of Agriculture	Veterinary Services, Crops Agriculture, Extension, Mechanization PPMED
Health Department	Office of the Municipal Director of Health Services, Environmental Division under Local Government
General Works	PWD, Feeder roads, Rural Housing
Community Development and Social Welfare	
Physical Planning	Department of Town Planning, Parks and Gardens
Finance	Controller and Accountant General
Natural Resources	Forestry, Game and Wildlife
Trade and Industry	Trade and Cottage Industry
Disaster Prevention	Fire Service Department
General Administration	Planning and Co-coordinating Unit, Births and Deaths, Information Services Department, Statistical Service and Co-operatives

The Municipal Administration sources of funding are as follows:

1. Revenue from direct taxation
2. Common fund.
3. European Union funds.
4. Ceded revenue from Ministry of Local Government
5. Stool lands revenue.
6. Land rates from mining companies.

Procedurally the District Chief Executive authorizes payments for services rendered but the Municipal Co-ordinating Director and the Municipal Finance Officer are the signatories to the various bank accounts.

3.5.11 Municipal health administration

The Municipal Health Management Team is responsible for managing health activities in the Municipality. Funds for Municipal Health activities are in the form of financial encumbrance from Government of Ghana, Donor Pooled Fund (DPF) and Internal Generation Funds (IGF)

3.5.12 Municipal health system and municipal development orthodox health facilities

Table 5: Facilities and their Location

Facility	Location
AgogoPresby Hospital (Mission)	Agogo
KonongoOdumasi Government Hospital	Konongo
Juansa Health Centre	Juansa
Dwease Health Centre	Dwease
Praaso Health Centre	Praaso
Ananekrom Health Centre	Ananekrom
Nyamponase Health Centre	Nyamponase

Table 6: Private health facilities

a. First Klass Hospital	**Konongo**
b. Life land Clinic	Konongo
c. Patience Clinic	Konongo
d. SABS Hospital	Konongo

Others

Chemical Sellers	67
Trained TBA	84
Traditional Healers	59
Church Camps	17
CBSV	100

Table 7: Number of communities and outreach sites for CWC

Sub-municipal	Number of communities	Number of outreach sites
Konongo/Odumasi	17	26
Agogo	73	24
Juansa	8	10
Dwease-praaso	11	11
Amantenaman	9	7
Total	118	78

3.6 STUDY POPULATION

The population for this study comprised all children under five and their mothers who are in the Asante-Akim North municipality.

3.7 SAMPLE AND SAMPLING PROCEDURE

For the selection of participants of the study units, multi-stage sampling technique was applied which comprised cluster, and simple random sampling. The multi-stage technique was adopted due to the fact that the study population is large and diverse. The municipal was clustered into five sub-districts or health areas namely: Konongo-Odumase, Agogo, Juansa, Dwease-Praso and Amantenaman. In each of the sub-districts, three towns were randomly selected. Each of the towns in the sub – districts was assigned a unique number, the numbers were placed in a bowl and thoroughly mixed. Then the three towns were hand picked (fish bowl) where mothers with under five children were selected for the study.

3.7.1 SAMPLE SIZE

Three hundred and twenty two (322) mothers and their under five children were selected from the study population for the study. The size was determined statistically by applying the population proportion sample size determination formula ie $n = z^2 P (1- P) / d^2$. This was arrived by assuming that the children under five years with malnutrition is 70.0%, and an estimated difference between the actual proportion and the research value to be 0.05 at 95% confidence level.

$$n = \frac{1.96^2 \text{x } 0.70(1 - 0.70)}{0.05^2}$$

$$n = \frac{3.84 \text{ X } 0.70(0.30)}{0.0025}$$

$$n = \frac{3.84 \ X \ 0.21}{0.0025}$$

$$n = \frac{0.80}{0.0025}$$

$n = 322.56$

n = 322

$$n = \frac{z^2 \, p(1-p)}{d^2}$$

where:

n = The estimated sample size

p = Sample proportion 85% (proportion assumed to answer the questionnaire)

d = The probability that the desired sample size will not be representation of the study (5%)

z = level of confidence that the chosen sample will be representation of the population (1.96)

3.8 PRE-TESTING

The instruments and questionnaires were pre-tested at the Asante Akim South district, outside the study area to make sure the questionnaires developed and tools adopted were respondent friendly.

3.8.1 Data handling

The questionnaires were administered by trained field workers. The researcher was also part of the team that took the anthropometric measurement.

3.8.2 Ethical consideration

Ethical clearance for the research was obtained from the University Authorities (Department of Community Health of the School of medical sciences, Ethical research committee, KNUST). Permission was sought from the Asante-Akim North Municipal assembly, Municipal Health Directorate and the chiefs of the various towns included in the research.

3.9 DATA ANALYSIS

The data collected were coded and statistically analysed using SPSS/ CP windows version 16.0.The research question one which sought to determine the nutritional status of the children was analysed using frequency and percentage counts. The prevalence of malnutrition (weight-for-age, weight-for-height and height-for-age) were determined among the children according to gender and age categories of WHO Child Growth Standard (2000; 2006). The WHO Child Growth Standard measure was used to determine and categorized the children as normal, underweight, wasted or stunted (WHO, 2006).

