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INVESTIGATING THE CAUSES OF MALNUTRITION AMONG WEANING CHILDREN (6- 12 MONTHS). A CASE STUDY OF MAGBEMA, BABAHUN AND PELEWAHUN IN NJALUAHUN CHIEFDOM, KAILAHUN DISTRICT.

ABSTRACT

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The purpose of this research was specifically to know the causes of Malnutrition among Weaning Children (6-12 months), a case study of Magbema, Babahun and pelewahun in Gboo Section, Njaluahun Chiefdom, and Kailahun District. Its aim is to know the causes of malnutrition among weaning children (6-12 months) in Babahun, Magbema and Pelewahun in Njaluahun Chiefdom, Kailahun District, and Eastern Sierra Leone. The objectives are to identify the food consume by weaning children identify the period of breast feeding, determine the nature and prevalent of malnutrition of these children and the causes of malnutrition among weaning children in Magbema, Babahun and Pelewahun in Njaluahun Chiefdom. Instruments such as questionnaires, face to face interviews, text book, group discussion and the internet are used to collect relevant data on the topic under investigation. A sample size of 150 children was selected and its selection is based on random sampling. The major finding of the research is the assessing the nutritional status of weaning children in Magbewma, Babahun and Pelewahun in Njaluahun Chiefdom, Kailahun District.

The conclusions of the findings are to improve the nutritional status of weaning children in the study areas. Based on the research, recommendations are proposed by the researcher to government, the heads of the communities. Like the chiefs and town development committees.

Introduction:

Malnutrition is a condition which occurs when there is a deficiency of certain vital nutrients in person's diet. The deficiency fails to meet the demands of the body leading to effects on the growth, physical health, mood, behaviour and other functions of the body. Malnutrition is one of the many causes affecting third world countries. In Sierra Leone it is one of the main causes of the high infant mortality rate. In fact about 30 percents of African children including Sierra Leoneans affected by the illness die before the age of five. This alarming situation has given me the zeal to make an investigation into the causes of malnutrition among weaning children (6months – 12 months) in the selected areas in Njaluahun Chiefdom. Generally, there are two main diseases of children caused by malnutrition. They are Marasmus and Kwashiorkor. These diseases occur when the body is deprived of the right substance it needs for healthy living. In most cases the condition shows itself after a sudden stop of breast feeding or when the mother's milk falls in quality and quantity after the first six months of breast feeding, and the child's diet is supplemented by starchy, protein-deficient yam and cassava. The child becomes irritable and restless; the skin cracks and scales; the liver is damaged and the child often dies before the age of five (5).

A child with kwashiorkor may have the following features:

- Failure in growth. The child will be shorter in height and lighter in weight except in cases of gross oedema.
- Breaking or peeling off of muscles is typical and may not be evident because of oedema.
- The child is always pathetic about his surroundings and irritable when being moved or disturbed. He prefers to be miserable and refuses to eat.
- Change of hair: the hair of a normal and healthy African child is black, coarse in texture, and has a healthy sheen which reflects light. In case of kwashiorkor, the texture changes. The hair becomes silky ad loses it colour. The colour becomes brown or reddish brown.
- Skin changes: the skin, especially of the face becomes lighter in colour than that of his parents.
- Dysentery – stools are frequently loose and contain undigested particles of food stuff.

Marasmus may be termed as a disease of "Starvation" or not having enough food of any kind to eat. A child gets Marasmus at any age but common during the second and third years. It is sometimes referred as a dry malnutrition.

The following are the signs and symptoms:

- In all cases, the child fails to grow. If the age is known, the weight will be found to be extremely low by normal standard. In severe cases the loss of flesh is obvious. The ribs become prominent and countable.
- The muscles are always wasted. There is little if any sub-coetaneous fat left. The skin hangs in wrinkles especially around the buttocks, thighs and arms.
- Ravenous appetite - the child usually has a good appetite. He often violently sucks his fingers or clothing. His muscles are very thin, his face is thin and looks like that of an old man. There is little or no fat underneath the skin and the body is not proportionate to the head.
- Most children suffering from marasmus are not disinterested like those suffering from kwashiorkor instead the sunken eyes have a rather wide awoken appearance.

There is no oedema and dermatosis some children are held way between kwashiorkor and marasmus. They might be very thin like a marasmus child and at the same time oedema like a child with kwashiorkor; such children are said to marasmus kwashiorkor.

Statement of Problem:

Many studies have suggested that Malnutrition is the most common affliction in the world today and that it affects both the physical and mental development of the child. The most vulnerable groups are the weaning children found in the poorer societies of the world. Many researchers have suggested that 50% - 60% of these children (about 300 million) suffer from some degree of protein – energy malnutrition, and since we have become aware of some of the physical and mental problems that can be generated by this diseases, one can immediately appreciate the urgency and importance of the affliction (WHO, 2000). Though other researchers do not agree with the conclusion and proposals of these studies and say that it would be a great waste of the limited resources of these poor countries to try helping the malnourished, particularly the stunted growth. Infact, some of these researchers contend that stunting is actually advantageous because it produces small people with lower nutritional requirements and evolution in accordance with the adaption mechanism or organisms (WHO, 2000).

Animal experiments have also suggested that marginal malnutrition and retardation of growth may prolong life (Ross, 1996). What these researchers however, have failed to show is how the quality of life is affected by malnutrition. Even though much is not known about the long term effects of stunting it may also be accompanied by mental retardation, immune – incompetence, increased

morbidity and greater chance of mortality. It is also known with some certainty that stunted girls have problems in adulthood; one such problem is that they tend to have babies with low birth weight, and low birth weights correlate with greater mortality in infancy. It can be seen, therefore that stunting can perpetuate morbidity premature mortality in childhood, thus making it critical that researchers and societies pay greater attention to the malnourished child. Sierra Leone is not spared from this gloomy world trend. Even before the conflict/related war, the nutrition unit of the Ministry of Health and Sanitation in Sierra Leone has indicated that the most serious and wide spread deficiency diseases has protein – energy malnutrition of young children. Increasing levels of malnutrition especially among children exacerbate the suffering of vulnerable civilian population less than five years of age (Pratt. 1999).

Purpose of the Study:

The major reason for assessing nutritional status is to enable researchers to advance further in their isolation of that nutrition related factors, which can diminish a child's chance to grow well. Growth is dependent on the adequate intake and utilization of food by the body for intake and utilization however, are not only influenced by physiological factors such as infection, but also by the ecological balance that an individual has been able to achieve with his environment and that influence his ability to make food available for himself. The environmental factors, which influence the nutritional status of an individual, are many and varied and are all implanted within his/her socio-economic status. For example, poverty is associated with infection, which in turn can be accompanied by loss of appetite and a withdrawal from solid foods, or by a change, in the diet.

