# NUTRITIONAL STATUS OF ORPHANS IN SELECTED ORPHANAGES WITHIN NAIROBI PROVINCE, KENYA.

BY

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# DECLARATION

This thesis is my original work and has not been presented for the award of a degree or any other award in any other university.

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## DEDICATION

To my family, my loving husband David Mwaniki and our two children Melody Wangechi and Joy Nyambura.

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## ABSTRACT

The nutritional surveys that have been carried out in Kenya have concentrated on children aged five years and below who are under the care of their parent(s). The HIV/AIDS pandemic has led to increased number of orphans and mushrooming of orphanages. Children living in these orphanages may also suffer from malnutrition. The main objective of this study therefore was to investigate the nutritional status of orphans aged fifteen years and below in selected orphanages within Nairobi. Convenience sampling technique was used to select the three orphanages within Dagorretti and Makadara divisions for the purpose of the study. Results of the study show that 52 % of the sample, were female and 48 % were male. Majority (60%, n=53) of the children were aged between 4 and 11years of age. Only 40% (n=35) were aged between 12 and 15 years. Malnutrition was present among the orphans, with 8% of the children stunted, 21% underweight and 21 % wasted. Children aged 12 to 15 years had malnutrition prevalence of 43 %. Between the age of 12 and 15 years, boys were more malnourished (55%) than girls (27%). Demographic information of the caretakers showed that they were between 26 years and 53 years of age and 38 % had a minimum of primary education. Assessment of the nutritional knowledge of the caretakers showed that 59% were most knowledgeable, 38% knowledgeable and 3% not knowledgeable. The most common ailment among the sampled population were colds, flu and cough with 25% children suffering from them within the last seven days before and within the time the study was carried out. The other common disease was diarrhoea with a prevalence of 8%. The food served most of the week among four other foods served for lunch and supper was *Ugali* with vegetable/Meatstew (25%). The food rarely served in the week was Banana/Meatstew (2%). There was no significant difference in prevalence of malnutrition between the three orphanages that is, stunting (p=0.708), underweight (p= 0.682), wasting (p=0.646) and body mass index (p=1.000). Increase in the number of children who were not sick resulted in decreased prevalence of malnutrition among the children (r=<-0.02) in all the homes. In this study children aged 12 to 15 years had very high prevalence (43 %) of malnutrition. The older children were prone to nutritional deficiencies. The findings of this study indicated that malnutrition was prevalent among HIV/AIDS orphans and therefore appropriate strategies should be applied or formulated to alleviate the sufferings of this disadvantaged group.

## ABBREVIATIONS

| | |
|---|---|
| **AIDS** | Acquired Immuno Deficiency Syndrome. |
| **GOK** | Government Of Kenya |
| **HIV** | Human Immuno Deficiency Virus. |
| **NCHS** | National Center for Health Statistics |
| **SDs** | Standard Deviations. |
| **STDs** | Sexually Transmitted Diseases. |
| **UNICEF** | United Nations International Children's Education Fund |
| **UNDPI** | United Nations Department of Public Information |
| **UNAIDS** | United Nations on HIV/AIDS |
| **GAM** | Global Acute Malnutrition |

# CHAPTER 1: INTRODUCTION

## 1.1 Background Information

The first HIV/AIDS case in Kenya was reported in 1984 (GOK, 2002). Since then, 1.5 million Kenyans have died of HIV/AIDS, a number that was estimated to rise to 2.6 million by 2005 (GOK, 2002). The National AIDS and STDs control programme (NASCOP) estimated the adult prevalence rate at 13.5% of the total population of Kenya in 2001 (GOK, 2002). The HIV/AIDS prevalence in urban population range from 11% to 29 % and 2% to 31% in the rural population (GOK, 2002). Overall among the urban populations, the rate averages 15%, while in the rural populations, the average rate is 12% (GOK, 2002). The adult prevalence has since declined to 7% (CBS, 2004). Two significant shifts have already taken place. First, there has been a rapid rise in infections among the youth. Second, the incidence and prevalence of HIV/AIDS in rural Kenya has caught up with the trend in urban areas (CBS, 2004). Prevalence among Kenyan women 20-24 years of age is over three times that of men in the same age group (CBS, 2004)

More than 75% of HIV/ AIDS cases occur in adults between the ages of 20 and 45 years (GOK, 2002). Since this is the most economically productive population, illness and death at these ages is a serious economic and social burden for the family and society. These deaths have important consequences for children since most people in this age group are raising young children. It has been estimated that there are about 900,000 HIV/ AIDS orphans, under the age of 15 years who have lost either one or both parents, and this will increase to 1.5 million by 2005 (GOK, 2002).

While extended families in Kenya had traditionally fostered orphaned children, the high incidence of HIV infection and AIDS and the growing numbers of children left in the wake has already overwhelmed the traditional care structures in most parts of the country (USAID, 2002). The extended family is struggling to take care of these orphans, as well as other family members who may be infected. Where this structure is unable to cope, some Kenyan households are being led by children as young as 10 to 12 years old (USAID, 2002). In other families, the entire structure has fallen apart, leaving orphans homeless in the streets and vulnerable to HIV/AIDS. Some of these have been taken up in orphanages, most of which are impoverished and lack basic facilities and services for the children.

Many HIV/ AIDS orphans lack basic needs and necessities for survival namely food, shelter, and clothing, medical services and school fees among other needs. Most of them do not have access to basic health services, and many are not likely to complete their primary education. As a result the recent achievements in reducing child mortality and illiteracy rates in Kenya are rapidly being reversed by HIV/AIDS (UNICEF, 1996). With this background, it is necessary to establish whether the nutritional status of the orphans is supportive of good health for achievement of their goals in life.

**1.2 Statement of the problem**

The ever-increasing number of orphans will inevitably have a profound impact on societies in which they live. Kenya had the third highest number of HIV/AIDS orphans in the world estimated at 890,000, Nigeria being the first with 1 million orphans and Ethiopia second with 990,000 orphans (UNAIDS, 2002).

In Kenya it is the high number of HIV/AIDS orphans that is potentially the biggest long-term crisis, yet very few studies look seriously into the plight of HIV/AIDS orphans and patients. With orphans in Kenya under the age of 15 years projected to reach 1.5 million by the year 2005 (GOK, 2002), this outgrowth of the HIV/AIDS pandemic may create a lost generation, a large cohort of disadvantaged, under-educated and less healthy youths.

### 1.3 Justification

The serious social and economic dislocation that will result from the large and growing proportion of children who are orphaned will require comprehensive, creative and long-term solutions (Ng'wesheni *et al.,* 1997). Orphans may suffer the loss of their families, depression, increased malnutrition, lack of immunization or health care, increased demand for labour, lack of schooling, loss of inheritance, forced migration, homelessness, vagrancy, starvation, crime and exposure to HIV infection (Johnston *et al.*, 1999). The threat to the prospects of economic growth and development in most seriously affected areas is considerable. Acquired experience in taking care of orphaned children, as a social problem is limited. Historically, orphaning on a large scale has been a sporadic short-term problem, caused by war, famine and disease. Orphaning has been transformed into a long-term chronic problem by HIV/AIDS. There is concern that if these orphaned children are not adequately cared for in the orphanages they may run into the streets where they will be exposed to conditions that may make them vulnerable to HIV/AIDS infections (Ng'wesheni *et al.,* 1997). They may also suffer from malnutrition, which will leave them crippled, chronically vulnerable to illness and intellectually disabled.

The vulnerability of orphans is exacerbated by the geographic concentration of HIV/AIDS pandemic, lack of appropriate care and poverty. Many of the orphanages are impoverished and left with little or no outside assistance (Christian and Glen, 1991). Important and lasting impact of nutrition in the crucial months of infancy and sound childhood nutrition cannot be overstated. Infants and children who are denied a strong start in life of good nutrition face problems in making up the lost ground, and the impact on their own development and of their societies can be a lasting one (Ng'wesheni *et al.,* 1997). The findings of this study will help governments, policy-making bodies, Non-Governmental organizations and donors to formulate and design strategies that could alleviate the suffering of orphaned children. Finally it will enable the nutritionists understand the difficulties faced by orphaned children and be able to effectively monitor their nutritional status.

**1.4 Research questions**

(a) Which types of foods do the orphans in the study centres consume?

(b) What are the children's personal hygiene practices?

(c) What illnesses do the children suffer from?

(d) Which age group in the study population is malnourished?

**1.5 Null hypotheses**

(a) There is no difference in the prevalence of malnutrition in the three orphanages.

(b) The morbidity of the orphans does not relate to their nutritional status.

(c) There is no difference in the hygienic practices of the children in the three orphanages.

(e) The personal hygiene of the orphans does not relate to their nutritional status.

## 1.6 Objectives

### 1.6.1 General objective

To establish the nutritional status of orphans in the selected orphanages within Nairobi Province.

### 1.6.2 Specific objectives

(a) To identify the food consumption patterns of the orphans in the selected orphanages.

(b) To identify the hygienic practices of the orphans in the selected orphanages.

(c) To establish the morbidity pattern of the orphans in the selected orphanages.

(d) To establish the prevalence of malnutrition of the children in the selected orphanages.

# CHAPTER 2: LITERATURE REVIEW

## 2.1 HIV/ AIDS in the world

The first recognized cases of HIV/AIDS occurred in America in 1981 and in Uganda in 1982 (Michael, 2001). Since then HIV/AIDS has become the world's biggest fatal disease and the largest cause of death in Africa. By the end of 2002, there were approximately 42 million people in the world living with HIV/AIDS. Of these 20 million people died, 4 million of them being children under the age of 15 years (UNDPI, 2004). Globally 40 million people are estimated to be living with HIV/AIDS, with Africa contributing 26.6 million (66.5%). The total percentage of population infected by HIV/AIDS globally is 1.1% and 8.0% of these are in Africa (UNDP, 2004).

Sub-Saharan Africa has just over 10% of world population but it is home to more than 60% (25.8 millions) of all people living with HIV/AIDS (UNAIDS, 2006). In 2005 an estimated 3.2 million people in Sub-Saharan Africa became infected with HIV while 2.4 million people died of AIDS (UNAIDS, 2006). Africa therefore remained the epicenter of the global crisis. African women aged 15-24 years now comprise the majority of the new infections accounting for 42%, and are more than twice as likely to contract the virus as young men (UNDP, 2004).

## 2.2 Orphanhood in the world

In countries severely affected by HIV/AIDS, there has been a growing concern over the number of orphans, a problem that has increased largely as a result of the HIV/ AIDS pandemic (World Bank, 2000).

