ASSESSMENT OF NUTRITIONAL STATUS AND CARE OF HIV/AIDS ORPHANS CARED IN HOMES: A CASE STUDY OF ILULA KILOLO DISTRICT

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN HUMAN NUTRITION OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

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ABSTRACT

Orphans may be at increased risk of becoming malnourished probably due to inadequate attention or care. This study was conducted to compare the nutritional status and care of AIDS-orphans and non-orphans aged 0-15 years at Ilula Kilolo district in Iringa region Tanzania. A total of 100 households were visited, 40 households affected and 60 non-affected households. Affected households were purposively selected from a list of pilot Hospice care program of Ilula Health Center while non-affected households were randomly selected. AIDS orphans were purposively selected while non-orphans were randomly selected. A total of 120 children were recruited for the study, 60 AIDS orphans and 60 non-orphans. Weight-for-height, Weight-for-age, Height-for age and BMI-for-age were computed from anthropometric measurements. The results of the study indicated that 63.3% of orphans were double orphans and 28.3% and 8.3% were paternal and maternal orphans respectively. Among orphans caregivers 55% were grandparents most of them being unemployed and widows. Affected households were more disadvantaged in terms of food security than non-affected and that most of these households had no support from relatives, the government or other organizations. There was no difference in key nutritional indicators and the mean Z-score for children under the age of 10 years were not statistically different. The difference in the proportion of acute malnourished children between orphans and non-orphans was not statistically different at 5% level of significance ($p = 0.4155$). These results suggest that the nutritional status of surviving AIDS-orphans cared for by members of extended family in homes is not different from that of non-orphans. However immediate follow up studies are required after the death of parents so as to determine the impact of parents loss on children who might not survive the death of their parents as the proportion of under five deaths among orphans was significant $p = 0.001$.

DECLARATION

I, Grey Saga, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work and has not been submitted for a degree award in any other University.

Signature:.....

Date: 28/10/2005

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DEDICATION

This work is dedicated to all children affected by AIDS and its related illness.

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LIST OF ABBREVIATIONS

ACC/SCN	Administrative Committee on Coordination Sub Committee on Nutrition
AIDS	Acquired Immune-Deficiency Syndrome
ARV	Antiretroviral
BCG	Bacilli Calmette-Guerin vaccine
CDC	Centres for Disease Control and Prevention
DTP	Diptheria- Tetanus-Pertussis vaccine
ESAURP	East and South African Universities Research Program
FAO	Food and Agriculture Organization
FHI	Family Health International
HIV	Human Immunodeficiency Virus
ICN	International Council of Nurses
MoH	Ministry of Health
NAC	National AIDS Committee
NACP	National AIDS Control Programme
NBS	National Bureau of Statistics
NCHS	Unites States National Center for Health Statistics
NGO	Non Governmental Organization
TB	Tuberculosis
TT	Tetanus Toxoid
UNAIDS	Joint United Nations Programme on AIDS
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.0 Background information

Like many other countries in Sub Saharan Africa, Tanzania is facing a major threat to the survival of its people and the development chances of the nation from various health problems and Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) pandemic in particular. More than 2 million people were estimated to be living with HIV and AIDS in 2002 and the World Banks estimates that by 2010 life expectancy will be reduced to 47 years because of HIV and AIDS, as opposed to the projected 56 years without AIDS (UNAIDS, 2002). Worse still, the HIV and AIDS pandemic has interacted with other underlying public health problems, most notably tuberculosis (TB).

Many African cultures are characterized by strong family and kinship networks that function as social support systems in times of need. Within these systems, relatives take children who loose parents, as has been the pattern in East Africa. However, as the prevalence of HIV and AIDS and related illness increases and the number of orphans grows, this system is being challenged. Community support systems, especially foster families, are increasingly overburdened. Some adults refuse to take in orphans, while others continue to take them in despite of their own poverty, advanced age, or ill health. This poses the great danger to the young children in all aspects of life, health being one of them.

Care is increasingly recognized as an important determinant of good health and nutrition among children, along with food security, availability of health services and a healthy environment (Ruel *et al.*, 1999). The most devastating impact of diseases on children is when their immediate family environment and support system is challenged by the sickness, disability and or premature death of one or both parents. Any kind of illness has impact on families and household and the impact of some diseases such as HIV and AIDS and its related opportunistic infections is more acute because it affects individuals, mainly at the peak of their reproductive and productive lives. Death of a young adult means death of a father or mother who are in most cases breadwinners in the household. When any kind of diseases strikes the first line of response comes from the children, families and communities themselves (Hunter and Williamson, 2000). The general practice in sub-Saharan Africa is that orphans are cared for by the extended family rather than in orphanage and evidence has indicated that an increase in HIV and AIDS orphans is pushing community resources to the limit (Foster 2002, cited by Lindblade *et al.* 2003).

1.1 Study Problem and Justification

1.1.1 Study Problem

While loss of parents poses a great danger to childcare in poor resource households, data about the nutrition, social condition of children, the households and communities they live are inadequate. In addition few published studies on the health status of orphans do clearly indicate whether orphans cared for within the community constitute a high risk population that should be targeted for public health intervention (Panpanich *et al.* 1999, cited by Lindblade *et al.* 2003). While orphans are considered to be at more risk of becoming malnourished than non-orphan children, there has been a tendency to ignore the nutritional status of school age or adolescent children. Orphans (AIDS orphans in particular) have

been increasing in number while families, communities; the government cannot cope with the needed resources to cater for their needs (NACP, 1998). In addition support for orphans has not been a prominent target of funding by the government as well as major bilateral and multilateral agencies (ESAURP, 2002).

1.1.2 Justification for the Study

While health is a very important aspect of development, there is apparently broad failure among planners to integrate nutrition in care of orphans and other vulnerable children. The government of Tanzania has made care for AIDS orphans a major component of its national strategy in the battle against AIDS (ESRAUP, 2002). However, no attempts can start until the situation of orphans in both urban and rural areas is known. This study aims at collecting the information that keep in pace with the National policy that aims at supporting orphans.

Countries that have relied on institution to care for the orphans have realized that orphanages are not always the answer to the problem of orphans (UNICEF, 1996). They are expensive to build and orphanages remove children from their communities and extended families, a practice that can have a catastrophic consequence on children emotional lives and development (UNICEF, 1996). However, the burden of care for the sick and their dependants may be heavy for already disadvantaged poor resource households that cannot afford to meet even their basic needs. With increase in number of orphans, orphanages are stretched to the point of admitting no more and therefore even those who were ready to take this as an option find themselves in a position caring for orphans in their homes. It is therefore becoming important to determine if these families are providing adequate support to AIDS orphans. This study is an attempt to assess if

orphans cared in homes are well nourished and receive support from the households, communities, the government and Non Governmental Organizations (NGO's).

1.2 Objectives of the Study

1.2.1 General objective

The overall objective of this study was to provide information about the nutrition and care of AIDS orphans cared in homes.

1.2.1 Specific objectives

a) To assess the nature of orphans and caregivers

b) To assess food situation, investigate and compare orphans feeding in households

c) To document areas where AIDS orphans receive support in the study area.

d) To compare the nutritional status of AIDS orphans and non-orphans

1.3 Scope of the Study

This study involved assessing the nutritional status of the orphans cared in homes using anthropometric measurements. In addition assessing the nature of those responsible for caring for AIDS orphans was done. The study also involved assessing feeding, provisional of preventive health services (immunization in particular) and supports to orphans in the study area. This study incorporated assessment of nutritional status of children aged 0-15 years.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter review relevant information that are in line and related to the study under consideration. It provides definition of terms and explains the impact of HIV and AIDS in the community, households and children. It also covers the aspect of childcare by focusing on child feeding, use of preventive health services and support for orphans. Because this study deals with children who have lost parents from AIDS, the literature mainly focuses on the impact of HIV and AIDS on issues that are related to children.