Other socio-economic factors include the unavailability of health care facilities and services, which could provide health, and nutrition services for both preventive and curative purpose. Unfortunately however, even today with all the information available, doctors, nutritionists, dieticians, nurses and health workers can still observe the effect of inadequate feeding on the growth and development of children in general and in particular, weaning children in hospitals and clinics the outcomes of inadequate food consumption with its complex physical interactions in malnutrition. For many years protein – energy malnutrition (PEM) has been recognized as the major malnutrition problem in Sierra Leone, particularly among children and to some extent, among pregnant and lactating women.

It has been estimate that malnutrition is the second cause of mortality and morbidity among 0 – 5 years old and the cause of half of childhood deaths (World bank, 1996). Since the general socio-economic conditions are poor in the rural areas, health and nutrition, particularly of children, may be worse than urban areas. The World Bank has estimated that about 40%/800 million people of the

population in developing countries are living in absolute poverty. In addition to poverty, they have little or no access to public services, including medical services (World Bank, 1997). The UNDP (2007) Sierra Leone Development Report (Page 34) has this to say, like education, the provision of basic health services will help promote human development. The state of health of Sierra Leone's population is poor. But the government continues to intensify efforts to improve health care systems to reduce infant, fewer than five and maternal mortality and prevent diseases.

This study will be targeting the group, weaning children, age 6 months – 12 months. This is a critical age from the nutritional perspective because it is the transitional period during which the child is weaned from the breast milk to family food and solid texture diets. Weaning children continue to be nutritionally vulnerable as their growth rates are slower than they were at birth. When malnourished children survive to adulthood their stunted growth, retarded mental development, lessened ability to learn, reduces work efficiency and physical defect including blindness are among the handicaps that beset them. Children form a significant part of the population of various communities. Their nutrition is therefore of paramount importance. Even though studies of malnutrition have been done in the past but no study has be conducted to investigate the effect of socio-cultural and economic causes of malnutrition in the chiefdom. This is the researcher's area of interest in this study.

Aim of the Study:

The aim of this research is to investigate the causes of malnutrition among weaning children (6 months – 12 months) in Babahun, Magbema and Pelewahun in Njaluahun Chiefdom**,** Kailahun District, and Eastern Sierra Leone.

Specific Objectives of the Research:

The objectives of the study will include:

a. To identify the causes of malnutrition among weaning children in Babahun, Magbema and Pelewahun in the Njaluahun Chiefdom, Eastern Sierra Leone.
b. To determine the nature and prevalent of malnutrition among these children.

c. To identify the socio-economic characteristics that may influence the nutritional status of weaning children in these areas.
d. To identify the period of breast feeding .
e. To identify the food consume by weaning children in the study areas.

Significance of the Study:

There is a Latin adage that says “mens sana incorporate sano”, means Sound Mind in a Sound Body. Healthy nation promote development of the people in that nation. In other words, any nation whose population continues to be sick, weak dies at an early age and retard the development of that nation. It is therefore necessary for student offering Physical Health Education and other related courses to conduct research with regards the causes of malnutrition among weaning children for the following reasons:

- ✓ This work is important because it will be of benefit to researchers who may intend to carry out related investigation.
- ✓ The result of this research will be of good use to Non-Governmental Organizations (NGOs) and other charitable organizations which will help them identify the causes of malnutrition is weaning children and strategize their solutions.
- ✓ The investigation will also highlight some of the causes and preventive measure of malnutrition among weaning children for the attention of stakeholders in the medical field.
- ✓ Information collected can help development planners of health officers to easily identify children with kwashiorkor and maramus diseases.

Limitations:

The investigation is limited to the three (3) selected areas in Njaluahun Chiefdom (Babahun, Magbema and Pelewahun) due to inadequate funding and time at my disposal to administer questionnaires to respondents. (nursing mother with children- 0-5 yrs) and health workers.

Delimitation:

This research was supposed to include the hypothesis statement but I delimited it from the study because of unavailability of instruments to carry out the research work effectively and efficiently.

Definition of Terms:

Absorption:	The processes by which nutrients moves from the gastro- intestinal track into the circulatory system.
Anemia:	Deficient in quality and/or quality of blood cells within the body.
Balance Diet:	Diet that contains all essential food nutrients in the right proportion.
Case in:	Principal protein in milk – a phosphate protein.
Diet:	The combination of foods in order to provide the essential nutrients from the meal.
Digestion:	Breaking up food into their constituent nutrients.
Dysentery:	An infection of the intestines mark of severe diarrhea.
Electrolytes:	Any substance, which dissociates into ions when dissolved and thus conducts an electric current.
Excretion:	The removal of undigested food waste and other waste products of metabolism from the body through the bowel, lungs, skin and kidneys.
Food:	Anything solid or liquid, which provide with nutrients.
Food Security:	A situation that exists when all times have physical, social and economic access to sufficient, safe and nutrients food that meet dietary needs and food preferences for an active health life.
Food in security:	Low level of food intake, which can be transitory (when it occurs in time of crisis), seasonal or chronic (when it occurs on a continuing bases).
Growth Monitoring:	One aspect of nutritional surveillance by the use of anthropometric measurement of weight and height over time taken on an on-going basis to track the child's growth progress.
Health:	State of complete physical, mental and social well being and not merely the absence disease or infirmity (WHO).

Ingestion: The taking in of food.

Kwashiorkor: In severely malnourished children characterized by growth failure and oedema. Deficiency disease relating principally to lack of protein as seen.

Macro-Nutrient: Major sources of nutrients protein, carbohydrates and fats that are required by the body in large amounts and that are available to be used for energy.

Malnutrition: The impairment of health resulting from a lack, excess or unbalance of nutrients.

Marasmus: Extreme protein energy/calorie malnutrition marked by wasting or emaciation in young who receive grossly insufficient amount of food.

Metabolism: The sum of all the physical, chemical process by which the living organism utilizes nutrients within the cells to produce heat and energy and maintain body functions.

Micro – Nutrients: The food substances that are measured by the food in smaller amount ie vitamins, minerals and other trace elements.

Morbidity: The quality of being unhealthy.

Mortality: The proportion of death in a community.

Nutrients: These are chemical substances that are found in food by which the organism ingests, digests, absorbs, transports, utilizes and excretes food substances.

Nutritional Status: The condition of health of the individual as influenced by the utilization of nutrients.

Oedema: Presence of abnormal amounts of fluid in intercellular space.

Overweight/obesity: Body weight that is above normal as a result of excessive accumulation of fat.

Stunting: Low height for age, reflecting a sustained episode(s) of under – nutrition.

Transportation: The movement of food by circulatory system from the digestive track to the tissues that need them.

Vulnerability: The presence of factors that place people at risk of becoming food insecure, malnourished or other adverse conditions that affects their heath and ability to cope.

Wasting: Low weight for health, generally the result of weight loss associated with a recent period of starvation or disease.

