KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF COMMUNITY HEALTH

THE NUTRITIONAL IMPACT OF THE WORLD FOOD PROGRAMME-SUPPORTED SUPPLEMENTARY FEEDING PROGRAMME ON CHILDREN LESS THAN FIVE YEARS IN RURAL TAMALE.

BY

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A THESIS PRESENTED TO THE SCHOOL OF GRADUATE STUDIES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTER OF PUBLIC HEALTH DEGREE IN POPULATION AND REPRODUCTIVE HEALTH.

JULY, 2007

DECLARATION

I, TIBILLA MOSES ABUGBIL, hereby declare that this project work is my original product under the supervision of Dr. Anthony K. Edusei of the Community Health Department, Kwame Nkrumah University of Science and Technology, Kumasi. References made to other people's works have been duly acknowledged. I declare that this work has not been presented in whole or in part in any academic institution for the award of a degree.

Signature ……

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Date …….

Signature ……..

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(ACADEMIC SUPERVISOR)

Signature ……..

REV.DR. EDMOND NII-LARYEA BROWNE

(HEAD OF DEPARTMENT).

DEDICATION

This work is dedicated to my dear late wife, Rosemary Azure-Tibilla, whose death on the 19th of August, 2007 coincided with this research, and our two orphaned children, Vida Wunpoa Tibilla of St. Louis senior high school, Kumasi and Fredrick Zaanyaya Tibilla of Central International School, Tamale**.**

ACKNOWLEDGEMENT

To God be the glory for giving me the strength and courage to pursue this programme under very trying moments.

I am most grateful to all the lecturers and staff of the school of medical sciences, KNUST, especially Dr. Anthony K. Edusei who, despite his tight schedules guided me through this entire work, offering academic guidance and very useful suggestions when I most needed them.

My sincere gratitude also goes to the District Director of Health Service for Tamale, Dr.John Abenyiri and his able team for their moral and material support. I should not forget Mr Prosper Dakura, who supervised the field work and data entry

Even though they remain anonymous, I wish to extend my sincere gratitude to the community leaders, mothers, and the children who were the subjects for the study.

Finally, I wish to extend my gratitude to all my friends, colleagues and the inexhaustible list of people who, in diverse ways helped to make this work a success.

May the almighty God bless you all, Amen.

DEFINITION OF TERMS.

Assemblyman. An elected non- partisan member of a cluster of communities (assembly area). It is a non-salaried voluntary job.

Anthropometry. The use of human body measurements for the purpose of obtaining information about nutritional status.

Body-Mass-Index. An index that relates body weight to height. The body mass index (BMI) is obtained by dividing a person's weight in kilograms (kg) by their height in meters squared (m^2).

Care- giver A person who cares for a child, and provides for the daily needs of the child**.**

Food-for work. A feeding programme where beneficiaries are given food rations as remuneration for work done (usually community level labour)**.**

Infantometer. A measuring board, usually inbuilt with a tape measure, for taking the length of children less than two years old.

Preschool child. A child who is not yet up to the school-going age, i.e. 0 – 59 months

Protein energy malnutrition The lack of sufficient energy or protein to meet the body's metabolic demands, as a result of either an inadequate dietary intake of protein, intake of poor quality dietary protein, increased demands due to disease, or increased nutrient losses.

Underweight Moderate and severe Weight- for- Age below minus two standard deviations (-2SD) from Median Weight- for-Age of the reference population.

Wasting Moderate and severe Weight- for- Height below minus two standard deviations (-2SD) from the median Weight- for- Height of the reference population.

Stunting Moderate and severe Height- for- Age below minus two standard deviations (-2SD) from Median Height- for- Age of the reference population.

Severe Underweight Moderate and severe Weight- for- Age below minus three standard deviations (-3SD) from Median Weight- for-Age of the reference population.

Severe Wasting Moderate and severe Weight- for- Height below minus three standard deviations (-3SD) from the median Weight- for- Height of the reference population.

Severe Stunting Moderate and severe Height- for- Age below minus three standard deviations (-3SD) from Median Height- for- Age of the reference population.

LIST OF ABBREVIATIONS AND ACRONYMS

ADRA	Adventist Development and Relief Agency
AIDS	Acquired Immune Deficiency Syndrome.
ARI	Acute Respiratory Tract Infections.
BMI	Body Mass Index
CBO	Community-Based Organization.
CDC	Centre for Disease Control.
CHNC	Community Health and Nutrition Centre
CRS	Catholic Relief Service.
DHMT	District Health Management Team.
FAO	Food and Agricultural Organization
GDHS	Ghana Demographic and Health Survey.
GHS	Ghana Health Service.
GWCL	Ghana Water Company Limited
HIV	Human Immuno-deficiency Virus
IFPRI	International Food Policy and Research Institute
KVIP	Kumasi Ventilated Improved Pit Latrine.
MAID	Management Aid

MCH	Maternal and Child Health
NCHS	National Centre for Health Statistics
NGO	Non Governmental Organization
NORDA	Northern Region Development Agency
PEM	Protein Energy Malnutrition.
RCH	Reproductive and Child Health
RUMNET	Rural Media Network.
SFHNE	Supplementary Feeding, Health and Nutrition Education
TMA	Tamale Metropolitan Assembly
TMHD	Tamale Metropolitan Health Directorate
UN	United Nations.
UNICEF	United Nations' Children's Fund.
WFP	World Food Programme.
WHO	World Health Organisation

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ABSTRACT

This study was a cross sectional evaluation study which sought to find out the nutritional impact of the supplementary feeding programme on the target population - children 6 months to 59 months. The study also looked at other factors (socio-economic and demographic) known to affect the nutritional status of children. The impact of the supplementary feeding programme was measured based on anthropometric indicators – height-for -age, weight –for – age, and weight-for-height.

The study used multistage sampling techniques to select 400 children 6 to 59 months from the base-line study carried out at the beginning of the programme in 2003 by reviewing the existing baseline data. Four hundred (400) children 6 to 59 months old benefiting from the supplementary feeding programme as at August, 2007 were also selected using the register of beneficiary children in each community. Anthropometric measurements were taken of the sampled children (post intervention) while same was retrieved from the sampled baseline data (baseline). Mothers/ care-givers of the children were the subjects for interview, and similar information was sought out from the sampled baseline data.

The results of the study were analyzed using Epi Info 3.4 software and presented in appropriate statistical graphs and tables

The results of this study revealed that among all the under fives surveyed at the baseline, 57.9% of them were stunted, of which 26.2% were severely stunted; 66.7% were underweight with 30.7% being severely underweight, and 41.8% were wasted, with 8.8% severely wasted.

At the post intervention four years later, stunting went up by11.2% to 69.1%, underweight also went up by 3.5% to70.2%.Wasting, however, reduced by 10.5% to 34.3%. Severe stunting, underweight and wasting also followed similar trends, with severe stunting increasing by10.0%, severe underweight increasing by 0.4%, and severe wasting dropping by 3.5%. This showed that there were increases in the proportions of stunting and underweight between the baseline and post intervention groups. Comparing the difference in the proportions of moderate and severe stunting at baseline and post intervention with 95% CI, it has been revealed that the increase was not significant (i.e. moderate stunting, 0.12,-0.01; and severe stunting,0.05,-0.17). The difference in increase in the proportion of moderate and severe underweight was also not significant with 95% CI (i.e. moderate underweight, 0.03,-0.09; and severe underweight, 0.05,-0.06). However, the proportion of wasting reduced at the post intervention stage. Comparison of the proportion of reduction of moderate and severe wasting also indicated that the reduction was mild at 95% CI (i.e. moderate wasting, 0.11,-0.01; and severe wasting, 0.17,0.0004). This is an indication that the supplementary feeding project was only successful in reducing acute malnutrition (wasting) rather than chronic malnutrition.(stunting and underweight).

Chronic malnutrition continued to increase over the project implementation period. Other factors that might affect nutritional status generally did not seem to bring about improvements in

the proportion of stunting and underweight after the intervention. The difference in nutritional status by sex equally did not show any different trend. Stunting and underweight increased in both males and females after the intervention. Like in the general target group, wasting however decreased in both males and females after the intervention. Comparison of the differences in proportions of decrease in the stunting and underweight, and the proportion of reduction in wasting were equally not very significant at 95% confidence level.

The study recommends among other things that supplementary feeding interventions should target severely malnourished children for rehabilitation with education while mothers/care-takers of moderately malnourished children are targeted with socio-economic interventions, education, and possibly take-home rations.

CHAPTER 1

INTRODUCTION

1.1 Background Information.

Under nutrition is an underlying cause of 53% of all deaths in children younger than age 5 years (WHO, 2005). The prevalence of stunting (chronic under nutrition) has dropped world wide. In developing countries, stunting dropped from 47% in 1980 to 33% in 2000 (WHO, 2000), although progress has been uneven among regions. Stunting has increased in Eastern Africa, but decreased in South-eastern Asia, South-central Asia and South America. Northern Africa and the Caribbean show modest improvement while Western Africa and Central America present very little progress (WHO, 2005).

Despite an overall decrease of stunting in developing countries, child malnutrition still remains a major public health problem in these countries. In some countries rates of stunting are rising, while in many others they remain unacceptably high (WHO, 2003).

The pattern in Africa is quite distinct. The prevalence of stunting declined from 40.5% in 1980 to 35.2% in 2000, a decrease of only 0.3 percentage points per year (WHO, 2005). The highest level of stunting is found in Eastern Africa, where, on the average, 48% of preschool children are currently affected. In this region, stunting has been increasing at 0.1 percentage points per year.

This trend, together with high rates of population increase, translates into annual increases in the numbers of stunted children in Eastern Africa. Over the period 1980–2000 the number of stunted preschool children in Africa increased from about 12.9 million to 22 million (WHO, 2005).

In Western Africa the estimated prevalence of stunting in 2004 was 35%, a proportion that has changed little in recent years. Wasting has remained around 10%, and underweight prevalence has remained roughly the same over the 1990 – 2004 periods (WHO, 2005).

The broad overall averages however tend to hide disparities between and within countries. In Ghana, protein-energy (PEM) malnutrition is the most widespread and serious nutritional problem among children (GDHS, 2003). PEM is manifested as mild, moderate or severe stunting, wasting, and underweight. There have been slight improvements between 1998 and 2003 in rates of underweight and wasting among children under 5 years, but stunting rates deteriorated (GDHS, 2003). In 1998 stunting was 26%, wasting 10% and underweight 25 % nationally (GDHS, 1998); and in 2003, stunting was 30%, wasting 22%, and underweight, 7 % (GDHS, 2003).

Within Ghana, there are also wide regional variations in the rates of malnutrition. Nutrition indicators for the three northern regions (the Northern, Upper East and Upper West regions) showed levels of underweight, wasting and stunting above the national average (GDHS, 2003). The Upper East has a stunting rate of 31.7%, a wasting rate of 12.9% and an underweight rate of 32.4%, while the Upper West region has a stunting rate of 34.1%, wasting rate of 11.0%, and underweight rate of 25.9%. The Northern region has the highest stunting and underweight rates of 48.8% and 35.5%, respectively, but the lowest in terms of wasting

among the three regions (GDHS, 2003). It is also expected that there will be wide variations within the regions from district to district. For example, the rate of underweight among child welfare and outreach clinic attendants in the Northern region ranged from 29.5% in the West Gonja district to 60% in Tamale metropolis (Regional Public Health Unit Annual Report, 2005). Due to the multidimensional nature of the factors causing malnutrition especially in developing countries, Governments, multinational partners and non-governmental organizations have adopted different approaches, alone or in combination with other approaches to combat malnutrition. Supplementary feeding programmes, operating with funds made available from local and international sources are widely used as one the strategies to reduce child malnutrition. These vary from giving supplementary foodstuffs to mothers attending maternal and child health (MCH) clinics, to community nutrition centres, nutrition rehabilitation services, food assistance such as food-for-work, and emergency feeding programmes. Almost all of these programmes focus on delivery of fortified foods and in some cases are complemented with health and nutrition education.

1.1.1 Supplementary Feeding

In Ghana supplementary feeding programmes have been known for quite some time. The World Food Programme started operating supplementary feeding in Ghana in 1963. Supplementary feeding programmes have been mainly targeted at preschool and school-age children as well as pregnant and lactating women in areas identified to be food insecure, poor or have persistently high rates of malnutrition. The Catholic Relief Service (CRS), The Adventist Relief Agency (ADRA) and The World Food Programme are among the main non governmental agencies that have been known to support supplementary feeding programmes in Ghana.