2.1 Children affected by HIV and AIDS

UNICEF defines children affected by HIV and AIDS as children infected with the virus directly, children whose parents, particularly the mother and or primarily breadwinner, are HIV and AIDS affected, children living in affected families or those families that have taken children orphaned or displaced by HIV and AIDS (Granger and Elliot, 2001). Because children affected by HIV and AIDS have a broader definition, this study focused on AIDS orphans who have lost one or both parents due to AIDS or AIDS related opportunistic infections as an attempt to capture the impact of HIV and AIDS to AIDS orphans. According to Hunter (2001), orphans are defined by the number of biological parents missing. Single orphans are orphans who have one surviving parent and they are divided into two categories: maternal orphans and paternal orphans. Maternal orphans are orphans whose mothers have died while paternal orphans are orphans whose fathers have died. Double orphans are children whose both parents have died (UNICEF, 2003).

2.2 Childcare

Care is defined as the behaviors and practices of caregivers (mothers, fathers, siblings, and other child care providers) to provide food, health care, stimulation and emotional support necessary for children's health, growth and development. In this study the focus is in the provision of time and attention to meet the physical, mental and social needs of growing children (ICN 1993, cited by Maxwell *et al.* 2000). Good care practices need to be grounded in good information, knowledge, free cultural biases and misconception. Most crucial cultural practices affecting nutrition are feeding, protecting child health, support and cognitive stimulation and care and support for mothers (UNICEF, 1998). This study attempted to assess how AIDS orphans are cared for by focusing on feeding, use of health and preventive heath services as well as support offered to orphans and caregivers by extended family members, the community, the government as well as international organizations and non governmental organization.

2.3 Global situation of HIV and AIDS

Since the identification of acquired immune deficiency syndrome (AIDS) 20 years ago, more than 20 million people have died and 40 million people live with AIDS or Human immunodeficiency virus (HIV) in the world. The pandemic is still spreading worldwide and in year 2000, three million people including 500 000 children died of AIDS and another 5.3 million people including 600 000 children were newly infected with HIV (USAID, 2002). Among those affected 95% live in developing countries and Africa alone accounts for two third of current HIV and AIDS cases. The increase in adult mortality has left and will continue to leave many children without parents who are the principal caregivers and breadwinners in the households. This is a very big challenge to the poor resource households that cannot meet even the basic needs.

2.4 The problem of HIV and AIDS in Tanzania

Since 1983 when the first cases of AIDS were reported in Tanzania, HIV and AIDS epidemic has spread both in rural and urban areas. Most infections are mainly sexually transmitted through homosexual and heterosexual intercourse and therefore youth, men and women being the sexual active group are the population group most affected. Worse still, the HIV and AIDS pandemic has interacted with other underlying public health problems, most notably tuberculosis (TB). In Tanzania, HIV and AIDS and TB were reported to be the leading cause of death in adults in the surveyed areas and TB remains the principle cause of death in people living with HIV and AIDS. Up to 50% of TB patients in Tanzania are co-infected with HIV and AIDS whereas in other countries this accounts up to 70% (MoH, 2002). According to UNAIDS (2002), 50% of beds at Muhimbili hospital were occupied by those with AIDS related illness.

2.4.1 The problem of HIV/AIDS in Iringa region

HIV and AIDS and related opportunistic infections pose the greatest challenge to the health of the people of Iringa region. According to NACP (2001), there was low prevalence of HIV and AIDS in the age group 15-24 years almost in all regions in Tanzania, however Iringa was one among the regions that showed an increase in HIV prevalence among this group (NACP, 2001). The prevalence of HIV and AIDS in the area stands at 15%, which means in every 100 individuals approximately 15 individuals have contracted HIV. Iringa ranks in the fourth place among Tanzania regions with high sero-prevalence of HIV-1 with a prevalence of 21% for low risk population in East Africa. Other regions include Dar es Salaam with a prevalence of 31.4%, Arusha (20.4%), Mbeya (21%) and Mara region (11%). Also HIV has interacted with other public health problems and diseases that had been brought under control have been increasing in recent years TB

in particular. In the year 2002 there were 307 TB cases reported at Ilula Health Centre among which 14 were relapsing cases while the remaining were new cases. Men and women were equally affected by TB with a slight higher percentage in men. Many of the reported cases were HIV-related TB cases (Saga, M. Personal communication, 2003)

Table1: Proportion of TB patients admitted at Ilula Health Centre in 2003 by gender

Gender of the patient	Frequency (n)	Percent (%)
Male	160	52.1
Female	147	47.9
Total	307	100.0

Source: Ilula Health Centre (2003)

HIV and tuberculosis affect all age groups. Among the admitted cases at Ilula Health Centre, the individuals aged between 15-45 years were the age groups most affected because seventy percent of those aged between 15-45 years were affected by TB (Fig. 1).