Weaning: Weaning is the period during which the body that still lives mainly on milk is still given small quantities of suitable solid food. Nutrition is the active process by which our body absorbs and make use of food. Proper nutrition is particularly important for life, for the human body in like an engine and requires and adequate supply of fuel to keep it working efficiently (Macmillan Press; 1997. Children Health). It is also a fundamental pillar of human life, health and development across the entire life span. From the earliest stage fetal development (egg, embryo and zygote), at birth, through infancy, childhood, adolescence and into adulthood and old age, proper food and nutrition are essential for survival, physical growth, mental development, performance and productivity, health and well –being. It is an essential foundation of human and national development (Waterloo Conference, 1988).

Hunger and malnutrition remain among the most devastating problems facing poor and needy, and continue to dominate the health of the world's poorest nations (WHO, 2000). The study of nutrition has progressed to such an extent that is no possible to identify the constituents of diet and determine whether the diet is adequate to aid growth and development of the human body.

Nutrients, which are ingested through food, are needed for the maintenance of existing tissues support of metabolic process and physical activities, and the growth of new cells.

An imbalance of the nutrients ingested upsets the body's maintenance of its functions and leads to malnutrition. But for all practical purposes, very slow progress had been made in alleviating nutritional deficiency in many part of the world. The current nutritional diagnosis of word's less develop countries is widespread under nutrition and the most common form is protein energy

malnutrition (WHO, 2000). Protein – energy malnutrition describes a range of clinical disorders. It is by far the most lethal form of malnutrition. Children are its most visible victims. Marasmus, at one extreme of the range, is due to a continued restriction of dietary energy and protein as well other nutrients. Kwashiorkor is on the other end of the spectrum and is due to both a quantitative and a qualitative deficiency of protein (WHO, 2000).

Between these two syndromes exists varying combinations of deficiencies of protein and energy together with deficiencies of protein and energy together with deficiencies of minerals and vitamins. The extreme cases are easily recognized and so can be treated, but the majority of the children who suffer from protein – energy malnutrition have the milder subtler forms and these children usually go untreated. Many easily develop the serious forms later. While protein – energy malnutrition occurs characteristically in children under 5 years of age, wherever the diet is poor in protein and energy, no age, unfortunately, is immune to the disease. In adults, the disease is less frequent and the clinical manifestations are less obvious since both protein and energy requirements are reduced relative to body weight as age advances. In some areas, however, the manifestations in adults become more apparent. For developing countries in particular, there has been a consistent decline since early 1970s in the proportion and absolute number of chronically undernourished people. From 1969 to 1971 approximately 893 million people were chronically undernourished, compared with 809 million from 1990 to 1992. These figures represent a drop from 35 to 2o percent of the population of these countries. The current and achievable challenge is to build upon and accelerate the progress that has been made Lathem, (1997). Nutrition experts have claimed that majority of the children in less developed countries suffer mostly from the less defined forms of malnutrition. Nearly 30% of humanity (infants, children, adolescence, adult and other persons) in developing world are currently suffering from one or the multiple forms of malnutrition (WHO, 2000).

No research can actually pin – point the prevalence that is, the actual number of children who suffer at a particular point in time. Varying estimates have been generated from time to time. No researcher can pin –point the prevalence that is the actual number of children who suffer at a particular point in time. In spite of the uncertainty, protein – energy malnutrition is largely responsible for most of infant mortality since it is proven that in many areas of the world up to half of the children born do not reach the age of 5 years. According to WHO's Progress Report (2003), currently an estimate 149.6 million children under five years of an age, that is 26.7% of the world's children in this group age, are still malnourished when measured in terms of weight for age. Malnutrition is the greatest single contribution to childhood mortality in developing countries.

A pan American Organization Sponsored Studies in 18 widely separated areas of the Americas found malnutrition to be the underlying cause of death 7% of all death in young children and an associated cause in 46%. F.A.O. and W.H.O data indicate improvement of the nutritional situation in Asia and Latin America from 1980-1990 out deterioration in the Sub-Sahara Africa. There is a synergy between malnutrition and infection, which can increase morbidity, and it has been stated that this synergy is the leading causes of morbidity and mortality in children in the developing world Latham (1997). Infections have been known to aggravate the malnutrition situation. Mild forms of protein –energy malnutrition exist where there are high rates of infections such as gastro- enteritis, measles and pneumonias. Latham (1997) in working among Ethiopian refugee children found a significant association between diarrhea and nutritional status. The retardation of growth by parasites was demonstrated by a study of two Kenya villages by Stephenson and workers WHO (1998).

Ascaris infection appeared to adversely influence nutritional status, and de-worming was found to enhance the growth of children harbouring these parasites. In turn, nutrition an increase the rate of infection of certain diseases. In tropical areas of the world, rates of infection of diseases such as malaria, hook warm and schistosomiasis is are increased in the growth retarded child WHO (2000).

Protein energy malnutrition has been associated with the body's immune system. Latham (1997) observed that children with protein energy malnutrition showed signs of depressed cell-mediated immunity (MTI) and showed marked thymic atrophy. This depression explained the incidence of gram negative and herpes simplex infections. These observations have been shown to improve once malnutrition has been alleviated. Microscopy findings have also suggested that there is probably a pre-terminal failure of the humoral immune system, a condition more marked in kwashiorkor than in Marasmus FAO (1997).

Malnutrition or undesirable physical or diseases conditions related to nutrition can because by eating too little, too much or an unbalanced diet that does not contain all nutrients necessary for good nutritional status Latham (1997). An essential prerequisite to the prevention of malnutrition in a community is the availability of enough food to provide for the nutrient needs of all people. For adequate food to be available, certainly there must be adequate food production or sufficient funds at the national, local, family level to purchase enough food. Availability of food, however, is just part of the picture. It is now recognized that malnutrition if only the over sign, or symptoms, of much deeper problems in society Latham (1997). It is obvious that each person must eat an adequate

amount of good quality and safe food throughout the year to meet all nutritional needs for body maintenance, work and operation and for growth and development in children.

Similarly, one must be able to digest, absorb and utilize the food and nutrients efficient poor diets and disease are often the result of insufficient household food security, inappropriate care and feeding practices and inadequate health care, Latham (1997). Other factors can also contribute to unavailability or inadequacy of resources for afflicted families. Every rural community or society has certain natural or human resources as well as a certain potential for production. A host of factors influence what and how much food will be produced and how and by whom it will be consumed. The proper use of resources may be affected by economic, social, political, technical ecological, cultural and other constraint. It may be affected by lack of too or training to use them and by limited knowledge, skills and general ability to use the resources. The cultural context is of special importance for its influence, especially at local level, on the use of resources and the establishment and maintenance of institutions. The micro levels include factors that can be considered on a national, regional or community scale. They are on economic, political and ideological importance and include agricultural practices, food supply, population growth, migration, urbanization health conditions and illiteracy.