The overall objective of these feeding programmes is to provide undernourished children, particularly those below the age of five years, with nutritionally balanced food to supplement their unbalanced staple diet, with the aim of ensuring normal growth and preserve health (WFP, 2005). Most of the feeding programmes, aware of the impact of non-food factors on nutritional status, also focused on indirect strategies, including increasing MCH attendance, nutrition and health education, promotion of food production and acceptance of low-cost but nutritious foods, and other related activities.

1.1.2 World Food Programme (WFP) Assisted Supplementary Feeding Programme.

The Ghana Health Service (GHS), in partnership with the World Food Programme (WFP) is implementing what is known as the Supplementary Feeding, Health and Nutrition Education component (SFHNE) of the food supplementation programme. This component is targeted to benefit a yearly average of 60,000 women and children in the Northern, Upper East and Upper West Regions, thus:

(i) 10,000 pregnant and lactating women and 14,000 boys and girls of 6–24 months receiving monthly take-home rations for seven months during the lean season and,

ii) 36,000 boys and girls aged 2–5 years receiving one cooked morning meal for 260 days a year (WFP 2005).

Programme activities include providing fortified blended food, strengthening capacity and enhancing health and nutrition education at the community level. The Ghana Health Service (GHS), in partnership with WFP carries out complementary activities aimed at significantly increasing the impact of the component in rural areas by boosting outreach services and/or community health compounds.

In targeted communities in the three northern regions, women in the second trimester of pregnancy and the first six months after delivery and children aged 6–24 months receive a micronutrient-rich supplement in Community Health and Nutrition Education Centres (CHNECs).

Antenatal care for pregnant women includes a take-home ration of a fortified blended food, iodized salt and oil. In day-care/pre-school centres, children aged 2–5 receive one micronutrient-rich cooked mid-morning meal.

Community Health nurses and volunteers under the supervision of the Ghana Health Service (GHS) sub-district staff weigh pregnant women monthly and monitor the growth of the children less than 5 years. Lactating women are counselled and supported to breastfeed their infants exclusively for six months.

1.2 **Problem Statement**

The nutrition of preschool children is of considerable interest not only because of concern over their immediate welfare, but also because their nutrition in this formative stage of life is widely perceived to have substantial impact on their physical and mental development and on their health status in adulthood. Their physical and mental development, in turn, shapes their lifetime options by affecting their schooling success and post-schooling productivity.

Improving the nutritional status of malnourished infants and small children may, therefore, have important payoffs over the long term.

Malnutrition can take many forms. Long-term macro or protein-energy malnutrition (PEM) usually is manifested in stunting, i.e., being short for one's age and sex relative to standards established for healthy populations. Shorter-run PEM is often measured as wasting (low Weight-for-Height), underweight (low Weight- for-Age), and a low Body-Mass-Index (BMI).

In the northern region, 48.8 percent of children under five years are stunted and 21.8 percent severely stunted; 6.6 percent of children under five are wasted and 1 percent severely wasted. Weight-for-age results show that 36.5 percent of children under five are underweight, with 8.7 percent severely underweight (GDHS, 2003). Even though food supplementation has been operating for over a decade in the Tamale Rural areas, the rate of child malnutrition does not seem to be reducing as much as expected. In 2003 stunting in Tamale was 42.5%, underweight 41.4% and wasting 12.5% among children benefiting from the WFP food supplementation (DHMT, 2003). Sixty percent (60%) of children attending child welfare or outreach clinics in Tamale are underweight (Regional Public Health Unit, 2005).

Supplementary feeding programmes are possibly the oldest and the most common form of intervention for correcting malnutrition. A critical analysis of the Supplementary Feeding Programmes which have been undertaken around the world shows that although only a few programmes have been rigorously evaluated, it seems that in relation to their main objectives, most of them have not proved to be successful. (Rondo, 1990).

Several donor agencies as well as non-governmental agencies and churches have been carrying out supplementary feeding programmes targeting vulnerable women and children less than five years of age in the northern region. Several others are also working in various health and development areas in the Tamale metropolis and around the region. Indeed, nearly every community in Tamale is benefiting in one way or the other from the services of an NGO or a Community-Based Organization (CBO).

Key among them is the World Health Organization (WHO), the United Nation's Children's Fund (UNICEF), the World Food Programme (WFP), and the Catholic Relief Services (CRS). Local based organizations include Amassachina, Gubkatimali, Rural Media Network (RUMNET), Northern Regional Development Association (NORDA), Management Aid (MAID), among others.

In rural Tamale, the Word Food Programme, in collaboration with the Ghana Health Service has been operating the supplementary feeding programme for preschool children, pregnant and lactating women in selected communities since in 1996. There are currently nine communities benefiting from the supplementary feeding programme in rural Tamale. Five others were phased out in 2006 after up to ten years on the programme. Of the nine who are still benefiting, five have been on the programme for four years and four have been on the programme for six years. Even though there have been quite a number of operational changes in the phases of the programme since its onset, the basic on-site feeding of children and take home ration for pregnant and lactating women have remained, with slight changes in the food basket. An impact study is therefore necessary to determine whether the program is succeeding in its main objective of reducing child malnutrition and whether scaling up will be beneficial.

1.3 Rationale for the study

The factors contributing to the cause of malnutrition are complex and multifaceted. They are related to morbidity patterns, care practices, mother's level of education, environmental factors, and food and nutrition. Dietary intake is one of the main contributors to nutritional status. Mild to moderate malnutrition contributes to nearly 53% of all infant deaths in children (WHO, 2005)

Clinical assessment of nutrition disorders is not very meaningful in public health nutrition as clinical signs of malnutrition are usually late signs, thus identifying only severe cases of malnutrition. Malnutrition usually starts as mild to moderate, thus it is mainly detected in its early stages, through the use of anthropometric, biochemical or haematological methods. Growth assessment is the single measurement that best defines the health and nutritional status of children, because disturbances in health and nutrition, regardless of their aetiology, invariably affect child growth. Health and nutrition problems during childhood are the result of a wide range of factors, most of which (particularly in underprivileged populations) relate to unsatisfactory food intake or severe and repeated infections, or a combination of the two. These conditions, in turn, are closely linked to the general standard of living and whether a population is able to meet its basic needs such as food, housing, and health care. Growth assessment thus serves as a means for evaluating the health and nutritional status of children, just as it also provides an indirect measurement of the quality of life of an entire population.

Of the various anthropometric indices that can be used to assess child growth status, the following provide a comprehensive description: height-for-age portrays performance in terms of linear growth,

and essentially measures long-term growth faltering; weight-for-height reflects body proportion, or the harmony of growth, and is particularly sensitive to acute growth disturbances; and weight-for-age represents a convenient synthesis of both linear growth and body proportion (WHO, 1993).

Current available data on nutritional data in the Tamale Metropolis is the GDHS, which provides data only at the regional level. The GDHS uses nationally allocated enumeration areas and the numbers that might be captured for the measurement of the nutritional indicators may not be representative of the district as well.

Baseline data prior to the start of the supplementary feeding programme in the various communities were collected but these concentrated mainly on the nutritional indicators of weight for age, weight for height and height for age. There have not been any follow up studies to the baseline in the Tamale area. Attempts by WFP to come out with a comprehensive baseline in 2005 did not include the Tamale area. Sampling of communities for that study was done from all benefiting communities in the three northern regions. It can therefore not stand as representative of any single region or district as some districts like Tamale were completely not represented.

This study determined the current nutritional status of children in beneficiary communities before the start of the programme (baseline), and the current situation in the same communities; and by this, establishes the contribution of the supplementary feeding to the nutritional status of the beneficiary children. The study also looked at some other possible contributory factors (confounders) to the nutritional status of the children.
The study in the end provided some information that will guide policy direction on nutrition interventions.

Furthermore, as WFP is planning a systematic withdrawal of food support, the information provided will help the district authorities to decide whether it is worthwhile sustaining supplementary feeding when WFP finally withdraws.

1.4Conceptual Framework of the causes of malnutrition.

Malnutrition refers to a wide range of conditions, each with a specific cause related to one or more nutrients (for example proteins, iodine, calcium, or energy) and each is characterized by cellular imbalance between the supply of energy and nutrients on the one hand, and the body's demand for them to ensure growth, maintenance and specific functions on the other (WHO, 1996).

The aetiology of early childhood malnutrition is complex, multifactoral and contextual. The major immediate cause of childhood malnutrition is deficiencies in protein and energy. However, behind these deficiencies lie a myriad of factors, acting individually or interacting with one another to influence infant feeding practices and thus their nutritional status and health.

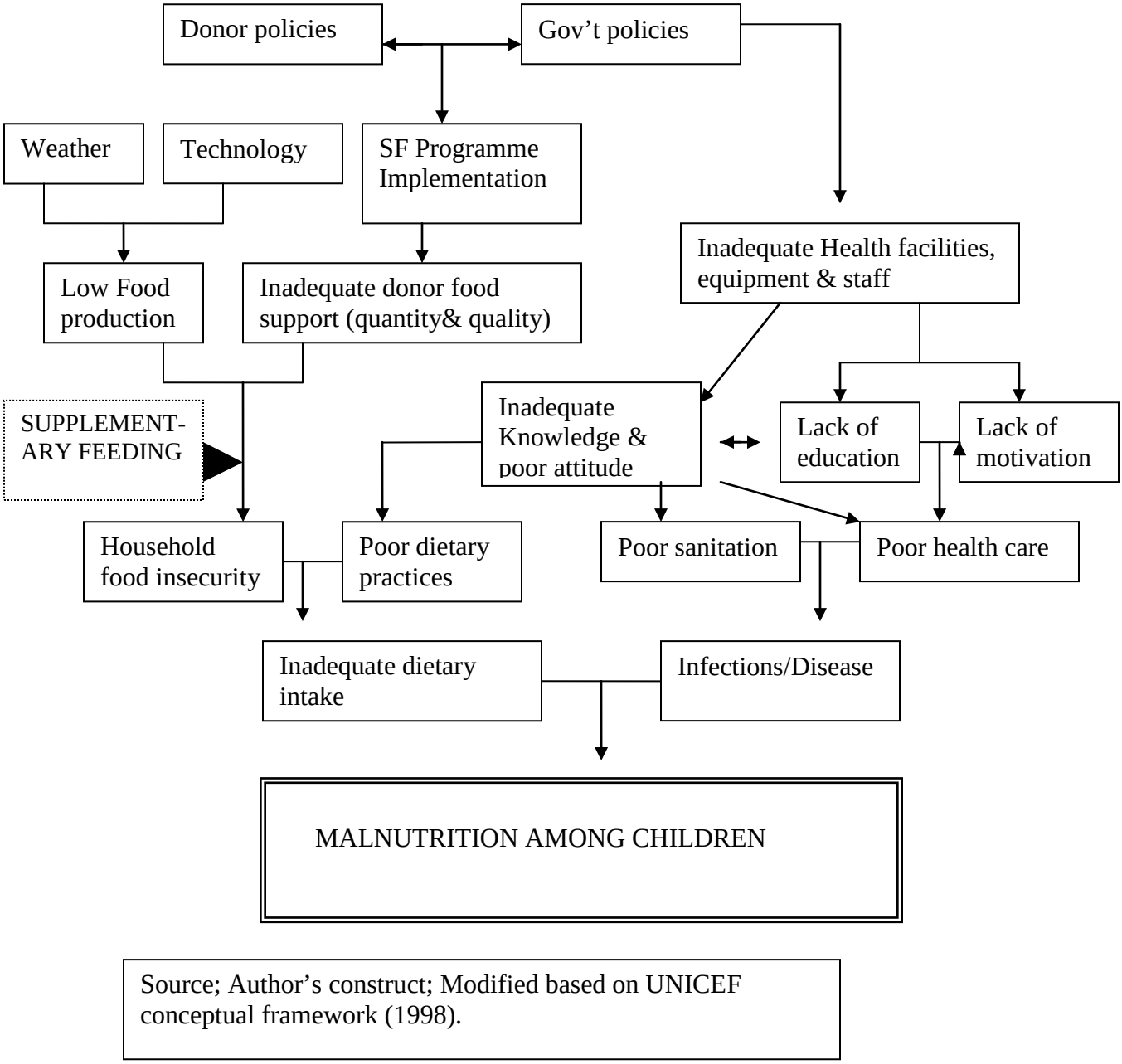
Malnutrition ultimately results from inadequate intake of nutrients, and, or from diseases that compromise the body's ability to digest, absorb, transport, and utilization nutrients. There are however, economic, social, cultural, political and behavioural factors causing malnutrition. These have been conceptualized into immediate, underlying and basic determinants of malnutrition (UNICEF, 2000). The immediate determinants of malnutrition are inadequate dietary intake and infections. These two also tend to interact very closely, one leading to the other; their combined or individual effect bringing about child malnutrition.