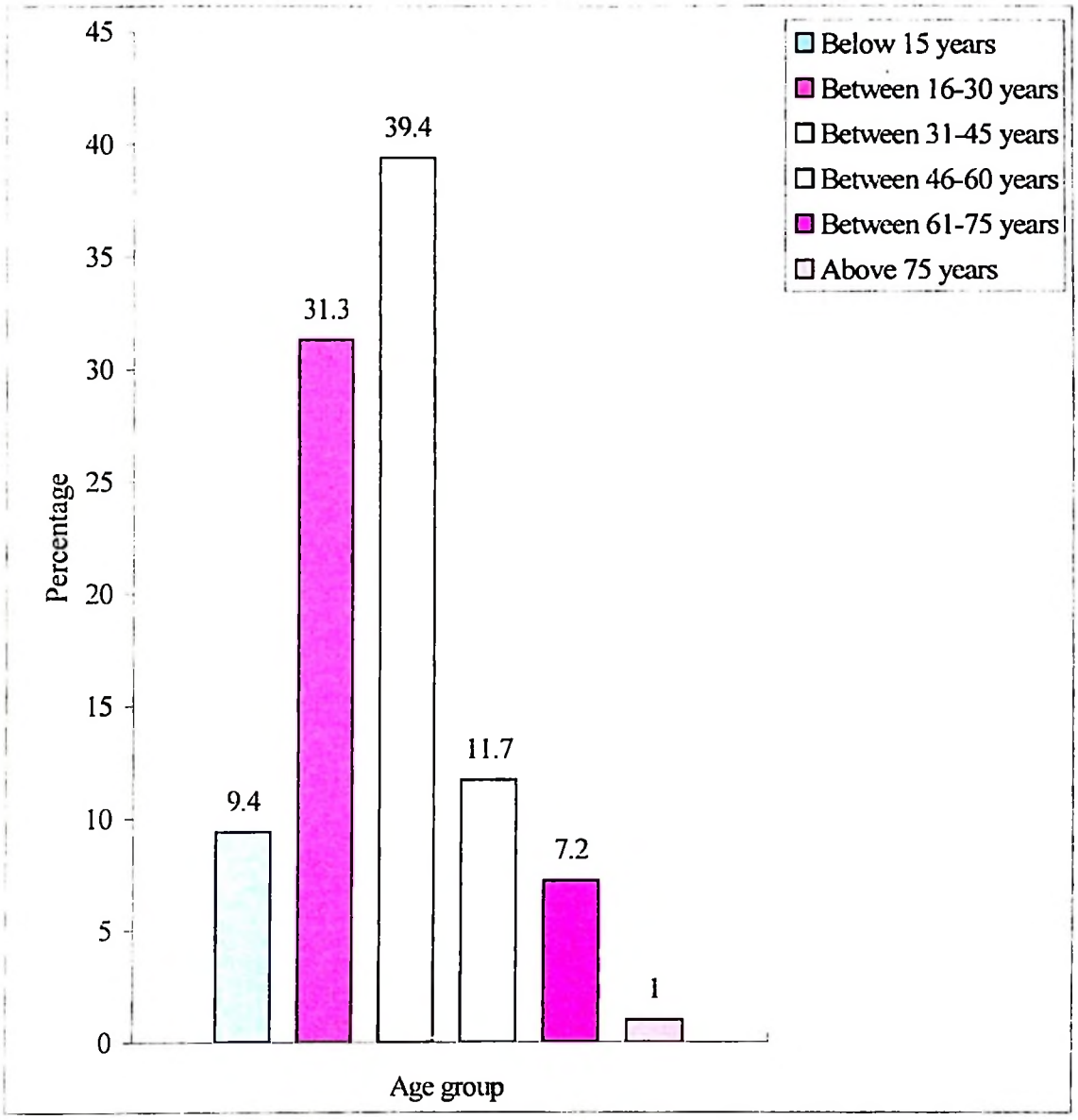

Figure 1: Proportion of TB patients admitted at Ilula Health Centre in 2003 by age groups

2.5 The impact of HIV and AIDS

HIV and AIDS affect families long before parents die. HIV and AIDS is now the fourth leading cause of death worldwide and a significant health crisis in many parts of the world, but also a developmental crisis that threatens and even reversing the health advances gained over several years ago (USAID, 2002).

2.5.1 Suffering and loss of parents

Children orphaned by AIDS and related illness or those who have parents suffering are vulnerable in almost all aspects of their lives. Orphans witness the prolonged illness and death of one or both of their parents and suffer mental distress as a result. Some of the challenges faced by orphans are loss of parents, depression, increased malnutrition, lack of immunization and health care, lack of schooling, early entry into paid or unpaid labor, loss of inheritance through "property-grabbing," homelessness, early marriage, exposure to abuse and increased risk of HIV and AIDS (Haworth *et al.* 1991, cited by Gilborn *at al.* 2001).

The illness or death of a parent often exposes a child into harsh support environment. Frequently children drop out of school, impairing their long-term future, to work at home or on the farm, to replace lost income and support their families. They are often separated from their own siblings. Their nutrition and health may be pressured to exchange sex for money or goods, increasing their own risk of HIV infection and causing great psychological distress (UNICEF, 2002). According to Kameka (2002), these children may engage in child labour, miss love, receive inadequate health care as well as abuse or engage in prostitution. Also due to sickness and disability of elderly, parents or guardians, children raised in a family with chronically sick parents or old parents are likely to perform duties inappropriate for their age.

2.5.2 Increase in the number of orphans

2.5.2.1 Global orphans estimates

According to revised 2000 estimates, there are currently 34.7 million children under age 15 in 34 countries who have lost their mother, father, or both parents to HIV and AIDS and

other causes of deaths, and by 2010 the number is estimated to reach 44 million. Without AIDS, the total number of children orphaned would have declined by 2010 to less than 15 million. In 2010, 20% to 30% of all children under 15 will be orphaned in 11 Sub-Saharan African countries even if all new infections are prevented and some form of treatment is provided to slow the onset of AIDS in those infected with HIV (UNICEF, 2002).

2.5.2.2 Orphans estimates in Tanzania

According to USAID (2002), it is estimated that by the year 2005 there will be 2 145 000 orphans in Tanzania and from this figure, the total number of orphans due to AIDS will be 1 090 000 which represents 50.8% of total orphans. There will be 534 000 maternal AIDS orphans and 450 000 non-AIDS maternal orphans making 984 000 maternal orphans. There will be 1 426 000 paternal orphans with 712 000 and 714 000 AIDS and non-AIDS orphans respectively. It is estimated that the number of double orphans will reach 340, 000 with 275 000 and 65 000 AIDS and non-AIDS double orphans respectively.

The National AIDS Control Program (NACP) of the Ministry of Health estimated that, at the end of 2001, there would be a cumulative total of 1.3 million AIDS orphans countrywide. This number is expected to rise to 2 million by the year 2005. Higher proportion of orphans is paternal orphans, and at all ages those who have lost both parents the proportion is very low. Orphan-hood is more common among children of school age and very few children under five are orphans. This is attributed to the reason that as the child ages, parents are also aging and suffer higher mortality (NACP, 2001).

(a) Age when orphaned

Adults who die of AIDS are at their economically most productive years, but they are also in the middle of their child bearing. Age when the child is orphaned is very important as orphans may still be depending on their parents to feed them and provide them with basic needs as well as for cognitive stimulation and socialization. UNICEF (2003) found that the age distribution of children is fairly consistent across countries and only 2% of children were orphaned below 1 year, about 15% were orphaned under 4 years and 35% were orphaned when they were between 5-9 years old while those orphaned between 10-14 years old represents 50%. Normally as the child age, they are more likely to be orphaned because their parents are also aging and suffer higher mortality rate at older age. Thus there are very few orphans under the age of five and orphan-hood is more common among children of school age 7-19 years particularly paternal orphans (NACP, 2001). In at least eight countries of Sub-Saharan Africa, between 20% and 35% of children under 15 years have lost one or both parents from all causes.

(b) Type of orphans

Adult mortality produces three types of orphans namely paternal, maternal, and double orphans. Higher proportion of children at all ages are paternal orphans because fathers are usually several years older than mothers and that they have higher mortality. At all ages the proportion of children who have lost both parents is very low (NACP, 2001).

2.5.3 Challenge on support systems

Most African cultures are characterized by strong family and kinship networks that function as social support systems in times of need. Community support systems, especially foster families, are increasingly overburdened. Within this system, relatives,

such as uncle or aunt, take children who lose parents, as has been the pattern in East Africa. However, as the prevalence of HIV and related illness increases and the number of orphans grows, this system is being challenged. Some adults refuse to take in orphans, while others continue to take them in despite their own poverty, advanced age, or ill health. Where one parent has died, the majority of orphans stay with the surviving parent (UNICEF, 2003). Care and support for mothers and caregivers is important and as long as unequal division of labour and resources continue to favor men and son preference continue to exist, caring practices vital to the nutrition well-being of children will continue to suffer (UNICEF, 1998).

2.5.3.1 Caregivers

Although majority of orphans and vulnerable children are living with surviving parents or extended family, many of them are cared for by a remaining parent who is sick or dying, elderly grandparents who themselves are often in need of care and support, or impoverished relatives struggling to meet the needs of their own children. Moreover, with the death of a parent, children experience profound loss and a heavy burden falls to the surviving parent. If the second parent also dies, the welfare of the child's is threatened. Guardians are more likely to be women, the mother if she is still alive, and on death of the mother, other female members are likely to look for the children even when the father is still alive.

According to Tanzania AIDS Project (1995), 59% of children who have lost both parents are taken by grandparents and another 41% by other relatives while those who have lost their father are in households with their mother or grandparents. Report by AXIOS, (2001) have indicated that care of the orphans and vulnerable children was left in the hands of

extended families, in particular grandparents and most of orphans caregivers were very old and poor grandparents who themselves needed support for their living. There are differences in responsibilities assumed by mothers and fathers in every country in the region with mothers more likely to continue to be responsible for their orphaned children than are fathers (UNICEF, 2003). In the survey conducted in Kampala Uganda in 1999, data on household structure revealed a high rate of widowhood, and that guardians were predominantly female (Gilborn *et al.*, 2001). Also grandparents and elderly care are increasing common particularly in rural household.