The micro level is defined within intra-family or individual parameters, and the factors, in this level are mostly social and biological in origin. These factors include anthropometry, dietary practices, cultural patterns, infections and parasitic disease and psychological stress. The micro level also encompasses family size, the spacing of children births and the total number of children in the family. All these factors can play definite roles the etiology of malnutrition and how it has now become important to consider most, if not all of them, in order to gain insight into the etiology of malnutrition in a particular community. Several studies have been conducted to show the social ecology in which the physical growth of children has been affected. In some of these studies, for example, poverty has been widely recognized closely associate with poor nutrition and growth.

A family's income is important for good nutrition because it determines what foods and how much of those foods can be produced by a household. Several studies have found positive association between income and a family's food intake. In India, for example, Thimmayama (1993) showed that income can be important in making greater amounts of food available to the household. Large households would cater for the needs of more people, and in households where money or income in limited one would expect a decrease in the availability of resources per capital. When that happens, the nutrients intake of family members also decreases. Latham (1996) found in Guatemala that

infants with greater body weight increments belong to relatively smaller families. The marital system in which a child is brought up has also been shown to affect the nutritional status of the child. Extended and polygamous families for example tend to comprise more people and therefore make greater demands on the family resources. Gophan and Viswero (1999) concluded from their study that large family size, multiple wives and "broken homes" affects a family's economy, and their study showed the significance of these factors in the etiology of malnutrition. Welbourn (1989) was able to show the importance of the broken home" in the etiology of kwashiorkor. When a parent is made to sole care – taker of a child or a number of children, and lacks any regular source of income, it is hard for that parent to take care of the needs of the child or children, which normally means that the food available to the household is limited and, therefore, the nutritional needs of its members compromised.

Desai et al (1997) found, through their study in rural Jamaica that a single mother faces a difficult financial situation that the children from such a home tend to suffer physical growth impairment more commonly than those living with both parents. The religious affiliation of a household is part of the cultural milieu in which a child develops and can be important in determining food choices and nutrition. Household can deem a type of food unacceptable due to the religious and ancestral taboos associated with that food. A child's nutritional needs can be comprised depending upon how seriously these taboos are taken. Religious affiliation can also influence the way a mother raises a child ad therefore, can influence the general well being of the child. In this study of Muslim household, Hurst (1999) found that Muslim women of child bearing age do negligible amounts of farm work. While the household fulfills his obligation to provide all the food for the family, the wife, free from the constraints of farm work, fulfills her obligation to take care for the children and to prepare the food. It should be pointed out, that in Nigeria, however, Morely et al. (1998) did not find any statistically significant differences among children from household with differing religious affiliations.

The socio – economic well being of the household is used as an index of household wealth. Household possessions are used to indicate levels of living and socio-economic status. The variables that are used – that is, the type of possessions – will depend on the population been studied, and researchers such as Belcher (1997) have suggested that both functional and material possessions such as furniture should be included in the scale. Several researchers have been able to show the connection between the socio-economic status and the nutritional status of children. A study by Bendy- Darisme (1997), for example, found the household's level of living to be associated with the

food intakes of Caribbean children. Dewalt et al (1998) supported this finding in their study of a high land Mexican community. Desai et al (1997) also found an association between socio-economic status and physical and mental growth in their study of rural Jamaica. Christiansen ET al (1997) working among poor families in Bogota, Colombia, was also able to show the influence of socio-economic status on weight for age and height forage. In most developing countries, the characteristics, of the mother can indirectly measure socio-economic status and therefore, the nutritional well being of the child. The formal educational level of the mother will normally determine her occupation and hence, her economic contribution to her family's income. The age and occupation of the mother can also indirectly measure the child practices and its effect on the growth of the child. Gans (1996) found that the nutritional status of the child was more dependent on the mother's than on the father's occupation who have higher anthropometric measurements are those whose mothers are generating incomes of their own.

The number of years of formal education a home maker receives is also important in determining the dietary status of the members of her household. This conclusion is derived from the relationship studies have found to exist between the quantity of a home maker's knowledge of nutritional principles and facts Larson (1997). It is reasonable to assume that this knowledge can determine whether a family is well fed or not, because in most cases it is the home maker who determines what goes into the family meal. Sims (1997) showed that the mother who possesses the highest level of nutrition knowledge is from a higher socio-economic status group (interms of occupation, education and family incomes); has a smaller family; is at an earlier stage in the family cycle, spends less money for food each week, has less authoritarian attitudes toward child rearing; feels that proper nutrition is important for her child. Calinedo and Sanjur (1997) have also demonstrated that there is a positive correlation between home maker education and the dietary levels of united state children. In the Philippines, Florence (1998) showed the same trend, the mother's education correlating with her children's caloric intake. Studies have shown that the mass media influence people's life styles including food patterns. The rationale behind this theory is simple; the mass media expose people to various kinds of information and information increases awareness (WHO, 2000).

Christiansen et al (1997) for example, found that parents who read more frequently have a higher than average percentage of children whose weight is normal for their height. Black (1997) also found that Puerto Rican women who read and use written communication sources developed or used diversified diets. Ravioto and Delicardic (1997) found that mothers who listened more often to their radios have less severe malnourished children. If he has regular employment, he is more likely to be

better off financially that if he is a peasant cultivator or unemployed. Good et al (1997) found that children with kwashiorkor normally come from households headed by low- income father

METHODOLOGY

Introduction:

This chapter focuses on the method of Data Collection based on the objectives of this researcher.

The Study Area:

Three (3) village communities around Segbwema in the Njaluahun Chiefdom were selected for the studies. Segbwema is the chiefdom head quarter town for the sections. Village communities around Segbwema were selected for the study. There were two main reasons for the selection of the study area. The first was that the community should be a village. The second was that any village selection should practice both farming and petty trading activities.

Sample Size:

Njaluahun Chiefdom consists of ten(10) sections. This section concentrated only on one section which consists of three main villages. Magbema, Babahun and Pelewahun are five miles and half mile respectively from Segbwema, Babahun five miles from Segbwema, Pelewahun half mile and Magbema three (3) miles from Segbwema. Magbema is the section head quarter village of Gboo Section and it is largest most population and one with most facilities than the other two villages. Magbema has a estimated population of 650 people, out of which 45.3 percent are children and the remaining 54.7 percent represent adults. It has one primary school, one rice mill machine, one hand pump water and good toilet facilities. Babahun and Pelewahun both have one hand pump water and barry which are used by the two communities.

Sampling Technique:

Systematic sampling technique was employed where a listing of all household in the three villages was done. For example in Magbema a list of all households was provide and every fifth house was selected.

