

DISSERTATION

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S UNIVERSITY OF GHANA

TOPIC: WEANING PRACTICES AND THE PREVALENCE
OF UNDER NUTRITION IN AKATSI DISTRICT

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DECLARATION

I declare that this dissertation has been the result of my own field research , except where references have been made; and that it has not been submitted towards any degree nor is it being submitted concurrently in candidature for any other degree

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MR OBUOBI

Dedication

This thesis is dedicated to my
loving children Senyo and Fafa
who missed their mother's love

Table of contents

| contents | Page |
|--|-------------|
| Declaration | i |
| Dedication | ii |
| Table of contents | iii |
| Acknowledgement | vii |
| | |
| List of Abbreviations | viii |
| Executive Summary | ix |
| | |
| CHAPTER ONE | |
| 1.0 Introduction | 1 |
| 1.1 Background information | 1 |
| 1.2 Study Area | 2 |
| 1.3 Statement of the Problem | 2-3 |
| | |
| CHAPTER TWO | |
| 2.0 Literature Review | 4 |
| 2.1 <u>Def</u> inition of weaning | 4 |
| 2.2 Under nutrition | 5-6 |
| 2.3 Under nutrition in babies aged 6-12 months and in children 1-3 years | 7 |

| | |
|--|-------|
| 2.4 Growth and Development | 7 |
| 2.5 Weaning Practices | 8-13 |
| 2.6 Factors leading to under nutrition | 13 |
| 2.7 Studies in Ghana | 14-16 |
| CHAPTER THREE | |
| 3.0 Study Objectives | 17 |
| 3.1 Broad Objectives | 17 |
| 3.2 Specific Objectives | 17 |
| CHAPTER FOUR | |
| 4.0 Methodology | 18 |
| 4.1 Type of study and <u>Baseline</u> information | 18 |
| 4.2 Sampling Technique and Sample size calculation | 18 |
| 4.3 Data Collection Techniques | 8-19 |
| 4.4 Training and Pretesting | 19 |
| 4.5 Quality checks | 19 |
| 4.6 Data Processing, Analysis and Report writing | 20 |
| 4.7 Ethical Considerations | 20 |
| 4.8 <u>Limitations</u> of the study | 20 |

| | |
|---|-------|
| 7.2 Recommendations | 39-40 |
| References | 41-44 |
| ANNEXES | |
| 1. Population Structure of Akatsi District | 45 |
| 2 Selection of Clusters | 45-46 |
| 3 Determination of appropriate sample size | 46-47 |
| 4 Selection of households | 47 |
| 5 Questionnaire | 49-52 |
| 6 Map of Ghana showing Volta Region and Akatsi District | |
| 7 Map of Akatsi District | |

| | |
|---|-------|
| CHAPTER FIVE | |
| 5.0 Results of the findings | 21 |
| 5.1 Socio-Economic and Demographic Characteristics of Samples (Mothers and Children) | |
| | 21-23 |
| 5.2 Prevalence of Under nutrition | 23-26 |
| 5.3 Weaning Practices | 27 |
| 5.3.1 Breast Feeding and the introduction of water and semi-solid foods | 27 |
| 5.3.2 Food sources and Variety | 27-29 |
| 5.3.3 Other contributory factors to under nutrition | 30-32 |
| CHAPTER SIX | |
| 6.0 Discussion | 33 |
| 6.1 Introduction | 33 |
| 6.2 Background characteristics of mothers and children involved in the study | 33 |
| 6.3 Prevalence of under nutrition | 34 |
| 6.4 Weaning practices | 35-36 |
| 6.5 Child Care | 36 |
| 6.6 Childhood Illnesses | 37 |
| CHAPTER SEVEN | |
| 7.0 Conclusions and Recommendations | 38 |
| 7.1 Conclusions | 38-39 |

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List of Abbreviations

| | |
|--------|--|
| AF | Artificially Fed |
| BF | Breast Fed |
| DANIDA | Danish International Development Agency |
| DHMT | District Health Management Team |
| CBDs | Community Based Distributors of family planning devices |
| HSE | High Socio Economic |
| KVIP | Kumasi Ventilated Improved Pit latrine |
| LSE | Low Socio Economic |
| MOH | Ministry of Health |
| MUAC | Mid Upper Arm Circumference |
| NGO | Non Governmental Organization |
| PEM | Protein Energy Malnutrition |
| RKPC | Rapid Knowledge Practice and Coverage |
| RN | Random Number |
| SI | Sample Size |
| UHC | Urban High Class |
| UMC | Urban Middle Class |
| UNICEF | United Nations International Children and Education Fund |
| UPC | Urban Upper Class |
| WHO | World Health Organization |
| WIAD | Women in Agricultural Development |

Executive Summary

The nutritional deficiencies endured in early childhood can have debilitating mental and physical consequences that are carried to adulthood. In the third world countries a variety of activities such as growth monitoring and evaluation, community based weaning foods feeding programmes and many others have been under taken to prevent and treat malnutrition in childhood.

Past studies in Ghana has shown that under nutrition is prevalent among preschool children.

The DHMT of Akatsi district analyzed data from child welfare clinic at Akatsi health centre and found that about 25% of the children in the period of weaning seen at the clinic were undernourished.

The DHMT has attached importance to under nutrition in the under five age group and would therefore like to know the extent of the problem in the district. This will enable them in collaboration with an NGO (Africare) plan and implement measurable interventions.

The study was designed as a descriptive cross- sectional survey. WHO, Rapid Knowledge, Practice and Coverage (RKPC)/30 cluster sampling technique was used. A sample size of 323 was determined based on 0.05 confidence level and precision of 1.96. Twelve mothers were interviewed in each cluster giving a sample size of 360 for the study. Questionnaire administration to mothers with children aged 6-23 months and anthropometric measurement of their children were used to collect data. The anthropometric measurements were compared with the Harvard standard reference based on the percentage of the median. The children were grouped into two age groups :-6-11 and 12-23 months.

The study results were as follows. Under nutrition both acute and chronic were more prevalent in children aged 12-23 months. Overall, 27-33% were chronically undernourished. Children aged 6-11

months were fed mostly on breast milk and koko (porridge from fermented maize and were cared for by their mothers. Children aged 12-23 months ate the family food which was mainly banku made from com and cassava dough with hot pepper and sometimes with soup and smoked or dried fish. A small proportion of them also ate beans. Diarrhoea and fever was more prevalent among children aged 12-23. There was no significant difference between under nutrition and the mothers' age, education, occupation, child's birth order, waster source fuel source, human waste disposal and immunization.

Based on the results the following conclusions were drawn. The main causes of under nutrition among children aged 12-23 months are poor child care by older children, lack of protein rich foods and infections. Children aged 6-11 months also do get infections, the koko may not be rich in nutrients, however, they get more of the breast milk which provides them with nutrients some protection.

The following recommendations among others, are provided to the DHMT: The DHMT should establish malnutrition clinics at the various health facilities; The DHMT should collaborate with Africare to establish nutrition rehabilitation centre in the district; The DHMT should collaborate with the district assembly and Africare to establish food demonstration farms.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

In recent years third world countries, international donor agencies, and the nutrition community at large have begun to focus greater attention on weaning age malnutrition. New programme concepts have been developed and tested, old approaches critically examined, and leadership has begun to be sensitized to the need to mobilize resources to attack the problem.

A variety of activities have been undertaken, including donation feeding programmes, community-based weaning foods, growth monitoring and evaluation, and many other important aspects of prevention and treatment of malnutrition in children. The nutritional deficiencies endured in early childhood can have debilitating mental and physical consequences that are carried into adulthood.

The existence of such conditions in any population group can have a negative impact on the growth and productive capacity of a nation. To achieve any meaningful reduction in childhood malnutrition will require understanding of the determinants (or factors) contributing to the condition.