Accordingly, a child is classified as underweight or severely underweight when that child's weight-for –age deviates by -2 or -3 Z score, respectively, from the standard population. Wasting and severely wasted statuses as malnutrition were determine when a child's weight –for –height score deviates from the reference population by -2 or -3 Z score respectively. In addition, height-for-age standard deviation of -2 or -3z score is used to classify the children as either stunted or severely stunted (de Onis *et al*., 2006; Onis *et al*., 2004; WHO Malnutrition Growth Reference Study Group, 2006). It must be noted that, in this study, those classified as "normal" may include overweight or obese children since the purpose of the study was only to determine those under five children with underweight, wasting and stunting conditions.

The children age was re-categorized into 0-5, 6-11, 12-17, 18-23, 24-35, 36-47 and 48-59 with which the prevalence of malnutrition among them was determined.

Linear logistic regression models were built to analyze research questions two, three and four. To meet the requirement for logistic regression analysis, the dependent variables (weight-for-age, weight-for-height and height-for-age) were dichotomized (Babbie, 2007; Huck, 2008); into underweight or normal; stunted or normal; wasted or normal, thus only two categories of dependent variable. However, the independent variables (maternal age, marital status, maternal education level, maternal income, number of under five children in the house and maternal nutritional knowledge) were both categorical and continuous variables (Babbie, 2007; Huck, 2008). Nonetheless, the independent variables were introduced together into the model to determine how collectively they affected or predicted either underweight or severely underweight. Alpha of 0.05 was set as the significant value in the analyses.

3.10 LIMITATION OF STUDY

The children and their mothers from whom data was taken for the study were conveniently selected from the randomly selected communities, these participants may not be the true representation of the entire under five children in the Asante- Akim North Municipality. Also the data from the mothers may not be the true reflection of their socio-economic status of the parents in the municipality. This is because the mothers in the study were not selected randomly from the general population of mothers in the Asante-Akim North Municipality.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

The purpose of this study was to determine the nutritional status of children under five years and maternal factors influencing the children's nutritional status in the Asante-Akim North Municipality. This chapter focused on the results as derived by the use of the statistical analysis tools. The results are presented according to research questions and in tables for clarity.

4.2 PARTICIPANTS' BACKGROUND INFORMATION

The demographic data of the participants were analysed using frequency and percentage. Table 1 indicates that 3.7% (11) of the mothers were of age below 20 years. Fifty-two percent (156), 37.7% (113) and 6.7% (20) of the mothers are also of the age categories 20-29, 30- 39 and 40- 49 years, respectively. In addition, 84.3% (253) are Christians, 12.7% (38) are Muslims, 2.7% (8) were traditionalists and 0.3% (1) belonged to other religious categories. Twenty-nine percent (89) of the participants were single, 42.2% (127) were married, 3.6% (11) were divorced, 2.6% (8) were widowed while 22.2% (67) were cohabiting. Educational levels indicated that 8.3% (25) had no formal education, 9.7% (26) had primary education, 54.3% (163) had J.H.S/Middle school education, 4.7% (14) had vocational education, 12.3% (37) had secondary education and 10.7% (32) attained tertiary education. Also 11.3% (34) were unemployed, 7.3% (22) were apprentices, 43.7% (131) were traders, 10.0% (30) were farmers, 18.7% (56) were self-employed and 9.0% (27) were government workers (see Table 8).

Table 8: Demographic Characteristics of Participants

Variables	Frequency (f)	Percentage (%)
Age of Mothers		
Below 20 years	11	3.7
20-29 years	156	52.0
30-39 years	113	37.7
40-49 years	20	6.7
Marital Status		
Single	89	29.6
Married	127	42.2
Divorced	11	3.6
Widowed	8	2.6
Cohabiting	67	22.2
Educational Level		
No formal Education	25	8.3
Primary Education	26	9.7
J. H. S/Middle School	163	54.3
Vocational Training	14	4.7
Secondary Education	37	12.3
Tertiary Education	32	10.7
Mothers' Occupation		
Unemployed	34	11.3
Apprentice	22	7.3
Trader	131	43.7
Farmer	30	10.0
Self-employed	56	18.7
Government Worker	27	9.0
Religious Status		
Christian	253	84.3
Muslim	38	12.7
Traditional	8	2.7
Others	1	.3

4.3 NUTRITIONAL STATUS OF CHILDREN UNDER FIVE YEARS IN THE ASANTE-AKIM NORTH MUNICIPALITY?

The nutritional status of the children, expressed as (weight-for-age, weight-for-height and height-for-age) was determined for the children under five years on the basis of WHO Child Growth Standard (2000).