The Research Design:

The study employed both quantitative and qualitative research methods in order to generate detailed information about the socio-economic and cultural factors and make proper analysis of its impact on the nutritional status of weaning children in Njaluahun.

Methods of Collection Information:

The data collection methods and techniques comprised of in- depth interviews with parents, administering, structured questionnaires, focused group discussion, direct observation and anthropometric measurements.

The Interview:

Interviews were conducted privately in the homes of respondents who were the mothers. The questions were interpreted in Mende or Krio, these are the two main languages spoken in the research areas.

Focused Group Discussion:

Since there exists a high proportion of illiterate parents (care – givers) and difficulties in collecting quality data to enable the respondents to express themselves more freely; focused group discussion may lead to important insights. Two measurement of nutritional status were used; namely anthropometric and dietary. A variety of screening techniques have been employed as more direct ways of measuring growth in children, included in these anthropometrics measurement are height, weight, head, chest and mid-arm circumferences. Depending upon the reason for screening and the circumferences, some of the measurements are more useful than others. Height, weight, head and mid arm circumference measurement were taken for all the children. These anthropometric measurement were chosen for the following reasons;

1. They are easy to measure and would, the refore, decrease the problem of inter- and intra-observation error.
2. They equipment need is easy to use and reading available.

Accessing Physical Growth/Observation:

For this study, the growth standards of the United States National Centre for Health Statistics (NCHS) used as references (Hamil et al, 1998). These standard were chosen because;

1. The WHO has recommended that the National Centre for Health Statistics (NCHS) references be used as an international reference population (Stephenson et al, 1998).
2. They are based on recent measurements of large samples of children. The children can be classified therefore a normal, wasted out not stunted. This classification therefore gives an idea of children who eed some sort of action programme and it can be useful to policy makers (Waterloo, 1997).

In this technique a respondent is asked to recall all the food he/she has consumed the precious twenty four hours. It is an in expensive way of gathering dietary data, as it can have more coverage and requires less interview time and subjects co-operation. It can be obtained quickly and easily especially when most of the foods were fairly homogeneous. It is also a good technique to used illiterate population like the study areas. It however, relies on an individual memory and therefore is prone to error. Also, an individual's intakes can show variation with time, so it may not be a reliable tool of assessment when one is considering a period of time. When subjects are made aware of the 24-hour recall, it can improve the evaluation. When they are not made aware of it, it can minimize the livelihood of respondent's altering their diets and there by falsifying their food intake data (YOUNG 1998). It this study a child from each household was randomly selected to represent the household when the dietary data was being obtained. The 24- hour recalls were obtained from 90% of these children while the remaining 10% had their foods weighted. The information on the weighed foods could be used to substantiate the finding of 24-hour recalls and to estimate the amount of some selected nutrients that were consumed by this children. A one –time household food inventory also described the kinds and amount of food consumed in the previous 24-hour. To make it easier for the subject to recall, they were made to start with then last food consumed and the recall was worked backwards.

The Dietary Evaluation:

Both qualitative and quantitative methods were used to evaluate the diets of the children. The qualitative methods include the determination of the composition of the diets by listing the food mentioned as consumed by at least 10% of the children. The second method described the typical

meal patterns of children and determined the kinds of foods eaten in the mornings, afternoons and evening. The quantitative methods were food diversity score and dietary quality score.

Instruments:

The three instruments used are:

1. The structured guide.
2. The data collection exercise.
3. Questionnaires used during interview for focused group discussion.

The Questionnaire:

Data was collected through household interview using both structured and semi-structure questionnaires. Questionnaire was used together the data on socio- economic and cultural characteristics. Efforts were also made to minimize the respondent burden, so as to ensure maximum co-operation from the subjects.

Pre-Testing the Questionnaire:

The pre-testing took place one month before the study commenced. Slight modification was made after the pre-testing to make the questionnaire more suitable to the rural locality and the questions were re-coined to produce maximal impact.

Interview Guide:

An interview guide was designed to direct the focused group discussion. Some of the questions used in the structured questionnaires were reported as a check to check to confirm the accuracy of the responses given during interviews.

Anthropometric Measurement:

A both room scale accurate to the nearest 0.5kg was used to for weighting. The children wore light clothing but not shoes. The height was measure with a steel measuring tape, accurate to the nearest 1 millimeter. The children were instructed to remove their shoes and to stand with their heels, buttocks, shoulders and backs of heads touching the wall, and with arms at their sides. A ruler and pencil were used to measure the top of the head and the measurement was recorded. If for any reason a child could not stand as desired, he was made to lie flat on a table or bench with his head place in

contact with a wall. Legs were kept extended by gently holding the child's knees together. A ruler was firmly placed against the child's feel and marked. The recording was then made.

Method of Data Analysis:

Analysis of quantitative data was done using the statistical package of social scientists (SPSS). Data were treated quantitatively and qualitatively using tables, bar charts in statistical variables.

ANALYSIS AND DISCUSSION OF RESULT

This chapter focuses on discussing the findings of the study, assessing the nutritional status of weaning children in Njaluahun Chiefdom, Eastern Sierra Leone and investigating the causes influencing their nutritional status. Section 1 entails the causes of malnutrition among weaning children, the mean weight and height and also the nutritional classification of children in the survey based on age. The samples from the three villages were compared using table presentations. The nutritional status of the boys and girls of both 6-months and 12+ months old were tabulated. The nutritional status of girls was compared with those of the boys at difference ages to determine the differences in weight and height of the different sources. The percentages of weight for age and percentages of height for age were found to be realistic indicators of nutritional status. Section 2 includes selected variable such as socio-economic, demographic, children in the study areas. These were analyzed and presented in graph forms.

Personal Characteristics of Study Group:

There were one hundred and fifty children involved in study group. One hundred and fifty were boys while fifty were girls. Selected variables describing the cause of malnutrition, the age, sex, mean weight and height and the nutritional class of the group based on age and sex.

Table 1: Factors Associated with Acute and Malnutrition on Logistic Regression Analysis:

Acute Malnutrition	Adjusted	Or 95% CI	P- Value
Age Group:			
2 – 6 months	2.78	1.26- 6.15	0.012

7- 12 months			
Sex:			
Male/Female	1.94	0.98-3.84	0.058
Household Head:			
Mother or other/Father	1.82	0.81 – 4.08	0.148
Relationship with Child:			
Other/father, mother	1.58	0.55-4.56	0.400
Evidence of Deworming:			
No/Yes	0.44	0.22-0.87	0.018
Diarrhea:			
No/Yes	1.28	0.61-2.68	0.507
Fever:			
Yes/No	6.51	0.87-48.87	0.068
Chronic Malnutrition:			
Major age group:			
2-6 months 7-12 months	1.37	0.99-1.88	0.052
Sex:			
Male/Female	1.56	1.15-2.13	0.004
Diarrhea:			
Yes/No	0.81	0.58-1.12	0.193
Cough:			
Yes/No	0.78	0.52-1.18	0.239

Source: From Research Questionnaire

Logistical regression analysis into the causes of malnutrition was performed variables with prevalence (P) values less equal to 0.2 were selected. The selected variables for acute malnutrition included: household head, major age group, gender of the child, evidence of deworming, diarrhea ad fever while for stunting the variables selected were major age group, gender, diarrhea and cough. On logistic regression, age group 2-6months adjusted or 2.78 95% CI 1.26 – 6.15 (P. Value = 0.012) was significantly associated with acute malnutrition, while deworming in the previous 2 months adjusted or 0.55 95% CI 0.22 – 0.87 (P. Value=0.018) was protective. A male child was nearly 2

times more likely to suffer chronic malnutrition compared to a female child adjusted or 1.56 95% CI 1.15 – 2.13 (P. Value = 0.004).