On the other hand it has been difficult to track this trend because there are few estimates of the number of HIV/AIDS orphans and because those estimates that do exist are not often comparable from one country to another. However, the needs of these children and their growing numbers necessitates governments, donors, non-governmental organizations, religious bodies and others concerned with the child welfare to take this trend seriously (USAID, 1999; Foresythe and Rau, 1996). Globally, the USA Census Bureau estimated that more than 16 million children will have lost either or both parents by the year 2005 in countries severely affected by HIV/AIDS (Panos Institute, 1999). The number of orphans was predicted to increase to 22.9 million by the year 2010, largely as a result of HIV/AIDS pandemic (Panos Institute, 1999). In sub- Saharan Africa the number of orphans is predicted to comprise up to 8.9% of the global orphan children under the age of 15 years by the year 2010 (UNAIDS, 2002).

The size of the population at risk of the HIV/AIDS and the increasing spread of the pandemic in Africa means that the problem will continue to worsen. These children may lack the proper care and supervision they need at this critical period of their lives. The strain on social systems to cope with such a large number of orphans is and continues to be tremendous. The burden will increase on society, both in the community and in the nation, to provide services for these children, including orphanages, food, health - care and school fees. Many children go without adequate health-care and schooling, which will increase the burden on society in the future. The number of urban street children may also increase. These children have the potential and the right not only to survive to adulthood, but also to develop their abilities and play a useful and fulfilling role in society.

Instead, they face the prospect of a relentless struggle for physical survival, for basic education, for love and affection, and for protection against exploitation, abuse and discrimination. The problem of meeting the needs of these children represents a major new challenge to governments, organizations and communities (Christian and Glen, 1991).

**2.3 Malnutrition in the world**

HIV/AIDS orphans are often more prone to malnutrition and infections and less likely to receive health-care than other children. This is so especially with the very young children who are likely to suffer from lack of care, and die unnecessarily of malnutrition and respiratory infections. Malnutrition is usually the result of a combination of inadequate dietary intake and infection. In children, malnutrition is synonymous with growth failure. Malnourished children are shorter and lighter than they should be for their age (UNICEF, 2000). There are 226 million children under the age of five in developing countries who suffer from moderate or severe stunting (UNICEF, 1998). This is nearly 40 percent of their respective age groups. High levels of stunting among children suggest that there will also be a longterm deficit in mental and physical development that can leave children ill prepared to take maximum advantage of learning opportunities in schools. On the other hand, stronger children grow into stronger and more productive adults (UNICEF, 1998). There is increasing evidence that (a) good nutrition helps the body resist infection (b) that when infection occurs, nutrition relieves its severity and seriousness and (c) that it speeds recovery (UNICEF, 1998). Malnutrition is implicated in more than half of all child deaths worldwide (UNICEF, 1998).

This proportion is unmatched by any infectious disease since the Black Death (A Bubonic plague that killed a quarter of England's population in 1348 (Allan, 1985)) yet it is not an infectious disease. In developing countries malnutrition contributes to more than half of the nearly 12 million under-five deaths each year (UNICEF, 1998). Various studies have associated malnutrition with parental education. Bhuiya (1986 ranked mothers' education as having the most significant effect on nutritional status of boys) in rural Bangladesh. The education of the father in the same study also had a positive impact on the nutritional status of girls.

A survey done by UNICEF (1990) in selected areas of Namibia found that the more familiar a guardian was with positive health behaviour which was as a result of more education, the more likely the child was to be less wasted. In the same report more education was highly significant and positively correlated with better nutrition in all occasions. In Kenya, a study done by Central Bureau of Statistics (CBS, 1998), found out that the education of the mother was closely linked to the nutritional status of children in that children of women with no education were more than three times likely to be underweight as children of women with at least secondary education.

**2.4 Nutritional situation of Kenyan children**

The main sources of information about child malnutrition in Kenya are the four rural child nutrition surveys carried out in 1977, 1978/79, 1982 and 1987 and the household welfare monitoring and evaluation surveys (UNICEF, 1992). Information on nutritional status of children in urban areas is limited to a few studies focusing on Nairobi and Mombasa (UNICEF, 1992). With the high incidence of poverty and HIV/AIDS today, it is true that malnutrition is also high.

HIV infected orphans suffer from tuberculosis, chronic or repeated bouts of diarrhoea, gastrointestinal bacterial infections, fungal infections among many other ailments (Ng'wesheni *et al.,* 1997). Many children who are HIV infected suffer from growth faltering due to bacterial infections, pneumonia, septicaemia, diarrhoeal diseases and measles. The implication of the above conditions is malnutrition (Ng'wesheni *et al.*, 1997). Even in early disease, attention must be paid to the child's diet, as many orphanages with inadequate incomes find it difficult to prepare nourishing diets for children. Many of the orphans who are not in the orphanages also suffer because they are left under the care of elderly grandparents, often women, who lack necessary resources to care for them hence putting them at the risk of malnutrition (Ng'wesheni *et al.*, 1997).

Regular measurement of weight, height, and head circumference of children can detect malnutrition. A study of children aged one to five years old carried out on the nations of the world, found out that between 1990 and 1998 twenty two percent of children less than five years in Kenya were moderately underweight while five percent were severely underweight; six percent of the children were wasted while thirty three percent were stunted (UNICEF, 2000). Stunting, a sign of frequent infections and chronic undernutrition, is indicated by a low height for age that is below 2SDs (standard deviations compared to a reference data) and is common with a peak at two to three years of age. Wasting, indicating acute under nutrition is indicated by a low weight for height with a cut off point of 2SDs. It is less prevalent and occurs mainly between one and two years of age (UNICEF, 2000).

In a healthy, well fed population of children, it is expected that only two to three percent of children would fall below two standard deviations from the median of the reference population for each of the three nutrition indices namely wasting, stunting and underweight (UNICEF, 1994). Blackhart (1979) studied two child populations under three years of age at Kenyatta Estate and Mathare valley in Nairobi and found that only 6 % of the children were underweight. In Korogocho, a peri-urban squatter settlement in Nairobi, 27 % of the children were stunted and 4.9 % wasted among the children (Maina *et al.*, 1988). Central Bureau of Statistics (1978) found that 2.1% of the children were stunted and 4 % were wasted. Another study by UNICEF (1994) found that in Nairobi, stunting was 30.2 %, wasting 5.5 % and underweight 22 %. Urban wasting was put at 5 % while wasting at the Coast Province was at 4 % (KDHS, 1999). Stunting was 19.6 % and wasting 2.5 % in a survey by Central Bureau of Statistics (1991).

Studies carried out in rural Machakos have shown that other than pregnant and lactating mothers, young children are the group most affected by marginal nutrition. Malnutrition in this group is due to both an inadequate diet and high morbidity rate. The studies associated high morbidity, high population densities and low levels of education with malnutrition. Poverty and low socio-economic status are important factors of malnutrition (CBS, 1987). Winikoff *et al*, (1984) and Okeahialam (1975) found that socio-economic status of the family as reflected by the total family income in both urban and rural areas to be an important factor contributing to poor nutritional status. UNICEF (1994) found that high levels of female education had negative association with stunting levels. Thus mothers with better education had fewer children stunted compared to those with little or no education.

Maternal education was related to knowledge of good child-care practices and to household wealth. Children of mothers who had secondary education had lower rates of stunting and wasting than those of mothers who had primary or no education (KDHS, 1999). In Kenya, it was found that girls in all respects were nutritionally at greater risk than boys (CBS, 1977). In this study however, they did not consider the different potential growth patterns existing between boys and girls. By taking this into consideration during the 1978/1979 nutritional survey no differences between the sexes were found. A study by Unicef in 1994 also found no significant difference between the nutritional status of girls and boys. However higher prevalence of malnutrition was associated with higher morbidity rates in the same study.

Prevalence of infectious diseases among children was found to cause increased risk of malnutrition (KDHS, 1999). The most recent study carried out in Kenya showed a decline in malnutrition levels in the year 2003 compared to those obtained in 2000 (CBS, 2004). In this survey 35 % and 30 % of the under fives were stunted in 2000 and 2003 respectively. Wasting declined from 6% to 5% and underweight from 21% to 19% in the same period (CBS, 2004). The mother's level of education had an inverse relationship with stunting levels of children and the male children were more likely to be underweight than the female (CBS, 2004).

**2.5 Food and health**

Food is any substance, which is consumed for the purpose of providing energy and supplying the body with materials necessary to build and repair tissues (Stover, 2002). Although there are more than 50 known nutrients, all are easily classified into six categories as follows: carbohydrates, proteins, fats, vitamins, minerals, and water.

Balanced meals promote health and constitute all the six categories of nutrients in the right proportions (Krause and Mahan, 1984). The nutrients perform three basic functions namely building and maintaining body tissue, furnishing energy and regulating body processes. Each class of nutrients is involved in one or more functions as follows:

### 2.5.1 Proteins

Proteins promote growth, repair and replacement of worn out tissues. They also form a major component of body muscles, brain and body fluids. In addition, they serve as secondary source of energy (Stover, 2002). Children are still growing, and need protein to build up the millions of body cells, which form tissues, organs and organ systems. A common nutritional disorder associated with inadequate intake of protein is kwashiorkor (Jenny, 1988). Proteins are made up of amino acids, which join together in different patterns. These amino acids make up different proteins. There are two types of amino acids: Non-essential amino acids which the body can make from other acids on its own, Essential amino acids which the body cannot make and so must be provided by the food (FAO, 1993). Proteins from vegetable sources do not contain all the essential amino acids and therefore cannot supply all the amino acids the body needs to make proteins that go on to build and repair tissues. However a combination of two or more incomplete proteins eaten together complement each other. Animal source of protein contain all the essential amino acids and are usually more expensive than vegetable protein foods (Jenny, 1988). Food supplying protein should be eaten every day because excess protein is broken down and stored or used for energy.

**2.5.2 Carbohydrates and Fats.**

Carbohydrates are the sources of energy and are chemically changed into simple sugars during digestion so as to be absorbed into the blood stream. Their functions are; To provide the body with energy, Cellulose moderates movement of food along the digestive system, Cellulose increases food bulk that gives food satiety value, Cellulose helps in the elimination of excess cholesterol from the body but is not broken down (except for a little symbiotic bacteria), Cellulose absorbs water, which softens faecal matter for smooth passage out of the body (Jenny, 1988). The amount of carbohydrates required by an individual depends on body size, sex, activity levels and whether people are growing, pregnant or lactating (Corinne *et al.,* 1980).

Carbohydrates are abundant, relatively cheap and occur in food in various forms of complex polysaccharides and simpler starches and sugars. They should be used in preference to protein as an energy source, so that proteins can be used for body growth and repair of worn out parts (Corinne *et al.*, 1980). Fats are a more concentrated source of energy than carbohydrates. It is needed for the absorption and use of fat soluble vitamins. Fat, oils and excess carbohydrates are converted into fat and stored. These excess fats are a major cause of obesity (Corinne *et al.*, 1980). Energy in children is important, as they are active at this age. Insufficient supply of energy-giving foods to a child results in one being underweight. Starvation, which is lack of food for long periods of time, may cause marasmus (Corinne *et al.*, 1980). This is where the body adapts to shortage of food by wasting of muscles and the depletion of fat stores, so that energy is only supplied to vital organs for example brain and heart (Marian, 1984).