4.3.1 GENDER DIFFERENCES IN UNDER FIVE MALNUTRITION PREVALENCE RATES

Frequency count and percentages were calculated to determine the gender categories of the various malnutrition status among the children. Frequency data indicate that of 42.7% (128) underweight children, 22.7% (68) were boys with 20.0% (60) being girls under five years children. In addition, wasting affected 30.3% (91) of the children, of which 16.3% (49) and 14.0% (42) were boys and girls respectively. Moreover, out of 47.3% (142) were stunted under five children, 25.3% (76) were boys while 22.0% (66) were girls (see table 9 for data). Therefore, malnutrition is high among the under five children and that more boys are malnourished than girls, in the Asante-Akim North Municipality.

Table 9: Prevalence of Under Five Malnutrition in the ASANTE-AKIM NORTH Municipality

Malnutrition Status	Male		Female		Total	
	f	%	*f*	%	*f*	%
Weight-for-Age						
Normal	88	29.3	84	28.0	172	57.3
Underweight	68	22.7	60	20.0	128	42.7
Weight-for-Height						
Normal	107	35.7	102	34.0	209	69.7
Wasted	49	16.3	42	14.0	91	30.3
Height-for-Age						
Normal	80	26.7	78	26.0	158	52.7
Stunted	76	25.3	66	22.0	142	47.3

4.3.2 AGE DIFFERENCES OF UNDER FIVE MALNUTRITION PREVALENCE RATES

Frequency and percentage analysis were calculated to determine the prevalence, according to age categories, of malnutrition among the under five children. Data from Table 10 reveal that 3.3% (10), 6.3% (19), 5.0% (15), 4.0% (12), 7.0% (21), 7.3% (22) and 10.0% (30) underweight under five children were within 0-5, 6-11, 12-17, 18-23, 24-35, 36-47 and 48-59 age categories, respectively. Also, wasting affected 5.3% (16), 5.7% (17), 2.7% (8), 3.0% (9), 3.7% (11), 3.7% (11) and 6.7% (20) of under five children from 0-5, 6-11, 12-17, 18-23, 24-35, 36-47 and 48-59 age brackets, respectively. Moreover, of 47.3% stunted

children, 5.3% (16), 5.0% (15), 4.3% (13), 3.7% (11), 9.7% (29), 9.3% (28), 10.3% (31) fell within 0-5, 6-11, 12-17, 18-23, 24-35, 36-47 and 48-59 age categories, respectively (see Table 10). Hence, malnutrition affects more of the children as they grew up in the Asante- Akim North Municipality

Table 10: Prevalence of Under Five Malnutrition according to the Age (month) in the Asante-Akyim North Municipality

Malnutrition Status	0-5		6-11		12-17		18-23		24-35		36-47		48-59	
	f	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*	*f*	*%*
Weight-for-Age														
Normal	49	16.3	29	9.7	10	3.3	9	3.0	25	8.3	19	6.3	30	10.0
Underweight	10	3.3	19	6.3	15	5.0	12	4.0	21	7.0	22	7.3	30	10.0
Weight-for-Height														
Normal	43	14.3	31	10.3	17	5.7	12	4.0	35	11.7	30	10.0	40	13.3
Wasted	16	5.3	17	5.7	8	2.7	9	3.0	11	3.7	11	3.7	20	6.7
Height-for-Age														
Normal	43	14.3	33	11.0	12	4.0	10	3.3	17	5.7	13	4.3	29	9.7
Stunted	16	5.3	15	5.0	13	4.3	11	3.7	29	9.7	28	9.3	31	10.3

4.4 MATERNAL FACTORS INFLUENCING NUTRITIONAL STATUS OF UNDER FIVE CHILDREN IN THE ASANTE-AKIM NORTH MUNICIPALITY.

The relationship between maternal factors and the nutritional status of the children was explored in three approaches. Thus, children's weight-for-age status, weight-for-height, and height-for-age were predicted by the maternal factors.

4.4.1 Maternal factors as determinants of weight-for-age status of under five children

Linear logistic regression model was built to estimate weight-for-age status as a function of some maternal factors (maternal age, maternal marital status, maternal education, income, maternal nutritional knowledge and number of under five household children). The Table 11 results show that the odds of being underweight could not be significantly determined by any of the maternal factors at C.I. 95%. For example, maternal age (χ^2 = .069, *df* = 1, *p* = .79), Odd's ratio 1.0 (C.I. = .97-1.04) was not a significant predictor of whether a child unde five years would grow underweight (see table 4 for data). Thus, the maternal factors under study (maternal age, maternal marital status, maternal education, income, number of under five household children and maternal nutritional knowledge) were not good predictors of weight-for-age status of the under five children in the Asante-Akim North Municipality.

Table 11: Logistic Regression Analysis of Weight-for-Age Status (Children Under Age) as an Unadjusted Function of Maternal Factors.