The average weight and height of all the children of the same age (6months – 12 months) and sex (male and female) were calculated below:

Average weight = total weight/No. of children
Average height = total height/No. of children

Which become the reference weight and height respectively. The percentage weight for age was calculated using the Gomez classification, which is based on weight for age only.

Percentage weight = 100 X weight of child/

Reference weight of child of the age (ie Average weight of the group)

The percentage height for age was calculated for each child using the waterloo classification of height for age. Percentage height for age = 100 x height child/ reference height of child of the same age (ie average height of the group of the group).

The nutritional status of each child was assessed using the Gomez and Waterloo percentage references:

Gomez % Reference	**Nutritional Class**
Weight for age 90 – 109	Normal
75 – 85	Grade I or mild malnutrition
60 – 74	Grade II or Moderate malnutrition
<60	Grade III or severe malnutrition
Waterloo % reference	Nutritional Class
Height for age 90 – 94	Mild stunting
85 – 89	Moderate stunting
<85	Severe stunting

Source: From Research Questionnaire

Age Differences:

The nutritional status of each child was determined/assessed using the Gomez classification of weight for age and Waterloo classification of height for age for assessment of nutrition status. The

table shows an overall statistical distribution of the general nutritional class of the group in the survey based on age and sex. The general nutritional status of the group is positive and very encouraging with 76% girls age 6 months plus having normal nutritional status, 12% were below expected weight, while 12% were still below expected weight for age. The boys 6 months plus had 72% normal nutritional status, 12.5% above expected weight for age and 15% were below the expected weight for age. In the 1-12 months category, girls had 80% normal weight for age and 20% below expected weight. There was an almost even distribution in the 6 months plus category for boys among the nutritional status classes. Thirty – five percent had normal weight for age, 35% also had below expected weight for age and 30% above the expected weight for age. This shows that at the same age, the nutritional demand for boys is higher and that with every increase in age the risk of malnutrition is greater.

Weight:

Usually measured in kilograms, it determines the heaviness and skeletal growth in children. It is usually compared with the age of the child; the weight for age indicates the category of well nourished and poorly nourished nutritional status. Serial measurement of weight helps to establish the pattern of growth during childhood, to evaluate nutritional status of the child. A decrease in body weight may indicate an inadequate intake of nutrients resulting in under nutrition. A persistent low weight for age in childhood will lead to malnutrition of various degrees ranging from mild to moderate to severe depending on the decreased percentage weight for age (UNICEF, 1998). Similarly, a consistent excess increase in weight for cause's obesity, which is not desirable in children. Increase in weight should be gradual to give desired growth effect. The mean height of the group in the survey was within normal height for age based on the Waterloo classification. Eighty-four percent (84%) of the girls age 6 months plus had normal height for age while 16% were below expected height for age. In the 1-12 months of age girls there was an impressive 100% normal height for age. The boys also had 90% for 6 months and 80% for 1-12 months normal height for age while 10% and 20% respectively were below expected height for age. The low height for age 16% in the girl's age 6 months also indicated that boys are at a higher risk of stunting given the same condition and facilities as their age increase. It is not clear why this situation, but it may not be devoid of social, economic and cultural status of the family in which the children find themselves.

Height:

Usually measured in centimeters and determines the length of the child. Although height is genetically determined. It can be modified by dietary adequacy. Stunting or growth failure is

impaired increase in height and is linked to impaired intellectual development. Low height for age indicates long- term growth faltering as a result of acute or chronic under nutrition. Severe stunting can lead to increase risk of infection, illness and long term deficits in mental and physical development that can leave children ill prepared to take maximum advantage of learning opportunities in school.

Table 2: Mean Weight and Height of Boys and Girls Aged 6 Months:

VILLAGE	GIRLS		BOYS	
	WEIGHT	**HEIGHT**	**WEIGHT**	**HEIGHT**
Babahun	11.2	89.2	11.6	87.2 inc
Magbema	12.1	88.9	12.9	89.5 inc
Pelewahun	12.5	84.3	12	88.2

Source: From Research Questionnaire

The tables illustrate the mean weight and height of the boys and girls age 6 months in each of the three villages. It shows a very close range between the mean weights of children in all three villages. Pelewahun had the highest mean weight (12.5kg) with Babahun showing the lowest (11.2kg) for girls. The mean heights for girls showed higher values for Magbema and Babahun villages respectively. The mean weights for the boys age 6 months were (12.9kg) for Magbema, (11.6kg) for Babahun, and (12kg) for Pelewahun. Mean heights were also found to be (87.2 in) for Babahun, (89.5 in) for Magbema and (88.2in) for Pelewahun. The mean height showed that there were more children in Pelewahun with normal height for age than the other villages.

Table 3: Nutritional Classification of Children in Survey (Gomez and Waterloo):

TOWN	CLASSIFICATION	NO. OF CHILDRE	PERCENTAGE %
GOMEZ	Mild Malnutrition	122	48.8
	Normal	113	45.2
	Obese	15	6.0
	Total	**250**	**100**
WATERLOO	Mild Stunting	200	80
	Normal	50	20
	Total	**250**	**100**

Source: From Research Questionnaire

The table illustrates the overall nutritional status of children in the study group, based on Gomez and Waterloo classification of height for age. Over forty percent (45.2%) of the group had normal nutritional status (90-109% average weight for age). Six percent (6%) were above the expected weight for age and therefore are obese, with over 109% average weight for age. About forty-eight percent (48.8%) had below expected weight for age with 75-89% average and therefore are in the mild malnutrition lass or grade 1. Over nutrition as under nutrition is a nutritional problem emerging among the middle class in developing countries. However, this is very low among weaning children.

Family Characteristics

Type of Family:

Families in the study were roughly divided into three categories. In Babahun, the families' studies were nuclear, extended or single parent. In Magbema, they were mostly the extended family type. In Pelewahun families were mostly the nuclear, extended or single type.

Table 4: Cross – tabulation between types of family unit and nutritional status of children.