In starvation, death eventually results from the breakdown of vital body tissue to supply energy. The child therefore becomes very thin and weak and the condition often results in death (Marian, 1984).

### 2.5.3 Vitamins.

Vitamins are protective food nutrients available in small amounts but essential for normal metabolism and growth. They are essential components of the diet whose absence leads to variety of deficiency diseases. Vitamins are divided into two groups: Fat soluble vitamins that is A, D, E, K and Water-soluble vitamins, which are Vitamins in B complex and C. Vitamins are vital to health and each has a specific role to play in the body (Krause and Mahan, 1984). Vitamin A is one of the most essential vitamins in the health and growth of children (Ruth, 2001). Its major functions include: keeping the skin and mucous membranes healthy, strengthening resistance to infections, is essential for growth and development, plays a part in reproduction and lactation and keeps the hair healthy. It is also responsible for bone and teeth formation (Marian, 1984). Fruits and vegetables are the major sources of vitamins in a diet. A nationwide micronutrient survey reported low consumption of fruits in Kenya (MoH/ UNICEF, 2001).

### 2.5.4 Minerals.

Mineral elements are necessary in forming the skeletal structure of the body and are present in every body cell and body fluids. There are about fifteen important minerals, which can be obtained from food. Macro minerals such as calcium, phosphorus, iron, sulphur etc are required in the body in relatively large amounts.

Micro-minerals include iodine, copper, and zinc which are required in very small amounts (Corinne, 1980). The three main functions of minerals are: To help form bones and teeth, for example calcium, phosphorus and fluorine. To form body fluids – sodium, chlorine and potassium. To make up body cells, such as muscles, liver and blood–iron, sulphur and phosphorus. A well balanced diet will supply enough of these minerals (FAO, 1993).

**2.6 Food and Nutritional Deficiency**

Nutritional deficiency diseases and disorders are caused either by inadequate or excessive intake of a given nutrient. The most common nutritional deficiency diseases and disorders in Africa, and in Kenya specifically, are marasmus, kwashiorkor, anaemia, scurvy, rickets and osteomalacia, beriberi and pellagra, eye problems and dental fluorosis (Krause and Mahan, 1984). Kwashiorkor is caused by severe malnutrition in children who get too little protein in their diet, resulting in retarded growth. Symptoms of kwashiorkor include: retarded growth, chronic diarrhoea and infections, deterioration of hair, skin and nails, retention of fluid under the skin, causing swelling (oedema) of the eyes, stomach, hands and feet and poor digestion of food. In severe cases the skin peels off in patches, leaving raw wounds. Brain development is also affected. The child may be anaemic as well (Anne, 1987). The height and weight of the child are below normal for his age. Where there is oedema, the weight may appear satisfactory (Stover, 2002). Marasmus occurs as a result of total starvation. In this case, the body lacks all nutrients especially carbohydrates leading to muscles becoming wasted away and very thin. (Allan, 1985). Marasmus can occur at any age as long as food intake is not adequate.

Symptoms of marasmus include, extreme loss of weight that is, the child is skinny and bonny and he may weigh half of what he should at his age. There is no or little sub-cutaneous fat and, therefore, the skin, especially around the upper part of the arms, the thighs, buttocks and stomach, are wrinkled. The face is also wrinkled and looks like that of an old person. The ribs can be clearly seen. The eyes protrude and the child is generally apprehensive. The hair may look normal, but the head will look big in comparison to his small body. The child is weak and growth is retarded (Anita, 2002). Inadequate intake of vitamins results in a variety of nutritional disorders. Vitamin A deficiency in the body will cause night blindness, rough, dry and scaly skin, checked growth, malabsorption of food in the intestinal tract and mucous membranes of the nose and throat are affected (Anne, 1987).

There are eleven vitamins in the B group but the three important ones are thiamin, riboflavin and nicotinic acid (niacin). Vitamin B helps to release energy from food. A very active person requires more vitamin B than a less active one (Anne, 1987). Inadequate intake of B vitamins results into general body weakness and in severe shortage, Beriberi (vitamin $B_1$), and pellagra (niacin) (Jenny, 1988). Vitamin D is also known as the sunshine vitamin. It is found in a variety of foods. Without the supply of vitamin D the body is unable to absorb calcium. Rickets is a nutritional disorder caused by inadequate intake of vitamin D, where the bones of a child become so weak that the legs bend under the weight of the body. Vitamin C is easily lost during the preparation and cooking of fruits and vegetables especially when these foods are overcooked (Anita, 2002). Vitamin C keeps the skin, bones and muscles healthy.
It also increases resistance to infection and helps the body absorb iron. Inadequate intake causes bleeding of gums and slow healing of wounds.

Severe shortage causes scurvy (Marian, 1984). A balanced diet supplies the required minerals in the body. Extra amounts are however needed in special cases, for example, pregnant women and growing children need increased supplies of calcium and iron (Anita, 2002). Calcium forms the structure of bones and teeth. It also helps to control the formation of muscles. Inadequate intake of calcium causes rickets and stunted growth in children (Marian, 1984). Iron helps to form haemoglobin in red blood cells, which carries oxygen needed for energy production and so prevents anaemia. However, vitamin C is needed for its absorption (Jenny, 1988). Fluorine helps to form strong enamel on teeth and so prevents teeth decay (Marian, 1984).

**2.7 Nutrition and HIV/AIDS**

Management of HIV/AIDS requires long term nutritional care and drug therapy. There is interaction between drugs and the nutrient intake and nutritional status of the HIV/AIDS individual taking these antiretrovirals. Both the side effects and the therapeutic effects of the drug affects a person's nutrient intake, metabolism and requirements and ultimately, his nutritional status (Richard, 2002). Just as important, food and the nutrients in it affect the action of the antiretrovirals by altering it's absorption, metabolism and excretion (Richard, 2002). While the link between good nutrition and health is clear, the case of food as first line defence against HIV/AIDS is less known. People who are otherwise physically fit fare better at every stage of HIV/AIDS-infection. The initial primary infection may be virtually symptomless, the latency period of infection may be extended, and they may show fewer of the various symptoms of opportunistic infections (Hill, 2002).

The high fruit, high vegetable regimen rich in antioxidants recommended for the prevention of heart diseases and cancer helps to boost the immune system and ongoing response in the HIV/AIDS-infected (Cooker, 2000). Natural minerals and vitamins such as Zinc, vitamin A and B have proved successful in prolonging the lives of people living with HIV/AIDS (Eudjo, 2003). Dietary habits rich in acid–producing factors and over consumption of foods rich in simple sugars appear to preserve, protect and activate HIV/ AIDS viruses (Richard, 2002). Malnutrition has previously been associated with infectious diseases. Studies in Nigeria associated the incidence of diarrhoea with wasting, underweight and stunting (Waterlow, 1992). A survey carried out in 1994 revealed that high incidence of infectious diseases, resultant morbidity and mortality among young children in most developing countries is largely due to lowered body resistance to infections because of malnutrition (FAO, 1994).

**2.8 Food Security in Kenya.**

National food security is based on planned production of maize, wheat, rice, sugar, beans, beef, sorghum/millet, potatoes and milk (Forsythe and Rau, 1996). Adequate supply of these foods is achieved through: increasing food production in all areas of the country, emphasizing drought resistant crops in dry areas for example sorghum and millet, establishment of a food commodity and monitoring and reporting system, improved monitoring and forecasting of weather conditions in the main agricultural zones and dissemination of information on expected weather trends, regulation of food exports to maintain domestic supplies and importation of food, accumulation of a multi-commodity strategic food reserve for domestic surpluses and grain supplied on concessional terms to be used during periods of crop failure or other emergency situations.

Although Kenya produces and imports food to meet the nutritional requirements of her population, nutritional deficiencies among certain groups have persisted due to: unequal food purchasing power, unequal food supplies among districts and fluctuations in availability of food from season to season. The incidence of malnourishment is highest in Eastern and Rift Valley Provinces. Those who suffer most are small land holders with low incomes, rural low wage earners, pastoralists, urban poor especially in Nairobi and pregnant women and young children in poor families (Forsythe and Rau, 1996).

### 2.8.1 Food security and HIV/AIDS.

Many males work in the formal labour market in urban areas, whereas the women, who form the majority of Kenya's rural population represent the backbone of Kenya's small land holder agricultural and informal sectors (Eudjo, 2003). Cash remittances from the male household head and the earnings from the woman working in farming/informal sector therefore often sustain families (Eudjo, 2003). Family food security is threatened particularly when the woman dies in a family especially when families depend primarily on women's labour for food production, animal tending, crop planting and harvesting. Studies in Africa have shown that children's nutritional status is more closely related to mother's work and income than that of the father (Richard, 2002). The illness and death of a female will have a dramatic impact on the family, especially given that women provide the majority of labour and managerial services for small holdings in rural areas. The overall socialization and education of the children is also affected (Forsythe and Rau, 1996).

## 2.9 Personal hygiene and HIV.

HIV-positive individuals are at increased risk of both contracting certain infections and having more severe and prolonged infections than those who are immuno-competent (Michael, 2001). Good personal hygiene helps prevent infections and spread of diseases (Heathcock *et al.*, 1998). The mouth and the body skin are a primary source of infection in any individual, which may spread to other parts of the body. The junction of the tooth and gingiva provides potentially weak barrier through which bacteria may enter the connective tissue and systemic circulation. In this respect, maintaining a low microbial load within the mouth should be seen as an essential component of preventive treatment regimen in HIV/AIDS-positive individuals (Cooker, 2000). Patients of HIV/AIDS may present with common skin infections, which are more extensive or recurrent than usual in the primary infection stage. Frequent whole body baths reduces the microbial load on the body skin thus reducing skin infection (Hill, 2002).

## 2.10 Nutritional anthropometric measurements.

The influence of nutrition on the health of an individual is measured through assessment of nutritional status. Anthropometry, which is a measure of growth and development, is an important examination especially of infants, children and adolescents and pregnant women. It deals with comparative measurements of the body that permit estimations of body fat, muscle tissue and bone. They include height, weight, head, arm and chest circumference, skinfold and bony widths (Clifford *et al.*, 2004). Physical measurements reflect the total nutritional status over a lifetime.

The use of anthropometric measurements is justified in that, a large body of evidence exists showing that nutrition influences the physical dimensions of the body particularly in early childhood, characterized by rapid growth (Gibson, 1990). Anthropometric measures yield indices, which are then compared using a normal distribution curve representing an international reference population defined by the United States Centre for Health Statistics (NCHS). This in turn has been recommended by the World Health Organization (WHO) and the Centre for Disease Control (CDC).