1.2 Study Area

Akatsi is situated to the south of Ho in the Volta Region of Ghana, with an estimated population of 95,000 people. (Appendix 1). It covers an area of about 906 sq km., and made up of about 456 villages/communities with a population density of 103 inhabitants per sq. Km. The district is bounded on the North by Ho district, East by Ketu district, West by south Tongu districts and the south is Keta district. The district has been divided into four subdistricts namely: Akatsi/Gefia, Avedakpa, Avenorpeme and Wute. There are five health centres in the district. Each subdistrict except Wute, has a health centre with Akatsi health centre serving as the district health institution. The district has eight Maternal and Child Health (MCH) static clinics, two private clinics manned by Medical Officers and three Maternity homes manned by qualified midwives. The vegetation of the district is mainly coastal savanna. The inhabitants are mainly traders and farmers who produce cash crops such as maize, onions and cassava and groundnuts.

1.3 Statement of the Problem

Akatsi district has experienced, over a couple of years high incidence of under nutrition among weaning infants and children under five years. It is estimated that about 25% of children under two years were under nourished in 1996 and 1997 (Akatsi district annual report 1996 and 1997). These children were seen at the Akatsi Health centre. Clinical history revealed that most of these children were in the weaning period , that is they had just started taking food supplements or adult food.

The Akatsi District Health Management Team (DHMT) has attached importance to under nutrition in children under five years and so every year there is refresher course for health workers on early

identification and management of under nutrition. Health education talks on the use of high protein meal such as soya bean flour which is being sold in the district precede every health programme in the district. The district has a Non Governmental Organization (NGO) that is ready to support maternal health and child survival programmes with resources. The DHMT would therefore like to know the weaning practices and the nutritional status of the children in the district. This would give an idea of the type of measurable interventions to put in place. It is for the above reasons that weaning practices and the prevalence of under nutrition are being studied. The research is expected to provide information on the weaning diets and practices prevalent in the communities and the individuals responsible for decisions affecting babies' diets. It is also to provide information on the prevalence of under nutrition among infants and children 6-23 months in the district.

CHAPTER TWO

2.0 Literature Review

2.1 Definition of weaning.

Alnwick, Moses and Schmidt (1988) defined weaning as the process of introducing foods other than breast milk to a child, and gradually increasing the amount, so that eventually the child gets enough energy and nutrients from ordinary family food. Weaning is also defined by Rowland and Milla (1986) as a period from the time when the child is first given supplementary food until it is completely removed from the breast.

Alnwick et al. (1988) classify weaning into first, second and third stages. Children in the first stage of weaning get almost all nutrients from breast milk but start other foods. The first foods given to the baby are called ‘weaning foods’. These foods must be specially prepared and they must be rich in energy, clean and safe, soft and easy to eat, easy for a family to obtain and easy to prepare. In the second stage the child continues to get the same amount of breast milk and he gets increasing amounts of other foods. The type of food slowly changes from soft weaning foods to the usual family foods. The child in the third stage takes slowly decreasing amounts of breast milk and eats increasing amount of family foods. Weaning is completed when a child gets all her nutrients from family foods.

2.2 Under nutrition

Alnwick, Moses and Schmidt (1988), describe under nutrition as a condition where by children do not grow as well as they could, they have less energy to do things to learn, they have less interest in the world around them and less resistance and immunity against infection.

Many children are mildly undernourished, or undernourished for a short time. If their nutrition improve, and there is more stimulating play with adults, their development usually catches up. But their development may not catch up completely if the under nutrition is severe or continues for a long time.

The child may appear normal, but may not achieve as much as he could have.

A child who is undernourished has difficulty both resisting and fighting infection. All children get many infections, especially between the ages of 6 months and 3 years. Some diseases, such as cough and colds, malaria, and measles, are equally common in well nourished and undernourished children, but an undernourished child may become more ill, and may take longer to recover than a well nourished child. Other infections, such as diarrhoea and pneumonia, are both commoner and more severe in undernourished children.

Traditional methods of assessing growth deficit in young children is on the basis of weight for age. Gomez et al.(1956) were the first to divide deficit in weight for age into three categories of severity. Three categories of under nutrition were recognized based on the “Harvard” growth standard based on the percentage of the median.

The percentages of the median are:

Normal- more than 90% of the standard weight for age;

Grade I - 90-75 per cent - mild malnutrition;

Grade E 75-60 per cent - moderate malnutrition;

Grade E1 less than 60 per cent - severe malnutrition.

WHO (1981) describe the three main types of severe malnutrition (PEM) as marasmus, kwashiorkor and marasmic kwashiorkor (a mixture of the two). An undernourished child who has many infections, is likely to develop one of the above. Marasmus is the result of a child having a very low intake of energy and nutrients. It always follows severe illness or a period of frequent infections. Marasmus usually occurs in the first two years of life, but it can occur at any age, particularly during famines. Children with marasmus are extremely wasted, have extremely low weight; 'Pot belly', and An' old person's face'. They are also irritable, fretful and always hungry.

Kwashiorkor is more complicated. It is commonest in children aged 1-3 years, but can occur in older or younger children. Kwashiorkor is mainly due to lack of energy and nutrients. But there are other factors also that cause some children to develop kwashiorkor while other children on the same diet develop marasmus. The signs of kwashiorkor may appear very quickly, often when a child has an infection, or stops breast feeding suddenly. But usually the child has been under nourished and growing poorly for some time before the signs appear. Children with kwashiorkor have oedema of the legs and arms and face, moon face, moderately low weight, wasted and weak muscles, misery and apathy, poor appetite, pale, thin, peeling skin, sparse hair with weak roots and enlarged liver. Some children have signs of both marasmus and kwashiorkor at the same time. They normally have

extreme low weight and oedema.

2.3 Under nutrition in babies aged 6-12 months and in children 1-3 years

According to Tomkins and Watson (1989) the risk of under nutrition increases when babies reach the age of 6 months. From the age of 6 months, babies need both weaning foods and breast milk. Some babies do not get enough weaning food while others stop breast feeding early.

They are also exposed to infection because, they start to eat other foods, crawl on the floor, put things in their mouths which may be contaminated and may cause diarrhoea. Babies are more likely to become ill with infections such as measles because by 6 months of age, the protective, antibodies which they got from their mothers through the placenta are finished. They may stop growing and their growth lines become flat. Lack of weaning food often causes growth failure in the second 6 months of life and severe malnutrition in the second year. This also explain the risk of malnutrition which continues to be high in children of 1 - 3 years old.

2.4 Growth and development

Beaton et al.(1990) describe signs of growth and development as becoming taller, fatter, heavier to carry and grow out of clothes.

If a child is undernourished, his growth in height slows down. A child who is undernourished for a long time (chronic) is shorter than he should be. A child is stunted if her height is below the 3rd percentile for her age. A child who is thin but healthy grows and develops normally, and always looks thin in the same way. This is referred to as 'lean'. Children become thin when they are under nourished and become thin if they are sick. Becoming thin is a sign that a child is not healthy. This

unhealthy thinness is called wasting. Wasting is a sign that a child is not growing now (acute). The child has a problem that it may be possible to do something about. If the parents can improve the child's nutrition, the child can recover from wasting more quickly than from stunting. Thinness can be measured using weight-for-height and mid-upper arm circumference (MUAC).

2.5 Weaning practices

According to WHO (1986), babies up to the age of six months, should gain at least 500g each month. Not growing well from a period of 1 month can be a serious sign at this age. The commonest cause is lack of breast milk or feeding any thing other than breast milk at this time. Even water can make the baby suckle less at the breast, and grow more slowly.

From 6-12 months, not gaining weight well for 1 month may not be such a serious sign at this age as it is in a younger baby. However, not gaining weight for 2-3 months can be serious. The commonest reason for poor growth between 6 and 12 months are insufficient or bulky weaning foods and frequent or severe infections. If the mother also stops breast feeding ,it can make the child's nutrition worse. After the age of 1 year, growth naturally slows down. Failure to gain weight for 1 month is not usually important. If the child seems well and has gained at a healthy rate before. Failure to gain weight for 3 months may be the beginning of a problem. The commonest reason for growth failure at this age are insufficient food and frequent or severe infection. If the mother stops breast feeding, it can make the situation worse.