The immediate determinants are influenced by the underlying determinants, which unlike the immediate determinants manifest at the household or family level. These are food security at the household level, care for mothers and children, and healthy environment and access to health care. These exacerbate the immediate determinants to bring about malnutrition.

Food security has been defined as access for all individuals at any time to sufficient nourishing food for a healthy and active life (FAO, 1999). It therefore includes the availability of foodstuffs, the quality of the diet, the stability of supplies over time and space, and the access to food produced at home or purchased.
Affecting the underlying factors from down the scale are the basic determinants. These are the potential resources (human and material) which if harnessed can have a positive effect on the underlying causes. They consist of education and resource availability and control.

The use of supplementary feeding is therefore a strategy to address the issue of inadequate food intake as an immediate cause of malnutrition, and household food security as an underlying cause of malnutrition. Its impact on nutritional status will therefore depend on the other factors and their interactions.

Figure 1. Conceptual Framework of the causes of malnutrition



Source; Author's construct; Modified based on UNICEF conceptual framework (1998).

1.5 Research Hypotheses

The Nutritional status (weight-for-age, height-for-age and weight-for-height) of children benefiting from the supplementary feeding programme in the rural Tamale Metropolis is better now than at the start of the supplementary feeding programme four years ago.

1.6 Research Questions.

1. What is the nutritional status of children 6 months to 59 months in supplementary feeding beneficiary communities in Tamale Metropolis as compared to the start of the programme?

2. Is there any significant improvement in the nutritional status of children 6 months to 59 months in Tamale since the implementation of the supplementary feeding programme?

3. What other factors could influence the nutritional status of children 6 months to 59 months in Tamale Metropolis?

4. What can be improved in the implementation of the supplementary feeding programme to enhance its impact on the nutritional status of children?

1.7 Main objective of the study

The main objective of the study is to determine the nutritional impact of the World Food Programme assisted supplementary feeding programme on children 6 months to 59 months in rural Tamale

1.8 Specific objectives of the study

1. To compare the nutritional status of children 6 to 59 months in the supplementary feeding programme communities at the start of the programme and four years later.

2. To ascertain if there is a significant difference in nutritional status of children (6 to 59 months) in the supplementary feeding programme communities at the start of the programme and four years after the programme.

3. To establish whether the supplementary feeding programme has had an impact on the nutritional status of children less than five years of age in the rural communities in Tamale.

4. To make suggestions and recommendations to the Metropolitan Assembly, Health Directorate, and WFP.

CHAPTER 2

LITERATURE REVIEW.

2.1 Malnutrition Situation

Malnutrition is a major public-health problem throughout the developing world and is an underlying factor in over 50% of the 10–11 million children under 5 years of age who die each year of preventable causes (WHO, 2006). Childhood malnutrition is a major health problem affecting about 32% of children in the developing countries (UNICEF, 2004). The term malnutrition is used to refer to a number of diseases, each with a specific cause related to one or more nutrients (for example, protein, iodine or calcium) and each characterized by cellular imbalance between the supply of nutrients and energy on the one hand, and the body's demand for them to ensure growth, maintenance, and specific functions, on the other (WHO, 1996).

The prevalence of stunting (chronic under nutrition) has fallen in developing countries from 47% in 1980 to 33% in 2000, although progress has been uneven among regions. Stunting has increased in Eastern Africa, but decreased in South-eastern Asia, South-central Asia and South America. Northern Africa and the Caribbean show modest improvement while Western Africa and Central America present very little progress (WHO, 2005).

Despite an overall decrease of stunting in developing countries, child malnutrition still remains a major public health problem in these countries. In some countries rates of stunting are rising, while in many others they remain unacceptably high (WHO, 2003).

The pattern in Africa is quite distinct. The highest level of stunting is found in Eastern Africa, where, on the average, 48% of preschool children are currently affected. In this region, stunting has been increasing at 0.1 percentage points per year. This trend, together with high rates of population increase, translates into annual increases in the numbers of stunted children in Eastern Africa. Over the period 1980–2000 the number of stunted preschool children in Africa as a whole, increased from about 1.9 million to 22 million (WHO, 2005).

For Western Africa the estimated prevalence of stunting in 2004 was 35%, a proportion that has changed little in recent years; wasting has remained around 10%, and underweight prevalence has remained roughly the same over the 1990 – 2004 period (WHO, 2005).

The broad overall averages, however, tend to hide disparities between and within countries. In Ghana, protein-energy malnutrition (PEM) is the most widespread and serious nutritional problem among children. PEM is manifested as mild to moderate stunting, wasting, and underweight. The rates of stunting and wasting among children under 5 increased between 1998 and 2003; but that of underweight reduced slightly within the same period (GDHS, 1998; GDHS, 2003). In 1998, stunting was 26%, wasting, 10% and underweight, 25 % nationally. The last GDHS (2003) put stunting at 30%, wasting at 22%, and underweight, at 7%.

Within Ghana, there are wide differences in the rates of malnutrition. Nutrition indicators for the three northern regions (Northern, Upper East, and Upper West regions) showed levels of underweight, wasting and stunting above the national average. For example, the Northern, Upper East and Upper West regions are known to have the highest malnutrition rates; higher than the national average. In fact the Northern region has the highest stunting and underweight rates of 48.8% and 35.5%respectively (GDHS, 2003)

2.2 Causes of Malnutrition

Malnutrition during childhood is as a result of a wide range of factors, most of which relate to unsatisfactory food intake or severe and repeated infections, or a combinations of the two. The most frequently suggested causes of malnutrition are: poverty, low parental education, lack of sanitation, low food intake, malabsorption, diarrhoea and other infections, poor feeding practices, family size, short birth intervals, maternal time availability, child rearing practices, and seasonality (WHO, 1993; FAO, 2006). There are also economic, social, political, and cultural causes of malnutrition which underscore the close link between malnutrition, the general standard of living, and whether a population is able to meet its basic needs, such as food, housing, and health care. These conditions have been summarised into immediate, underlying, and basic causes of malnutrition (UNICEF, 2000).

2.2.1 Infections.

Children with severe malnutrition (<70% normal weight/height) have a markedly increased risk of mortality, often due to infections, of which malaria is a very important one (Caulfield et al, 2004; WHO, 2005). The evidence is quite clear that recurring diarrhoea has a major inhibitory effect on young child growth (Tomkins, 1989). Both reduced food intake and intestinal malabsorption seem to play a part in the impact of diarrhoea. It is likely that recurrent infections also have direct impact on the growth process, unrelated to decrease in food intake or nutrient absorption (Beaton et al, 1992**).**

2.2.2. Mothers' Education

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. 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 and Lapping, 2002).Mother's knowledge of issues of child nutrition, translated into good nutritional practices may however be more directly related to children's nutritional status than mere level of education. (Glewwe, 1999; Ruel et al, 1999). Given the same quantum of nutritional information however, it is expected that the more educated will acquire more understanding of issues. Paradoxically, when it comes to putting the knowledge into practice, the highly educated and working women are faced with the problem of decreased time for child care. Other studies, however, suggest that, good care practices could compensate for low maternal education and insufficient income. (Ruel et al, 1999)

2.2.3 Poverty.

Income disparities often translate into disparities in the nutritional status of children. In 13 countries studied; children from the poorest 20 percent of the population were more than twice as likely to be underweight for their age (UNICEF, 2006.).Per capita national income growth is also one of the basic determinants of child malnutrition, and this is related to facilitating public and private investment in women's education and status, national food availability and household food security, and healthy environment. (IFPRI, 2000). Poverty also works in diverse ways to bring about child malnutrition (World Bank, 1997; Gilles et al, 2006). Similar findings have been observed in other studies conducted in Alexandria, Egypt. (Nawal et a,l 2001). Poverty is associated with inadequate food, and poor sanitation and hygiene that lead to increased infections and stunting in children. Poverty is also associated with poor maternal education, increased maternal stress and depression, and inadequate stimulation in the home (Salley et al, 2007). A more educated woman is more likely to be more gainfully employed, and for that matter earn more income. The occupation of the mother may therefore have an influence on the child's nutritional status,

2.2.4 Family eating patterns.

In most families, the care a child receives depends on his/her relationship with the care-giver, and possibly, the age of the care-giver among others. In most northern homes, children eat with their parents only in the very youthful ages. Usually, after the age of two years children are introduced to communal eating with their peers. When this happens, the younger ones are unable to compete with their elder siblings and this might affect the amount of food they eat.

2.3 Supplementary Feeding Programmes

Food supplementation is one of the several interventions used to combat malnutrition, especially among children. Supplementary feeding programmes, especially for children has been implemented using one of three well known systems; Take –home rations, On –the –spot delivery of cooked food, and sale of food at low cost to beneficiaries. Each of these systems has its own advantages and disadvantages. For example, the take-home –home system is operationally cheaper than the on-the-spot system, but provides less opportunity for education, and recuperation is rather slower.

In the take-home system, only 40 -60% of the food may be reaching the beneficiaries due to the probability of sharing food with other family members. (Austin et al, 1981). This is not to say that on-the-spot feeding is without problems. On-the –spot feeding is labour intensive and more expensive.

Several studies have tried to link nutritional status of children to diet. A prospective cohort study to assess the relationship between high levels of stunting and wasting (accompanied by serum deficiency of iron, foliate and vitamin B*12*) and diet concluded that the situation was due to the low consumption of bio available micronutrient-rich foods. The implication here is that children who do not consume adequate amounts of bio available multivitamins in their home diet or supplementary feeding rations may still be stunted and wasted even though they consume adequate amounts of macronutrients. (Ramoteme et al, 2006)

National supplementary feeding programmes for children in Brazil for example involved about thirty million beneficiaries. However, like many supplementary feeding programme, there has not been any evaluation to determine how effectively the beneficiaries were being reached and how regularly and how much food was reaching each beneficiary. (Rondo, 1990).

The nutritional impact of food consumed by the children is therefore based on the assumption that the food delivery is full proof and that all children are receiving the right programme ration.

2.4 Factors that might influence the impact of supplementary feeding.

2.4.1 Current nutritional status of the child.

The nutritional status of the child at the time of entry into a feeding programme may affect his or her response or improvement in nutritional status. The effect of supplementation has been observed to be highest in the most malnourished. The impact of supplementary foods on growth rates have been seen to be greatest on those with the worst nutritional status at the time of entry. (Rao et al 1977; Hossein 1992). According to Beaton et al (1982) the most severely malnourished children are those that benefited most from nutritional supplementation programmes.

2.4.2. Infections

The height and weight of Children with severe malnutrition (<70% normal weight/height) have a markedly increased risk of mortality, often due to infections, of which malaria is a very important one (Caulfield et al 2004; WHO 2005). The evidence is quite clear that recurring diarrhoea has a major inhibitory effect on young child growth (Tomkins 1989). Both reduced food intake and intestinal malabsorption seem to play a part in the impact of diarrhoea. It is likely that recurrent infections also have direct impact on the growth process, unrelated to decrease in food intake or nutrient absorption (Beaton et al 1992) gains of normal children were seen to remain almost the same in supplemented as well as non-supplemented groups.

2.4.3 Age of the Child.

Child growth will occur (and weight gained) whether or not they are fed supplementary foods. However, the effect of weight gain has been observed to be highest among children 6 months to 24 months age group (Hendricks et al, 2002, Luther et al 1990). Targeting supplementary feeding to coincide with the period of high nutritional risk should therefore maximise its effectiveness (Luther et al,1990). For example, a study to assess the effectiveness of implementation, and nutritional impact of take-home nutrition supplementation in Cape Province, South Africa showed that growth in children less than 2 years improved significantly compared with children over 2 years where little change was noted. The absence of a comparative group however limits this study from attributing the observed change to the programme (Hendricks et al,. 2002). In another study on the determinants of child nutrition and mortality in Eastern Uganda nutritional status before the first 5 months of life was satisfactory; deterioration followed. Wasting or low weight-for-height existed predominantly among those aged 6-24 months. Stunting was high after 5 months. The proportion of underweight children was greater in the second year of life; improvement occurred thereafter (WHO, 1992). Supplementary feeding of children aged 6 to 24 months in populations with inadequate dietary intake can therefore be attributable to the prevention of wasting in a large proportion of children (Revera et al, 1996; WHO, 2002).