Variables	*B*	*Wald*	*df*	*Sig.*	*Odds Ratio*	*95% CI*
Age of Mother	.005	.069	1	.79	1.0	.97-1.04
Marital Status	-.14	.254	1	.61	.87	.51-1.48
Education	-.07	.07	1	.79	.93	.56-1.56
Income	-.53	.93	1	.34	.59	.199-1.74
No. of Children < 5	.24	1.65	1	.19	1.26	.88-1.81
Nutritional Knowledge	-.02	.09	1	.76	.99	.89-1.09

4.4.2 Maternal factors as determinants of weight-for-height status of under five children

The predictive power of some maternal factors status (maternal age, maternal marital status, maternal education, income, number of under five household children and maternal nutritional knowledge) for weigh-for-height status was tested with linear logistic regression model. Table 12 results indicate that all of the maternal factors were not significant in predicting weigh-for-height status in the children (C.I. = 95%). For instance, maternal marital status (χ^2 = .2.91; *df* = 1, *p* = .09), Odd's ratio .62 (C.I.= .36-1.07) was not a significant determinant of the weight-for-height status of the children (see table 5 for data). Therefore, whether a child grows wasted or not was independent on maternal age, maternal marital status, maternal education, income, maternal nutritional knowledge and number of under five household children.

Table 12: Logistic Regression Analysis of Weight-for-Height Status (Children Under Age) as an Unadjusted Function of Maternal Factors.

Variables	*B*	*Wald*	*df*	*Sig.*	*Odds Ratio*	*95% CI*
Age of Mother	.001	.002	1	.97	1.00	.96-1.04
Marital Status	-.48	2.91	1	.09	.62	.36-1.07
Education	.32	1.35	1	.25	1.34	.80-2.36
Income	-.29	.23	1	.63	.75	.24-2.39
No. of Children < 5	.0	.14	1	.71	1.07	.74-1.56
Nutritional Knowledge	-.04	.50	1	.48	.96	.87-1.07

4.4.3 Maternal factors as determinants of height-for-age status of under five children

To predict height-for-age status from maternal factors (maternal age, maternal marital status, maternal education, income, number of under five household children and maternal nutritional knowledge), a linear logistic regression model was built. Results from Table 13 show that maternal education (χ^2 = 4.07, *df* = 1, *p* = .04), Odd's ratio .59) and income (χ^2 = 4.73, *df* = 1, *p* = .03), Odd's ratio .24) were significant in determining the height-for-age status of the children at C.I. 95%. However, maternal age (χ^2 = .42, *df* = 1, *p* = .52), maternal marital status (χ^2 = 1.43, *df* = 1, *p* = .23), number of household under five children (χ^2 = .43, *df* = 1, *p* = .51), and maternal nutritional knowledge (χ^2 = .09, *df* = 1, *p* = .77) could not significantly predict a child's height-for-age status at 95% C.I. (refer to Table 6). Therefore, maternal education and income, and not maternal age, marital status, number of household under five children and maternal nutritional knowledge, are important in determining whether a child would grow stunted during the first five years of life or not.

Table 13: Logistic Regression Analysis of Height-for-Age Status (Children Under Age) as an Unadjusted Function of Maternal Factors.

Variables	*B*	*Wald*	*Df*	*Sig.*	*Odds ratio*	*95%CL*
Age of mother	-01	.42	1	.52	.99	.95-1.02
Marital status	-.32	1.43	1	.23	.72	.43-1.23
Education	-.54	4.07	1	.04	.59	.35-99
Income	-1.4	24.73	1	.03	.24	.07-.87
No. of children	< 5.12	.43	1	.51	1.12	.79-1.60
Nutritional knowledge	-.02	.09	1	.77	.99	.89-1.09

4.5 EFFECTS OF BREASTFEEDING ON THE NUTRITIONAL STATUS OF CHILDREN UNDER FIVE YEARS IN THE ASANTE-AKIM NORTH MUNICIPALITY?

Linear logistic regression model was used to predict nutritional status from breastfeeding status among under five children. Regression data indicate that breastfeeding status was a significant predictor of weight-for-age status (χ^2 = 9.44, *df*= 1, *p* = .002) at C.I. = 1.31-3.36 and height-for-age status (χ^2 = 14.34, *df*= 1, *p* = .001) at C.I. = 1.55-3.96 status but not weight-for-height status (χ^2 = .12, *df* = 1, *p* = .92) among the children under five years. The odds of being underweight and stunted were 2.09 and 2.45 times for under five children who were not exclusively breastfed than those exclusively breastfed for six months. Hence, exclusively breastfed under five children are more likely to be underweight or stunted but not wasted relative to their exclusively breastfed counterparts in the Asante-Akim North Municipality.

Table 14: Logistic Regression Analysis of Malnutrition Status Children Under Five as an Unadjusted Function of their Breastfeeding Status.

Variables	*B*	*Wald*	*Sig.*	*Odds Ratio*	*95% CI*
Breastfeeding Status					
Weight-for-Age	.74	9.44	.002	2.09	1.31-3.36
Constant	-.72				
Weight-for-Height	-.09	.12	.73	.92	.56-1.50
Constant	-.78				
Height-for-Age	.91	14.34	.001	2.45	1.55-3.96
Constant	-.62				

4.6 RELATIONSHIP BETWEEN IMMUNIZATION STATUS AND THE NUTRITIONAL STATUS OF CHILDREN UNDER FIVE IN THE ASANTE-AKIM NORTH MUNICIPALITY

Child immunization status was independently and logistically regressed as a factor to determine under five nutritional status (weight-for-age, weight-for-height and height-for-age). Table 15 results reveal that child immunization status was a significant predictor of both weight-for-height (χ^2 = 13.25, *df*= 1, *p* = .001) and height-for-age (χ^2 = 6.07, *df*= 1, *p* = .01) status of the children at 95% confidence interval. The odds of being wasted and stunted, as a consequence of being partially immunized, were .35 and 2.06 respectively. However, immunization status was not a significant factor in determining whether a child under age five years would be underweight or not (χ^2 = -.17, *df* = 1, *p* = .54, C.I. = .48-1.46). Therefore, a child under age five years with incomplete immunization is more likely to be wasted or stunted, but not underweight, than a child with a complete immunization.