Ruel; Habicht, and Olson (1992) carried out an evaluation of the impact of a nationwide clinic-based growth monitoring (GM) programme in Lesotho to determine if clinic attendance was

associated with improved maternal knowledge of weaning practices and diarrhoea. The results showed that mothers who had attended the clinics knew more about the appropriate timing for introducing animal protein rich foods in the child's diet and about the use of oral re-hydrating salts for diarrhoea, than those who had not. They also found out that, difference in knowledge between previous clinic attendants and new attendants was particularly marked among mothers with less than secondary schooling and mothers with young babies (less than 6 months).

Hasan and Khan (1996) studied the influences of weaning practices on nutritional status in the rural area of Aligarh. It was found that weaning was late in most of the infants. The nutritional status of infants up to 6 months was significantly better than that of infants more than 6 months of age. For most of the children family-type food was used as weaning food.

Igdedion et al.(1996) examined the weaning practices in infants aged 4 to 9 months of two hundred Tiv mothers in Makurdi, Nigeria. The study showed that all the mothers breast-fed their infants and most introduced supplementary feed at 3 to 4 months. Most of the mothers also fed the traditional pap or "akamu" usually prepared by adding boiling water to fermented maize-sorghum paste. However, only a few of these (34) enriched such paps. Price was a major determinant influencing the choice of feed given to the infants. Only a few of the mothers (19%) used commercial milk formula, about a quarter fed legume (24%) and fruits and vegetables (30%). The study showed that the mother's educational level and occupation influenced both time and duration of breast feeding and introduction of milk formula. Three-quarters of the mothers used bottle feeding while a quarter used spoon and cup and feeds were improperly stored.

The weaning practices of children aged 3-19 months, in Madrid, were investigated by van den Boom, Kimber and Morgan (1995). The results were compared with the national and international guidelines for the introduction of complementary foods. It was found that mothers in Madrid followed national and international guidelines. However, there is the need to control the composition of ingredients in the products of initial phase of weaning and also time the introduction of first complementary foods.

Al Mazrou et al. (1994) conducted a national Child Health Survey to establish baseline information about feeding practice on a nationwide basis in Saudi Arabia. Eighty-two percent of the currently breast fed children, were less than 6 months of age, but only 55 per cent of the infants up to 1 year of age were breast fed without supplementation. The mean interval between supplementation and weaning for all age groups of mothers was 7.7 months. The predominant causes of weaning were child reaching suitable age and mother not having enough milk.

Hoare (1994) describes a community-based infant weaning program in the Gambia which adapted local foods to improve nutritional content. The project also resulted in the development of a simple but effective demonstration kit.

Salih et al. (1994) investigated infant-feeding and weaning practices among Sudanese mothers. It was found that, majority (77.9%) believed that breast milk was best for their babies, emphasizing the previously reported high breast-feeding rate in Sudanese mothers. Food supplementation started by 6 months in 82.5% mainly in urban middle and high classes (UMC and UHC) compared to urban

poor class (UPC) and the rural group (RG). A mixture of food items was used for supplementation by 62.1% of the study group, whereas giving one food item was significantly more practiced in RG (54.9%) compared to others. Household food was introduced by 6 months in 35.4%. Weaning started between 6 and 12 months in 27.1% and thereafter in 64.9%. A greater proportion of rural mothers (36.5%) weaned their babies after the age of 18 months. About half the children (52.8%) were weaned abruptly, mainly among UPPC and RG. The first food item of choices for weaning was fresh goat's or cow milk (77.6%), followed by powdered or formula milk (16.1%). The commonest second preferred food was a starched gruel (39.1%) made either of rice (24.5%) or fermented sorghum.

Guldan, Zhang and Zhang (1993) undertook a study among rural 4-12-month-old infants from two townships of a country in Sichuan, this was done in order to understand some of the factors involved in weaning and growth faltering in rural China. Feeding practices found to be associated with the better growth of the positive deviant infants included breast feeding through age 12 months, feeding soyabean milk, liver and pork products on a more than weekly basis during the ages of 7-9 months, not feeding rice flour (mifen) before age 7 months, and not giving supplements or tonics. Mothers' nutrition knowledge was also associated with positive deviance status.

During the critical period of infancy, breast feeding and weaning practices play an important role in determining the growth of an infant. Rao and Rajpathak,(1992) conducted a study in India and found that almost all artificially fed (AF) infants in low socio-economic (LSE) class were malnourished while this was not so in the high socio- economic (HSE) class. However, the

proportion of malnourished children in the LSE class for partially breast fed (BF+AF) group was comparable with exclusively breast fed (BF) group and was significantly lower than AF group indicating protective effect of partial breast feeding against risks of contamination associated with weaning foods in such communities.

Fagbule and Olaosebikan (1992) examined the knowledge, attitude and practice of weaning in mothers in Ilorin community, the capital of Kwara State of Nigeria. They found that women with high level of education and family income breast fed for a shorter period, and tended to wean earlier than illiterate and low income group. By age of 3 months 44.2% had commenced weaning and 83.9% by 6 months. Diarrhoea, associated with bottle feeding or cow-pea diet, was the major cause of morbidity reported during weaning (55.8%).

Amine, al -Awadi and Rabie (1989) carried out a survey to investigate feeding pattern and weaning practices in Kuwait. The result showed that 60.0% of the infants were breast-fed, 14.0% were bottle-fed and 25.4% received mixed feeding. The mean duration of breast feeding 5.8 months and varied from 9.5 to 4.3 months among illiterate and educated mothers respectively. The results also showed that older mothers were more likely to breast feed their infants for a longer duration. On the contrary, mothers from high-income families were less likely to practice breast-feeding. In addition, the study revealed that 37.4% of the infants were weaned suddenly; as a result of insufficient milk, new pregnancy, infant reaching age mothers' sickness, infant refusal and mothers' desire.

Dettwyler (1987) studied infant feeding in Mali and found that, patterns of infant feeding, based on cultural beliefs, affect the nutritional status, health, and growth of children in the first two years of life. The results of the study showed that, virtually all women breast fed their infants on demand, for comfort as well as nutrition. Weaning took place at an average age 20.8 months, with a range of 6-32 months. Bottle/formula use was very rare. In contrast to many other populations, however, a number of infant in this community showed improved growth after weaning.

2.6 Factors leading to under nutrition

Igbogboja (1992) investigated a number of risk factors leading to malnutrition among malnourished children in the middle belt of Nigeria. It was found that poverty, family instability, poor environmental sanitation, faulty weaning practices, illiteracy, ignorance, large family size and preventable infections are the main factors responsible for malnutrition. Among other things, the author recommended health education, with emphasis on the importance of breast feeding, family stability, responsible parenthood and small family sizes through culturally acceptable family planning methods. He also stressed on the need to improve weaning methods through nutrition education, growth and food demonstration with community participation.

Igbedion,(1991) Also found that, financial inaccessibility to nutritious food by poor people, lack of technical knowhow for infant food processing, cultural practices which favour the use of cereal rather than legumes for weaning infants and the long cooking time, can lead to protein energy malnutrition, xerophthalmia, anaemia, low birth weight, stunting and wasting.

2.7 Studies in Ghana

Armar-Klemesu et al. (1992) studied feeding practices and nutritional status of breast fed infants and young children in the Upper East region of Ghana in order to gain an insight into factors affecting nutritional status. More than half the mothers gave water as the first food to their infants, after delivery. Only 40% gave breast milk About 20% of the mothers started supplementation before 3 months but by the sixth month, the proportion increased to 72%. In most cases (70%) porridge, mainly from millet, was the food given. The majority of children aged 6 months were found to be well nourished. However, about 20% were mild to moderately malnourished and 5% were severely malnourished. Only a third of the children aged more than 6 months were well nourished. Nutritional status of the children appeared to deteriorate as they grew older, there was no indication that this was related to the age at which supplementation was initiated.