The following are some of the indices: (a) Wasting which is determined by Weight-for-Height. This is weight of a child compared to median weight of reference (healthy) children of the same height. A child with low weight-for height is wasted or too thin. Wasting is a result of serious underfeeding and /or illness (FAO, 1993). (b) Stunting which is determined by Height-for-Age. This is the height (length) of a child compared to the median height of a reference (healthy) child of the same age. A child with a low height-for-age is stunted. Stunting is as a result of poor growth over a period of several months and is usually caused by chronic underfeeding and ill health. Stunting becomes more common as children get older because there has been a longer period for slow height growth to occur (Gibson, 1990). (c) Underweight which is determined by Weight-for-Age. This is the weight of a child compared to the median weight of reference (healthy) children of the same age. A child with a low weight- for-age is underweight. An underweight child may be wasted, stunted, or both (FAO, 1993). Measurements of head, mid-arm and abdominal circumference are also useful. Measurement of head circumference provides information about brain growth, midarm circumference about muscle mass, and abdominal circumference about water retention. Skinfold thickness measurements provide information about fatness and leanness.

The width of the fat layer that lies directly beneath the skin is measured in various places on the body to obtain the skinfold thickness (Marian, 1984). Height and head circumference represents past nutrition or chronic nutritional status. Weight and skinfold thickness reflects present nutritional status and are used to assess energy reserves both as fat and as protein. Weight in children is a sensitive measure of growth which gives immediate nutritional history and can be an early clue to growth problems and nutritional inadequacy (Clifford *et al.*, 2004).

# CHAPTER 3: MATERIALS AND METHODS

## 3.1 Study site

The study was conducted in the City of Nairobi, Kenya which lies $1^0$ South of the equator and longitude $36^0$ E. It has an area of 684sq Km (UN, 1994) with a population of 2.1 million (CBS, 2002). It is divided into 8 divisions namely, Westlands, Kibera, Makadara, Pumwani, Dagoretti, Embakasi, Kasarani and Central (Appendix 4). The orphanages selected were Rafiki and Cheryl's in Dagoretti and Mama Ngina in Makadara divisions.

## 3.2 Study population

Children orphaned by HIV/AIDS who were between 2 and 15 years and their caretakers in the orphanages within the study centres were considered for this work.

## 3.3 Study design

This study was descriptive cross-sectional. It was aimed at collecting both qualitative and quantitative data related to the nutritional status of the orphans in the selected orphanages. Both methods supplemented each other in that qualitative methods provided the in-depth information while quantitative methods provided the hard data needed to meet required objectives and to test the hypothesis.

### 3.4 Sampling and sample size determination

#### 3.4.1 Sampling

Convenient sampling technique was used to pick Nairobi and the orphanages for the study. Information from the orphanages' records was used and simple random sampling method applied to get the required number of orphans and their caretakers. The caretakers of the sampled orphans were automatically included in the study.

#### 3.4.2 Sample size

Sampling size was determined using the formula as used by Fisher *et al.* (1998).

$$n = \frac{Z^2pqD}{d^2}$$

Where n= desired sample size of HIV/AIDS orphans.

(Population >10,000).

Z= standard deviation usually 1.96 which corresponds to 95% confidence level.

p= the proportion in the target population estimated to have a particular characteristic=0.5

q=1-p (1-0.5)=0.5, d= 0.05 which is the Degree of accuracy, D=1, the design effect

$$n = \frac{(1.96^2)(0.5)(0.5)}{0.05^2}$$

$$n = 384$$

This formula was modified for a population of less than 10,000

Then , $$nf = \frac{n}{1 + n/N}$$

Where nf = desired sample size if the population is less than 10,000 individuals (n< 10,000)

n= Sample population

N = Study population (total number of orphans in the three

Orphanages, namely, Rafiki=32, Cheryls=35, Mama Ngina =47 a total of 114 orphans.

$$nf = \frac{384}{1 + 384/114}$$

This gave a sample of 88 children.

Using probability proportional to size, the sample size from each orphanage was:

(32/114 × 88= 25, 35/114 × 88 = 27, 47/114 × 88 = 36)

Rafiki =25 Cheryls = 27 Mama Ngina = 36 to get a total of 88 children.

### 3.5 Research instruments

Weight of the children was taken using a bathroom weighing Salter scale and the weights recorded to the nearest 0.1kg. Weight was taken as the average of two measurements. A height meter was used to take the heights of the children and recorded to the nearest 0.5cm. The children were taken the measurements with no shoes, standing straight and with no heavy clothing. Height was taken as the average of two consecutive measurements for accuracy. Interview guide was divided into three sections one to be filled by the children and the others by the caretakers and the overall in charge of the orphanage. Interview guide for the children sought information regarding demographic data of the children, personal hygiene and anthropometric measurements. Interview guide for the caretakers sought information on demographics characteristics of the caretakers, food consumption, nutritional knowledge and children's morbidity. The interview guide for the overall in charge of the orphanage sought information regarding the total number of orphans and sources of income for the orphanage among other issues.

The semi-structured questions enabled the researcher to probe the informants for more information. It also gave the informants the chance to give information in details as the questions asked were not rigid. The informants were not strictly limited to respond to questions as they appeared in the schedule. This was done inorder to make the interview less formal and hence make the informants feel free as they responded to the questions.

### 3.5.1 Pretesting

Pretesting was done in Kikuyu Division, Central Province, Kenya and specifically, Thogoto and Faith Children's Homes to improve the data collection and clarity of the questions. Data was collected from 15 respondents.

### 3.6 Data collection

Data collection was done using structured questionnaires (Appendix 1 to 3). Desk review was done for those children who were not able to respond verbally. Pre-testing of the research instruments was carried out to enhance the validity of the instruments and improve on the questions. Anthropometric data, which includes, height, weight and age was collected from the children. These three variables were developed into indices of nutritional status. These instruments were attached to the interview schedule. The interviewer filled in the anthropometric data of children after weighing and measuring their height as well as verifying their ages by filling in their dates of birth. Sex of child was also indicated and used to test whether nutritional status of children vary or otherwise.

### 3.7 Ethical consideration

Permission was sought from all the relevant authorities: Kenyatta University, Ministry of Education, and the proprietors of the Orphanages namely Rafiki, Cheryls and Mama Ngina.

### 3.8 Data analysis

Data was processed using EPI-Info and Statistical Package for Social Sciences (SPSS) personal computer programs for respective generation of indices of nutritional status and analysis. The children were classified into categories of nutritional status using the National Centre for Health Statistics (NCHS) as a reference data. Anthropometry was used to determine the nutritional status of the children. Z-scores were used for children between 4 and 11 years. Body Mass Index was used for children between 12 and 15 years. Children (12 to 15 years) with their BMI below 16.0 were considered severely malnourished. Those with their BMI between 16.1 and 18.5 were considered to be moderately malnourished and those between 18.6 to 25.0 were considered normal.

Children (4 to 11 years) who were below - 3 SDs of the reference data were considered severely malnourished. Those considered to be moderately malnourished were between –2.99 and –2.0 SDs and those above –1.99 SDs were considered normal. Weight for Height measure was used to show the prevalence of acute malnutrition or nutritional wasting. Stunting which is a measure of linear growth was measured by height for age. Weight for age is a combination of chronic and acute malnutrition. A child may have low weight for age either because he has grown at a reduced rate over a long period of time or has recently suffered from an episode of acute malnutrition. It does not distinguish between acute and chronic malnutrition.

The total number of all the children who were severely and moderately malnourished was given as Global Acute Malnutrition (GAM). Chi-square test and Pearson product moment correlation were used for statistical association of variables and one way Analysis Of Variance (ANOVA) was used to test the differences of means in indices of nutritional status of the children.

# CHAPTER 4: RESULTS

## 4.1 Demographic Characteristics of the Children

Gender refers to the aspect of being male or female. The study sought to find out gender distribution in the sample and whether children in different age groups varied in their nutritional status. The study was carried out in three orphanages with a total of 88 children. The sample was made up of Rafiki with 25 orphans, Cheryl's, 27 and Mama Ngina, 36. The sample also varied in the number of children in each age category with 53 orphans between 4 to 11 years and 35 between 12 years and 15 years of age (Table 4.1).

TABLE 4.1 Distribution of children by gender in the orphanages.

| **Orphanage** | **AGE** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4 to 11 years | | | | 12 to 15 years | | | | Total | |
| | Boys | | Girls | | Boys | | Girls | | | |
| | N | % | N | % | N | % | N | % | N | % |
| **Rafiki** | 6 | 7 | 10 | 11 | 7 | 8 | 2 | 2 | 25 | 28 |
| **Cheryl's** | 9 | 10 | 7 | 8 | 4 | 5 | 7 | 8 | 27 | 31 |
| **Mama Ngina** | 8 | 9 | 13 | 15 | 9 | 10 | 6 | 7 | 36 | 41 |
| **Total** | 23 | 26 | 30 | 34 | 20 | 23 | 15 | 17 | 88 | 100 |

## 4.2 Demographic data of children's caretakers

The caretakers are the people who look after the children in the orphanage. Education level affects nutritional status of children in that those with better education will know what is good nutrition and its importance to children. Marital status refers to social position in relation to marriage. Gender has its role in the upbringing of children.

The female and male figures will represent mothers and fathers, as is the case in a home setting. The demographic data of the caretakers was similar in the three orphanages. Mama Ngina had 12 caretakers, Rafiki 10 and Cheryl's 11 giving a total of 33 (n=33) in all the orphanages. Majority of the caretakers (79%) were married; 38% had attained a minimum of primary education, the males were (53%) and female were 47% (Table 4.2).

TABLE 4. 2 Demographical data of the caretakers

| Orphanage | Rafiki % (N=10) | Cheryl's %(N=11) | Mama Ngina %(N=12) |
|---|---|---|---|
| Age | 35-50 | 32-48 | 26-53 |
| Marital status, | | | |
| single | 33 | 0 | 30 |
| Married | 67 | 100 | 70 |
| Educational level, | | | |
| Primary | 33 | 40 | 40 |
| Secondary | 67 | 0 | 60 |
| College | 0 | 60 | 0 |
| Gender | | | |
| Female | 50 | 40 | 50 |
| Male | 50 | 60 | 50 |

## 4.3 Morbidity and personal hygiene

### 4.3.1 Morbidity experience

Children who are sick may have poor or no appetite for food. This has a negative impact on their nutritional status especially if prolonged or is recurrent. The information was sought from the orphanages' resident nurse. The children in the three orphanages suffered from various infections which included colds/flu, diarrhea, vomiting, malaria and ringworm. The results in Table 4.3 were based on the number of children who had suffered from any of the ailments in the last seven days before and within the time of the study.