2.4.4 Gender of the Child.

Though the phenomenon has not been well explained, it has been found that the sex of a child is a predictor of his or her nutritional status. (Bendley et al, 1988; Salah et al, 2006). Other studies also agree that there is little difference in malnutrition prevalence between boys and girls in most regions. (UNICEF, 2006). The variation of nutritional status between boys and girls when observed might therefore be frequently related to home care practices and child preferences practiced in some societies.

2.4.5 Type of supplementary foods.

Many studies that have tried to ascertain the effectiveness of supplementary feeding have been based on the comparative clinical effectiveness of the foods given to the children. The comparison of the effectiveness of different foods have always shown one to be superior to the other in promoting growth (IFPRI, 2001;UNICEF, 2004).Where factors such as food sharing by other family members are not controlled for, the effectiveness of a particular supplementary food may be misleading (IFPRI, 2001). The quality of foods used can also determine whether the children are getting all the important macro and micro-nutrients necessary for proper growth.

2.5. Measurement of nutritional status.

Because of the link between malnutrition and social factors, the nutritional status of a population is a sensitive indicator of the quality of life in the community (WHO, 2003)

Growth assessment is the single measurement that best defines the health and nutritional status of children. Any disturbance in the health and nutrition of the child regardless its cause invariably reflects in growth. Growth assessment therefore serves as a measure of the health and nutritional status of children, and also provides a proxy measurement of the quality of life of an entire population (WHO, 1983; WHO, 1995).

Among the anthropometric indices for assessing nutritional status of children, those that provide a comprehensive description of growth are height-for-age, weight-for-height, and weight-for-age. Height-for-age portrays performance in terns of linear growth, and measures long-term growth faltering (chronic malnutrition). Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted) and are chronically malnourished. Children who are below minus three standard deviations (-3 SD) from the median of the reference population are considered severely stunted. Stunting reflects failure to receive adequate nutrition over a long period of time and is also affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effect of malnutrition in a population and does not vary according to recent dietary intake.

The weight-for-height index measures body mass in relation to body length and describes current nutritional status. Children whose Z-scores are below minus two standard deviations (-2 SD) from the median of the reference population are considered thin (wasted) for their height and are acutely malnourished. Wasting represents the failure to receive adequate nutrition in the period immediately preceding the survey and may be the result of inadequate food intake or a recent episode of illness causing loss of weight and the onset of malnutrition. Children whose weight-for-height is below minus three standard deviations (-3 SD) from the median of the reference population are considered severely wasted.

Weight-for-age represents a convenient synthesis of both linear growth and body proportion (acute and chronic malnutrition). It takes into account both acute and chronic malnutrition. Children whose weight-for-age is below minus two standard deviations from the median of the reference population are classified as underweight.

As recommended by the WHO, survey indices are usually compared with reference standards defined by the United States National Centre for Health Statistics (NCHS) and accepted by the United States Centres for Diseases Control and Prevention (CDC). Information on child growth is helpful in monitoring trends, determining priorities, and evaluating the effectiveness of nutritional intervention programmes (WHO, 1986).

Available literature shows that nutrition indicators have rarely been rigorously used in assessing nutritional status in supplementary feeding programmes at the population level (Rondo, 1990). The most frequently applied area is in therapeutic feeding programmes where nutrition indicators are used to assess the impact on beneficiaries and project level.

CHAPTER 3

METHODOLOGY

3.1 Profile of the study area.

Tamale District is one of the eighteen (18) administrative and political Districts in Northern Region. It also serves as then Metropolitan as well as the Regional capital.

3.1.1. Location

It is located in the centre of the Northern region, approximately 175km east of longitude 1^0 west and latitude 9^0 north. It is bounded to the north by Savelugu-Nanton district, to the south by Central and East Gonja districts, to the east by Yendi district and to the west by Tolon-Kumbugu district.

3.1.2 Population Characteristics

The Metropolis has an estimated total population of 346,846 (projected at 2.9% regional growth rate from 2000 census). The actual growth rate of the Metropolis is 3.5% which is higher than the national and regional growth rates of 2.9% and 2.8%, respectively.

It has a surface area of 1011 sq. km. which forms about 13% of the total land area of the Northern Region. Its population density stands at 315 persons per sq. km. which is about 12 times higher than the regional average density of 25.9 persons per sq km.

The urban dwellers form 67.1% of the population of Tamale Metropolitan area, leaving only 32.9% of the population living in rural Tamale.

3.1.3 Ethnicity

In urban Tamale where there is ethnic diversity, the Dagomba's still constitute almost 80% of the total population. Other tribes in the urban metropolis include Frafras, Dagarbas, Akans, Ewes, Moshies, among others. Almost all the people in Tamale rural are Dagombas.

3.1.4 Religion

Islam is the predominant religion in the metropolis with about 84% of the population affiliated to it. Christians constitute 13.6% (with Catholics forming 43.7% of that number), traditional worship about 1.6% and others forming less than 1%.

3.1.5 Settlement Pattern.

Urban Tamale occupies a total area of 130km.sq. The rest of the metropolis is made up of small village settlements. Quite a number of peripheral communities close to the central district are slowly being engulfed by the urban area.

Most of the infrastructure such as health and educational institutions, electricity, Pipe borne water, are located in urban Tamale. In addition, all institutions that stimulate economic growth such as industries, financial institutions, commercial institutions and research institutions are located in the urban area. Most of the surrounding rural communities therefore depend on the urban area for most needs and services.

3.1.6 Topography and drainage:

The Tamale Metropolis is located approximately 180 metres above sea level. The topography is generally rolling with some shallow valleys, which serve as stream courses. There are also some isolated hills, which do not inhibit physical development.

3.1.7 Economic activities

Majority of the people are predominantly farmers. Business activities are mostly concentrated within the business centre of the metropolis. Petty trading is common among the people. The main industrial activities in the district include agro-processing activities such as rice milling, vegetable and shea butter oil extraction, cotton ginning and textile or smock weaving. Other small scale industries include vehicle repairs, prefabrication of spare parts, and manufacture of farm implements, leather works, pottery and carpentry.

3.1.8 Vegetation and climate

As a result of its location within the Guinea Savannah belt, the Metropolis experiences one (1) rainy season starting from April/May to September/October with a peak season in July/August. The Metropolis experiences a mean annual rainfall of 1100mm with only 95 days of intense rainfall.

The dry season is usually from November to March which is influenced by the dry north-easterly (Harmattan) winds while the rainy season is influenced by the moist south westerly winds. Maximum day temperatures range from 33^{o} C to 39^{o} C while mean night temperature range from 20^{o} to 22^{o} C. Mean annual day sunshine is approximately 7.5 hours. 29

The climactic conditions have to a greater extent influenced the vegetation of the area. Apart from the preserved natural colonies of vegetation such as fetish groves, forest reserves and community woodlots, the whole Metropolis exhibits Guinea Savannah grassland vegetation with tall grass interspersed with drought resistant trees such as neem, sheanut, dawadawa and Mahogany. During the rains the Municipality becomes green making the vegetation more luxuriant. In the dry season however water becomes scarce as a result of poor vegetation cover, serious run-off and evapo-transpiration. The grasses dry up and the accompanying bush fires destroy the soil nutrients and even expose the soils to serious erosion.

There is one (1) major forest reserve in the Metropolis located at Sinsab-gi-gbini. There are other plantations which include the Water Works Plantation, Kogni fuel wood Plantation and MOFA wood Plantation.

3.1.9 Educational institutions

Table 3.1 Educational institutions in Tamale

Level	Public	Private	Total
1. Nursery	158	32	190
2. Primary	226	19	245
3. J. S. S.	66	2	68
4. S. S. S.	8	3	11
5. Tech./Vocational	1	1	2
6. Polytechnics	1	-	1

Source: MOE/GES Tamale.

3.1.10 Health infrastructure

Table 3.2 Type and number of health facilities in Tamale

Type of facility		Number
CHPS compounds	-	6
Health Centres	-	4
Hospital	-	2
Other Clinics	-	4
Private Clinics	-	10
Community clinics	-	1
Quasi Government	-	2
Total	-	**29**

Source**:** TMHD 2006**.**

3.2 Water and Sanitation:

Even though Tamale is an urban district it is still vulnerable in terms of adequate potable water supply. The Municipality has two main water systems. The urban water system and peri-urban and rural water systems based on the location of the facilities.

During the dry season, most of the water bodies dry up while the already poor underground water level falls, making boreholes and wells to dry up.

3.2.1 Total Rural Potable Water Supply

Table 3.3 Main Source of Drinking Water in Tamale

Water Source	Number
Pipe borne (inside household)	15040
Pipe borne (outside household)	20664
Tanker supply	1771
Well	778
Borehole	267
Spring/Rainwater	96
River/Stream	1154
Dugout	5230
Other	269
Total	**45,269**

Source: TMA 2006

The fact that a good number of households (14.9%) in the Municipality still use unsafe sources of drinking water is an indication of the nature of possible health problems. However, it is worth noting that 78.8% of households have access to pipe borne water. Unfortunately the piped system is very unreliable due to frequent breakdowns resulting in many people reverting to tanker services and other sources.

3.2.2 Urban water supply in Tamale

The capacity of the Tamale water supply system is 4.3 million gallons per day.

Coverage in terms of numbers is about 450,000 people. This figure includes the little over 42 communities in the rural area who enjoy treated water from the Tamale water treatment plant.

The Ghana Water Company rations the water in order to attain a high percentage of coverage. Without rationing, the coverage is only 43% of the urban population. With the rationing which is done effectively, the coverage goes up to 95%. This will continue until the proposed capacity expansion is executed. .

Ghana Water Company Limited (GWCL) as the government agency supplying potable water has already put forward its plans to government to expand the water system of the Tamale Municipality and its environs. This includes increasing the water supply at the Dalun treatment works by an additional 6 million gallons per day.

This will involve building a new water treatment plant at Dalun, laying new raw water and treated water transmission pipe line to Dalun and Tamale respectively and laying of a new network of distribution pipes to cover the whole of Tamale. This will at the end bring the total daily output to 10 million gallons

3.2.3 Sanitation

Table 3.4 Coverage of sanitation systems in Tamale

System		Coverage
Water closet	-	5%
KVIP and pit latrine	-	6%
Solid waste disposal	-	65%

Source: TMA 2006

3.3 Major health indicators

Table 3.5. Health Indicators.

Maternal Mortality Rate	-	3.6/1000 live births
Infant Mortality	-	17/1000 live births

Source: TMHD 2006

Table 3.**6. Common Diseases**

Disease	**Cases**	**%**
Malaria	66455	62.0
Skin Diseases & Ulcers	5925	5.5
Other ARI	5477	5.1
Road Traffic Acc	1780	1.7
Home/Occupied Accommodation	1377	1.3
Rheumatism & Joint Pains	1227	1.1
Trachoma	142	-
Guinea worm	249	-
Tuberculosis	78	-
HIV/AIDS		
All others	16264	15.2

Source: TMHD 2006

The diseases above are the priority diseases as well as the top ten causes of OPD attendance in the metropolis.

3.4 Study Method and Design

The study is a before and after evaluative study. The study compared the impact of the supplementary feeding programme on the three main growth indicators –wasting, stunting and underweight of children in supplemented communities at the start of the programme four years ago (2003) with the current (2007).

The study, among other things sought to compare the growth indicators of children by sex of the child and by age category of the child.

Finally the study also sought to identify the possible effects of other factors on the nutritional status of the children.

Data that was collected during the survey were compared using reference indicators from National Centre for Health Statistics / World Health Organization (NCHS/WHO)

3.5. Data Collection Techniques

3.5.1 Anthropometry.

The survey team consisted of graduates and nutrition technical officers. Even though these are professionals who are familiar with anthropometric measurements, they were trained in taking of weights and heights of children.

Baseline anthropometric data was extracted from baseline records. First, the baseline questionnaires were re-numbered and the appropriate sample drawn from each sampled community. Anthropometry of the current sampled children was then carried out in the field.