Children in children headed households may suffer from lack of supervision and care, and this may lead to poor nutrition and declining health status (Granger and Elliot, 2001). Children living in these situations are at increased risk of loosing opportunities for school, health care, growth, development, nutrition, and shelter; in short, their rights to a decent and fulfilling human existence. This study is an attempt to provide information of the nature of the caregivers in the study area by assessing the relation with orphans, their age, education, marital status, employment, income and expenditure, needs, and support.

2.5.5 Impact on family income

Household monthly expenditure is a reflection of economic status and also could be a reflection of purchasing power and priority the household attach to the items (Lorri *et al.*, 1997). Household income is reduced when an adult fall ill and families can exhaust their entire savings long before their infected member die, a phenomenon that has adverse effect on nutrition welfare of the household. The illness result not only in higher medical expenses and lower income for the family members, but also increase and create hardships for survivals especially for young children. Therefore HIV and AIDS can affect family

income and therefore food intake, which can consequently lead to malnutrition (UNAIDS, 2002). Households with orphans are more likely to become poor because of the increase in dependency ratio, as the income of fewer adults will be required to sustain more dependants. In Mwanza region, over two thirds of caregivers were living on less than $1 per day (UNICEF, 2003). Women ability to provide care is increasingly affected by the need to provide additional cash income and as demand on their time grows, women becomes less able to provide adequate level of care (Maxwell *et al.*, 2000).

2.5.6 Food availability in the household

Malnutrition in Tanzania is the result of a number of factors that interact and lead to vulnerability to various nutrition disorders. Inadequate food intake due to poor food supply and limited purchasing power, health conditions and lack of information about food and nutrition are some of the factors that contribute to malnourishment. Each member of the family should have access to food to meet nutritional requirements and this is not only physical access but also economic and social access to cultural acceptable foods (Latham, 1997). In affected households some of the recommendations for child feeding may be compromised in the short term to cover the long-term food security.

2.5.6.1 Crop production

Loss of even few workers can make a significant difference in the size of the harvest in the household. As the number of the people available to work on the farm declines, the production of food and cash crops also declines (USAID, 2002). Infected individuals die prematurely; prior to which their productivity will have already declined following onset of AIDS related opportunistic infection. Labour of healthy individuals is diverted into other crucial activities such as caring for the sick and attending funerals of those who have died

(UNAIDS, 2002). Hunger is therefore a problem for many children in households affected by HIV and AIDS, as households with orphans tend to reduce the area of land they cultivate and grow crops that are less labour intensive but less nutritious (UNICEF, 2003).

2.5.6.2 Food intake in the household

In HIV and AIDS affected households that lack community support, food consumption can significantly drop to more than 40% putting the children at more risk of malnutrition. In Kagera region AIDS death led to a general consumption drop of 33% and food consumption of 15% (UNAIDS, 2000). The death of either parent or another adult in the household will worsen a child height-for-age and increase stunting (UNICEF, 2003). Although food availability may be adequate in the area, the accessibility of hard cash may be difficult for most families. In families that are dependent on subsistence level farming, surviving children and members sometimes go hungry after farm worker in the family dies. Gilborn *et al.* (2001) reported that majority of the children who had lost parents didn't get enough to eat. They reported not getting enough to eat a few times a week or more and here young children are more vulnerable. When children lose parents feeding of children in the households is more likely to be impaired.

(a) Infant feeding

Breastfeeding is one of the most important child survival and early childhood development intervention (Preble and Piwoz, 2001). Exclusive breastfeeding for the first 4-6 months of child's life limits exposure to diseases agents through mother antibody and provides all the nutrients the baby needs (NBS, 2000). It is recommended that infants be exclusively breastfeed for the first 4-6 months and improve support from fathers, grandmother's and other relatives to emphasize the need for exclusive breastfeeding for this period at the

household level as well as enhancing household access to information on psychosocial benefits of breastfeeding and making growth monitoring at community rather than facility level. Also micronutrients (Vitamin A, iodine and iron, in particular,) either in the diet or through supplementation should be provided for children aged 0-59 months. The proportion of infants under 4 months currently receiving breast milk exclusively probably do not exceed 20% in most African countries. Only 31% of children in Sub Saharan Africa experience benefits of exclusive breastfeeding (UNICEF 2000, cited by Preble *et al.* 2001). Other reports Huffman *et al.* (2000), cited by Kulwa (2001) have indicated that although 97% of infants in urban Kenya are breastfed at birth and on average of 19 months, the proportion of those who are exclusively breastfed is very rare.

Appropriate complementary feeding promotes growth and prevents stunting among children 6-24 months. Rates of malnutrition usually peak at this time with consequences that persist throughout life. Stunting is seldom reversed in later childhood and adolescents. Appropriate breastfeeding involve a combination of practices to maintain breast milk intake and at the same time improve the quality and quantity of food consumed. And it is important to make sure food complement rather than substitute breastfeeding. When children loose parents complementary feeding is more likely to be impaired. It therefore becomes important to assess how these children are fed under loss of parents because early supplementation especially under unhygienic conditions can result in infection with foreign organisms and lower immunity to diseases. Supplementation of breastfeeding with other liquids begins early in Tanzania and most children aged 2-3 months receive supplements (NBS, 2000). It is recommended that starting at about 6 months of age, children should be fed freshly prepared energy and nutrient rich complementary foods, while continuing to breastfeed up to 2 years or longer. Also children aged 1- 4 years should receive five or

more feeds a day, and that mother and caregivers should receive counseling on appropriate complementary feeding (UNICEF, 2003).

(b) Adolescents nutrition

During the second or third year of life adults foods become more and more important. Frequent feeding is important because two meals a day will not give the needed nutrients to the child because of the small size of the stomach. Children should be fed at least 4 times a day (Helsing and King, 1982). Children aged above 5 years are still growing physically and mentally hence have high food intake and energy requirements. Good nutrition, health and social care are necessary for their educational development. Some of these children get into this group already malnourished and also they may continue to be malnourished because of missing some meals such as breakfast and staying the whole day in school. In addition worm infestation, heavy workload and inadequate food put this group into risk of becoming malnourished. Under loss of parents those factors may be more pronounced (MoH, 2002).

2.5.7 Impact on health and nutrition of the child

In Sub-Saharan Africa, child health has been deteriorating due to the HIV and AIDS pandemic and other factors. Chronic malnutrition is widespread and orphans caregivers are predominantly poor women. Children in affected households are significantly more disadvantaged than children in two-parents families. In some countries, half or more children suffer severe or moderate malnutrition. Where child health is fragile, the infection of a caregiver can precipitate the death of a child. According to the Census Bureau, only five of 51 countries in Sub-Saharan Africa will attain the target of 45 child deaths per 1,000 live births by 2015 that was set in 1994 at the Cairo Conference on Population and

Development (Hunter and Williamson, 2000). The likelihood of children dying in infancy is 40% higher in Sub-Saharan Africa than any other world's region due to HIV and AIDS and evidence from Uganda indicates that improving investment in child survival intervention are outweighing the impact of HIV (Hunter, 2001).

2.5.7.1 Malnutrition

Child malnutrition is one of the most severe and lasting consequence of parental death. AIDS orphans are more prone to malnutrition and infection and less likely to receive healthcare than other children; the very young children are at more risk especially if the grandparents look after them. This is reinforced by the belief that, the child whose mother has died of AIDS or AIDS related illness is also doomed to die of the same cause. These children are likely to die unnecessarily of malnutrition and common childhood illness such as diarrhea and respiratory infections and children below 3 years are more vulnerable (Mukoyogo and William, 1991).