Armar-Klemesu and Wheeler (1991) reviewed the background to the current recommendations for the initiation of weaning on the basis that factors such as variations in infant nutritional requirements, breast milk adequacy and the relevance of traditional infant feeding practices, have not adequately been taken into account. It was found that the main weaning food for infant aged up to 6 months is the traditional fermented maize porridge, which is introduced by the third month for the majority of infants.. Though the majority of infants are introduced to the family diet from 6 months onwards, some are still exclusively breast fed. The majority of children were well nourished but 30% of those exclusively breast fed as well as 30% of those aged less than 3 months, 6-12 months, and 12-18 months, respectively could be classified as being malnourished. It was also found that growth faltering could begin earlier than otherwise thought. The author concluded that breast milk

inadequacy in the younger infants and inadequate supplementation of breast milk in the older infants could account for the observed prevalence rates of malnutrition and further that timely and effective supplementation of breast milk could ensure satisfactory growth. Among other things the author recommended that measures aimed at alleviating malnutrition in the preschool age group should also be directed at early infancy for timely intervention since it appears that part of the problem could begin during that period

Grant (1955) carried out a dietary study in two zones of Gold Coast. There was little variety in diet, with foods high in starch content predominating. With the exception of a moderately well to do group, the diets appeared to be poor or inadequate to the extreme in terms of usual western concept

Gyebi-Ofosu (1990) studied the nutritional status of children of both sexes in peri urban and a village in the Ashanti region of Ghana.. It was found that there was no difference between the sexes in terms of mild to moderate under nutrition, and less than 5% were severely under nourished. One and half times as many females as males were well nourished. With wasting, two fifths of all the children were well nourished.

Ghana Demographic and Health survey (1993) examined the nutritional status of children in Ghana About one in four children aged 0 to 35 months were chronically undernourished . It was found that feeding patterns and diarrhoeal diseases were important determinants of under nutrition. The risk of diarrhoea could be reduced by improving water supply and also heating and reheating before feeding infants and children younger than two years, Decher (1993). Inappropriate weaning practices and

lack of maternal knowledge on optimum growth of a child, Commey (1990) were major causative factors in under weight children. Parental education especially maternal, Gardiner (1991) is demonstrated to be a consistent factor influencing infant and child survival.

Ocloo (1993) studied the problem of chronic under - nutrition. It was found that, socio-economic, cultural, environmental, political, technological, low agricultural productivity and other factors have direct and indirect effects on under nutrition, especially in Africa.. The author recommended that the structures which bring about this problem, particularly in terms of increased agricultural productivity should have higher priority. Soboti and Addy (1980) noted that, socio-economic, nutritional or infective factors contribute to a high incidence of PEM from 6 months to 3 years, with a marked drop in incidence after the latter age. The peak age range for Marasmus was from 6 months to 2 years, and for kwashiokor 1 to 3 years for both sexes.

Saaka (1996) reviewed a five-year feeding programme for poor rural communities in the Upper West Region of Ghana. It was found that the programme succeeded in reducing child malnutrition.(PEM) from 13% to 5.6% with most of the communities reducing their PEM to 3%.

The available literature shows that a lot of work has been done both internationally an locally, on the topic. However, it is anticipated that the findings of this study will facilitate meaningful interventions, in the Akatsi district.

CHAPTER THREE

3.0 STUDY OBJECTIVES

3.1 Broad Objectives

The broad objective of this study was to describe the weaning practices and the prevalence of under nutrition among weaning children in Akatsi district.

3.2 Specific Objectives

1. To describe the weaning practices of mothers and other care takers of young children.
2. To determine the foods available in the home and community suitable for feeding young children.
3. To determine the prevalence of under nutrition among children aged 6-23 months.
4. To describe the nutritional status of children aged 6-23 months
5. To determine the possible factors that can cause under nutrition among children in the weaning age group.

CHAPTER FOUR

4.0 METHODOLOGY

4.1 Type of study and baseline information

The study was designed as a descriptive cross-sectional survey and employed the methods outlined below. A review of the existing document on nutritional status of children at Akatsi Health centre was carried out to determine the age group that is mostly affected, and nutritional programmes being carried out in the district. The documents reviewed included the annual reports of the Akatsi district nutrition unit.

4.2 Sampling technique and sample size calculation

WHO, Rapid Knowledge, Practice and Coverage (RKPC)/30 cluster sampling technique was used, to select the clusters.(annex 2)

With a precision of 0.05, confidence interval of 1.96, it was determined that a sample size of 323 was needed.(Annex 3)

4.3 Data collection techniques

Eight National service personnel were recruited for data collection. Questionnaires were administered to mothers with children aged 6-23 months in the randomly selected 30 clusters, between July 20th and July 26th, 1998. Twelve mothers were interviewed from each cluster giving a sample size of 360. Toddler weighing scale and tape measure were used to measure the body weight and body length of the children. The weight of the mothers and the children was taken

together in minimum clothes. The children were then taken from the mothers and their weights taken separately. The difference gave the weight of the child. Supine length were measured for the children. To measure the MUAC, the children were either made to sit on their mothers' laps such that their left arm was closest to the measurer.

4.4 Training and Pretesting

The researcher trained the eight interviewers in anthropometric measurement technique, interpretation of questionnaire into the local language, community entry, how to approach the respondents by seeking permission from head of household and introductory remark including assurance of confidentiality, and how to fill the questionnaire.

The questionnaire was pretested using mothers and children in one of the communities which was not among the selected clusters. The pre-testing was done with mothers with children ages between 6 months to 23 months. The result of the pretesting provided useful information on the responses anticipated and specified areas of the questionnaire that required modification before the main study began. There were no changes in the questionnaire after pretesting.

4.5 Quality checks

At the end of each day when the interviewers returned from the field, the resident checked questionnaires for completeness. The resident visited each interviewer on the field to do spot checks on interviews, filling of questionnaires and anthropometric measurement of children.

4.6 Data Processing, Analysis and Report Writing

Data was coded and sorted out manually by the resident, and entered into the computer, with the help of two clerk/typists, at Onchocerciasis research centre at Hohoe. Data was organized and analyzed using EPI info 6 software. Preliminary report was prepared at Akatsi and a draft presented to a section of the DHMT including the District Director of Health Services.

4.7 Ethical Considerations

Though there were no ethical issues, verbal consent for the study was sought from the Regional Director of Health services, the District Chief Executive and the paramount chief of the area. Individual consent for the interview was also sought the mothers who were interviewed.

4.8 Limitations of the Study

1. Two of the clusters have to be changed because the study was conducted during the rainy season and the roads became impassable after a heavy downpour of rain. This may affect the sampling and the results of the study because the children in those may be at a disadvantage in terms of accessibility to health care and food.
2. Time was a limiting factor. Time for the study was very short and so the sample size could not be increased to include more communities in the district.

CHAPTER FIVE

5.0 Results of the Study

5.1 Socio-economic and Demographic characteristics of Samples (Mothers and Children)

The background characteristics of the mothers and children involved in the survey are summarized below.

TABLE 1a: Shows the distribution of mothers by age, ethnicity, occupation and education and 1b shows children by age group and sex

Teenage mothers constituted less than 6% of the total. Most of the women (85.5 %) were aged between 20 and 39 years, with a nearly equal distribution between those aged 20-29 years and 30 to 39 years .

Over half the mothers (51.7) were of the Avenor ethnic origin ; other important groups were the Anlo (22.2%)and the Aves (16.7 %). They were predominantly farmers and traders.

A little over half of the women had some education, either Primary, Junior Secondary School (JSS) or senior secondary school (SSS) and above. However, 43.3% were illiterates.

Table la : Characteristics of mothers

| MOTHERS | | |
|------------------------|-----|------|
| <i>a) Age in (yrs)</i> | No | % |
| 16-19 | 20 | 5.6 |
| 20-29 | 161 | 44.7 |
| 30-39 | 147 | 40.8 |
| >40 | 32 | 8.9 |
| <i>b) Ethnicity</i> | | |
| Avenors | 186 | 51.7 |
| Aves | 60 | 16.7 |
| Anlos | 80 | 22.2 |
| Others | 34 | 9.4 |
| <i>c) Occupation</i> | | |
| Farming | 210 | 58.3 |
| Trading | 100 | 27.8 |
| Self employed | 4 | 1.1 |
| unemployed | 10 | 2.8 |
| <i>d) Education</i> | | |
| None | 156 | 43.3 |
| Primary | 92 | 25.6 |
| JSS | 100 | 27.8 |
| SSS+ | 12 | 3.3 |

Table lb: Category of children involved in the study

| CHILDREN | | |
|---------------|------------|---------------|
| Age in months | Male No(%) | Female No (%) |
| 6-11 | 58 (16.1) | 78 (21.7) |
| *12 | 124 (34.4) | 100 (27.8) |
| Total | 182 (50.5) | 178 (49.5) |

Half (50%) of the 360 children were males and half females. The ages ranged from 6 to 23 months, with 136 (37.8%) aged less than 12 months while 224 (62.2%) were aged 12 or more months.