Most of the sick children were from Mama Ngina with 16 and Cheryl's with 10 out of a total of 34. The total number of infections reported in the previous seven days in all the three orphanages was 34, which is 39% of the total number of children. The children who suffered from colds/flu/cough were 25% while 8% suffered from diarrheal infections which were the two leading infections. The caretakers of the children in all the three orphanages reported that when a child was sick, they were taken to the resident nurse incases of colds/flu/coughs. In case of malaria, diarrhea and vomiting they were taken to a dispensary. For those with ringworm, medication was obtained from the chemists. It was expected that the children suffering from diarheal disease would be given special diet. In all the three orphanages it was reported that the meals were not altered and that the sick children were given the same food as the healthy.

TABLE 4.3 Children's morbidity experience.

| **Orphanage** | **No of children who suffered from ( N=88);** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Colds/flu/cough** | | **Vomiting** | | **Diarrhea** | | **Ringworm** | | **Malaria** | | **Totals** | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| **Rafiki** | 5 | 6 | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 0 | 8 | 9 |
| **Cheryl's** | 7 | 8 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 10 | 12 |
| **Mama Ngina** | 10 | 11 | 2 | 2 | 3 | 3 | 0 | 0 | 1 | 1 | 16 | 18 |
| **Total** | 22 | 25 | 2 | 2 | 7 | 8 | 2 | 2 | 1 | 1 | 34 | 39 |

### 4.3.2 Personal hygiene

Children who are growing up require to be constantly reminded to practice various aspects of personal hygiene. It was noted that sources of water were limited to one tap located outside the kitchen, a no go zone for the children. Personal effects such as toilet soap and toothpaste were only replaced at the end of every month. These factors could have contributed to the following results.

### 4.3.3 Bathing

Taking a bath daily is one of the measures that ensure a healthy skin which is able to prevent access of microorganisms into the body. The study sought to find out how frequently the orphans bathed. The majority (55%) of the children took a bath once a week, 35 % took a bath once in a fortnight and 10% took a bath every day. Those who took a bath less than once a day had a higher health risk considering the distance for example the children in Cheryl's had to walk to school on daily basis. The results are as shown in figure 4.1.

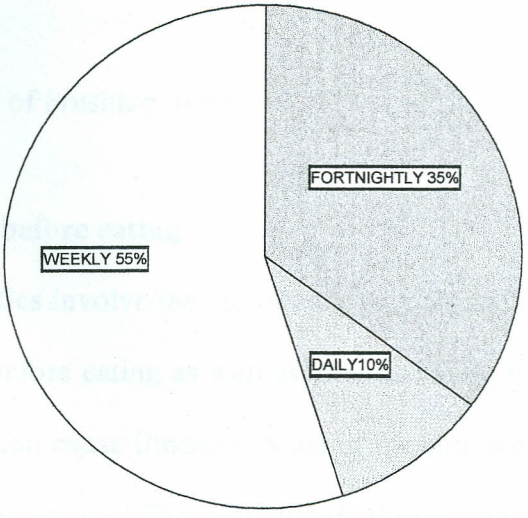



FIGURE 4.1 Frequency of bathing.

### 4.3.4 Brushing of teeth

Brushing of teeth twice or more in a day lowers the microbial load in the mouth thus ensuring healthy teeth and gums. The children in Cheryl's and Rafiki brushed their teeth most of the time with salty water. However those in Mama Ngina always used toothpaste to brush their teeth. Few children (6%) maintained good oral hygiene by brushing their teeth two to three times a day. Majority of the children (78%) brushed once a day. Brushing once a day reduces the microbial load in the mouth especially if done before going to bed. The children who brushed their teeth once a week were 16%. These children practiced poor oral hygiene (Figure 4.2).

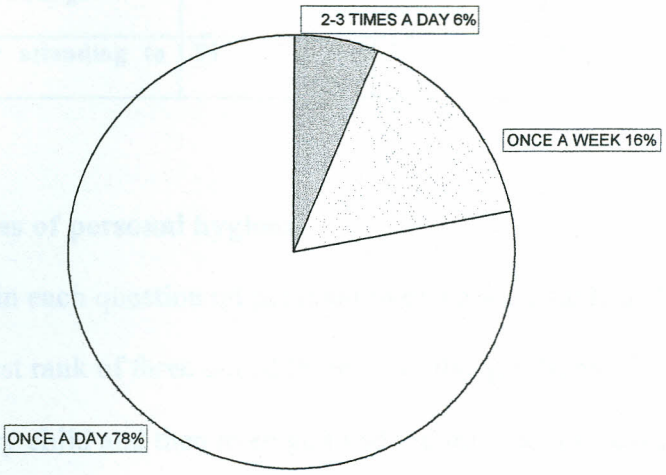



FIGURE 4.2 Frequency of brushing teeth.

### 4.3.5 Washing hands before eating

Many of our daily activities involve the use of hands which make them collect dirt and germs. Washing hands before eating as well as after attending to dirty work will help to get rid of germs that can cause illnesses. Most of the children (69 %) washed their hands sometimes before eating. The rest either always (14 %) or never (17%) remembered to wash their hands before eating.

Majority (91%) of the children washed their hands sometimes after attending to dirty work. The rest (6 %) never remembered or always (3 %) washed their hands after attending to dirty work. The children's practices are as shown in Table 4.4.

TABLE 4.4 Frequency (%) of washing hands before eating and after attending to dirty work.

| **Hygienic Practices** | **FREQUENCY ( %) (N=88)** | | | |
|---|---|---|---|---|
| | **Sometimes** | **Always** | **Never** | **Total %** |
| **Washing hands before eating.** | 69 | 14 | 17 | 100 |
| **Washing hands after attending to dirty work.** | 91 | 3 | 6 | 100 |

### 4.3.6 Average scores of personal hygiene

The answers given in each question on personal hygiene were ranked. The best answer was given the highest rank of three out of three in all the questions. The ranks were summed up for every child and then averaged and recorded to the nearest whole number. Those who scored 3 were rated as having high hygiene standards, those with 2 as having average and those having low hygiene standards had a score of 1. Few children (4%) maintained expected hygienic practices. Majority of the children (90 %) maintained average personal hygiene. Only 6% of the children were considered to practice low personal hygiene. The results are as shown in Table 4.5.

TABLE 4.5 Average scores on personal hygiene.

| | Frequency (%) of scores of personal hygiene practices (N=88) | | | |
|---|---|---|---|---|
| | Rafiki | Cheryl's | Mama Ngina | Total |
| **High** | 0 | 4 | 0 | 4 |
| **Average** | 23 | 27 | 40 | 90 |
| **Low** | 5 | 0 | 1 | 6 |
| **Total** | 28 | 31 | 41 | 100 |

### 4.4 Food consumption and feeding pattern

Food consumption patterns is crucial in determining the respondents' intake. In Rafiki and Cheryl's, children had two meals in a day during school days and three meals and a snack on week-ends. In Mama Ngina, the children got three meals a day throughout the week and a 10.00 O'clock snack for those aged five years and below. During special occasions, the children are given foods such as biscuits, cakes, ice creams and fruit juice in all the homes.

#### 4.4.1 Types of food consumed

The three main meals in a day namely, breakfast, lunch and supper were assessed to identify the types of foods that were rarely served and those served most of the week. To come up with the table, the orphanages' weekly menu were compiled and verified by visits made during mealtime. When all the foods served in the three orphanages were put together, the overall results showed that tea and bread were served most of the week for breakfast (19%). *Uji* (14%) was less frequently served for breakfast. *Ugali* with vegetables or Meat stew was served most of the times (25%) followed by rice and beans or green gram stew (22%).

Boiled maize and beans (*Githeri*) was also served (13%). The dishes rarely served were Banana and meatstew (2%) and *Ugali* with vegetables or meatstew (5%). Table 4.6 reflects the verified weekly meals.

TABLE 4.6 Frequency (%) of types of food served in the orphanage per week.

| Orphanage | Food (N=21) | | | | | | |
|---|---|---|---|---|---|---|---|
| | Breakfast | | Lunch and super | | | | |
| | Tea and bread | *Uji* | Rice and beans/ Green gram stew | Banana and meat stew | *Ugali,* vegetable/ Meat stew | *Chapati,* Green grams/Meat stew | Maize and Beans (*Githeri*) |
| **Rafiki** | 23 | 10 | 19 | 5 | 19 | 10 | 14 |
| **Cheryl's** | 19 | 14 | 24 | NIL | 33 | NIL | 10 |
| **Mama Ngina** | 14 | 19 | 24 | NIL | 24 | 5 | 14 |
| **TOTAL** | 19 | 14 | 22 | 2 | 25 | 5 | 13 |

### 4.4.2 Vegetables and fruits

Vitamin is essential in the body of a child. The major sources of water soluble vitamins, which are not stored in the body and hence need to be taken daily are fruits and vegetables. However the vegetables require proper preparation and cooking to conserve this nutrient. Dark-green leafy vegetables and cabbages were served in the three orphanages. Observations of the cooked vegetables were made and those that were mashy and lighter in colour after cooking were considered overcooked. In all the orphanages the vegetables were overcooked. Fruits were not served in the orphanages. In the meals where vegetables or fruits were not served vitamins were assumed not to be present.

The number of meals in which vitamins were absent were 42 out of 63, the total number of meals served in the previous one week in the three orphanages. The most under-utilized food at breakfast by all the orphanages were vegetables and fruits. Mama Ngina had the greatest number (17 out of 42). Rafiki had 13 and Cheryl's 12 of the meals. (Table 4. 7).

TABLE 4.7 Meals with no vegetables or fruits.

| Meals | Breakfast | Lunch | Super | Total |
|---|---|---|---|---|
| **RAFIKI** | 7 | 0 | 6 | 13 |
| **CHERYL'S** | 7 | 3 | 2 | 12 |
| **MAMA NGINA** | 7 | 6 | 4 | 17 |
| **Total** | 21 | 9 | 12 | 42 |

### 4.4.3 Proteins in meals

Proteins are essential for linear growth of the children. The meals considered having no proteins were those with no animal or plant proteins. The meals with carbohydrates only (example, porridge with no milk) or carbohydrates and vitamins (example, *Ugali* and vegetables) were considered to have no protein nutrient. The number of meals served in the week in which proteins were present were 68 % that is 43 out of 63 (the total number of meals served in the three orphanages). Cheryl's had the majority (10) of the meals with no protein. This means that children in Cheryl's ate more meals which had no proteins than those in Mama Ngina (7) and Rafiki (3). The distribution of the meals served without proteins are shown in Table 4.8.

TABLE 4.8 Meals with no animal or plant proteins

| Meals | Breakfast | Lunch | Super | Total |
|---|---|---|---|---|
| **RAFIKI** | 2 | 1 | 0 | 3 |
| **CHERYL'S** | 5 | 1 | 4 | 10 |
| **MAMA NGINA** | 4 | 1 | 2 | 7 |
| **Total** | 11 | 3 | 6 | 20 |

### 4.4.4 Other sources of nutrients

Proteins from animal source are considered first class because they have all the amino acids required for growth unlike those from plant source. Out of the 43 meals indicated in table 4.5 (c) as having protein, only 9 of them had the protein from animal source. Of this, 5 were served in Rafiki and 2 in Mama Ngina and Cheryl's. Carbohydrates were served in all the three main meals in the last one week and in all the three orphanages. Pulses (beans and green grams) were frequently (40 %) served in all the three orphanage compared to other varieties (27 %) served for lunch and super.