(a) Weight-for-height (Wasting)

Wasting indicates deficit in tissue and fatty mass compared with the amount expected in the child of the same height or length. It represents a failure to receive adequate nutrition in the period immediately preceding the survey and also as a result of inadequate food intake or recent episodes of illness causing loss of weight and onset of malnutrition. Severe wasting is closely linked to an elevated risk of mortality and wasting prevalence varies considerably with season. Provided there is no food shortage, the prevalence of wasting is usually below 5% even in poor countries. A prevalence exceeding 5% is alarming given a parallel increase in mortality and prevalence between 10-14% are regarded as serious and that above or equal to 15% are regarded as critical (NBS, 2000).

(b) Weight-for-age (Underweight)

Underweight reflects body mass relative to chronological age and is influenced by both weight and height of the child and therefore its composite nature makes its interpretation complex as it fails to distinguish between short children of adequate body weight and tall but thin children. Weight-for-age Z-score and data on underweight are of limited use because of failing to distinguish between stunting and wasting. However like stunting it reflects long-term health and nutritional experience of the individual or population (NBS, 2000). In Tanzania almost 30% of under 5 years are moderate or severe underweight for their age and other reports indicate that there has been little change in the 1990s in the rate of malnutrition on the Mainland while in Zanzibar the rate of moderate malnutrition has fallen while that of severe malnutrition on the basis of Weight-for-age has risen slightly (UNICEF, 2002).

(c) Height-for-age (Stunting)

Stunting reflects a process of failure to reach linear growth potential as a result of sub-optimal health or nutrition condition, which is frequently associated with poor overall economic conditions and or repeated exposure to adverse conditions such as illness and inappropriate feeding practices. Improvement in level of stunting is an indication of improvement in overall social economic. It usually starts to rise at the age of 3 years and for children aged below 3 years stunting reflects a continuous process of failing to gain weight while for older children it reflects as state of having failed to gain weight or being stunted (NBS, 2000). With loss of parents childcare practices in affected households are more likely to be impaired than in non-affected households. According to Moller *et al.* (1989), women at Ilula were not found to be at the state of acute undernutrition but stunted in growth probably due to lack of adequate food during childhood and adolescents. In

Tanzania 48% of under five children are stunted (low height- for-their age) a reflection of chronic malnutrition that sets in as children are weaned (UNICEF, 2002).

2.5.8 Socialization of the child

Like any other children, AIDS orphans need to acquire the cultural values and behavior norms necessary for their integration into the society. This is extremely difficult when the large number of children live with one elderly grandparent or in children headed households with no adult person (Mukoyogo *et al.*, 1991). The ability of individuals to transfer knowledge both within their generation and from their generation to the next generation is impaired. New generations are deprived of learning in absence of the guidance of someone more experienced (ACC/SCN, 2001).

2.6 Supporting orphans

In Tanzania supporting orphans was not a priority area. For example most of the funds allocated for HIV and AIDS related activities between 1997 and 2001 centered in prevention and treatment, but none of these funds were allotted to the support of the orphans (ESAURP, 2002). This means that, for the already poor household, this is the tipping point from poverty into destitution. In Mwanza region of United Republic of Tanzania 41% of the households could not meet school materials needs, 23% could not meet health care needs while 21% could not meet foods needs and 11% clothes needs. Some families may have sufficient income to cope or community may support them but others may be impoverished and completely unable to meet even the basic needs (UNICEF, 2003).

2.6.1 Medical care

For the well-being of orphans and other vulnerable children both children and their guardians need to have access to appropriate health care including clinical and preventive health care services, nutritional support, palliative care and complimentary home-based care, and full and relevant information. In case of unknown HIV status of children born from HIV infected mothers, nutritional and infant feeding support is essential and, whenever the HIV status of the child is known to be positive, preventive therapy against common opportunistic infections is recommended (FHI, 2001).

2.6.1.1 Immunization

If children are immunized at the correct age using protective vaccine and proper techniques, they will not be crippled by poliomyelitis, not die of whooping cough, tuberculosis, measles or its complication (Msambichaka, 1988). It is recommended that the children be taken as scheduled to complete a full course of immunization (BCG, DPT, and measles, as recommended and TT for mothers), and there should be support to mothers and caregivers to attend immunization sessions and strengthening routine immunization outreach services and ensuring adequate supply is important. Children should be fully immunized against diphtheria, pertussis and tetanus (DPT3) before 12 months of age. According to Mulenga *et al.* (1993), cited by Granger *et al.* (2001) children in HIV affected families are less likely to be fully immunized. Other results (Gilborn *et al.*, 2001) have indicated that the health status of children of PLHA is somewhat poor or very poor. It is important to ensure early identification of diseases, disability so as to facilitate early intervention to minimize the impact. Men should also participate in provision of childcare and reproductive health initiatives. It is also important that parents and guardians have access to appropriate preventive and curative medical care including access to ARV

regimens for those who are infected with HIV. By improving and extending the lives of parents and guardians, orphan-hood will be postponed and other interventions to prepare the child for a transition can be implemented to prevent the long-term problems orphans face (FHI, 2001). More than eight out of 10 children die at home, six of them have no contact with health services. Inadequate provision of health facilities and drugs is reported to compromise the quality of health care and imposition of cost sharing fees has affected people's use of formal health system (UNICEF, 2000).

2.6.2 Socio-economic support

Some of the threats that are faced by orphans are: isolation, loss of income and educational access; others include shelter, nutrition and other essential necessities. When families and children are forced to focus on daily basic needs to decrease their sufferings, attention is diverted from factors that contribute to long-term health and well-being of the individuals. It is widely recognized that most of the problems faced by AIDS-affected children and households result either directly or indirectly from the economic impact of AIDS. To mitigate the socioeconomic impact of AIDS, communities must be able to identify children and households most in need, prioritize their needs, and use local and external resources to improve their well-being and strengthen community safety nets (FHI, 2001).

2.6.3 Psychosocial support

The psychosocial needs of children continue to be one of the most neglected areas of support. Children are affected by the changes in their parent's emotional and physical state. When the parent becomes terminally ill, older siblings are often forced to take on premature parenting role for their younger siblings and nursing care for their parents. Without proper support mechanisms upon the death of a parent children experience a

profound sense of loss, grief, hopelessness, fear and anxiety. Long-term consequences can include psychosomatic disorders, chronic depression, low self-esteem, low level of life skills, learning disabilities, and disturbed social behaviors (FHI, 2001).

2.6.4 Education

Education plays a vital role in the well-being of children. It not only offers them a chance for their future but also provides developmental stimuli. Because of the impact of HIV and AIDS, a growing number of children may not be able to attend or stay in school, rising the number of pupils whose ability to take advantage of schooling is undermined (FHI, 2001). Safety nets directives have been passed to cushion the negative effect of cost sharing measure of social sector reforms. They allow orphans to receive primary education without parents contribution and for the under five children to have Maternal and Child Health (MCH) health services without fees. However the implementation of these directives is reported to be the problem and as a result many children of poor families are not attending school. Abolishing of primary school fees is aiming at reinforcing provision that all children be allowed to school regardless of their family's ability to cover some cost of schooling (UNICEF, 2001). The school attendance for non orphan children who live with at least one parent is 71% but for double orphans it is only 52%, and here relationship between the adult or caretaker and the orphan becomes very important as the closer the ties the greater the chance that the child will go to school.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter present hypothesis tested, types and source of data, sample size and location, questionnaire design, sampling techniques or procedures and analytical tools used in data analysis.