Table 15: Logistic Regression Analysis of Malnutrition Status of Children Under Five as an Unadjusted Function of their Immunization Status.

Variables	*B*	*Wald*	*Sig.*	*Odds Ratio*	*95% CI*
Immunization Status					
Weight-for-Age	-.17	.38	.54	.84	.48-1.46
Constant	-.15				
Weight-for-Height	-.1.06	13.25	.001	.35	.19-.61
Constant	-.03				
Height-for-Age	.72	6.07	.01	2.06	1.16-3.65
Constant	-.67				

CHAPTER FIVE

DISCUSSION

5.1 NUTRITIONAL STATUS OF THE CHILDREN

The purpose of this study was to determine the nutritional status of children under five years and maternal factors influencing the children nutritional status in the Asante-Akim North Municipality. This chapter presents the discussion of the study. The findings of the study indicate that malnutrition is high with 42.7%, 30.3% and 47.3% of the under five children being underweight, wasted and stunted in the Asante-Akim North Municipality. In addition, more boys (22.7%) were affected than the girls (20.0%). UNICEF (2008) confirmed this finding as it revealed that the rate of under-five stunting in Ghana is high, and that moderate and severely stunting are 22.4% and 7.4%, respectively. However, there was less prevalence rate (20%) of under-five stunting recorded in the Manya Krobo, a rural district of Ghana (Nti, & Lartey, 2007). In Malawi, 50% of the children were stunted (UNICEF, 2008), while the rate in Botswana was 38.7% (Mahgoub, & Bandeke, 2006). Moreover, UNICEF (2007) indicated that many developing countries have wasting rates of about 10% or more. A study conducted in Turkey also showed that 10.9%, 4.8% and 8.2% of the under five children were stunted, underweight and wasted respectively (Ergin, Atasoylu, & Beser, 2007). The rates in rural India also revealed that 65.5% were underweight, while as much as 81.8% stunted (Ray, 2001). The trend of malnutrition rates seem pronounced in the rural communities than urban centers. Hence, there may be a need for nutritional interventions to save the lives of these children.

Gender differences in the under-five malnutrition was also found in the current study with boys more malnourished than the girls. In support of this finding, UNICEF (2008)

recorded that 18.3% of boys and 17.1% of girls under five children are malnourished in Ghana. Mahgoub, *et al*. (2006) also indicated that in Botswana, malnutrition is significantly higher among boys (42.1%) than girls (35.4%). Furthermore, in Bangladesh the prevalence of underweight is 48% for boys as compare to 45.5% for girls (Rayhan, 2006; ANON, 2006).

The finding also indicated that under five malnutrition increases as the children grow older. This is because weight faltering usually concentrates between 3 and 12 months. However, after 12 months the child can be stunted and underweight but his/her weight-for-height can improve (WHO, 2006; UNICEF, 2007). The current study is done in a rural area. Ghana Health Service (2006) supported this reason as their report indicated an increase trend in the malnutrition among 0-11, 12–23 and 24–59 months under five children between the periods 2003-2006. The trend is high mostly in the three northern regions of Ghana. Ashanti region, recorded the rate among children 0-11, 12-23 and 24–59 months groups as 1.8%, 2.3% and 3.3% respectively. In addition, Ray (2001) found in rural India the proportions of underweight (65.5%) and stunting (81.8%) to be highest among children 13-24 months than those less in age. UNICEF (2008) confirmed that rural children are twice as likely to be malnourished than children in the urban centers. Thus, in the rural areas most of the parents are poor and find it difficult to provide the weaned child the necessary nutrients dense food. However, breastfeeding, especially exclusive, provides the child with the important macro and micro for proper growth and development, thereby protecting such children from malnutrition.

5.2 MATERNAL FACTORS INFLUENCING THE NUTRITIONAL STATUS OF THE CHILDREN

The findings from the study revealed that none of the maternal factors (maternal age, marital status, maternal education level, maternal income, number of under five children in the house and maternal nutritional knowledge) could predict the weight-for-age and weight-for-height status of the children. However, only maternal education and income predicted height-for-age status of the children.

Under five underweight or severe underweight, for example, is a reversible malnutrition status that results from inadequate intake of essential nutrients in the foods provided, disease and/or the child's body system functionality. Inadequate provision of nutritious food could be a consequence of nutritional knowledge, income, education level and marital status of the mother. The number of the under five children in the house increase the dilution of food resources and providing inadequate foods and necessary nutrients for the children. The age of a mother at pregnancy or at child birth is also critical to determining the child's nutritional status (Blössner, & de Onis, 2005; WHO, 2005). However, the findings of these study indicated that none of these maternal factors determined weight-for-age status of the under five children in the Asante-Akim North Municipality.