Children were weighed with minimal clothing using an electronic load cell scale (UNISCALE) to the nearest 0.05 kg, and height and length were measured to the nearest 0.1 cm using specially made wooden measuring boards (Infantometers). Recumbent length for children under 2 years old were measured while, children 2 years and older were measured in the standing position

The accuracy of the scales was standardized using known (calibrated) weights before the anthropometric sessions and after weighing 10 children each time.

Because the determinants of malnutrition differ according to the age of the child, as suggested by others (Grosse 1996; Sahn and Alderman 1997), the sample was categorized into three sub-groups thus; 6 months to 11 months, 12 to 23months, and 24 to 59 months.

3.5.2 Structured interviews.

General household information on families of the sampled children was obtained from their mothers/caregivers along with other data at the beginning of the survey. Information collected included household characteristics such as age and sex, occupation, marital status, and education of mothers/caregivers and child feeding practices.

These data provided an indication of the relationship between nutritional status of the children and socio-economic factors.

Similar information was extracted from data collected by the district at the beginning of the project (base-line).

3.6 Study Population

The study population was all children 6 to 59 months living in Tamale metropolitan area as well as their mothers/care givers. Mothers who did not have a child in this age group were excluded from the study.

3.7 Study Variables.

Table 3.7 Study variables

Variables	**Indicators**	**Operational Definition**	**Scales on Measurement**	**Method of Data collection**	**Data collection tool**
Demographic	Sex of Child	Male or Female	Nominal	Interview	Questionnaire
	Age of Child	In completed months	Ordinal	Interview	Questionnaire
Socio-economic	Educational level of mother	Highest level attained	Ordinal	Interview	Questionnaire
	Relationship to caregiver	Mother, grandmother ,aunt, other	Nominal	Interview	Questionaire
	Occupation of mother	Type of income generating activity	Nominal	Interview	Questionnaire
Nutritional status of children	Stunting Severe stunting	(Height-for-age) less than -2 SD Less than -3SD	Ratio	Anthropometry	Uniscale Infantometre, Microtoise
	Underweight Severe Underweight	(Weight-for age) less than -2 SD Less than -3SD	Ratio	Anthropometry	Uniscale
	Wasting Severe wasting	(Weight-for-height) less than -2SD Less than -3SD	Ratio	Anthropometry	Uniscale, Infantometre,Microtoise

3.8 Sampling techniques and Sample size.

3.8.1 Determination of Sample size;

The sample size was be determined by calculations based on the following formula;

$n = z^2 (pq)/d^2$

Where n =Sample size, z = Statistical certainty chosen, in relation to the error of risk. This equals 1.96 for a margin of error of 5% or a statistical certainty of 95% level of confidence. P = estimated prevalence rate to be investigated expressed as a fraction of 1. q = 1-p, expected number of children not presenting with the condition under investigation, expressed as a fraction of 1; and d = precision desired (margin of error allowed). (Snedecorw and Cochran, 1989)

The statistical certainty chosen is 95% level of confidence, hence z = 1.96.

The estimated rate (p) for the indicators to be studied, that is stunting and underweight and wasting are 48.8%, 35.5%,and 6.6% , respectively in the Northern region. (GDHS, 2003).

The margin of error allowed, (d) is 5% or 0.05.

Since the estimated p for stunting was higher *n* was calculated using the level of stunting thus; - $n = (1.96)^2 (.488x\ 1-.488) / (0.05)^2 = 384$. However, to ensure ease of statistical calculation the sample size was rounded up to 400, with the knowledge that this does not reduce the strength of the study.

3.8.2 Sample selection

Multistage sampling was applied to select the clusters (communities), the households and the study subjects. There are currently nine out of the fourteen rural communities originally on the supplementary feeding programme still actively feeding; the other five were phased out. The nine were considered as clusters and five clusters selected from them by simple random sampling (balloting).

In order to get the number of children to be studied in each community, population proportionate to size sampling was applied; where the proportion of the community's population to the sum of the five communities' population, determined the proportion of the sample it was allocated.

In each cluster (community), a list of children was acquired from the community supplementary feeding register, which exists for all beneficiary communities. The sampled children were then selected from the list of the children using systematic random sampling, after rearranging them by age groups

To ensure that children from the various sub-groups (6-11months, 12-23months and 24-59months) were selected without bias, the known proportion of children within the various age groups in the population was applied and the numbers proportionately allocated. That is, 6 – 12 months = 1.8%; 12 – 23 months = 4%; 24 – 59 months = 11.8 %.(GHS, 2006)

Selected children were then followed to their homes with the assistance of a community guide, usually the supplementary feeding centre attendant, who identified the addresses of the households. Mothers/caretakers were then interviewed and the children's anthropometry taken.

3.9 Pre-testing.

The survey questionnaire was pre-tested in a community in Garizhegu, a beneficiary community within the metropolis but which was not selected for the study. The questionnaire was pre-tested using mothers of children 6 months to 59 months. A few corrections with regards the clarity of some of the questions were made before the actual field administration.

The anthropometric instruments were also pre-tested and issues such as the correct placement of the scale and infantometre to ensure accurate measurement were rectified. The dry cell batteries on some of the scales were weak and had to be replaced

3.10 Data handling.

Data collectors were graduate nutrition officers on national service, and nutrition technical officers. This category of staff were already conversant with measurement of nutritional indicators especially anthropometry. They were however taken through two day training and field testing of the instruments.

A senior nutrition officer was made the team leader and part of his responsibility was to cross check all measurements and questionnaires at the end of each day to ensure conformity with consistency and completeness. At the end of each day, the principal investigator also cross checked the data before they were entered into the appropriate data templates

3.11 Ethical considerations.

Approval to conduct the study was first sought from the Northern Regional and the Metropolitan directors of health service respectively.

At the community level the verbal consent of the community leaders and assemblymen was obtained for community entry and the conduct of the study.

Mother's and care giver's consent was also sought for the removal of extra clothing and bangles from their children before weighing or measuring their heights.

3.12 Strength of study

Firstly, the sample size (N= 400) is large enough to allow for meaningful analyses of data on key variables. Secondly, the same communities studied at the baseline were the same communities studied in the current survey.

3.13 Limitations of the study

This study was limited in a number of ways:-

First of all, the factors causing malnutrition are so varied and multifaceted but this study compares narrowly, the nutritional indicators alone. It should be noted that some non-food factors may also affect nutritional status.

Secondly, lack of baseline data on some of the confounders makes comparison based on those confounders impossible.

Thirdly, the use of only anthropometric indicators (weight-for-age, height-for-age, and weight-for-height) to measure of the impact of the programme does not allow for general assessment of its success or otherwise.

Again this study looks at malnutrition at the population level rather than individual nutritional status at the start and upon follow up. By this, the effects of individual differences on nutritional status may be overlooked.

Finally, even though both baseline and follow up studies were conducted in the same period of the year food security situations vary from year to year, hence the nutritional status of the children.

3.14 Assumptions.

In carrying out this study, the following assumptions were made.

The base-line and current groups are similar in all characteristics and socio-cultural situations remain the same over the period.

That the children on supplementary feeding received the right rations that were stipulated for them.

Finally, that anthropometric records collected at the base-line are accurate.

3.15 Delimitations of the study.

The scope of assessment indicators was limited to only anthropometry (Stunting, Wasting and Underweight).

Explanatory factors assessed were limited to only sex of the child.

CHAPTER 4

RESULTS

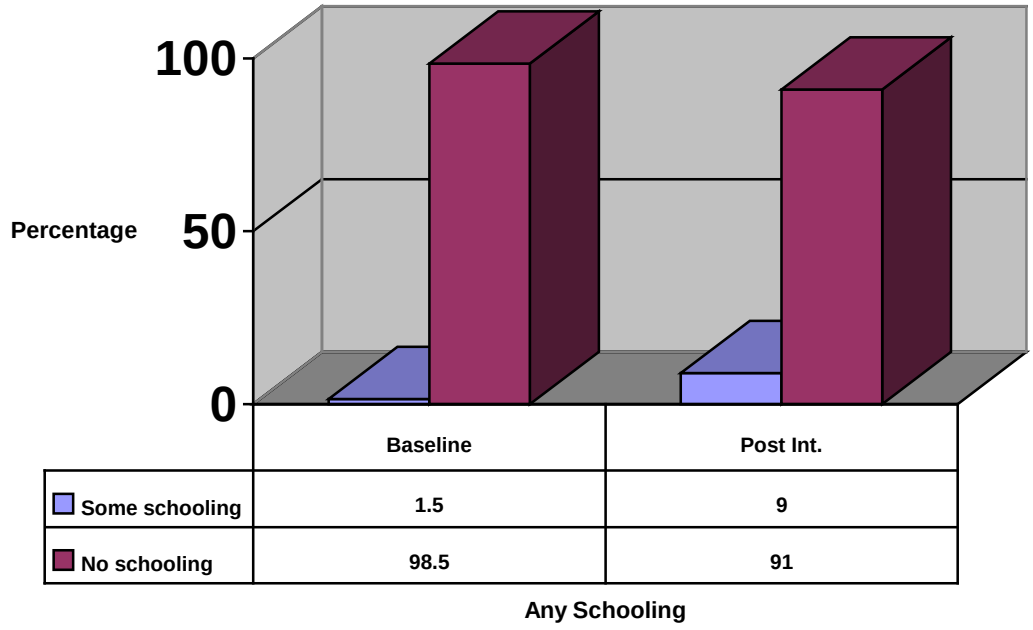
The data collected was analysed and the results presented in tables and graphs.

4.1 Background characteristics of respondents

In all, 400 women representing mothers and care-takers of children 6 to 59 months, were interviewed and the anthropometry of their children taken (Post intervention). Data review was done to obtain information from available baseline data of 400 mothers/ caretakers and the anthropometry of their children (Baseline). The background information obtained is as below.

4.1.1 Literacy Status of Mothers/Caretakers.

Fig.4.1: Literacy status of mothers/care-takers.



The number of respondents who have had some schooling increased slightly from 6 (1.5%) during the baseline to 36(9%) at post intervention. This however cannot be attributable to the health educational component of the intervention. Some schooling here was described as at least five years of primary and above. The majority of respondents both at the baseline (98.5%) and the post intervention period (91%) had never been to school.

Table 4.1 Age distribution of the sampled children

Age group	BASELINE				POST INTEVENTION			
	Frequency	%	Mean age in months	Std dev	Frequency	%	Mean age in months	Std dev
6 -11.9 months	78	19.8	6.7	2.9	52	13.0	9.0	1.5
12-23.9 months	57	14.4	17.1	3.6	124	31.1	18.2	3.2
24 -59.9 months	265	65.8	40.4	9.5	224	55.9	40.1	11.1
TOTAL	400	100			400	100		

A total of 400 children aged 6 months to 59 months were sampled for the study, both in the baseline and the post intervention. The majority of children in the target group were in the 24 to 59.9 months age group – 65.8% in the baseline and 55.9% during the post intervention. Whereas in the baseline the least proportion of children were in the 12 – 23.9 age group, at the post intervention the least proportion (13.0%) was children 6 – 11.9 months..

Table 4.2. Gender distribution of the sampled children.

Sex	BASELINE		POST-INTERVENTION	
	Frequency	%	Frequency	%
Male	212	53.0	190	47.5
Female	188	47.0	210	52.5
TOTAL	400	100	400	100

During the baseline, the proportion of males seen (53.0%) was more than females (47.0%). However, there were more females (52.5%) than males (47.5%) at the post intervention period.

4.2 Effect of Supplementary Feeding Intervention on the nutritional status the children.

Table 4.3 **N**utritional status of all children 6-59 months at baseline and post intervention.