3.1 Description of Kilolo District

3.1.1 Geographical location

Kilolo district is located along latitudes 7 - 9° South and longitudes 34°45′- East of Greenwich Meridian. The district is bordered by Dodoma region in the North, Morogoro region to the East, Mufindi district to the South and Mbeya region to the West. The district has 12 wards namely Ilula, Image, Irole, Uhambingeto, Udekwa, Mtitu, Dabaga, Ukumbi, Ukwega, Boma la Ngo'mbe and Idete.

3.1.2 Population and Ethnic Group

According to the 2002 census, the district total population was 205 081 (100 244 males and 104 837 females). Ilula is mixed with 13 752 males and 14 365 females making a total of 28 111 people. The main Ethnic group is Hehe who account for 90% of the population and 10% is composed of migrants such as Bena, Maasai, Sukuma, Kinga, Sagara and Barbaig (NBS, 2003).

3.1.3 District Economy

Kilolo district is predominantly rural with about 95% of its population residing in rural areas. Major economic activities include; agriculture and livestock rearing for people livelihood and income generation. Staple food crops grown include maize, beans, sorghum, millet and sweet potatoes. Other crops are round potatoes, peas, wheat and fruits. Cash crops grown include pyrethrum, tobacco, coffee, cotton, and sunflower. The major economic activities that contribute significantly to GDP include maize production, tobacco, tomatoes, onions, tea, coffee, sunflower and livestock keeping.

3.2 Rationale for choice of the area of study

The interview for this study was conducted in four villages namely Mtua, Mwaya, Isele and Masukanzi at Ilula ward, Kilolo district Iringa region from October 2003. The selection of the study area was based on the following reasons:

a) The location of Ilula and selected villages along the highway to Dar es Salaam where prevalence of HIV and AIDS is reported to be relatively high.

b) The concern about the large number of new TB cases reported at Ilula Health Centre in the year 2003.

c) An increase in number of orphans cared by members of the extended families.

d) Ilula is a sub-urban area; therefore represent an interface between rural and urban characteristics where, one can capture mixed information about orphans.

e) The presence of a Pilot Hospice Care programme of Ilula Health Centre and Hospice nurses that assisted in household's visits.

3.3 Hypothesis tested

Ho: 1. The proportion of acute malnourished AIDS orphans and non-orphans is the same.

3.4 Study population

AIDS Orphans 0-15 years cared in homes and non-orphans children were recruited for the study.

3.5 Sampling procedure and sample household

The subjects of the study were identified prior to data collection in the field. AIDS orphans were purposively selected while non-orphan children were randomly selected. A total of 100 households were visited during the study 40 affected and 60 non-affected, and a total of 120 children (60 orphans and 60 non-orphans.) were assessed and their caregivers interviewed.

3.5.1 Sampling of AIDS orphans

Purposive sampling was employed in selecting the household caring for orphans whereby 40 households with AIDS orphans were selected. A combination of Clinical AIDS and laboratory report are the methods that are used by Ilula Health Centre to identify AIDS patients. Home visits were done with the assistance of hospice nurses of Ilula Health Centre who were running the pilot Hospice program and village leaders to ensure that the child selected for the study are indeed orphans who have lost parents from AIDS or AIDS related opportunistic infections.

3.5.2 Sampling of non-orphans

Sixty households that were judged to have no orphans, have no child or any member of the household suffering from AIDS or related terminal illness, and that the children had both parents, were used to randomly sample non-orphans.

3.6 Data collection and questionnaire design

Both primary and secondary data were collected for this study. Primary data were collected through interviews of households and anthropometric measurements. A cross section, questionnaire based interview of mothers and care providers as well as anthropometric measurements, was employed in this study. A representative sample of these households was interviewed using a structured questionnaire (Appendix I and II). Questionnaires were employed to collect information from caregivers of the children as well as recording anthropometric measurements. Anthropometric measurements were collected for orphans and non-orphan children aged between 0-15 years whereby age, weight, and height measurements were taken and recorded. Secondary data were obtained from Ilula Health Centre, UNICEF Information Centre, Sokoine National Library (SNAL), Iringa rural district, and other reports to supplement primary data.

3.7 Assessment of nutritional status

This study involved assessment of nutritional status of orphans and non-orphans. The following anthropometric measurements were taken during data collection on nutritional status; age, weight, height and Mid Upper Arm Circumference (MUAC). The three measurements weight, height and age were used to derive three indicators of nutritional status namely Weight-for-age, Weight-for-height, and Height-for-age.

3.7.1 Age determination

Age of the child was obtained from MCH clinic cards, baptismal cards and birth certificates. Also questioning caregivers helped in determining the age of the child.

3.7.2 Weight measurement

For children aged below 6 years, a Salter spring balance (Model 235 PBW) with a scale measuring up to a maximum of 25 kg with increments of 100 g was used while for children aged 6-15 years a bathroom scale reading to 100 kg on which a child is made to stand was used. Measurements were taken to the nearest 100 g.

3.7.3 Height

For infants and young children under 2 years of age, recumbent length (crown-heel-length was measured) using length board and for children aged above 2 years a vertical measuring rod was employed. Measurements were taken to the nearest 0.1 cm.

Comparison in percentage of orphans and non-orphans children (in relation to that of the reference population was done whereby S.D score were calculated based on the following formula:

$$\text{S.D Score} = \frac{\textit{Individual value} - \textit{median value of reference population}}{\textit{S.D value of reference population}}$$

The analysis of anthropometric measurements was done using Epi-info 6 Windows 2000 package for nutritional assessment so as to determine Z- Score value for orphans and non-orphans children. These were then compared with that of the reference population and therefore establishing the level of malnutrition in children. In this study Z- Score was used for children aged between 0-10 years and BMI-for-age was used to assess the nutrition

status of children aged beyond 10 years. It was necessary to use BMI-for age to assess the nutritional status of children aged beyond 10 years because WHO does not recommend the use of Z- scores for comparing nutritional status of children beyond 10 years due to the influence of hormones on body build (WHO, 1983). This study attempts to include this group of children because there have been a tendency to ignore the nutritional status of adolescent or school aged children.

Anthropometric Z- scores was computed based on the 1978 CDC/WHO reference curves normalized version of the 1977 National Centre for Health Statistics (NCHS) while BMI was computed using the CDC 2000 charts which are the new recommended methods to judge if the child is underweight, normal or obese. The MUT''S table of Cut-off points for BMI-for-age was employed to establish the nutrition levels of adolescents children aged between 10 and 15 years. The BMI of children aged 10-15 years was calculated based on the following formula:

$$\text{BMI} = \frac{\text{Weight (Kg)}}{\text{Height (m}^2\text{)}}$$

Then the calculated BMI was compared with that of the standard CDC charts of children's Body Mass Index and Age for boys and girls.

3.8 Cut-off points

This study used a three-way classification to classify children as severe malnourished, normal or moderate. Z-score were derived using the reference standard developed by the National Center for Health Statistics (NCHS) and The World Health Organization (WHO). Cutoff points used are presented in Table 2 and 3 for Z-score and BMI-for-age respectively.