According to Biswas, and Bose (2010) stunting is one of the greatest problems still confronting the third world countries in the 21st centuries. They observed a high stunting 39.2% among the children with age and sex combined. They observed that mother's educational status was significantly associated with the prevalence of stunting among the children especially, girls. Among other variables maternal educational status was the strongest determinant of stunting in Bengalee, India (Biswas, & Bose, 2010). Education provides the opportunity for girls to become more empowered and self-confident as they

acquire knowledge, skills, attitudes and values critical for negotiating an equal place in society. Across the developing world, women play key roles in maintaining household food security, and in caring for children; important factors influencing children nutrition (Smith & Haddad, 2000). Women's disempowerment as a result of exclusion from education therefore results in their limited access and that of their children to basic health services and information. Maternal literacy and level of education impact on the human and economic empowerment of women (WHO, 2005). Maternal education is also supposed to improve the health seeking and child caring practices of the mother. Maternal education and maternal nutritional knowledge are significantly but independently associated with child nutrition outcomes (Webb, & Lapping, 2002).

Household income status is suggested to be a means to curbing the problem of stunting and underweight among under five children (Zere, & McIntyre, 2003). Zere and McIntyre (2003) indicate that the rate of stunting was the highest followed by underweight among the children in South Africa. Similar to the current finding, they also revealed that while stunting and underweight were responsive to improvements in the socio-economic status of the household, wasting does not appear to be sensitive. Since stunting is as a result of chronic malnutrition, it is often associated with socio-economic deprivation. The poorest bear the heaviest burden of stunting and underweight. According to Thomas, *et al*. (1990), family income has significant positive correlation on child survival. Increases in income at the household and national levels imply similar rates of reduction in malnutrition (Haddad, *et al*., 2003). Using a nutrition index based on weight-for-age of children in rural India, they revealed that higher per capita current income improves the nutritional status of both boys and girls. However, effect of income is not independent but in association with other factors such as mothers' educational level (Sarmistha, 1998).

5.3 EFFECTS OF BREASTFEEDING ON NUTRITIONAL STATUS OF THE CHILDREN

Breast milk contains colostrum that provides children with essential nutrients that protect children from most of the childhood infections (Brakohiapa, *et al*., 1988; Kumar, *et al*., 2006). The finding indicates that children not exclusively breastfed are more likely to be underweight or stunted than children exclusively breastfed counterparts. However, whether the child will grow wasted or not, is not likely to be determined by the child's breastfeeding status, according to the study. In support of this finding, Nguyen, and Kam (2008) concluded that exclusive breastfeeding were found to be significant factors for malnutrition among children under five. Under five children non-exclusively breastfed were 2-3 time more likely to be underweight and wasted than their exclusively breastfed ones. Furthermore, duration of exclusive breastfeeding is significantly related to malnutrition. More so, exclusive breastfeeding is independently positively significant to underweight, and stunting. A likewise study (Kumar, *et al*., 2006) concluded that delayed initiation of breastfeeding and deprivation from colostrum are significant risk factors for under nutrition among under-five children. Thus, initiation of breast-feeding after six hours of birth and deprivation from colostrum were found to be significant risk factors for underweight.

A study by Brakohiapa, *et al*. (1988) revealed that in Ghana, children who visited a children's hospital in the city of Accra, breastfeeding a child 19 month was a protective factor to growing malnourish. That, children who were not breastfed for 19 months or more were about 2.3 times more likely to underweight, stunted wasted than children who were breastfed for less than 19 months. However, Briend, and Bari (1989) indicate that

breastfeeding a child after 1 year of age is detrimental to his or her nutritional status, as children breastfed for more than a year are more than their counterparts breastfed for one year, to be more malnourished. In investigating the association between breastfeeding, nutritional status and survival between a cohort of 1087 children aged 12-35 months from rural Bangladesh, Briend, and Bari, (1989) also found that mean weight-for-age of breastfed children was 69.6% compared to 70.6% for non-breast fed children. Despite this difference in nutritional status, risk of dying was six times higher in non-breastfed malnourished children than in similarly malnourished breastfed children.

5.4 IMMUNIZATION AND THE NUTRITIONAL STATUS OF CHILDREN

The finding from the research indicates that incomplete immunization is a risk factor for wasted and stunted growth of children under five. However, weight-for-age status of the child is not determined by whether he or she has completed immunization. Asante-Akim North Municipality is a typical rural area. Therefore, it is not surprising malnutrition is high coupled with many children who are not completely immunized, as urban centers are almost always better in the under five immunization status than children from rural areas (Abedi, & Srivastava, 2012). Childhood vaccination may protect children's nutritional status and lead to improved child growth in developing countries (Abedi, & Srivastava, 2012; Bhavsar, *et al*., 2012). Accordingly, 43.8% children were fully immunized, 41.8% partially immunized and 14.4% not immunized. Consequently, 51.4% of the children were stunted and 21.7% wasted. In addition, Abedi, and Srivastava (2012) observed that fully immunized children had better nutritional status. Another study 12-59 months under five children from Bangladesh indicated that over one-fifth and two-fifths of unimmunized children were severely and moderately undernourished.