Nutritional Classification	Nutritional Status											
	HAZ(Stunting)				WAZ(Underweight)				WHZ(Wasting)			
	Baseline		Post intervention		Baseline		Post intervention		Baseline		Post intervention	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	166	42.1	123	30.9	131	33.3	119	29.8	231	58.2	259	65.8
Mod.Malnut	125	31.7	131	32.9	142	36.0	156	39.1	131	33.0	114	28.9
Severe Malnut	103	26.2	144	36.2	121	30.7	124	31.1	35	8.8	21	5.3

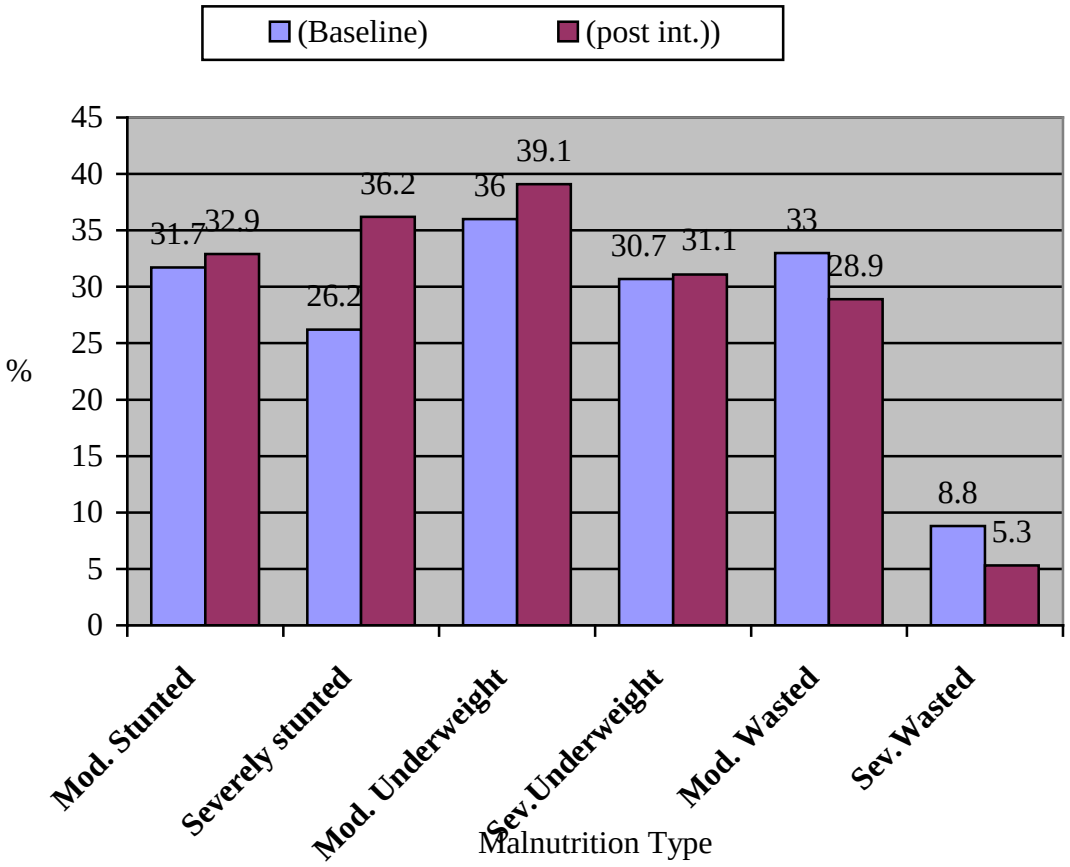
.

Comparison of the proportion of children stunted, underweight and wasted at the baseline and post intervention groups shows that the proportion of moderate stunting (whz<-2SD) and severe stunting (whz,-3SD) were higher in the post intervention group. Severe stunting was higher by10% in the post intervention than the baseline proportion. This was however, not significant at 95% [CI (0.05,-0.07]. Moderate stunting, higher by 1.2% in the post intervention, was also not significant at 95% [CI.(0.12,-0.01].

Moderate underweight (waz<-2SD) and severe underweight (waz<-3SD) also increased slightly by 3.1% and 0.4% respectively in the post intervention group. The increases were not significant at 95% [CI 0.03,-0.09, and 0.05,-0.06, respectively]

The proportion of moderate wasting (whz<-2SD) and severe wasting (whz<-3SD) however were lower by 4.1% and 3.5% respectively at the post intervention. These reductions were not very significant at 95% [CI 0.11,-0.01 and 0.17, 0.0004].

Fig.4.2 Comparison of the prevalence of malnutrition among children (6-59) months at baseline and post intervention.



Moderate and severe stunting as well as moderate and severe underweight was higher at the post intervention than at the baseline. Severe stunting (chronic under nutrition) increased the most from 26.2% at baseline to 36.2% at the post intervention. Moderate and severe wasting which signify acute malnutrition, however reduced from 33.0% to 28.9% and 8.8% to 5.3%, respectively

4.3 **Effect of gender on the nutritional impact of the supplementary feeding intervention.**

Table 4.4. Comparison of proportion of stunting (WHOHAZ) between males and females (6-59 months) at baseline, and at post intervention.

Nutritional Classification	Nutritional Status							
	HAZ (Stunting)							
	Baseline				Post Intervention			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
Normal	89	42.8	77	41.4	59	31.1	64	30.8
Mod.Stunting	67	32.2	58	31.2	66	34.7	65	31.3
Severe Stunting	52	25	51	27.4	65	34.2	79	37.9
TOTAL	208	100	186	100	190	100	208	100

Between males and females, the proportion of moderate stunting (haz<-2SD) was slightly higher among males than females in both the baseline (32.2%:31.2 %,) and the post intervention (34.7%:31.3%). At 95% CI, these differences were not significant (i.e. 0.10,-0.08 and 0.12, -0.57). Severe stunting (haz<-3SD) was however higher among females (27.4% as against 25.0%, and 37.9% as against 34.2%), than males in the baseline and post intervention, respectively. Again these differences were not significant at 95% CI (i.e 0.06,-0.11 and 0.05,-0.13, respectively).

Table 4.5. Comparison of proportion of Underweight (WHOWAZ) between males and females (6-59 months) at baseline and at post intervention.

Nutritional Classification	Nutritional Status							
	WAZ (Underweight)							
	Baseline				Post Intervention			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
Normal	67	32.2	64	34.4	59	31.4	60	28.7
Mod. Underwt.	78	37.5	64	34.4	72	37.8	84	40.2
Severe Underwt	63	30.3	58	31.2	59	31.1	65	31.1
TOTAL	208	100	186	100	190	100	209	100

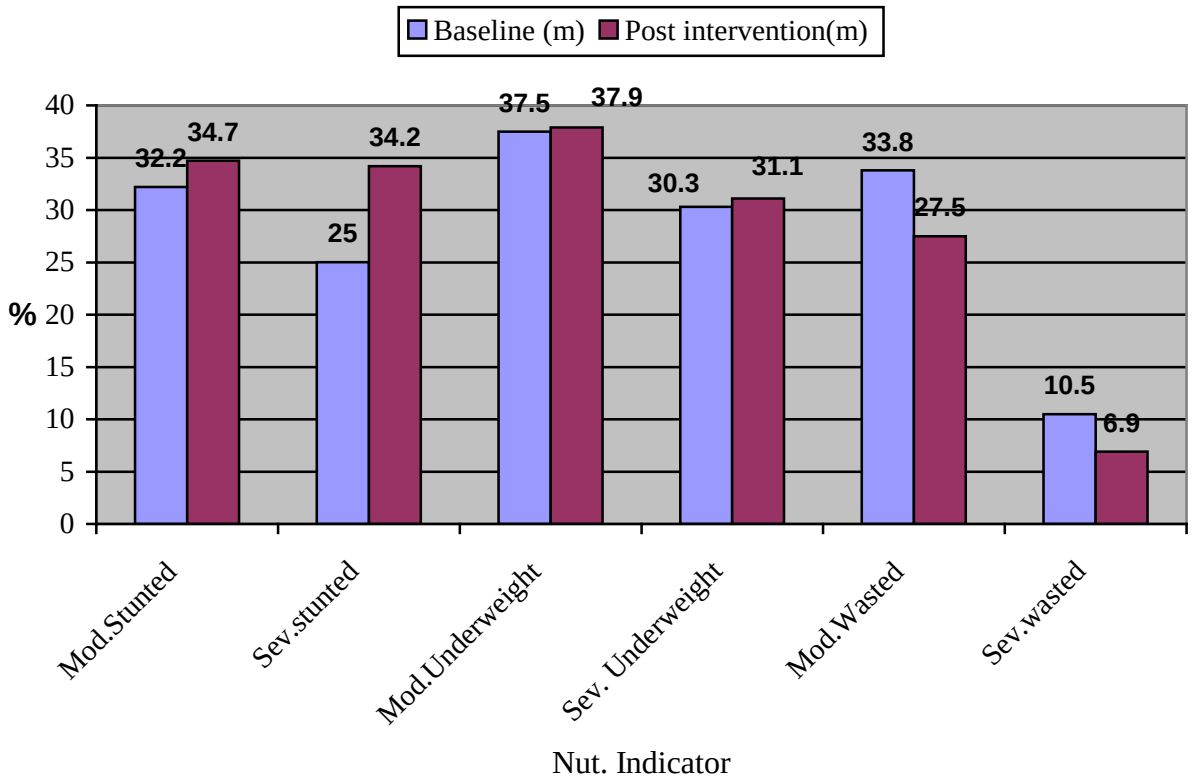
The proportion of moderate underweight (waz<-2SD) among males was slightly higher than among females during the baseline stage (37.5% for males and 34.4% for females). [95% CI; 0.12,-0.06]. In the post intervention group however, a higher proportion of females (40.2%) than males (37.8%) were moderately underweight [95%CI; 0.07,-0.11]. There was also not much difference in the proportion of severe underweight (waz<-3SD) between males and females in the baseline group (30.3%:31.2%) and the post intervention (31.1%:31.1%) group, [95% CI; 0.08,-0.10 and 0.09,-0.09].

Table 4.6. Comparison of proportion of Wasting (WHOWHZ) between males and females (6-59 months old) at baseline and at post intervention.

Nutritional Classification	Nutritional Status							
	WHZ (Wasting)							
	Baseline				Post Intervention			
	Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%
Normal	117	55.7	114	64.6	122	60.9	137	66.2
Mod. Wasting	71	33.8	60	32.1	52	27.5	62	29.9
Severe Wasting	22	10.5	13	6.9	13	6.9	8	3.9
TOTAL	210	1001	187	100	189	100	207	100

The proportion of moderate wasting was higher in males than females in the baseline (33.8% :32.1%) However, at post intervention, moderate wasting was higher in females than males (29.9% : 27.5%). In both cases, the differences were not significant at 95% [CI: 0.11,-0.07 and 0.06,-0.11). Severe wasting was higher among males than females in the baseline (10.5%: 7.9%), [95% CI; 0.009,-0.05], and the post intervention (7.0%: 3.9%), [95% CI; 0.07, 0.0004].

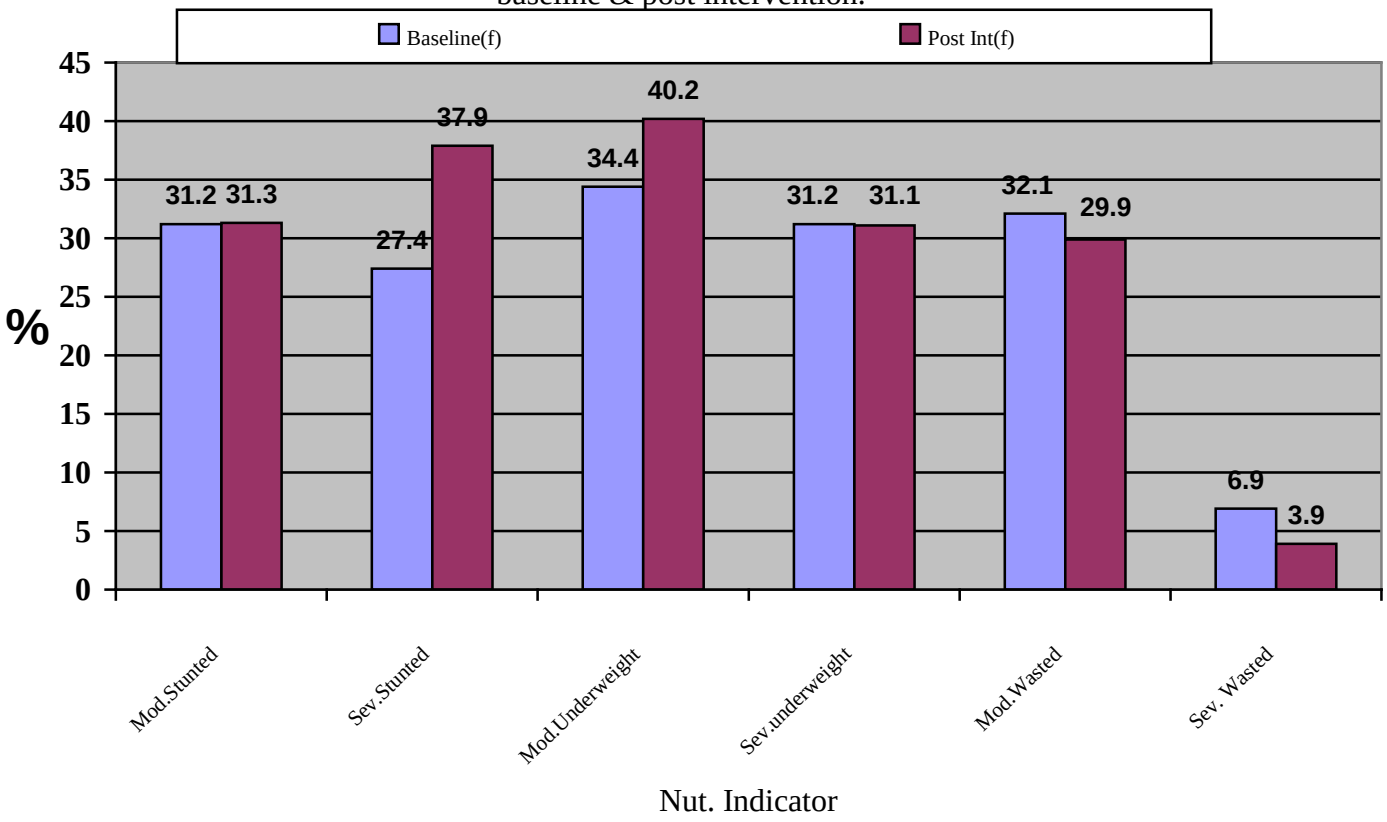
Fig 4.3 Comparison of the prevalence of malnutrition among of males 6-59 months at baseline & post intervention.