Types of Family Unit **Height for age:**	**Low**	**Normal**	**Total**
Single parent type	40(16%)	28(11.2%)	68(27.2%)
Extended family type	81(32.4%)	29(11.6%)	110(4%)
Nuclear family type	29(11.6%)	43(17.2%)	72(28.8%)
Total	**150(60%)**	**100(40%)**	**250(100%)**

Source: From Research Questionnaire

Types of Family Unit **Weight for age:**	**Low**	**Normal**	**Total**
Single parent type	25(10%)	43(17.2%)	68(27.2%)
Extended family type	84(33.6%)	26(10.4%)	110(44%)
Nuclear family type	25(10%)	47(18.8%)	72(28.8%)
Total	**134(53.6%)**	**116(46.4%)**	**250(100%)**

Source: From Research Questionnaire

A cross tabulation between the type of family a child came from and his/her anthropometric indices showed significant differences for both height for age and weight for age. Using height for age as the index for nutritional status; the result indicated that even though when one looked at all the

malnourished children, there were 28.8% and 44% of them from nuclear and extended families, respectively as opposed to 27.2% in the single family; yet a child from a single parent was classified as malnourished. The cross tabulation using weight for age showed a similar trend for the group. The regression analysis indicated that children from extended family households and those from nuclear family/families ad lower heights for age than their cohorts from single-parent households, even though the differences were not significant. If the single-parent household are relatively small and if the adult are gainfully employed, income per capital may be as low as in extended family households. Also the culture makes it possible for relatives and friends to help each other, so single-parent households may not be as bad off as one might expected. Hence, the children in such households could be doing better than the children from the nuclear and extended family households. This reveals that if the number in a household is large, this will usually place more nutritional burden on the head of the household. This is however quite contrary to the postulation for this study that children from single-parent homes would expected to have lower nutritional status that those who come from nuclear or extended families.

Characteristics of Mothers:

Respondents to the questionnaires were mostly mothers and children relatives of the weaning children. These relatives had lived with the children for periods ranging from six (6) months to twelve (12) months and the reasons given for the children coming live with them were either the death of the or that the mother had moved to another village or town. The respondents were mostly wives of the heads of households but some were themselves in some cases heads of their households.

Percentages of Mothers Age Group, Education and Occupation of Mothers:

The 250 mothers and caretakers interviewed range in age 16 to 92 years. Since some of the mothers did not know their exact ages, a list of important events that have occurred in the country were used to state their ages. The mean age of the mothers was 30% and 44% of them were between 21 and 30 years. This was not surprising since the children in the study were less than 6 years old. The percentage distribution across age range shown in the table above the education level attained by the mothers did not show any great variation. Over 48% of the mothers had no formal education, 35.2% had completed their primary education, while 16.8% had gone on to the middle school and more.

Educational Background and Occupations Husband:

Mothers were asked to indicate the level of education attained by their husband or fathers of their children and their occupations at the time of the study. About 49.6% of these fathers had no

schooling, while 28.8% had only primary education and 13.2% had managed to enter middle school. It is interesting to that a total of 98.8% of both mothers and fathers had not been to school or had any formal education. Sometimes ago in the mid 70's education children was not regarded as a right but a privilege in Sierra Leone. So education was not as common as it is now, and when parents decided to educate their children, they were more likely to educate the males in the family. This could, therefore, account for the higher percentages of illiteracy among females. The primary occupation of fathers included agriculture 80% and trading (20%). The percentage of male teachers in this survey was very low (2%) and that of service men was two percent (2%) most men are engaged in farming, which is considered a foster way to wealth than trading. In all the villages, the majority of the fathers were involved in some form of occupation. No father was found to be totally unemployed.

The period of breast feeding as stated by respondents are indicated in the table below. The stop breast feeding their children as follows:

2 after 6 months

5 after 7 months

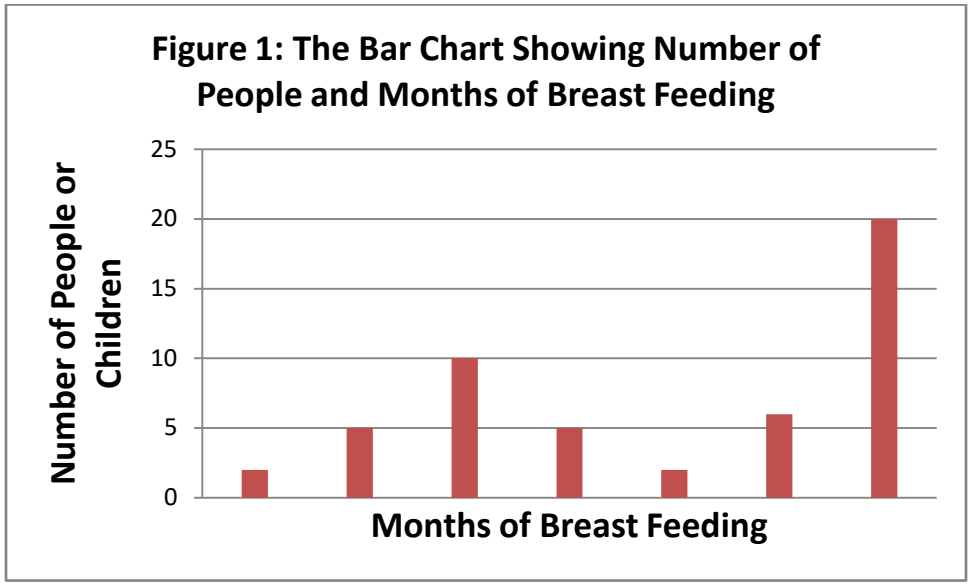
10 after 8 months

5 after 9 months

2 after 10 months

6 after 11 months

20 after 12 months



Source: From Research Questionnaire

According to the findings made by the researcher, 45 out of the target population stop breast feeding immediately after weaning their children. This indicate that 90% of the population do not encourage breast feeding after weaning their children and 10% continue breast feeding after weaning their children. From the answers derived from the interviewees, it is deduced that family planning is practiced mainly by the literate citizens while the illiterates still practice the traditional method of child bearing. To this effect the 24% that form the literate population practice family planning and the 76% illiterate do not. 40% of the respondents have once had their children attracted by malnutrition at different ages with different results interm of survival and health from the illness.