Table 2: Z-score Cut-off points classification

Z-score Cut-off-points	Classification
< -3	Severe underweight, stunting, wasting
Between –3 to <–2	Moderate underweight, stunting, wasting
> -2	Normal

Source: WHO (1983)

Table 3: BMI-for-age Cut-off-points classification

BMI Cut-off-point	Classification
Below 5^{th} Percentile	Underweight
Between 5^{th}-85^{th} percentile	Normal
Between 86^{th} –95^{th} percentile	Overweight
≥ 95^{th} percentile	Obese

Source: Madriaga (1998)

3.9 Data analysis

Data analysis was done by employing Epi Info 6 Windows 2000 package and Statistical Package for Social Science (SPSS) version 9. Comparative data analysis was done whereby different variables that were in focus during the time of survey were compared.

3.9.1 Analysis of nutritional data

In analyzing qualitative data, crosstabulation, frequencies and percentage was employed. The large part of the analysis based on descriptive statistics in which analysis was carried out to provide the basis to fulfill study objectives. The use of percentage means, ranges and other statistics was employed to describe the characteristics of sample children and their caregivers in the study area. Crosstabulation was used whereby different parameters that were in focus during the study were brought together and analyzed. The difference in the proportion of acute malnourished children between orphans and non-orphans was tested using chi-square, and the difference in the mean Z-scores was tested using T-test (Kirkwood, 1988).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This chapter presents the findings of the study. It describes the nature of orphans and caregivers, compares support, feeding, immunization as well as the nutritional status of orphans and non-orphans.

4.1 Background characteristics of assessed children

Children characteristics have important implications on the nature of the care they require. These include age, gender and tribes of the children. Therefore children characteristics have to be described so that the general picture is understood. The results presented in Table 4 and 5 summarize the background characteristics of the assessed children.

4.1.1 Age of the children

The age distribution of the assessed children ranges between 79 months and 180 months. The results presented in Table 4 indicate that majority of orphans were aged above 5 years while among non-orphans the proportion for under five was 46.7%. For those aged above 5 years the proportion was 53.3%. From these figures one can deduce that most orphans are school aged children or youths actively being involved in various activities in the household and outside.

4.1.2 Gender of children

Results show that there was almost an equal distribution of children by gender in affected households while in non-affected households there were more female children than male. Results summarized in Table 4 indicate that among orphans 48.3% were males while

females represent 51.7%. The proportion of male and female orphans suggest that both male and female children are equally affected by the consequences of AIDS and its related illness.

Table 4: Age category and gender of children (n=120)

Variable	Orphans n = 60		Non orphans n = 60	
	N	(%)	N	(%)
Children by age range				
Below 5 years	4	6.7	28	46.7
Between 5-10 years	32	53.3	22	36.7
Between 11-15 years	24	40.0	10	16.7
Gender				
Male	29	48.3	23	38.3
Females	31	51.7	37	61.7

4.1.3 Tribe of the child

Tribe of the child is important as it may reflect some of the food related cultural practices practiced in an area. The findings of this study indicates that most of the children assessed were Hehe. The result summarized in Table 5 show that over 70% of orphans and non-orphans were Hehe. The Bena constituted 10% in both affected and non-affected households. Other tribes include Luguru, Zaramo, Kinga, and Zungwa. The higher percentage of Hehe in both types of households is attributed to the reason that Hehe is the dominant tribe in Mazombe division Kilolo district Iringa region.

4.1.4 Education of children

Among the challenge faced by orphans caregivers is to make sure that orphans receive education by sending them to school. Due to loss of parents a significant number of children are reported to be dropping out of school. The results presented in Table 5 indicate

that more than 70% of orphans were primary school children, while among non-orphans those who were attending primary school the proportion is low i.e. 35%. Some of the children were in nursery schools while others were not yet registered in school. Among orphans 10% had no formal or informal education and were school age children not attending school. Basing on the finding of this study orphans are mainly school age children and that among orphans there were school aged children who were not attending school. Orphan-hood is reported to be more common among children of school age and very few children under five are orphans (NACP, 2001). Therefore supporting AIDS orphans at Ilula should also focus on the education aspect of orphans so as to make sure that orphans receive education required and appropriate for their age.

Table 5: Tribe and Education level of the children (n=120)

	Orphans n = 60		Non-orphans n = 60	
Variable	N	(%)	N	(%)
Tribe of the child				
Hehe	45	75.0	44	73.3
Bena	10	16.7	10	16.7
Others (Luguru, Wanji, Zaramo)	5	8.3	6	10.0
Education level				
No formal education	6	10.0	32	53.3
Nursery Education	10	16.7	7	11.7
Primary Education	44	73.3	21	35.0

4.2 Type of orphans and nature of caregivers

4.2.1 Age of orphan-hood

Age at which the children lose parents is very important because when breadwinners in the household die, the welfare of the child is threatened. They may not be provided with adequate care and young children are more vulnerable and therefore become more at risk of becoming malnourished than older children. The results illustrated in (Fig. 2) indicate that 70% of the children were orphaned when between the age of 5-15 years and only 30%

were orphaned when they were below 5 years. These figures imply that, majority of the children lose parents at the critical ages of development, when they still need their parents to provide them with basic needs, as well as preparing them for the future. Other reports (NACP, 2001) have indicated that orphan-hood is more common among children of school age and very few children under 5 years are orphans. This is attributed to the reason that as the child age, parents are also aging and suffer higher mortality. In this study this is also probably due to long prognosis of the disease because those who die of AIDS are still young people at their reproductive and productive ages. It may also be attributed to the reason that, children below the age of five years are more likely to contract HIV from their mother and suffer the risk of high mortality and therefore the sample of children comprises mainly orphans who have survived the death of their parents. According to UNICEF (1995), 25-30% of pregnant women attending antenatal clinic are HIV positive and one in three of their babies will develop AIDS and most will die before the age of five.