## 4.5 Nutritional status of the orphans

The children's nutritional status that is wasting indicated by weight-for-height, underweight indicated by weight-for-age, stunting indicated by height-for-age and by Body Mass Index was assessed.

### 4.5.1 Distribution of children by wasting, stunting and underweight (4 to 11 years) in each orphanage

Weight for height is a measure of nutritional wasting and reveals immediate nutritional history. Weight -for-age is an indicator of underweight and Height for age is an indicator of stunting. These indices were computed for children of 4 to 11years in each orphanage and the results are shown in Table 4.9. Wasting was highest in Cheryl's which had 31% of the children wasted. Rafiki and Mama Ngina had a prevalence of 19% each. Underweight was prevalent in all the three orphanages with Mama Ngina having the highest prevalence of 29 %. Cheryl's had 25% and Rafiki 6% of underweight children. All the stunted children were in Cheryl's which could have arisen as a result of the inadequate consumption of proteins.

TABLE 4.9 Distribution of children by wasting, underweight and stunting and by orphanage.

| Nutritional Status | | RAFIKI (N=16) | | CHERYL'S (N=16) | | MAMA NGINA (N=21) | |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % |
| Wasting (WHZ) | Severe (<-3sd) | 0 | 0 | 2 | 12 | 1 | 5 |
| | Moderate (-2.99 to-2.0 sd) | 3 | 19 | 3 | 19 | 3 | 14 |
| | GAM (<- 1.99) | 3 | 19 | 5 | 31 | 4 | 19 |
| | Normal(>-1.99 sd) | 13 | 81 | 11 | 69 | 17 | 81 |
| Underweight (WAZ) | Severe (<-3sd) | 0 | 0 | 0 | 0 | 1 | 5 |
| | Moderate (-2.99 to –2.0 sd) | 1 | 6 | 4 | 25 | 5 | 24 |
| | GAM(<- 1.99) | 1 | 6 | 4 | 25 | 6 | 29 |
| | Normal (>-1.99 sd) | 15 | 94 | 12 | 75 | 15 | 71 |
| Stunting (HAZ) | Severe (<-3sd) | 0 | 0 | 1 | 6 | 0 | 0 |
| | Moderate (-2.99 to –2.0 sd) | 0 | 0 | 3 | 19 | 0 | 0 |
| | GAM(<- 1.99) | 0 | 0 | 4 | 25 | 0 | 0 |
| | Normal (>-1.99 sd) | 16 | 100 | 12 | 75 | 21 | 100 |

### 4.5.2 Distribution of children by Body Mass Index (BMI) (12 to 15 years).

Children between 12 to 15 years have a different growth rate from those below 12 years of age. This necessitated the use of Body Mass Index to establish their nutritional status. Prevalence of undernourished children aged 12 to 13years was high and present in all the three orphanages. Rafiki (67 %) and Mama Ngina (47 %) had majority of the malnourished children. Cheryl's had 18 % malnourished children. Prevalence of undernourished children aged 12 to 13years was high and present in all the three orphanages. Rafiki (67 %) and Mama Ngina (47 %) had majority of the malnourished children. Cheryl's had 18 % malnourished children (Table 4.10).

TABLE 4.10 Prevalence (%) of various degrees of malnutrition of children aged 12-15 years in the three orphanages

| Malnutrition | | Orphanage | | | | | |
|---|---|---|---|---|---|---|---|
| | | RAFIKI ( N= 9) | | CHERYL'S (N=11) | | MAMANGINA (N=15) | |
| | | N | % | N | % | N | % |
| Body Mass Index (BMI) | Severe (<16.0) | 2 | 23 | 0 | 0 | 2 | 13 |
| | Moderate (16.1 to 18.5) | 4 | 44 | 2 | 18 | 5 | 33 |
| | GAM(<- 1.99) | 6 | 67 | 2 | 18 | 7 | 47 |
| | Normal (18.6 to 25.0) | 3 | 33 | 9 | 82 | 8 | 53 |

### 4.5.3 Nutritional status of children in the three orphanages (4 to 15 years).

The total number of the children who were malnourished in the three orphanages were computed. Malnutrition was prevalent in this sample where 8% of the children aged 4 to 11 years were stunted, 21% underweight and 21% wasted. Those aged 12 to 15 years had the highest (43%) level of malnutrition. (Table 4.11)

TABLE 4.11 Distribution of children by stunting, underweight and wasting (4 to 15 years)

| Nutritional Status | | N (N=53) | % |
|---|---|---|---|
| **Stunting** | Severe (<-3sd) | 1 | 2 |
| | Moderate (-2.99 to –2.0 sd) | 3 | 6 |
| | GAM | 4 | 8 |
| | Normal (>- 1.99 sd) | 49 | 92 |
| **Underweight** | Severe (<-3sd) | 1 | 2 |
| | Moderate (-2.99 to –2.0 sd) | 10 | 19 |
| | GAM | 11 | 21 |
| | Normal (>- 1.99 sd) | 42 | 79 |
| **Wasting** | Severe (<-3sd) | 2 | 4 |
| | Moderate (-2.99 to –2.0 sd) | 9 | 17 |
| | GAM | 11 | 21 |
| | Normal (>- 1.99 sd) | 42 | 79 |
| **Body Mass Index** | Severe (<-3sd) | 4 | 11 |
| | Moderate (-2.99 to –2.0 sd) | 11 | 31 |
| | GAM | 15 | 43 |
| | Normal (>- 1.99 sd) | 20 | 57 |

### 4.5.4 Nutritional status of children by stunting, underweight, wasting and by gender

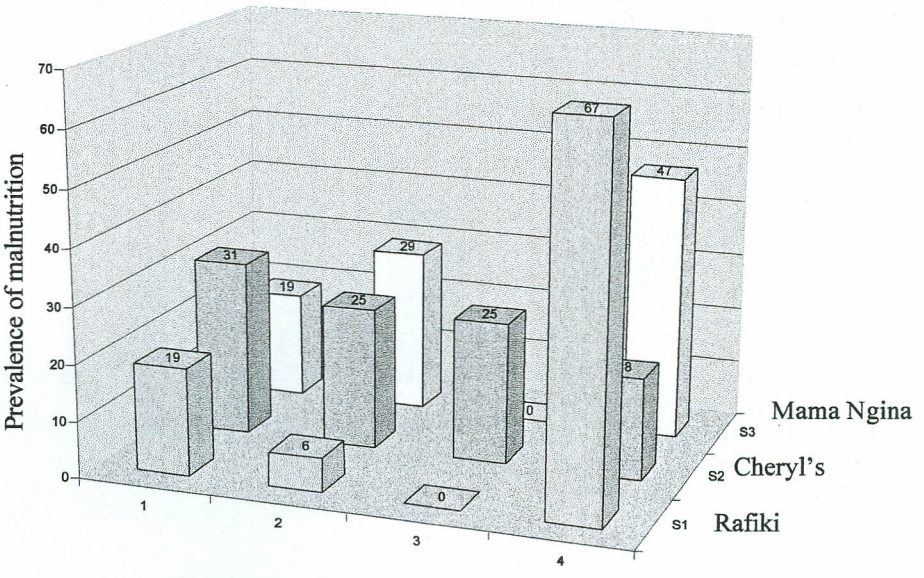
Nutritional status of each gender was computed to find out whether there were any differences in prevalence in children 4 to 11 years of age. Prevalence of wasting in boys (26 %) and girls (20 %) was statically similar. However, the boys were more stunted (13 %) and underweight (26 %). The results are as shown in Table 4.12.

TABLE 4.12 Nutritional status of children by stunting, underweight, wasting and by gender

| Nutritional Status | | SEX | | | |
|---|---|---|---|---|---|
| | | BOYS (N=23) | | GIRLS(N =30) | |
| | | N | % | N | % |
| STUNTING (HAZ) | Severe (<-3sd) | 1 | 4 | 0 | 0 |
| | Moderate (-2.99 to –2.0) sd) | 2 | 9 | 1 | 3 |
| | GAM(<- 1.99) | 3 | 13 | 1 | 3 |
| | Normal (>-1.99 sd) | 20 | 87 | 29 | 97 |
| WASTING (WHZ) | Severe (<-3sd) | 1 | 4 | 2 | 7 |
| | Moderate (-2.99 to –2.0) )sd) | 5 | 22 | 4 | 13 |
| | GAM(<- 1.99) | 6 | 26 | 6 | 20 |
| | Normal (>-1.99 sd) | 17 | 74 | 24 | 80 |
| UNDERWEIGHT (WAZ) (HAZ) | Severe (<-3sd) | 0 | 0 | 1 | 3 |
| | Moderate (-2.99 to –2.0) sd) | 6 | 26 | 4 | 13 |
| | GAM(<- 1.99) | 6 | 26 | 5 | 17 |
| | Normal (>-1.99 sd) | 17 | 74 | 25 | 83 |

### 4.5.5 Nutritional status of children by Body Mass Index (BMI) and gender (12 to15 years)

Nutritional status of each gender was computed to find out whether there were any differences in prevalence in children 12 to 15 years of age. In this age group, boys were more malnourished than the girls. The males who were malnourished were 55 % and girls were 27.3 %. The results are as shown in Table 4.13.

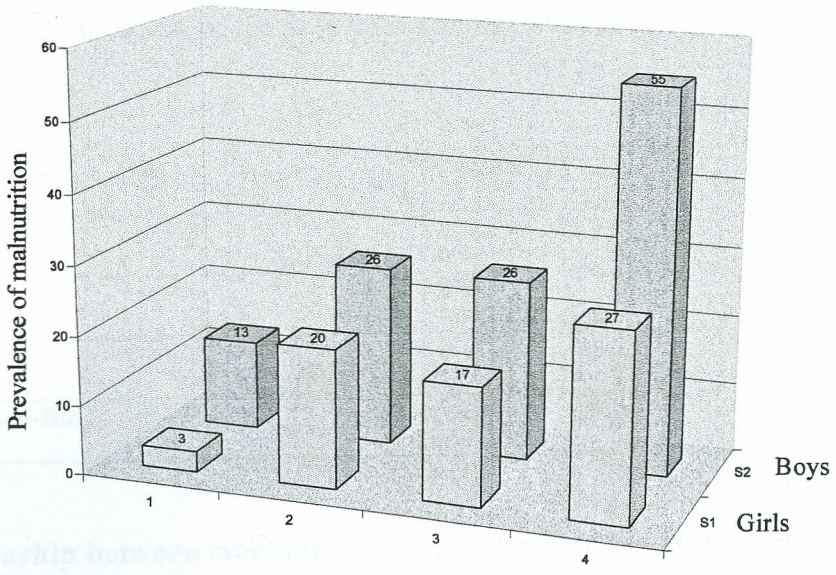



KEY
MALNUTRITION INDICES
1=Wasting
2=Underweight
3=Stunting
4= body Mass Index

Figure 4.3 Summary of nutritional status of children

### 4.5.7 Summary of nutritional status of children by gender.

To compare malnutrition between boys and girls in the sample, the prevalence levels were computed for each gender. In this sample boys aged 4 to 11 years had higher levels of malnutrition (13 % stunting, 26% underweight and 26% wasting) than girls (3% stunting, 17% underweight and 20% wasting). This was the case also with children aged 12 to 15 years where 55 % of the boys and 27 % of the girls were malnourished as indicated by their Body Mass Index (Figure 4.4).