Most fathers of the children(61.9%) had one wife each; another 29.2% had two wives. Nine percent had three or more wives. Fathers' occupation was more varied than those of their wives. Some of the fathers (43.6%) were farmers, 34.4% were self employed, 13.6% were in salary employment and only 5.6% were traders; with 2.8% unemployed.

4.2 Prevalence of under nutrition

Using the 'Harvard' standard as the reference measurement based on the percentage of the median, under nutrition was classified into normal (more than 90%), mild (90-75%), moderate (75-60%)and severe (below 60%). Gomez et al. (1956).

The diagnosis of under nutrition was based on the correlation between age and expected values of body weight, body length and arm circumference. Measurements of body weight and length were recorded for all children while the arm circumference was recorded only for children aged at least 12 months. The arm circumference of children below the age of one year was not measured because of the fact that babies have a lot of fat that makes accurate measurement difficult.

Children were categorized into three groups-normal nutrition (Code A), mild (Code B) and moderate to severe under nutrition (Codes C and D). For arm circumference, Codes B and C are equivalent to Codes C and D of other measurements. These categories were examined separately for those aged 6 to 11 months and for those aged 12 or more months. The results are summarized in Table 2.

TABLE 2a: Distribution of children by age, body weight and their nutritional status.

| Age in months | Normal >90% (A) | | Mild under nutrition 90-75% (B) | | Moderate/severe under nutrition <75% (C/D) | |
|---------------|--------------------|------|--|------|---|------|
| | No | % | No | % | No | % |
| 6-11 (n=136) | 70 | 51.5 | 32 | 23.5 | 34 | 25 |
| >12(n=224) | 79 | 35.3 | 61 | 27.2 | 84 | 37.5 |
| Total (n=360) | 149 | 41.4 | 93 | 25.8 | 118 | 32.8 |
| P value | > 0.003 | | >0.05 | | <0.015 | |

There was a significant difference between underweight among children 6-11 months (25%) and that of children aged 12-23 months (37.5%).

Body weight and body length

Overall, 40-44% of children were well nourished; 25-30% suffered form mild under nutrition while 27-33% were moderately to severely under nourished. Comparison between the two age groupings showed that while there was no significant difference in the proportions of children with mild under nutrition, the prevalence of normal nutrition was higher and of moderate to severe under nutrition lower in the 6-11 age group as compared to those 12 months or older.

Table 2b: Distribution of children by age and body length and their nutritional status

| Age in months | Normal >90% (A) | | Mild under nutrition 90-75%(B) | | Moderate/severe under nutrition (C/D) | |
|---------------|-----------------------|------|-----------------------------------|------|---|------|
| | No | % | No | % | No | % |
| 6-11 (n=136) | 76 | 55.9 | 39 | 28.7 | 21 | 15.4 |
| > (n=224) | 81 | 36.1 | 66 | 29.5 | 77 | 34.4 |
| Total | 157 | 43.6 | 105 | 29.2 | 98 | 27.2 |
| P value | <0.001 | | >0.05 | | <0.001 | |

Only 15.4% of children aged 6-11 months were stunted (chronic under nutrition) while stunting was two times or more (34.4%) among children aged 12-23 months

Table 2c: Distribution of children by age and mid upper arm circumference by their nutritional status

| Age in months | Normal >13.5cm (A) | | Moderate/Severe <13.5 cm (B/C) | |
|---------------|--------------------------|------|--------------------------------------|------|
| | No | % | No | % |
| | 6-11 (n=136) | | | - |
| >(n=224) | 151 | 67.4 | 73 | 32.6 |
| Total | | | | - |

The MU AC

This differs in the mode of categorization and is being limited to the older children. Nevertheless the results indicate that 32.6% of children were moderately to severely undernourished. This proportion is very similar to those obtained from Tables 2a and 2b (37.5% for body weight and 34.4% for body length).

The results indicate that approximately one third of the children aged 12 months and above have unacceptable degrees of long standing under nutrition (chronic). One quarter of children under the age of 12 months also suffered from moderate to severe under nutrition in 15.4% of whom it is of long duration.

There was no relationship between moderate to severe under nutrition and the mother's age, occupation or education status. The child's birth order was also not a factor. Other contributory factors will be examined in the subsequent presentation

4.3 Weaning practices

4.3.1 Breastfeeding and the introduction of water and semisolid food

Overall, 92.8% of children were breast fed. Most of the children aged 6-11 months (99.3%) and 88.8% of those aged 12 months or more were being breast fed. The difference in the proportions in the two groups was significant (P<0.001). In both groups of children water had been introduced in 97-99% and semisolid food in 90-96% by the age of 6 months. There was no significant difference between the groups in these aspects.

4.3.2 Food sources and variety

The child's source of nourishment, apart from breast milk, depends on the food variety readily available in the community, food prepared separately for the child or for the family and those bought from food vendors. In some communities children may be denied certain types of food. The data collected showed that meals were prepared separately for children less than 12 months much more frequently than for older kids (83.1% as against 63.8%; P< 0.001) while vendor food was bought more frequently for older kids than for those less than 12 months (67.9% vs 41.2%; P<0.001). The main food items prepared for kids less than 12 months were plain "koko" (64.6%). This is porridge from fermented maize, "banku" (14.9%), made from cassava and com dough and Weanimix (10.6%), a specially prepared flour from soya beans and maize. The main food items prepared for the older kids were plain "koko" (19%) beans (13.4%) and (47.4%) "banku". Beans is usually eaten with gari from cassava and rice. "Banku" as noted during

data collection , was mainly with hot pepper with very little dried or smoked fish which children up to 23 months could not chew (occasionally they were served “banku” with soup).

The children less than 12 months had relatively more “koko” and fewer beans while the reverse was true of the older children. There was no significant difference in the consumption of “banku”. Similar comments apply to the main foods bought for the two age groups.

A 24 hour recall of the foods consumed by the family and by the children are summarized in Tables 3 and 4.

TABLE 3 Food consumed by the family in the Akatsi district

Food eaten over a 24 hour period*

| Foods Items | Family of children Age 6-11 months | | Family of children Age ¹² months | | Total | | P value |
|----------------|---|-------|---|-------|-------|-------|---------|
| | No | % | No | % | No | % | |
| Banku | 291 | 74.2 | 477 | 69.6 | 768 | 71.3 | >0.05 |
| Beans | 21 | 5.4 | 53 | 7.7 | 74 | 6.9 | >0.05 |
| Kenkey | 32 | 8.2 | 43 | 6.3 | 75 | 7.0 | >0.05 |
| Koko | 34 | 8.7 | 69 | 10.1 | 103 | 9.6 | >0.05 |
| Other | 14 | 3.6 | 43 | 6.3 | 57 | 5.3 | >0.05 |
| Total | 392 | 100.0 | 685 | 100.0 | 1077 | 100.0 | - |

Notes:* The numbers given against the various food items represent the total number of ‘food units’ or ‘servings’ given. As some items were given more than once during the day the totals may exceed the available pop of 1077 servings of various types of food were given to 360 families.

f Comparison of proportions of food types served to families with children in each age category.

Table 3 shows that there were no significant differences between the families in the types of food and in which proportions they were served. This suggests that most families lived on a similar type of diet.