The proportions of moderate stunting and moderate underweight among males appear to have increased between the baseline and the post intervention period. These increases were however not significant at 95% CI (0.06,-0.11 and 0.09,-0.10, respectively). Moderate wasting however dropped from 33.8% to 27.8%, but this was also not significant at 95% CI [(0.15,-0.03].

Severe stunting among males between baseline and post intervention increased (95% CI:-0.003,-0.18). Severe underweight increased slightly and was also insignificant at 95% CI ;(0.08,-0.09). Severe child wasting among males on the other hand reduced moderately from 10.5% to 6.9%. This reduction also did not show much difference at 95% CI (i.e. 0.13, 0.04).

Fig 4.4 Comparison of the prevalence of malnutrition among females 6-59 months) at baseline & post intervention.



Among females, the proportions of moderate stunting at baseline and post intervention remain virtually unchanged (31.2% vs. 31.3%); 95% CI: 0.09,-0.09). The proportion of children severely stunted however increased dramatically from 27.4% to 37.9%. This was quite significant at 95% CI (i.e. -0.01, -0.19) [this difference is not significant]. The proportion of moderate underweight increased from 34.4% to 40.2% whiles the proportion of severe underweight stagnated around 31%. These were both not significant at 95% CI (i.e.0.04,-0.15 and 0.09, -0.09). The proportion of females who were moderately and severely wasted however reduced from 32.1% to 29.9% and 6.9% to 3.9%, respectively. These reductions were also not significant at 95% CI (0.11,-0.07 and 0.07,-0.01).

CHAPTER 5

DISCUSSIONS

5.1. Background characteristics of mothers and care-givers (respondents).

The results of this study indicate a very high level of illiteracy among mothers/care-givers. Even though the situation seems to have improved between the baseline and post intervention periods, levels of illiteracy among women (care-givers) still remain over 90%. High levels of illiteracy usually have negative impact on the earning capacity of women, hence their socio-economic status. Maternal literacy and level of education impact on the human and economic empowerment of women. (WHO, 2005).Income disparities have been known to translate into nutritional disparities of children. Children from the poorest 20% of the population have been known to be twice as likely to be underweight for their age (UNICEF, 2006). However, maternal education and maternal knowledge in nutrition are independently associated with nutritional outcomes (Webb and Lapping, 2002).The background of care-givers did not seem to impact positively on their child care and feeding practices, and for that matter, may not have contributed to any improvement in their children's nutritional status. The study, unfortunately could not find adequate data on the backgrounds of care-takers especially at the baseline, to justify the assertion. of the impact of background of care-givers.

5.2 Impact of the supplementary feeding interventions on the nutritional status on the children

Contrary to expectation, the overall nutritional status of children did not differ significantly between the baseline and post intervention periods. Indeed the proportions of moderate and severe stunting and underweight increased in the post intervention group. The program, however, was successful in reducing the proportion of acute malnutrition that is, wasting. It can therefore be said that the supplementary feeding programme was an effective stop cork for the food insecurity situation which characterises the Northern region, especially during the lean season, which happened to be the period within which this study was conducted.

The impact of the program in reducing chronic under nutrition (stunting) was, however, negative as both conditions were rather higher in the post intervention period. The questions that may need further research into, are what is the nature of household food distribution systems which the programme seeks to supplement, and whether the benefits are not shared by other family members? There may also be the need to research into other confounding factors to the causes of malnutrition. For example, poverty which is endemic in this part of the country is said to be associated with inadequate food, and poor sanitation and hygiene that lead to increased infections and stunting in children. (Salley et al, 2007).It has also been found out that children who do not consume adequate amounts of bio-available micronutrients in their home diet or supplemented feeing diet may still be stunted and wasted even though the consume adequate amounts of macronutrients (Mamabolo et.al).The availability of bio-available micronutrients in both home and supplementary feeding foods may need to be assessed

The question of how effectively the beneficiaries are being reached and how regularly and how much food is actually reaching each beneficiary may need to be assessed as well.

Generally however, the levels of stunting in the program area at post intervention seemed better than that reported for the Northern region in the 2003 Demographic and Health Survey where stunting stood at 48.8% (GDHS, 2003). The most commonly used threshold to show a serious public health disaster triggering blanket supplementary feeding to protect against increased mortality is a wasting rate greater than 15% (WHO, 2004). The wasting rates of 41.8% at baseline and 34.2% at post intervention spell a problem of public health concern and might require a more holistic approach. The proportion of reduction in the wasting indicator, though quite significant seems rather too slow over the four year period of the intervention.

5.3 Impact of Gender of the child on his/her nutritional status.

The sex of children had little impact on their nutritional status. Both males and female children suffered similar rates of stunting, wasting and underweight at the baseline and at the post intervention stages.
While the proportion of moderate stunting was higher in males than females during the baseline as well as the post intervention, severe stunting was rather higher among females than males at both the baseline and post intervention. This did not indicate any change in the trend of stunting by sex. It however, pointed to the fact that more females crossed the threshold into severe stunting.

Again, the proportions of moderate underweight was higher in males than females at the baseline, but this picture reversed at the post intervention group with a higher proportion of females being underweight. There was however no difference between the proportions of severe underweight between males and females at both the baseline and post intervention stages.

Similarly, the proportion of moderate wasting was higher in males than females at the baseline, whereas at the post intervention, the proportion of moderate wasting was higher among females than males. In both the baseline and post intervention groups, the proportions of severe wasting was higher among males than females

Why there were more moderately stunted, underweight and wasted female than males in the post intervention group and the other way round in the baseline, it is difficult to explain. This reversal cannot be attributed to the supplementary feeding intervention as rations were not based on the gender of the child. This situation seems more likely to be related to other factors, possibly, socio-cultural and child care practices rather than the supplementary feeding per se, and might require further research to authenticate.

The trends of changes in malnutrition proportions (baseline vs post intervention) are also similar. There were increases or stagnation in the proportions of moderate and severe stunting and wasting in both sexes at baseline and post intervention. In both sex groups the proportions of moderate and severe wasting saw reductions at the post intervention.

The findings of this study however seems to agree with findings of other studies that state that there was little difference in malnutrition prevalence between boys and girls in most regions (UNICEF, 2006; Salah et al, 2006; Bendley et al, 1988).

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS.

6.0 Conclusions.

6.0.1 The Impact of the Supplementary Feeding programme on nutritional status of the children

In general the overall impact of the supplementary feeding programme in improving the nutritional status of the beneficiaries has not been significant. The proportions of stunting and underweight continued to rise despite the intervention. There was however a slight reduction in the proportions of wasting at the post intervention.

6.0.2 Effect of gender of the children on their nutritional status

Comparison of the differences in the proportions of moderate and severe stunting, underweight, and wasting between males and females provide a picture which is difficult to explain from the findings of this study. The proportions of moderate stunting, underweight, and wasting were consistently higher among males than females at the baseline Several studies seems to confirm the findings of this study, the there is little difference in malnutrition prevalence between boys and girls in most regions (UNICEF, 2006; Salah et al, 2006; Bendley et al, 1988)..

The proportion of severe stunting was higher in females in both the baseline and post intervention groups, but the proportion of severe underweight remained the same. On the other hand, the proportion of severe

wasting was higher among males than females in both the baseline and the post intervention groups.

Among males, both moderate and severe stunting and underweight were higher in the post intervention stage but the reverse was also true at the post intervention

Both moderate and severe wasting however realised a reduction between the baseline and the post intervention. Among females, the picture was similar to what happened among the males. Moderate and severe stunting and underweight either increased or remained the same at the post intervention. Similarly, both moderate and severe wasting reduced at the post intervention.

6.1 Recommendations.

There was a baseline survey before implementing SFP to enable measurement of nutrition impact. However, the baseline information was very sketchy with regards to socio-cultural and demographic indicators. In future, baseline data should take into consideration indicators that will be used to measure the overall impact of the intervention.

Regular monitoring data were of poor quality and not very consistent probably due to inadequate training of supplementary feeding centre attendants. Data collectors need to be well trained and consistently monitored if their performance has to be improved.

Again, anthropometric equipment used at the supplementary feeding centres especially weighing scales need to be routinely standardized to ensure proper weight measurement. Centres should use the same type of weighing scales to ensure uniformity of measurements

On site feeding might simply be replacing meals that beneficiaries should have taken at home, rather than supplementing home food. This is self-defeating as wet feeding does not usually cover the child's total nutrient requirement. There is the need to educate mothers and care-givers on the need for continued feeding at home.

Feeding programs such as this one should rather target severely malnourished children for rehabilitation while targeting care takers of moderate and well nourished children with socio-economic interventions.

There is the need for more emphasis on nutrition and health education including cooking demonstration with mothers/caregivers. Complementary health care interventions such as routine immunization, deworming, iron, folic acid and vitamin A supplementation should be included in the supplementary feeding centre activities.

Supplementary feeding programs should be linked with other social, cultural, economic, and environmental development programs at the community levels.

The Government and development partners should put more emphasis on measures that will help improve the food security situation in rural Tamale.