Table 5: Showing Ages of Children and their Corresponding Deaths and Survived:

Number of Respondents	**Age of Children**	**Result**	
		Death	**Survival**
3	8 months	I1	2
2	9 months	-	2
4	11 months	1	4
6	12 months	3	3

Source: From Research Questionnaire

Three respondents had their affected by malnutrition at the age of eight months. One died from the illness and two survived. The children affected at the ages of nine months 2, survived while there

was no death, at eleven months 1 died and four survived. At 12 months 3 died and 3 survived from 6 respondents. According to the answers from the respondents, the highest number of deaths occurred at the age of twelve months. Three out of the six affected children died while three survived. From the answers given it could be seen that most of the children who died from the illness are those who left their mothers immediately after weaning. A young African child at an early age of his time of development has an extremely close relationship with his mother. He rides on the mother's back during most times of day and shares the same bed at night so as to have access to the mother's breast at any time of need. The sudden deprivation of this intimacy coupled with psychological bios may cause the child to lose appetite and may therefore be a factor in causing kwashiorkor. Many types of malnutrition are gain seen when the child is sent to live with some grandparent or other less responsible relatives who because of illiteracy, poverty and so forth may not take proper care of the child.

Thus a combination of materials deprivation and protein deficiency precipitate the development of kwashiorkor which may be difficult to treat.

Table 6: Food Consume by Weaning Children in the Study Areas:

Food Consume					
Villages	**Bennie Rice/Mix**	**Balance Diet Soft Rice**	**Unbalance Powder Rice**	**Total**	**Percentage**
Babahun	35(14%)	29(11.6%)	26(10.4%)	90	36
Magbema	47(18.8%)	30(12%)	23(9.2%)	100	40
Pelewahun	20(8%)	25(10%)	15(6%)	60	24
Total	**102**	**84**	**64**	**250**	**100**
Percentage	**40.8**	**33.6**	**25.6**	**100**	

Source: From Research Questionnaire

The table indicate that 40.8% of mother feed their children on bennie, rice/mix, 33.6% feed on balance diet soft rice and 25.6% feed on unbalance powder rice.

Foods Taboos:

It is the act or practice of setting apart, prohibiting or avoiding certain foods by social, religions, customs and declaring them as unsafe or associating food with ill health or disease. However, the nutritional status of children whose parents have certain foods that they do not give them did not differ in any way from the children who have no restricted. Foods that were taken as taboo included fish, snails, egg and pork for Muslims. Some foods are thought to be good or bad. If a child gets a illness after eating a particular type of food, the illness is attributed to that food. A number of food habits and practice are poor from a nutritional point of view and practiced only by women and children. Many taboos concern the consumption of protein rich animals, foods often by those groups of the community most in need of protein (Lathan, 1997).

However, the effect of food taboo practiced by families of the children under survey is not manifested in the nutritional status. It does seem that the other foods provided for the child are adequate enough to enhance the nutrition status. From further questioning, no parent mentioned meat (beef) as a taboo.

Religious Background:

The religious background of the families was also investigated. Seventy percent and more of household in Babahun, Magbema and Pelewahun were traditionalists. (75% in both Protestants and traditionalists were in the majority 38% and 3% respectively).

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary:

The research titled “The causes of Malnutrition among weaning children (6-12months)” case study of Magbema, Babahun and Pelewahun in Njaluahun Chiefdom, Kailahun District. The food and dietary pattern of house and weaning are as follows:

The main meal of the day was the evening meal.

The typical foods consumed by both mother and children appeared to follow cultured line. The composition of the diets of the children indicated that carbohydrate and protein consumptions were fairly high but fat consumption was low. The research revealed that malnutrition causes a lot of problems in the life of children in the study areas and in the process, 5 people or children lost their lives. The causes were, not eating the amount of food that the body needs, anemic in weaning

children, lost of weight and poverty as a cause root of all. Food taboo, both ancestral and religions, seemed to be the major reason why mothers avoided particular foods.

Conclusion:

The study comprised of a sample of 300 households in three (3) villages in Eastern Sierra Leone. Information was gathered on the magnitude of malnutrition among the 150 children, age 6 months – 12 months, who were living in these households and ascertained the socio-demographic parameters that could predict nutritional status among these children.

The magnitude of malnutrition can be summarized as follows:

1. Between 60% and 63% of the children, according to Waterloo's classification, are growing normally and have adequate weight for age and height for age.
2. About 6% to 12% of the children are stunted but not wasted and 10% to 14% are wasted but not stunted.
3. Growth rate for about three(3) – months period were only between the 3rd and 10th percentage.
4. For both weight for age and height for age, males had better indices the females.

The food and dietary pattern of households and weaning children are as follows:

1. The main meal of the day was the evening meal.
2. The typical foods consumed by both mothers and children appeared to follow cultural lines.
3. Taboo, both ancestral and religions, seemed to be the major reasons why mothers avoided particular foods.
4. The composition of the diets of the children indicated that carbohydrate and protein consumptions were fairly high but fat consumption was low.

The socio-demographic conditions of the households included the following:

Village Characteristics:

The socio-economic and cultural characteristics of a village could influence the nutritional status of children in that village.

Household Characteristics:

Religious background: Difference in the nutritional status of children from households with the different religious affiliation were not significant.

Family Size: Household size did not appear to influence the nutritional status of the children. No significant differences were found between children from single-parent homes, those from extended family household and those from nuclear family households.

Mothers: Mothers with some formal education had children who were better nourish than those with formal education, but the differences in nutritional status of children were not significant. Older mothers tended to have more malnourished children, but the relationship between mother's age and nutritional status was not significant. Fathers with no formal education, whose primary occupations were in agriculture, had children who were more malnourished. Those differences were mostly significant.

Recommendations:

To improve the nutritional status of these children, ways should be found to increase income in the households. In the rural areas, improving incomes would mean improving the agricultural sector so that people produce more. The pattern of local food production has not been encouraging and the government has been importing food to supplement what is produced in the country.

- The government could also help by providing technical assistance and loans. The government should be commended for the establishment of the rural banks, and it is hope that these banks will make the financing of loans for farmers and traders easier and faster.

  It is therefore necessary to improve sanitation in village particularly in Magbema where the prevalence of poverty was high and where sanitation was more of a problem.

- The heads of the communities, like the chiefs and town development committees should have decision-making involvement in the programmes.

  The community as a whole should also be aware of the parasitic infections that are prevalent in the community and the sources of those parasites. They must also be

aware of some of the problems that occur if the infections and their sources are not checked. The importance of village elders in combating the problem should be established. Once they realize their importance to the programmes and the differences that they can make in the communities, they could motivate their subjects to be actively involved.

Some of these programmes would involve the mobilization of people to perform certain jobs, and the chief and development committees can do more to effectively achieve their goal. This was demonstrated in the villages in the Pelewahun village in particular. The mobilization resulted in a more sanitary environment.

In Sierra Leone, women bear the responsibility for the children in the family. It is therefore important that the Non-governmental Organization should target mothers for some form of health education that would make them aware of the prevalence of parasitic infection in their communities, the possible sources of infections and how best they can help to keep their environment clean. As a short-term solution and to relieve children their worm burdens, a working paper concerning the findings on the prevalence of parasites could be sent to the permanent secretary of the Ministry of health to inform him of the need to establish de-worming programmes in these villages.

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