TABLE 4

Food consumed by children in the Akatsi district

Food eaten over a 24 hour period*

| Foods Items | Age 6-11 months | | Age *12 months | | Total | | P valuef |
|-------------|--------------------|-------|-------------------|-------|-------|-------|----------|
| | No | % | No | % | No | % | |
| Banku | 57 | 17.2 | 238 | 36.8 | 295 | 30.2 | <0.001 |
| Beans | 14 | 4.2 | 93 | 14.4 | 107 | 10.9 | <0.001 |
| Breast | 17 | 5.1 | 19 | 2.9 | 36 | 3.7 | >0.05 |
| Kenkey | 5 | 1.5 | 18 | 2.8 | 23 | 2.4 | >0.05 |
| Koko | 215 | 65.0 | 221 | 34.2 | 436 | 11.6 | <0.001 |
| Tea | 9 | 2.7 | 27 | 4.2 | 36 | 3.7 | >0.05 |
| Weanimix | 4 | 1.2 | 3 | 0.5 | 7 | 0.7 | <0.03 |
| Other | 10 | 3.0 | 28 | 4.3 | 38 | 3.9 | >0.05 |
| Total | 331 | 100.0 | 647 | 100.0 | 978 | 100.0 | — |

*Notes**:* The numbers given against the various food items represent the total number of 'food units' or 'servings' given. As some items were given more than once during the day the totals may exceed the available population of 360 children. Thus a total of 978 servings of various types of food were given to 360 children.

fComparison of proportions of food types served in each age category. Significant differences highlighted.

Table 4 shows that significant differences occurred between the two age groups as regards their consumption of banku, beans, koko and Weanimix. Banku and beans were eaten much more frequently by those aged 12 or more months while koko and weanimix were consumed more

frequently by the younger children. Previous information indicated that children aged 6-11 months were universally breast fed while 88.8% of children aged 12 months or more were still breast fed. It is presumed that for a given quantity of breast milk the greater benefit would go to the younger rather than the older child. Although beans were given more frequently to the older children, only 14.4% of the servings contained this source of protein.



4.3.4 Other contributory factors to under nutrition

Child care

Children were cared for by the mother, older children or relatives. With respect to the age groups 62.5% of those aged 6-11 months were cared for by their mothers as compared to 52.5% of the older children. This difference is not significant ($P=0.057$). Similarly 30.1% of the younger children were cared for by relatives as compared to 31.9% of the older children. Again this difference is not significant. However as the child grows older the older children assume greater responsibility with 7.4% of children aged 6-11 months being cared for by this group as compared to 14.7% for the older children. This difference is significant ($P < 0.04$).

Childhood illnesses

Those examined include diarrhoea, frequent fevers and upper respiratory tract infections. The results are summarized in Table 5. Diarrhoea and frequent fevers occurred in a significantly higher proportion of children aged 12 or more months than in the younger age group. The number of episodes of diarrhoea ranged from 1 to 10, with a median of 4. There was however no significant difference in the number of attacks between the two groups. Upper respiratory tract infections also occurred with similar frequency. Fevers were treated mainly with antimalarials and antipyretics.

Antibiotics were given to less than 8% of children. The main sources of advice were the Health centre and the Chemical shop. Interestingly, attendance at the chemical shop was relatively more for upper respiratory tract infections than for diarrhoea.

In about 10-12% of cases no treatment was given. The traditional healer played only a minor role (5-8% of cases).

Table 5: childhood illnesses experienced

| | Age 6-11 months n=136 | | Age k 12 months n=224 | | Total n=360 | | Illness |
|------------------|--------------------------|------|--------------------------|------|----------------|------|------------------|
| | No | % | No | % | No | % | |
| Diarrhoea | 80 | 58.8 | 160 | 71.4 | 240 | 66.7 | <0.014 |
| Fever | 99 | 72.8 | 195 | 87.1 | 294 | 81.7 | <0.001 |
| URTI | 96 | 70.6 | 162 | 72.3 | 258 | 71.7 | >0.05 |

**For differences between the proportions in age groups significant difference is highlighted*

Factors that may contribute to childhood illnesses

Immunization cards were looked at during the survey. Seventy five per cent of the mothers showed the children's cards while 62% of the children 12 months and above were fully immunized. Other factors examined together with the overall prevalence include food storage (bowl 87.5%), reheating of food (76.9%), fuel source (charcoal/wood 99.7%), fuel availability (92.2%), water source (pond 53.9%) and disposal of human waste (89% house/town latrine or KVIP, 10.6% open disposal). None of these was found to be different in families with children in the two age groups.

CHAPTER SIX

6.0 Discussion

This study describes the weaning practices and nutritional status of children in the weaning age group. Existing literature indicate that development of children in the weaning period depend on the following factors: maternal education and occupation; breast feeding and introduction of semisolid food; food source and variety in the community and in the home; child care; childhood illnesses; and other factors that may contribute to childhood illnesses such as food storage, fuel source, water source and disposal of human waste.

6.2 Background characteristics of mothers and children involved in the study

Ghana demographic health survey, (1993) noted that under-nutrition was considerably higher among children of mothers with no education or only primary school education than children of mothers with secondary or higher education.

In Akatsi district, most mothers involved in the survey (96.6%) were illiterates or had only primary to JSS education. The same applies to occupation where 89% of the mothers were farmers and traders. Majority of the mothers (80.3%) were within the age group 20-39 years with the mean age of 29.2 years. Teenage mothers (16-19 years) constitute only 5.6% and mothers 40 years and above constitute 8.9% of all mothers interviewed. The ethnic groups interviewed were mainly Avenors, Aves and Anlos. These are all Ewes with little variations in cultural practices.

There was no relationship between moderate to severe under nutrition and the mother's age, occupation or education status, ethnicity and the child's birth order as compared with what Ghana Demographic Health Survey (1993) where under nutrition was considerably higher among children of mothers with no education or only primary school education.

6.3 Prevalence of under nutrition

Under nutrition is classified into mild (90-75%), moderate (75-60%) and severe (below 60%) when compared the reference Harvard standard based on the percentage of the median, Gomez et al. (1956)

Signs that a child is growing at the normal rate are that, the child becomes taller, fatter, heavier and grows out of clothes Beaton et al. (1990). This can be monitored if the weight and the length are compared with the reference weight and age. Another way to find out if a child is well nourished is to measure how thin or how fat the child is using mid upper arm circumference (MUAC). MUAC is difficult to measure in children less than one year since babies have a lot of fat. Therefore, their exact age is needed to measure accurately according to Beaton et al. (1990).

One in four (25%) of Ghanaian children 0-35 months are chronically undernourished (Ghana Demographic and Health Survey 1993). Where chronic under nutrition means the children are either too short for their age or stunted.

In the Akatsi district, the children were categorized into 6-11 and 12-23 age groups. It was observed that the rates of underweight, stunting and wasting ; 37.5, 34.4, 32.6 respectively are higher than what Ghana demographic Health survey found (1993).

Overall, 27-33% were chronically (moderate to severe) under nourished. There was no significant difference in the proportion of children with mild under nutrition between the two groups, however, the prevalence of normal nutrition was higher and moderate to severe under nutrition was lower in the 6-11 age group. Wasting or acute under nutrition was 32.6%. This was done for children 12-23 by measuring the MUAC. The sums of these indicate that approximately one out of three of children aged 12-23 have chronic moderate to severe under nutrition. One out of four children aged 6-11 months suffer from moderate to severe under nutrition in whom only 15.4%

have chronic under nutrition.

6.4 Weaning practices

The best food for babies is breast milk. A baby needs nothing but breast milk for at least 4 -6 months. Breast milk continues to be the main source of nutrients for several more months, and can provide one-third of the nutrients that a child needs up to 2 years. Breast feeding should continue up to 2 years or longer if the mother and the baby wish (WHO/UNICEF, 1989).

The main weaning food for Ghanaian infants up to 6 months is the traditional fermented maize porridge which is introduced by the third month for the majority of infants (Amar- Klemesu and Wheeler, (1991).

Ninety-two percent of mothers interviewed in Akatsi district were still breast feeding.

More of the children 6-11 months (99.3%) were being breast fed while 88.8% of older children were breast fed. About 39.4% of the children were given water and semisolid food by 3 months and 92-98.1% by 6 months.

The child's source of nutrition apart from breast milk depends on the food readily available in the home and in the community. A family can most easily prepare good weaning foods from local low-cost foods (Oniang'o, 1988).