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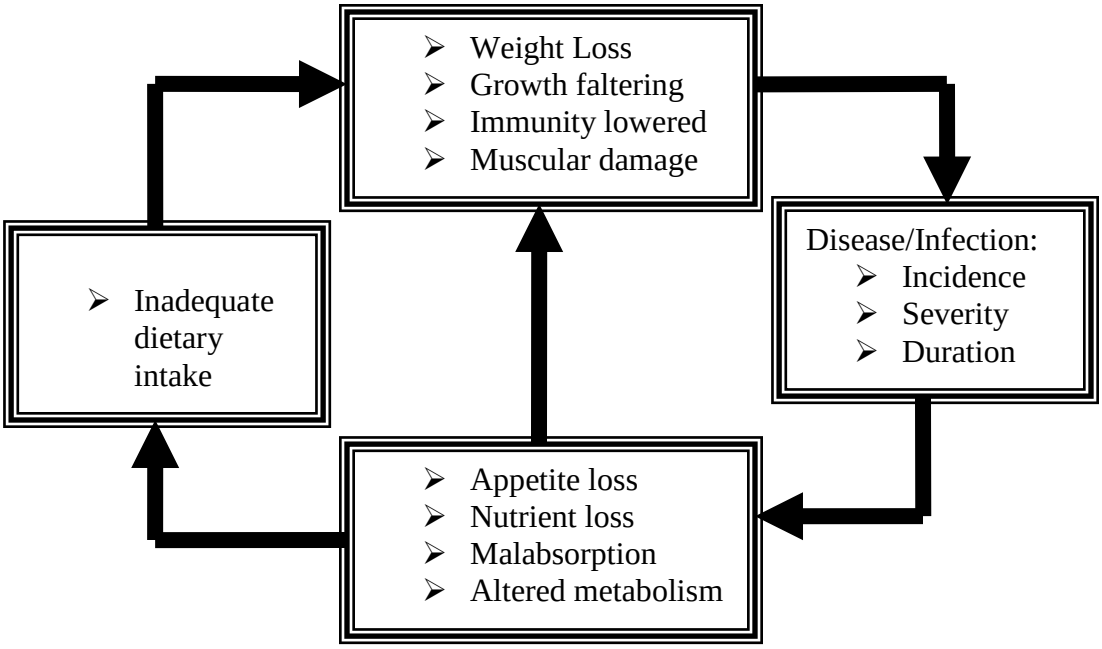
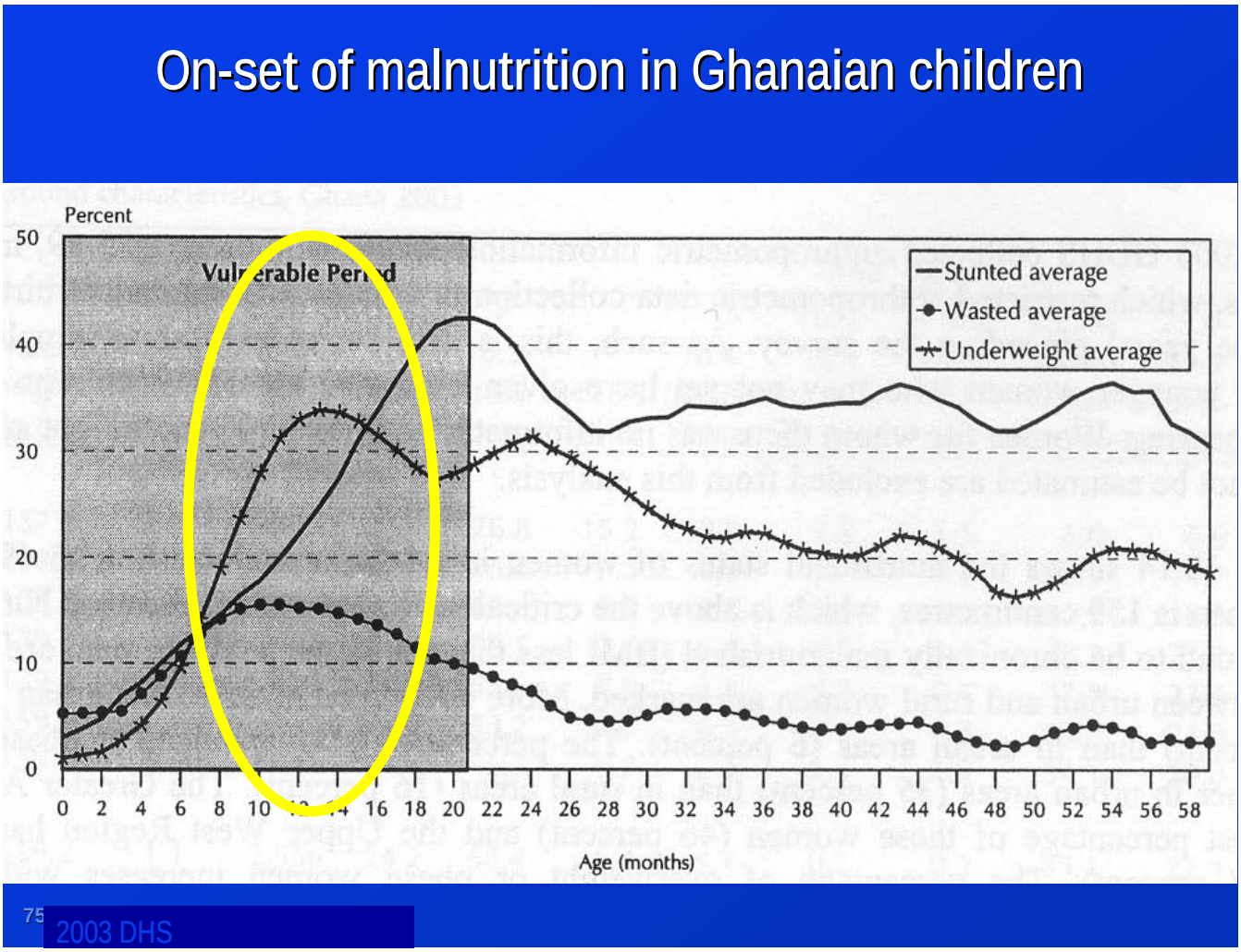
Appendices.

Appendix i.. Malnutrition and Infection Nexus



Source: Andrew Tomkins and Fiona Watson. Nutrition and infection, 1989.

Appendix ii



Source: GHDS 2003.

Appendix iii WFP food basket.

COMMODITY TYPE & RATION SIZE		
FOOD COMMODITY	Individual ratio size(per person per day)	Nutritional content of overall ration(kcal,kcal from protein)
CSB	300g/PLW 300g/I,6-24 130g/DC,PS	1,140kcal,4.7% 1,140kcal,4.7% 494kcal,4.7%
Vegetable oil	30g/PLW 30g/I,6-24 15g/DC,PS	265.5kcal,0% 265.5kcal,0% 132kcal,0%
Iodized salt	10g/PLW 10g/I,6-24 3g/DC,PS	0kcal,0% 0kcal,0% 0kcal,0%
Sugar	15g/DC,PS	60kcal,0%

PLW = pregnant and lactating women

I, 6–24 = Infants 6–24 months old

DC,PS = Children 2–5 in day care/pre-school

Source; WFP DRAFT COUNTRY PROGRAMME- 10418.0 (2006–2010 GHANA

Appendix iv. Study Questionnaire

A STUDY OF THE NUTRITIONAL IMPACT OF SUPPLEMENTARY FEEDING PROGRAMME ON CHILDRE (6 – 59 MONTHS OLD) IN RURAL TAMALE

QUESTIONNAIRE

Identify the mother/caregiver).of the sampled child aged (6 – 59 months old) in the household and interview her. First introduce yourself and explain that the purpose of the study is to find out whether the supplementary food is helping the children to grow properly. Ensure her that all the information she provides shall be kept confidential

A. IDENTIFICATION

SUB-DISTRICT……

COMMUNITY……SECTION……

HOUSE ID/LOCATION. ……

HOUSEHOLD No/LANDLORD'S NAME……

NAME OF INTERVIEWER……

SIGNATURE OF INTERVIEWER……

DATE OF INTERVIEW ……

B.BACKGROUND INFORMATION

1. What is your name (mother /caregiver) ……

2. How old are you?

a. <20 yrs

b. 20 -29yrs

c. 30 -39yrs

e. 40 + yrs

3.What is the name of the sampled child? ……

What is the sex of the sampled child? 1. Male ☐ 2. Female ☐

4.What is your relationship with the sampled child?

a).Mother

b).Grand mother

c).Mother's Sister

d). Other (Specify)……

5. How old is the sampled child? (Completed months) ☐☐

7. How many times have you delivered? ☐☐

8. What is the birth order of the sampled child? ☐☐

9. Have you been to school? Yes (1) ☐ No (2) ☐

10. If yes, what was the highest level of schooling you attained?

a. Primary

b. Middle/JSS

c. SSS/Technical

d. Tertiary

11. What is your marital status?

a. Married

b. Single

c. Divorced

d. Widowed

12. What is your main source of income?

a. Farming/agro-processing

b. Petty trading

c. Professional(teacher,nurse,agriculturist,police,doctor,etc)

d. Other (specify)……..

C. HISTORY OF ILLNESS (Child)

13. Has the sampled child had diarrhoea (that is, 3 or more watery stools in one day) since the past two weeks?

Yes (1) ☐ No (2) ☐

14. Has the sampled child suffered from any condition that made breathing difficult (RTI) in the past two weeks?

Yes (1) ☐ No (2) ☐

15. Has the sampled child had fever (hot/warm body) in the past two weeks?

Yes (1) ☐ No (2) ☐

D.YOUNG CHILD FEEDING KNOWLEDGE AND PRACTICE.

16. Has the sampled child ever been breastfed? Yes (1) ☐ No (2) ☐

17. How long after birth was the sampled child put to the breast?

a. Less than one hour

. b.1 to 24 hours

c. More than 24 hours .

d. No answer/can't remember.

18. Before putting the sampled child to the breast for the first time after delivery, was anything offered his/her to eat or drink? Yes (1) ☐ No (2) ☐

19. If yes, what was offered? a. Plain water (or plus additives.

b.Local/religious preparations

c. Milk from wet nurse.

d. Other(s) Specify……..

20. Is the sampled child still breastfeeding? Yes (1) ☐ No (2) ☐

21. Since this time yesterday, how many times has the sampled child eaten solid/semi-solid food (apart from breast milk)? a). 1- 2 times

b).3 times

c).4 times

d).5 times or more

e).NA (Has not started eating)

22. Who does the sampled child eat with? a).Separately

b).Father/mother

c). Older siblings

d).NA (Has not started eating

23. When should a new born be put to the breast after delivery?

a).Immediately after birth.

b).After mother/child have bathed.

c).After a day or more after delivery.

d).Whenever breast milk comes in.

24. What should a woman who has just delivered do with the first yellowish breast milk?

a).Give it to the baby.

b). Express and throw away.

c). Other (Specify)……

25. For how long should a woman feed her child ONLY breast milk, without giving water or other foods or drinks?

a).Up till 6 months

b).Less than 6 months.

c).More than 6 months.

d).Until baby shows signs of wanting food or other drinks.

e). Other (Specify)…….

E.. ANTROPOMETRY

(Seek permission from mother and take the weight and height/length of the child)

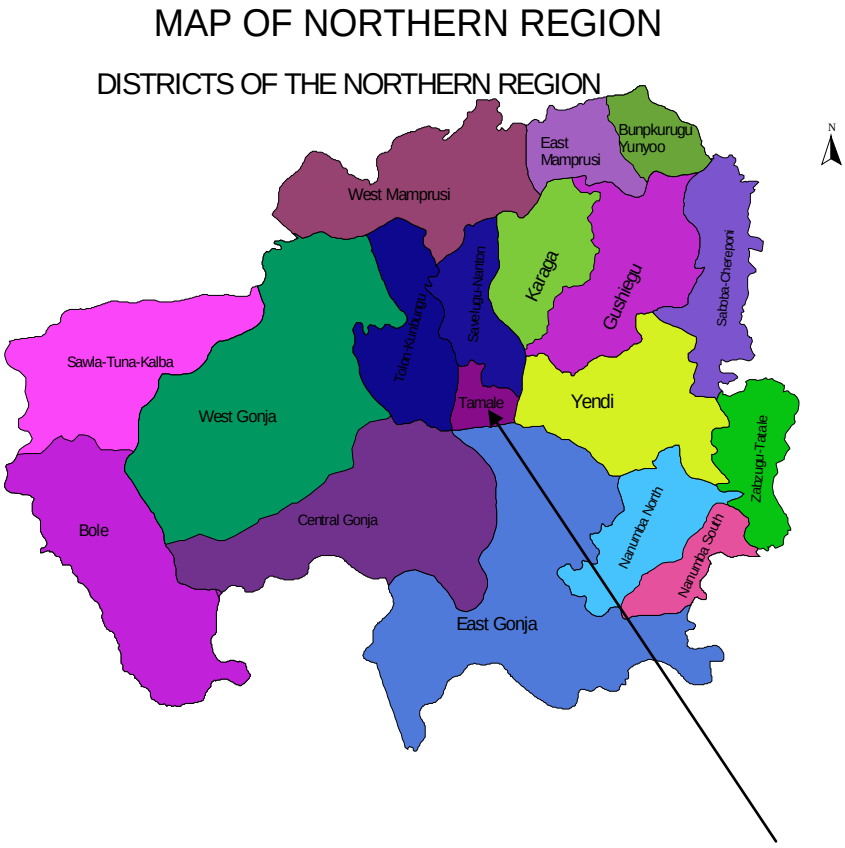
26. Weight of child in kilograms | | | | Kg

27. Height/length of child in centimetres. | | | | cm

TELL MOTHER/CARE - GIVER;

"THANK YOU FOR GIVING ME SOME OF YOUR PRECIOUS TIME AND FOR ANSWERING MY QUESTIONS"

Appendix v. Map of Northern Region Showing Tamale Metropolis.



]Appendix vi.Children having lunch in one of the feeding centres.

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