Similarly, Ray (2000) in Siliguri, India studied 316 children (under 5 years) and found a significantly higher ($p<0.05$) prevalence of malnutrition children amongst partially immunized and non-immunized children (81.25% and 88.2%) in comparison to fully immunized children (62.1%). This implies that partially and non-immunized children were at higher risk of malnutrition as they were not protected against the vaccine preventable diseases, including measles thus contributing to the vicious cycle of malnutrition and infection. Das and Hossain (2008) in Bangladesh studied 6005 children aged 12-59 months and they noted that those children who did not receive any vaccines, over one-fifth and two-fifths were found severely and moderately undernourished. Santosh, *et al*. (2013) found that of 600 under five children studied, 560 (93.3%) received primary immunization, while 40 (6.7%) were partially immunized. Diarrhoea and acute respiratory tract infection were also found in 222 (36.9%) and 83(13.8%) of children, respectively. Significantly, the prevalence of malnutrition was found to be higher in children who were partially immunized than fully immunized ones. Also, significant percentages of the children were stunted (38.7%) and wasted 58.9% among children with diarrhea and acute respiratory tract infections. This suggests there is a protective association of up-to-date immunization against stunting and wasting among the children under five years.

The finding also revealed that child immunization status was not a significant determinant of their weight-for-age status. On the contrary, Bhavsar, *et al*. (2012) found that the proportion of underweight was significantly higher among partially immunized children than that of fully immunized children. In a similar vein, Sengupta, *et al*. (2010) revealed that incomplete vaccination status, was a strong factors for childhood malnutrition. Santosh, *et al*. (2013) also indicated significant differences between fully immunized and

partially immunized children on their underweight status. Thus, partially immunized children were more likely to be underweight than fully immunized ones.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Malnutrition is perhaps the leading cause of death in children below age five in the developing countries including those in sub-Saharan Africa, Asia and Latin America. Malnutrition develops in children whose consumption of protein and energy are insufficient to satisfy their body's nutritional needs. Malnutrition may also occur in children who are unable to absorb vital nutrients or converts them to energy essential for healthy tissue formation and organ function (Awatef, *et al*., 2011). Literature suggests that factors such as family size, parental educational level and occupation, infants and young feeding practices, age and gender of the child can grossly affect childhood nutrition. Statistics indicate that globally, nearly 53% of all deaths in young children in 2003 were attributable to undernutrition. The malnutrition condition, especially among children under age five, affects their physical growth, mental development and capacity (de Onis, *et al*., 2004). Therefore, the purpose of this study was to determine the nutritional status of children under five years and maternal factors influencing the children nutritional status in the Asante-Akim North Municipality.

The findings of the study indicate that 42.7% of the under five children were underweight while 30.3% were wasted and 47.3% were stunted in the Asante-Akim North Municipality. Furthermore, more boys were malnourished compared to the girls. Thus, there is a high prevalence of under five malnutrition with more boys being malnourished than the girls. Moreover, under five malnutrition is age dependent; as the under five children grow older they turn to be malnourished more than younger ones.

The study further revealed that exclusive breastfeeding is a protective factor to underweight and/or stunting but not wasting among the under five children in Asanti-Akim North Municipality. Despite this difference in nutritional status, the risk of dying was six times higher in non-breastfed malnourished under five children compared with malnourished breastfed children. Incomplete immunization is also a risk factor for under five children growing wasted and stunted in the Asante-Akim North Municipality.

6.2 RECOMMENDATIONS

The following recommendations were made to parents of the children, municipal assembly authorities, regional, health directorate and the government of Ghana. These recommendations were made based on the findings and conclusions drawn from the study.

6.2.1 Parents

Household characteristics such as child feeding practices, sanitation, parents' education and many others influence the children's nutritional status. Parents of these children in the Asanti-Akim North Municipality are encouraged to provide well-nourished complementary foods for their under five children especially as the children grow and are being weaned of breast milk. The parents are again entreated to give birth to less number of children to be able to cater for them with little financial and food resources that may available to the household. It is also recommended that mothers exclusively breastfeed their children to protect them from some childhood diseases which are promoters of malnutrition especially among under five children. These parents are further encouraged to educate themselves about child health to provide their children the best care the children

may need. This may promote child health and prevent malnutrition among under five children.

6.2.2 Municipal authorities

The municipal authorities are the first level of national administrative authority to provide meaningful roadmap for the intervention of child health. The Asanti-Akim North Municipality, in conjunction with the municipal health directorate, is called upon to collaborate with other agencies like WHO, UNICEF, and other child friendly NGOs to educate the parents, especially mothers on exclusive breastfeeding, child weaning and the child feeding practices to prevent malnutrition and promote child health in the municipality. This collaboration when encouraged will increase the coverage of immunization and other child health promotion intervention activities in the municipality. The collaborations, especially with some financial donors, can provide finance for the women to improve their economic status that will improve child health. The municipality can also institute further research into the problem of malnutrition in under five children and why more boys are being malnourished than girls.