In this study, meals were prepared separately for children less than 12 months while older kids ate the family food. This is similar to what was found in rural area of Aligarh by Hasan and Khan (1996). The main meals prepared separately were plain porridge from fermented maize (koko) and weanimix. The older children had more of beans and banku made from cassava and maize. Banku with hot pepper and occasionally with soup and dry or smoked fish was served more, at an average 2 times a day. This is because the parents think the children are old enough to eat more of the family food than breast milk. There was no significant difference between the families in the types

of food and in which proportions they were served. This suggests that most families lived on a similar type of diet. However, there was a significant difference between the two age groups as regards their consumption of banku, beans, koko and weanimix. Breast feeding practice was generally high in the two age groups (92.8%). This is far better than what was found in Saudi Arabia by Al Mazrou et al, (1994).

6.5 Child care

Children aged 6-11 were cared for by their mothers while older children were cared for mostly by the older children. It implies as the child grows, older children assume responsibility. Poor child care may be a contributing factor to the high rate of under nutrition among children aged 12-23 months because the older children do not know much about child feeding and personal hygiene.

6.6 Childhood illnesses

Childhood illnesses looked at include diarrhoea, frequent fevers and upper respiratory tract infections. Diarrhoea and frequent fevers significantly occurred in a higher proportion of children above 12 months however, there was no significant difference in the number of attacks in the two age groups. Diarrhoea cases were sent to the health centres for treatment while for upper respiratory tract infection advice was provided mainly by chemical shops. Drugs used for treating fever are antimalarials and antipyretics. Only 8% of the children were given antibiotics. It is good that the women are aware of antimalarials and antipyretics as choice of treatment for fever instead of antibiotics. However if correct dosage was given the disease may be partially treated. This can lead to frequent fevers which can result into child having poor appetite hence under nutrition.

Factors that may contribute to childhood illnesses are poor storage of left over food, fuel and water

source, inaccessibility of immunization services and poor human waste disposal. None of these was found to be different in the families with children in the two age groups. Forty- one percent of the communities in the survey had boreholes as their water source provided by DANIDA and 89% the communities use house/town latrine or KVIP for human waste disposal. However, diarrhoea prevalence was high. Poor personal hygiene of individual mothers or care takers might be a contributing factor.

The main fuel source is wood and charcoal (99.7%). This was not expensive to obtain for most mothers (73.3%). Though fuel not expensive, fetching it from the bush is tedious work for the women.

Some of the vaccine preventable diseases play a role in the malnutrition and infection complex. Accessibility to immunization services was fairly good. About 75% of the children had immunization cards while 62% of children above 12 months were fully immunized. Despite these services, under nutrition was still high among children aged 6-23 months in the district. On the other hand, the prevalence of under nutrition may be higher in the absence of these services.

CHAPTER SEVEN

7.0 Conclusion and Recommendations

7.1 Conclusions

This chapter presents key conclusions, based on the results of the study, involving the children who were divided into two age groups :-6-11 months and 12-23 months. It was found generally, that there was no significant difference between under nutrition and the mother's age, educational status, occupation , ethnicity and the child's birth order. There was no significant difference between under nutrition and fuel source, water source and human waste disposal. Immunization coverage for childhood preventable diseases was relatively high in all the children. Only 40-44% of the children were well nourished, 25-30% suffered from mild under nutrition and 27-33% were moderately to severely under nourished. There was no significant difference in the proportions of children with mild under nutrition. The prevalence of normal nutrition was higher, and moderate to severe under nutrition lower in the 6-11 age groups as compared with those 12 months and above.

The overall results indicate that approximately one out of 3 of children above 12 months have unacceptable degree of long standing under nutrition. Moreover one out of 4 children below 12 months also suffer from moderate to severe under nutrition in 15.4% of whom it is of long standing duration. The main foods available in the communities for weaning children are: koko from fermented com dough, banku from com floor or dough and cassava dough, weanimix and beans. There were no significant difference between the families in the types of foods and in which proportions they were served.

Childhood illnesses which were examined were diarrhoea, frequent fevers and upper respiratory tract infection. All these illnesses occurred more in children 12 months and above than the younger age group.

Though there is under nutrition among children aged 6-11 months, it was mainly of the acute type. This could be due to infections from malaria, upper respiratory tract infection or diarrhoea from contaminated food such as koko which was mostly served. However children of this age group were cared for mainly by their mothers and had more breast milk which provided them with some amount of protection.

7.2 Recommendations

On the basis of the study findings, it is recommended that:

- The DHMT should establish malnutrition clinics at the various health facilities in the district;
- The DHMT should collaborate with Africare to establish a Nutrition Rehabilitation Centre in the district for the moderately to severely under nourished children;
- The DHMT should involve health staff like community health nurses, enrolled nurses, midwives and medical assistants in giving talks on under nutrition and weaning practices at gatherings;
- The district nutrition Technical officer should draw a programme for all schools in the district. The programme should include teaching school children how to prepare and eat balance diet and also teach them how to prepare and feed younger children since they take up the responsibility of caring for children as they grow older;
- The Technical Officer should also teach the women's organizations in the district how to prepare weaning foods rich in protein and energy;
- The DHMT should train the community based distributors (CBDs) of family planning devices to include weaning practices in their counseling;

The DHMT in collaboration with the District Assembly and Women in Agricultural Development (WIAD) should train the Unit committee members and women's groups to grow protein rich food like soya beans in the communities; and

Further work on the biological and energy value of the foods available in the community and in the homes especially families with malnourished children need to be carried out by the DHMT in collaboration with Africare.

The DHMT should collaborate with the district assembly and Africare and the agricultural department to establish food demonstration farms with community participation.

Home visit activities should be intensified in the district by the maternal and child health unit. This would enable the health workers identify some of the problems in the individual homes that can lead to under nutrition during the weaning period.

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ANNEXES

ANNEX 1

Population structure

| Age group | Population | % of total |
|---------------------------|-------------------|-------------------|
| 0-11 months | 3,800 | 4 |
| 12-23 months | 3,800 | 4 |
| 24-60 months | 11,400 | 12 |
| 5-14 years | 25,650 | 27 |
| Women 15-49 years | 19,000 | 20 |
| Men 15-49 years | 19,000 | 20 |
| Men and Women 50-60 years | 7,600 | 8 |
| Men and Women >60 years | 4,750 | 5 |

is 4 digits then, RN will be 1379.

For the study the serial number on the currency note was 2296582.

Counting from the left, the random number (R N) obtained was 2296

Selection of first Cluster

Generate commutative population sizes from list of communities and their populations.

The first cluster is that population of a community on the list, whose cumulative population is equal to or exceeds that of the RN.

The second cluster is chosen by adding our new RN to the SI

(Pop. In 2nd community + SI).

Example Random number + Sampling interval = 2296 + 3166 = 5462

Identify the subsequent clusters the following formula was used:

Number which was identified in the previous cluster + Sampling interval = Location of the previous cluster

Cluster 3 will be:

New RN + SI = 5,462 + 3,166 = 8628

(or population of next cluster + SI till 30 cluster are chosen).

Then 8628 + 3166 = 11794 (another cluster) until the 30th cluster was obtained.

ANNEX 3

Determination of appropriate sample size.

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

Where n = sample size

d = precision that is the researchers desired difference between observed proportions

and the true proportion.

z = Probability of observed proportion being within d of the true proportion,

that

confidence level z value 95% = 1.96.

p = estimate of the expected proportion

$q = 1 - p$

1. Precision level d - margin of error accepted 5% = 0.05.
2. Confidence level (z) - 95% = 1.96.
3. Estimate of proportion (p) 30% = 0.3.
4. $Q = 1 - p = 1 - 0.3 = 0.7$.

$$n = \frac{1.96^2 \times 0.7}{0.05^2} = 3.8416$$

$$\frac{3.8416 \times 0.2}{0.0025} = \frac{0.806736}{0.0025}$$

$$= 322.69$$

$$n = 323$$

Annex 4 Selection of Household

Determine the starting point of the first household where cluster begins.