KEY
MALNUTRITION INDICES
1=Stunting
2=Wasting
3= Underweight
4= body Mass Index

Figure 4.4 Summary of nutritional status by gender.

## 4.6 Relationship between the prevalence of malnutrition in the three orphanages

The orphanages seemed to have differences in the levels of malnutrition. One way Analysis of variance was used to establish the significance of these differences. One way Analysis of variance showed no significant difference in prevalence of stunting ($p=0.709$), wasting ($p=0.646$) and underweight ($p=0.682$) between the three orphanages in the children aged 4 to 11 years. Malnutrition of the children aged 12 to 15 years also had no significant difference ($p= 1.000$). The relationships were not significant ($p>0.05$) at 0.05 level of significance (Table 4.14).

TABLE 4.14 Comparison of the prevalence of malnutrition in the three orphanages

| Nutritional Status | F | p-value |
|---|---|---|
| **Stunting** | 0.809 | 0.708 |
| **Wasting** | 0.820 | 0.646 |
| **Underweight** | 0.831 | 0.682 |
| **Undernourished-BMI ( 12-15yrs)** | 0.191 | 1.000 |

## 4.7 Relationship between morbidity and nutritional status of the orphans

The health of the children was expected to have a direct impact on their nutritional status. Pearson product moment correlation was used to establish this. The relationship between the sick condition of the child (sick/not sick) and the nutritional status was weak and negative as indicated by correlation coefficient ($r=<-0.02$) for all the orphanages. However the relationship was not significant for children aged 12 to 15 years ($p=0.0568$). The relationships were significant ($p<0.05$) at 0.05 level of significance. (Table 4.15).

TABLE 4.15 Relationship between morbidity and nutritional status

| Nutritional Status | r | p-value |
|---|---|---|
| **Stunting (HAZ)** | -0.0179 | 0.0472 |
| **Underweight (WAZ)** | -0.0175 | 0.0431 |
| **Wasting (WHZ)** | -0.0131 | 0.0462 |
| **Body Mass Index (BMI)** | -0.0189 | 0.0568 |

## 4.8 Hygienic practices in the three orphanages

The hygienic practices of the children in the orphanages did not differ ($F=0.362, p=0.724$). One way Analysis of Variance was used to establish the significance of these differences. There was no significant difference in hygienic practices between the orphanages' ($p>0.05$). The results were as shown in Table 4.16.

TABLE 4.16 Differences between the orphanages on hygienic practices

| F | p-value |
|---|---|
| 0.362 | 0.724 |

## 4.9 Hygienic practices by nutritional status and by orphanage

The hygienic practices of the children were computed against their nutritional status in each orphanage. There was no significant relationship between hygienic practices and nutritional status of the orphans in all the three orphanages as indicated by Chi-square test ($p> 0.05$) in Table 4.17.

TABLE 4.17 Relationship between hygienic practices and nutritional status

| Nutritional status | Orphanage | p-value |
|---|---|---|
| **Stunting (HAZ)** | Rafiki | 0.068 |
| | Cheryl's | 0.073 |
| | Mama Ngina | 0.084 |
| **Underweight (WAZ)** | Rafiki | 0.085 |
| | Cheryl's | 0.067 |
| | Mama Ngina | 0.0719 |
| **Wasting (WHZ)** | Rafiki | 0.072 |
| | Cheryl's | 0.086 |
| | Mama Ngina | 0.062 |

## 4.10 Nutritional knowledge of caretakers

Answers on the functions of protein, carbohydrates and vitamins in a child's body were evaluated. Those who got the correct functions in three or more correct answers to the questions were rated as most knowledgeable, those who got two correct functions were rated as knowledgeable and those who got less than two functions correct were rated as not knowledgeable. Those most knowledgeable on the overall were (59 %). Those knowledgeable were (38 %) and only 10 % were not knowledgeable. The results are as shown in Table 4.18.

TABLE 4. 18 Levels of nutritional knowledge of caretakers in the three orphanages

| | RAFIKI (N=10) | CHERYL'S (N=11) | MAMA NGINA (N=12) |
|---|---|---|---|
| **Most knowledgeable** | 67 | 80 | 30 |
| **Knowledgeable** | 33 | 20 | 60 |
| **Not knowledgeable** | Nil | Nil | 10 |

### 4.11 Orphanages' sources of income and subsistence activities

The three orphanages rely on material and financial donations from individuals, Non - Governmental and religious organizations. However these donations were unpredictable and inadequate to provide for the basic needs of the children. Due to inadequate land space and finances, the orphanages have no subsistence activities which could subsidize the donations.

# CHAPTER 5: DISCUSSION

## 5.1 Nutritional status of the children

In this study, prevalence of malnutrition was the same in all the three orphanages that is in stunting (p=0.708), wasting (p=0.646), underweight (p=0.682) and by Body Mass Index (p=1.000). Specifically the study revealed that there was malnutrition among children in each orphanage. A multiplicity of factors interact to influence children's nutritional status. The findings of this study have established that malnutrition has its causes emanating from a number of complex factors for which specific interventions could be developed. Some of the nutritional risk factors established by this survey as causes of decline in child nutritional status included food insecurity, child's age and disease prevalence. However, at the macro levels, studies show that decline in Kenya's economic growth in the 1990's, the rise in inflation, increased poverty levels and HIV/AIDS pandemic are the major contributors to children's nutritional status (UNICEF, 2000).

The prevalence of wasting in this sample was high. Food is required for fuel, physiological functions as well as growth. Any imbalance is taken from, where there is inadequacy, or added, incase of abundance to the body stores of energy in form of fat, protein (in muscle) and for short-term use as carbohydrates (in the liver and muscle). These energy stores can be measured as weight and are therefore labeled weight-for-height. Leanness or fatness as weight for height measures body energy stress and indicate the energy intake or expenditure balance. Negative balance in children means that their development is affected.

A child's weight for height measure is an indicator of nutritional wasting and primarily reflects severe short-term deprivation of food in his/her immediate nutritional history, for example during episodes of disease such as diarrhea or times of food shortage. In Kenya, nutritional wasting or acute malnutrition affects only a small proportion of child population (CBS, 1984). In this study, 21 % of the children were wasted. This figure is different from the national average of 5% (CBS, 2004) or 6% (UNICEF, 2000). The high prevalence of wasting in this sample could have resulted from the sick children who were not given special meals.

There was Prevalence of stunting among children in the three orphanages. Children with a low height for age are stunted. This condition is usually associated with long term factors such as frequent infections and poor feeding practices (UNICEF, 2000). In this study, there was 8 % prevalence of stunting. This figure is below the national figure of 30% (CBS, 2004). In the study underweight children recorded high prevalence. Deteriorating standards of living and increase in food prices could have contributed to the high prevalence of undernutrition. A child's Weight- for -Age measure reflects both previous growth and present nutritional conditions. In this study, 21 % of the children were underweight. This figure is higher than the national figure of 13% (CBS, 1988) but similar to the national figure of 19 % (CBS, 2004). Another study which was done in Kenyatta Estate in Nairobi Kenya (Blackhart, 1979) found that the prevalence of malnutrition increased with age. In this study children aged 12 to 15 years had very high prevalence (43 %) of malnutrition. The older children were prone to nutritional deficiencies. This could imply that older children are more prone to environmental stresses than younger ones, and compounded by adolescent stresses.

These findings are similar to the findings of Anita (2002) which showed that tremendous growth spurt of adolescence usually occurs in girls between the ages of $10^1/_2$ and 13 years and in boys between the ages of 13 and 16 years. There was higher prevalence of malnutrition in boys than girls in all the indices of malnutrition that is stunting (boys=13%and girls=3%), underweight (boys=26% and girls = 17%), wasting (boys =26% and girls=20%) and Body Mass Index (boys =55% and girls=27%). This could imply that boys fall sick more often than girls. Boys also require more food than girls of the same age because of their physiological differences.

## 5.2 Morbidity and personal hygiene

The findings of this study indicated that the hygienic practices of the children were the same in all the three orphanages (p=0.724). Majority of the children did not maintain high standards of personal hygiene since only 3 % had high scores on personal hygiene. Absence of taps positioned strategically for example near the dining area, which could serve as a reminder to the children to wash their hands before meals could have contributed to the average scores of personal hygiene. Personal effects though given to the children were rationed and not replaced even if they got finished before the stipulated time. This could have contributed to the few baths that were taken daily (10%). Low personal hygiene is associated with increased morbidity, which in turn is associated with decreased nutritional status (Cooker, 2000). In the present study personal hygiene was not significantly associated with nutritional status of the orphans in any of the orphanages (Rafiki: wasting p=0.072; stunting p=0.068 and underweight p=0.085; Cheryl's: wasting p=0.086; stunting p=0.073 and underweight p=0.067; and Mama Ngina: (wasting p=0.062; stunting p=0.084 and underweight p=0.0719).

The two leading infectious diseases were colds (25%) and diarrhea (8%). Diarrhea is strongly associated with malnutrition and it kills by triggering off dehydration and electrolyte balance (Cooker, 2000). Repeated episodes of diarrhea have far reaching consequences leading to growth failure and malnutrition. Diarrhoea in children results mainly from unsafe water and neglect of personal hygiene. Morbidity breeds malnutrition and in turn, malnutrition increases morbidity, thus a vicious circle (Cooker, 2000). In this study morbidity was negatively correlated with the nutritional status of the children that is wasting (r= -0.0131), stunting (r=-0.0179), underweight (r=-0.0175) and Body Mass Index (r=-0.0189). This means that the prevalence of malnutrition increased with decreased number of children who were not sick and vice versa. This could be associated with the fact that sick children were not given special meals which could foster quick recovery. The sick children could also have suffered from episodes of low appetite thus affecting their food intake. The findings of this study are similar to those of previous studies whereby infectious diseases had negative effects on child's Height-for-Age, Weight-for-Height and Weight-for-Age (Waterlow, 1992).