6.2.3 Regional directorate

The regional health directorate should institute or liaise with other child health promotion institutions like WHO and UNICEF to institute research study in to malnutrition and factors influencing this in the whole region. This can give the trend of malnutrition in the region and possible factors and necessary interventions needed. Child health policies such as coverage of immunization activities and promotion of exclusive breastfeeding education can be carried out by the region. The region should be able to create the enabling

environment for women to access loans for trade and farming to improve their economic status that improve their children's nutritional status.

6.2.4 Government

The government is responsible to create enabling environment for health and economic growth and sustainability for its citizenry. These policies should consider improving the socio-economic conditions of households in the municipality. The government also has the mandate to strengthen the capacity of the communities, municipalities and the regions to institute child health promotion programmes and prevent malnutrition among children under five years of age.

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APPENDIX – 1

QUESTIONNAIRE FOR MOTHERS AND CHILD

ANTHROPOMETRIC MEASUREMENT

My name is Mensah Collins, a student of KNUST pursuing MPH. Health Education and Promotion. I am conducting a research on Nutritional status of under five year children as part of my academic work. Could you please spare me some few minutes of your time to answer the following questions. Your privacy is protected; no information that will identify you is required.

SECTION A: CHILD ANTHROPOMETRIC MEASUREMENT

1. Sex of the child

   Male [ ] Female [ ]

2. Age of the child (months) …….

3. Weight of the child (kg) ……

4. Height of the child (m) ……..

SECTION B: QUESTIONNAIRE FOR THE MOTHERS

Instruction: Mark [√] or state where needed the box corresponding to your choice concerning each statement below:

5. What is your age?.....

6. What is your highest level of education attained?

a. No formal education [ ]

b. Primary education [ ]

c. J. H. S/Middle School [ ]

d. Vocational Training [ ]

e. Secondary Education [ ]

f. Tertiary Education [ ]

7. Marital Status

a. Single [ ]

b. Married [ ]

c. Divorced [ ]

d. Widowed [ ]

e. Cohabiting [ ]

8. Religion

a. Christian [ ]

b. Muslim [ ]

c. Traditional [ ]

d. Others (specify) ……

9. Mother`s occupation

a. unemployed

b. apprentice

c. trader

d. farmer

e. self employed

f. gov't worker

g. others (specify) …….

10. Mother's monthly income

a. less than ¢50 [ ]

b. above ¢50 - ¢300 [ ]

c. above ¢300 - ¢600 [ ]

d. above ¢600 - ¢800 [ ]

e. above ¢800 [ ]

11. How many children do you have? ……..

12. How many of them are under five years? ……

13. How many people do you feed in your household?.....

14. Did you ever breastfeed this child/children

a. Yes [ ]

b. No [ ]

15. Is the child still breastfeeding?

a. Yes [ ]

b. No [ ]

16. When did you put the child to breast after birth?

a. less than 30 minutes [ ]

b. one hour [ ]

c. two hours [ ]

d. three hours [ ]

e. above four hours [ ]

17. Which of the following do you practice? Please *Tick (√) as many as applicable*

a. Exclusive breastfeeding?(6 months) [ ]

b. Breastfeed the child for 18 months [ ]

c. Breastfeed the child for 24 months [ ]

d. Breastfeed the child beyond 24 months [ ]

18. When did you start giving the child complementary diet?

a. Before 6 months [ ]

b. At 6 months [ ]

c. 7 – 12 months [ ]

d. After 12 months [ ]

19. What type of food do you give to your child? *Please tick as many as applicable*

a. cereals (eg: corn, wheat, millet, oats) [ ]

b. vegetables (eg: cabbage, garden eggs, okro) [ ]

c. fruits (eg: orange, mango, pawpaw, banana) [ ]

d. roots and tubers (eg: yam, cassava, cocoyam, potato) [ ]

e. legumes/meat, fish, egg [ ]

20. Have you received any education on the following?

Breastfeeding	yes [ ]	no [ ]
Healthy eating	yes [ ]	no [ ]
Complementary feeding	yes [ ]	no [ ]

21. What is the immunization status of your child?

a. No routine immunization [ ]

b. Partially immunized [ ]

c. Fully immunized [ ]

22. Did your child experience diarrhea in the last 2 weeks?

a. Yes [ ]

b. No [ ]

***Knowledge: Please respond to the following statements by marking [√] the column that most accurately represents your opinion of the extent to which you* agree (A), strongly agree (SA), disagree (D), strongly disagree (SD).**

		SA	A	D	SD
23.	Exclusive breastfeeding should be less than six months				
24.	Babies can be fed with water alongside breast milk within the first six months				
25.	Complementary food should be given within the first six months				
26.	Children need to consume more fish and, or meat than adults				
27.	Adults need to eat more fruits and, or vegetables than children.				
28.	Children do not need to eat more food than adults				

APPENDIX II

MAP OF STUDY AREA