Locate a central point of the cluster - it may be a market, school, mosque/church or chiefs palace

Randomly select a direction by spinning a bottle/pen or toss a coin.

Count the number of houses and the direction chosen to the boundary of the cluster making sure you do not enter the next cluster.

If there are 10 houses, randomly (by ballot) select the first house to enter

(you may also use serial No. of a currency note)

The next household is the one whose front gate is closer to the front door of the one you have just visited.

In the household, there may be more than 1 child (6 -24 months). Again randomly select the child to be interviewed.

ANNEX 5

QUESTIONNAIRE

| | | |
|---------------|---------------------|-------------|
| Village(code) | House Number (Code) | House Owner |
|---------------|---------------------|-------------|

MOTHER

| | | | |
|-----------|------------|-----|-----------|
| Last name | First name | Age | Ethnicity |
|-----------|------------|-----|-----------|

Occupation

Previous occupation

Previous areas of residence and duration

Husband's occupation

Number of wives

No of children and sex 1. 2. 3. 4. 5.

Educational background 1. None 2. Primary 3. Middle/JSS 4. Secondary/SSS
5. Tertiary 6. Adult literacy class

CHILD

| | | | | |
|-----------|------------|-----|--------------|-------------|
| Last name | First name | Sex | Age (months) | Birth order |
|-----------|------------|-----|--------------|-------------|

Immunization status

1. Do you have immunization card for the child Yes/No
2. Look at immunization card and record the dates of all the immunizations below:
dd/mm/yy

BCG

OPV at birth

OPV 1st _/_/_

2nd

3rd

DPT 1st

Measles

Present weight (Kg). Upper arm circumference (cm). Length of the child (Cm)

Child care

1. Mother 2. Relative 3. Older children

WEANING PRACTICES

Are you still breast feeding your child 1. Yes 2. No

Have you been told how and when to wean your child 1. Yes 2. No

If yes, by whom 1. Mother 2. Relative 3. MOH staff 4. Other

At what age did you start giving water to your child (Months)

At what age did you start giving semi-solid food (Months)

Who decides at what age semi-solid food begins 1. Mother 2. Relative 3. MOH staff

4. Other

Is your child's food prepared separately 1. Yes 2. No

If yes, what food do you normally give the child

1. Porridge from fermented maize(koko) 2. Tea 3. Weanemix 4. Formula milk 5. Others

Do you give vendor food to your child 1. Yes 2. No

If no, then who prepares the food 1. Mother 2. Caretaker 3. Other

If yes what food do you usually buy 1. Plain koko 2. Koko with pepper 3. rice

4. kenkey 5. Banku 6. others

What foods did the child eat for the past 24 hours

1. Plain koko 2. Tea 3. Rice 4. Kenkey 5. banku 6. others

Do you always heat the food you prepare before giving to the child 1. Yes 2. No

What techniques do you use in feeding the child 1. Cup and spoon 2. Hand 3. Feeding bottle 4.

Forced feeding

What kinds of food are children of this age not allowed to eat in your area

1. 2. 3. 4.

Does your child eat the family food 1.Yes 2.No

If your child eats the family food is this done with 1. Mother 2. Caretaker 3. Older children

What food did the the family eat for the past 24 hours

1. Banku 2. Rice 3. Fufu 4. Kenkey 5.others

Diarrhoeal disease

Since you started giving water or semi-solid food, has your child ever had 3 or more watery stools a day? 1. Yes 2. No

If yes, how many episodes have occurred 1. 2. 3. 4. 5. 6.

From whom did you seek advice or treatment for the diarrhoea ?

1. Hospital/health centre
2. Pharmacy/chemical shop
3. Traditional healer/herbalist
4. Relatives & friends
5. Others

Malaria, measles, URTI

Has your child had

1. Frequent running nose with cough since you started giving semi-solid food

1 Yes 2 No

If yes, from whom did you seek treatment when the child was ill ?

1. Hospital/health centre
2. Private clinic/doctor
3. Traditional healer
4. Pharmacy/chemical shop
5. Others

2. Several episodes of fever 1.Yes 2. No

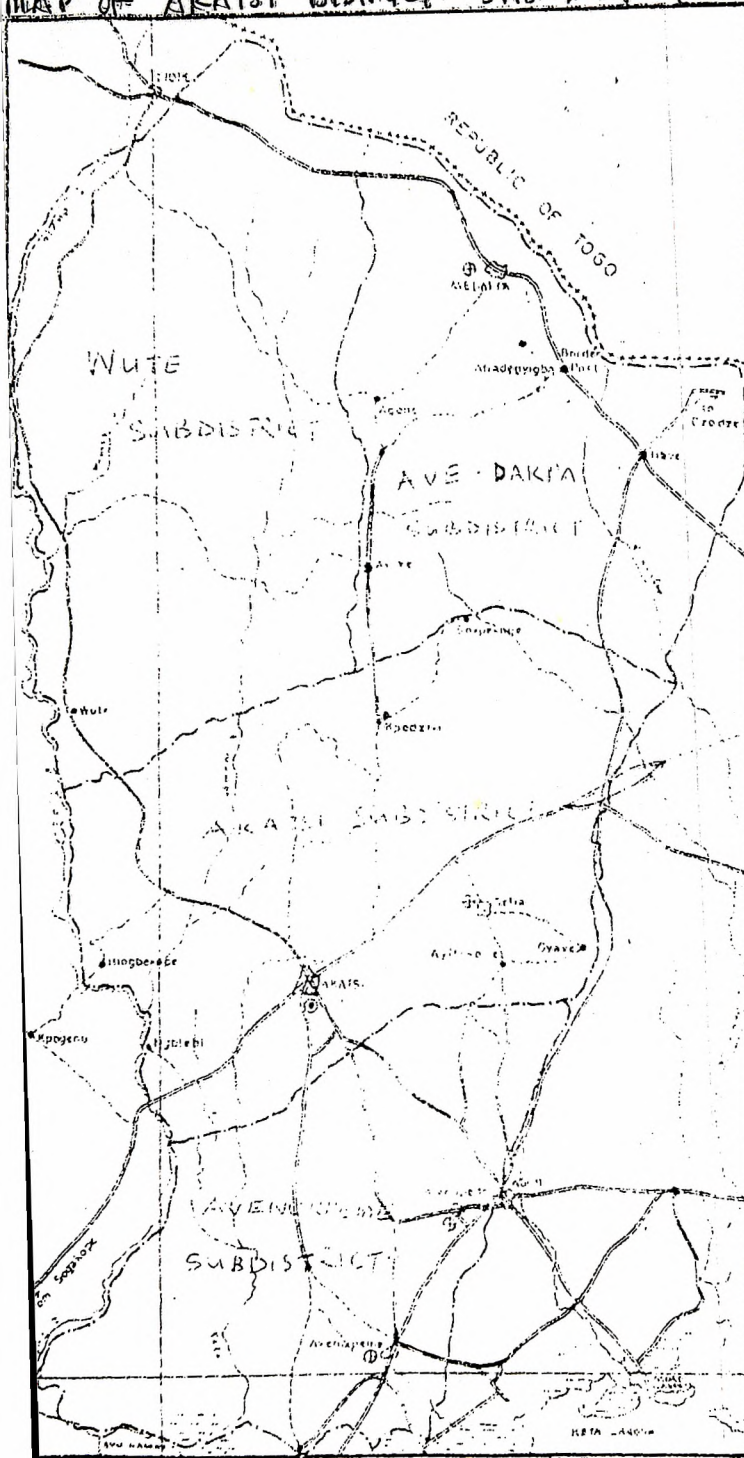
If yes, what treatment was given 1. Antimalarials 2. Antibiotics 3. Antipyretics

4. Unknown

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i busr^icr

MAP OF AKATSI DISTRICT SHOWING THE SUBDISTRICTS



SCALE - 1 : 150 000

LEGEND

| | |
|--|---------------------------|
| | International Boundary |
| | Subdistrict Boundaries |
| | Motorable Roads |
| | Footpaths |
| | Rivers |
| | District Capital (Akatsi) |
| | Hamlets/Villages |