A study carried out in Nigeria also associated morbidity with malnutrition (FAO, 1994). Another study carried out in rural Machakos associated the nutritional status of children with morbidity (CBS, 1987). UNICEF (1998) found out that infectious diseases were positively associated to malnutrition in children. The morbidity of the older children aged 12 to 15 years was not significantly associated with their nutritional status (p=0.0568). This could imply that the older sick children recovered faster than the younger sick ones before malnutrition could set in.

It could also mean that malnutrition among the older children had other influencing factors other than morbidity.

### 5.3 Types and variety of meals.

Data from the study showed that diet in the orphanages was dominated by basic staple foods supplemented by complimentary foods usually, in form of stews. Staples such as maize, wheat, and rice were observed as sources of energy. It was further observed that there was a tendency towards exclusive reliance on starches and green grams. The food most served on overall was *Ugali* with vegetables or meatstew (25%). This food is both cheap and easy to prepare compared to *chapati* with *ndengu* or meatstew, which is expensive and involving. Food eaten by the children in the orphanages mainly depended on donations. Children may be served with large servings of carbohydrates because they are cheap and bulky. Foods that provide the body with adequate nutrients to support all the body functions are associated with good health (Krause and Mahan, 1984).

It was found that during breakfast vegetables and fruits were not served in the week in all the three orphanages. Fruits were not served at all in all the three orphanages. This concurs with 1999 micronutrient survey, which reported a relatively low consumption of fruits in Kenya (MoH/UNICEF, 2001). This could have been due to the convenience of serving bread considering the little time available in the morning and it is cheap in terms of cost. Vegetables served for lunch and supper were observed to be overcooked. Overcooking destroys water soluble vitamins. Most of the protein foods provided to the children in the three main meals of the day were plant proteins.

Animal proteins have high calorific value while plant sources have low calorific value (Jenny, 1998). However eating two or more plant proteins together may complement each other. Proteins promote growth in children. Absence of proteins in the meals therefore results into checked growth (Anne, 1987). Meals that lack vegetable or fruits and proteins are not balanced. Unbalanced meals are associated with malnutrition (FAO, 1993). This findings are similar to those in this study where malnutrition that is stunting (8%), underweight (21%), wasting (21%) and by Body Mass Index (43%) was present in the sample. This could have been contributed by the 42% meals served without vegetables and fruits and the 20% meals served with no animal or plant protein.

**5.4 Feeding pattern.**

Breakfast, lunch and super were the main meals of the day. However, it was found out that disparities existed in the number of meals given to the children within a week. Most of the children had two meals in a day. Whereas two meals in a day could be explained by the long distance between most orphanages and where they attended school, no effort was made to pack food or a snack for the midday meal. The number of meals served to a child is important in promoting growth. Foods given in small portions but frequently foster better health and growth in children than bulky and rare servings (Anita, 2002). However the quality and quantity of food given to a child is very important.

Low food intake was reported to be associated with slow rate of growth (FAO, 1992). In a study in rural Machakos, inadequate diet was reported to be associated with malnutrition (CBS, 1987). The findings by CBS (1987) and FAO (1992) differed with those of this study. In Mama Ngina the children were fed on three meals a day and snack. There were more children in this home (36) than in Rafiki (25) and Cheryl's (27). This was not reflected in their nutritional status which had no significant difference with the other orphanages (stunting, p= 0.708); underweight, p=0.682; wasting, p= 0.646 and Body Mass Index, p=1.000). This could have been due to the quality and quantity of the meals served which did not foster better nutritional status. Children who were sick were not given a special diet to help them return to normal, healthy eating. There are many children in Kenya today who are orphaned, are living with HIV/AIDS and have special food and nutritional needs. Some of these children could have been in these orphanages since they foster children orphaned by HIV/AIDS. Lots of small meals rather than a few large ones and plenty of fluids, for example, soups and fresh fruit juices would encourage the patient to eat more and foster quick recovery from the sickness (UNAIDS, 2002). In this study however, the findings were contrary to the expectations that sick children would be given special diet to foster faster recovery.

### 5.5 Caretakers' knowledge of nutrition.

The caretakers had basic nutritional knowledge. However malnutrition was prevalent in all the three orphanages. Findings of the present study may be a reflection of the inadequacy of knowledge as a tool to fight malnutrition in a crippling economic environment. The education of the mother is closely linked to nutritional status of children (CBS, 1998).

For example, children of women with no education are more than three times likely to be underweight than children of women with at least some secondary education (CBS, 1998). A study carried out by UNICEF (1994) in Kenya found out that high levels of female education had negative association with nutritional status of children. Another study in Namibia found that more education of a guardian was highly significant and positively related to better nutrition of the children (UNICEF, 1990). The results of this study differed with those by UNICEF (1990) since majority of the caretakers in the three orphanages had adequate nutritional knowledge (Rafiki= 100%, Cheryl's = 100% and Mama Ngina=90%). This could have been as a result of the inadequate financial assistance given to the orphanages.

# CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Conclusions.

1. Malnutrition is prevalent in orphans living in Rafiki, Cheryl's and Mama Ngina orphanages.

2. Morbidity has an implication on nutritional status where reduced appetite during the episode, environmental and adolescent stresses are possible influencing factors that have to be put into context when addressing nutritional status of orphans in orphanages.

3. Personal hygiene has an implication on nutritional status in that the children's hygienic practices were the same and the prevalence of malnutrition was also the same.

4. Inadequate intake of protein food increases the risk of stunting in children as was the case in Cheryl's orphanage.

## 6.2 Recommendations

1. There is need for the government to develop and implement policy strategies on health that will address the plight of orphans living in orphanages.

2. The study population needs to be tested to establish their HIV status so that those who may require therapeutic feeding can start to enhance their health.

## 6.3 Suggestions for further research

1. A study should be carried out on the HIV/AIDS orphans in the orphanages to establish the environmental stresses that influence their nutritional status.

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## APPENDIX 1

**My names are Elizabeth W. Mwaniki, a Public Health student at Kenyatta University. The information you are going to give will not be released to anyone whatsoever but will only be used for learning purposes. The information will be used to write a thesis that is a requirement for the masters degree I am pursuing, so feel free to answer the questions. You are advised not to write your name anywhere on this questionnaire to avoid identification.**

## QUESTIONNAIRE

**AN INVESTIGATION INTO THE NUTRITIONAL STATUS OF ORPHANS IN ORPHANAGES.**

**(A)** ***IDENTIFICATION;***

DIVISION: _____

LOCATION: _____

NAME & CODE: _____

NUMBER OF MALE/FEMALE: _____

***(B) INTERVIEWER VISITS 1 2 3 FINAL VISIT***

---

)ATE _____ DAY _____
MONTH _____
YEAR _____
NTERVIEWER'S NAME: _____ NAME _____
RESULT _____ RESULT _____
NEXT VISIT DATE _____ TOTAL NO. VISITS _____
TIME _____

---

1. Indicate whether 1. Male
   2. Female
2. What is your age?

3. When did you come to the orphanage?

**PERSONAL HYGIENE:**

4. How often do you take a bath? (Whole body).
   1=daily 2=once a week 3= once a fortnight 4=others
   (2-4, probe why?)
5. How often do you brush your teeth?
   1= 2-3 times a day 2=once a day 3= once a week 4= others
   (2-4, probe why?)

6. Do you wash your hands?
   (a) After visiting the toilet? 1=Always
   2=Sometimes
   3=Never

(b) Before eating food?

1=Always

2=Sometimes

3= Never

(c) After attending to dirty work?

1=Always

2= Sometimes

3=Never

7. Child Nutritional Status

(a) Name of child _____

(b) Sex of child

1= male

2= female

(d) Date of birth _____

(e)

| | |
|---|---|
| 1 st height of child in cm | |
| 2nd height of child in cm | |
| Average height | |
| 1st weight of child in kilograms | |
| 2nd weight of child in kilograms | |
| Average weight in kilograms | |

# APPENDIX 2

## INTERVIEW GUIDE FOR CARE MOTHER AND FATHERS.

### *(A) BIOGRAPHICAL DATA;*

1. Age of care mother/father.

2. Gender

3. Marital status

4. Educational level for respondent

5. Religious affiliation.

6. Number of children under respondent's care

### *(B) FOOD CONSUMPTION, NUTRITIONAL KNOWLEDGE:*

1. What are the meals given to the children in a week?

| | **Breakfast** | **Lunch** | **Supper** |
|---|---|---|---|
| Day 1 | | | |
| Day 2 | | | |
| Day 3 | | | |
| Day 4 | | | |
| Day 5 | | | |
| Day 6 | | | |
| Day 7 | | | |

a) Do you hold birthday parties or other special occasions for the children?

1. Yes
2. No

If yes

(b) What foods are they given?

3. (a) Are the meals the same for all the children?_____.

1= Yes

2=No

If no

(b) Who are given the different meals?

1=Boys 3=Children below 2 years

2=Girls 4=Others. (Specify).

(d) Which are the different foods given to the above?

| **FOODS GIVEN** | **WHEN GIVEN(time of the day, week etc)** |
|---|---|
| | |

Foods children eat have three main functions in their bodies.

a. They give children energy.

b. Help a child grow.

c. Protect a child from diseases.

4. What is the function of the following foods in a child's body?

| FOOD | FUNCTIONS |
|---|---|
| Foods such as Milk, eggs, beans | 1 2 |
| Foods such as spinach, Sukuma wiki, cabbage | 1 2 |
| Foods such as ugali, Bread, potatoes | 1 2 |
| Foods such as oranges, Pawpaw, mangoes | 1 2 |

KEY 1=wrong answer

2=right answer

5. (a)Has the child suffered any illness in the last 7days

1 = yes

2 = no

(b) Name of the illness

1=Diarrhoea 2=flu/cough/cold 3=vomiting 4=malaria 5= others (specify)

6. What action did you take?

1=bought medicine

2=took child to dispensary

3=consulted health worker/resident nurse.

4=did nothing

7. Were certain foods increased during illness?

1=yes

2=no

If yes specify which ones _____

8.Were certain foods decreased during illness?

1=yes

2=no

If yes specify which ones _____

# APPENDIX 3

## INTERVIEW GUIDE FOR OVERALL INCHARGE OF THE CHILDREN'S HOME:

(A) Biographical data

1. Age of respondent _____
2. Marital status _____
3. Gender _____
4. Educational level of respondent. _____
5. Religious affiliation._____
6. Occupation._____
7. Total number of children in the orphanage.

   Number of males _____

   Number of females _____

(B) Sources of income and subsistence activities:

1. What are the orphanage subsistence activities?

2. Where do you get the income to run the orphanage?

3. What are the problems faced in providing for the children?

APPENDIX 4

MAP OF NAIROBI (INSET A MAP OF KENYA SHOWING THE POSITION OF NAIROBI)