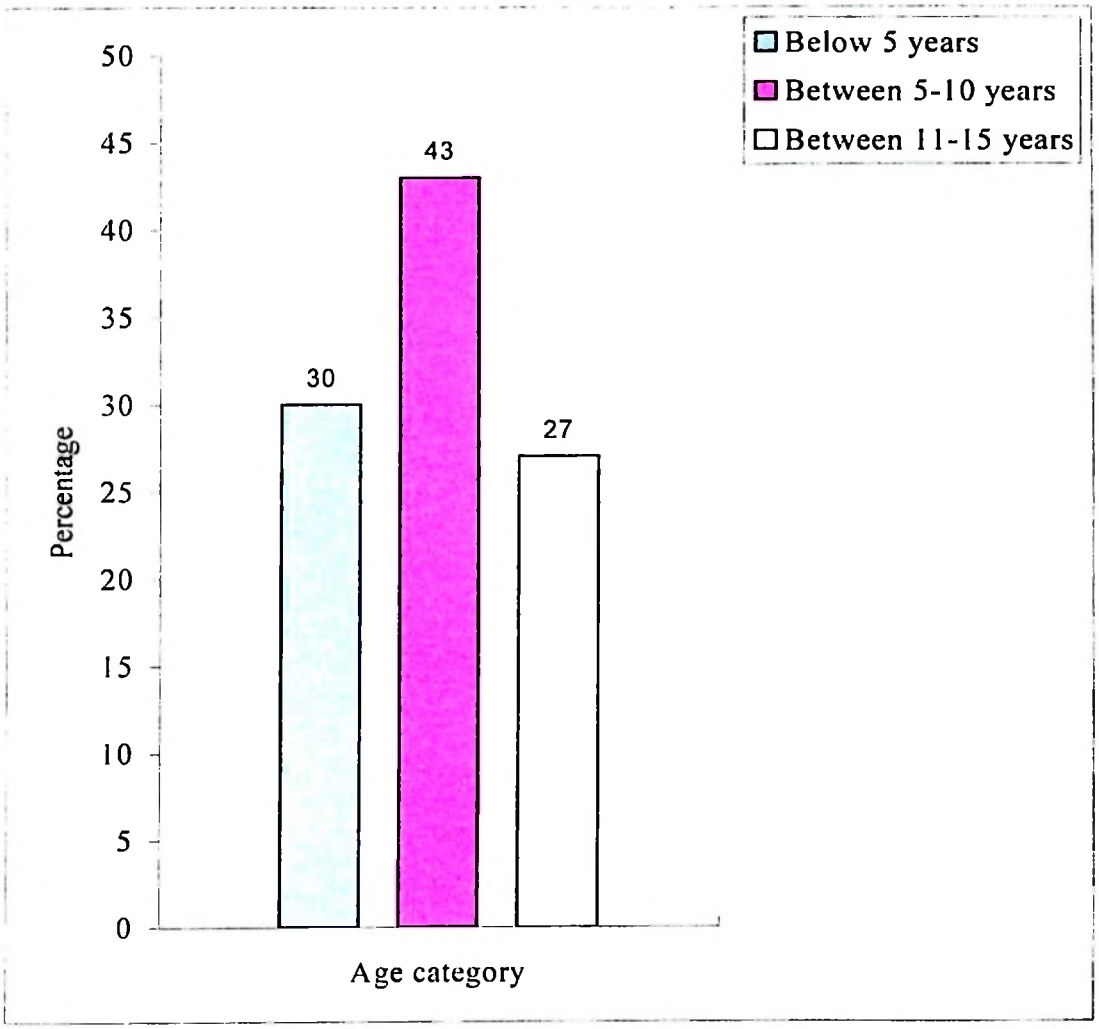

Figure 2: Age of orphan-hood

4.2.2 Proportion of paternal, maternal and double orphan

Children lose either one or both parents; those losing the father are termed as paternal orphans, while those losing the mother are called maternal orphans. Those who lose both parents are called double orphans. The result of this study indicates that there were few maternal orphans followed by paternal orphans and over 60% of orphans were double orphans. (NACP, 2001) have indicated that higher proportion of orphans is paternal orphans, and at all ages those who have lost both parents the proportion is very low.

This study indicates higher proportion of paternal orphans than maternal orphans i.e. 28.3% and 8.3% respectively. This finding of high proportion of paternal orphans is supported by literature that has indicated high proportion of paternal orphans than maternal and double orphans. But the special feature in this study is that there is higher proportion of orphans who have lost both parents, those who have lost their father have also lost their mother as illustrated by (Fig. 3). This is possibly because of the special feature of AIDS and related illness because it usually tends to cause loss of both parents contrary to other cause of death that in most cases do not cause deaths of both parents at their prime ages.

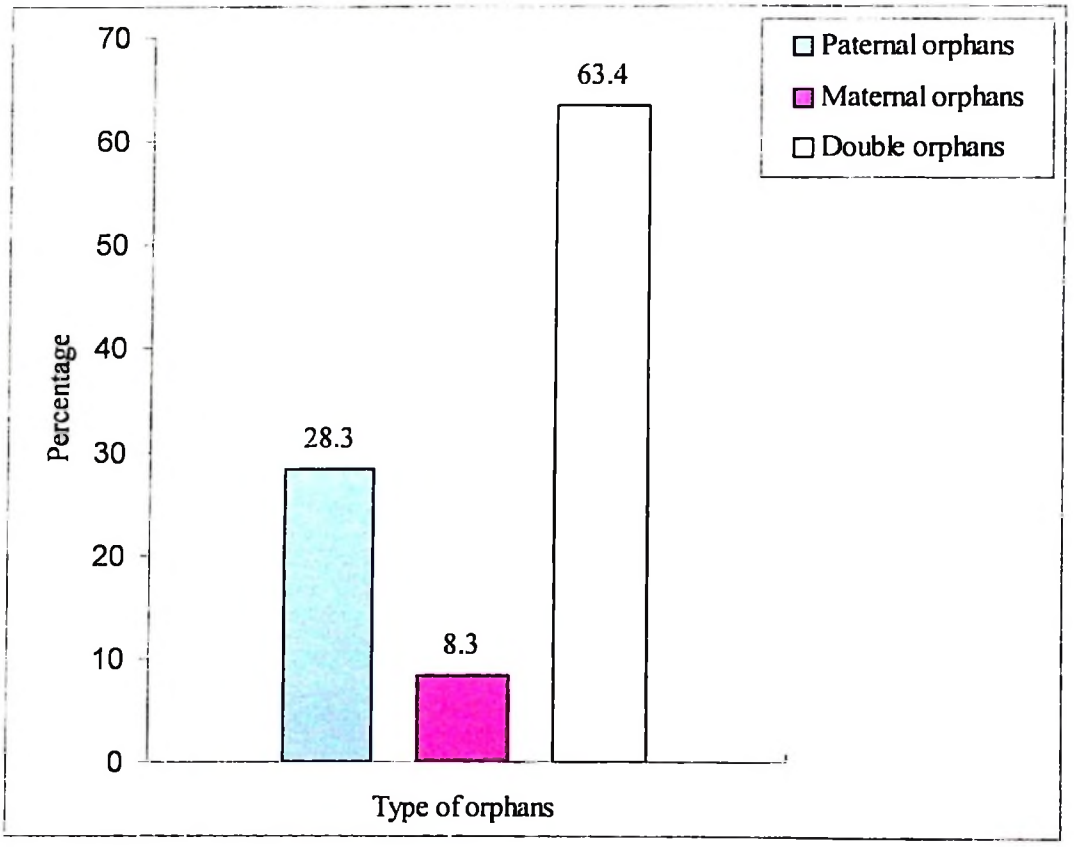

Figure 3: Proportion of paternal, maternal and double orphans

4.3 Nature of the caregiver

After loss of parents, relatives and foster parents take orphans and there is sometimes emergence of child headed households. The nature of the caregiver may suggest the type of care orphans receive. Some may themselves be illiterate, unemployed, with relatively low income from their economic activities. Others may be very old, with no support and even caring for orphans while they are themselves sick and with nobody to take care of them.

4.3.1 Caregivers

The results of the study show that non-orphans were principally cared for by their mothers. Most of the caregivers aged between 20 and 30 years making 60% of interviewed caregivers in non-affected households. The study further revealed that majority of orphan caregivers were grandparents. Among orphans caregivers 55% were grandparents; from this figure grandmothers constitute 37.5% while grandfathers form 7.5% and the rest were cared by their mothers, aunts or sisters (Table 6). From these figures it is an indication that most of the caregivers were women. Though males were present in non-affected household, no man was regarded as caregiver and in non-affected households, majority of caregivers were women, grandmothers, aunts or sisters as compared to their male counterparts. This is probably due to the preconceived notion that domestic activities and activities related to care for children are women activities and this may possibly be further reinforced by women reproductive role in the community. According to Gilborn *et al.* (2001), guardians are more likely to be women, the mother if she is still alive, and on death of the mother other female members are likely to look after the children even when the father is still alive. Tanzania AIDS Project (1995) found that grandparents cared 59% of orphans who had lost both parents, and 41% were cared for by other relatives while those who had lost their fathers are in households with their mothers or grandparents.

Table 6: Caregiver by type of household

Caregivers		Affected households (n=40)		Non-affected households (n=60)	
		N	(%)	N	(%)
Mothers		10	25.0	60	100.0
Grandparents	Grandmother	15	37.5	0	0.0
	Grandfather	3	7.5	0	0.0
	Both	4	10.0	0	0.0
Aunts, sisters		8	20.0	0	0.0
Total		40	100.0	60	100.0

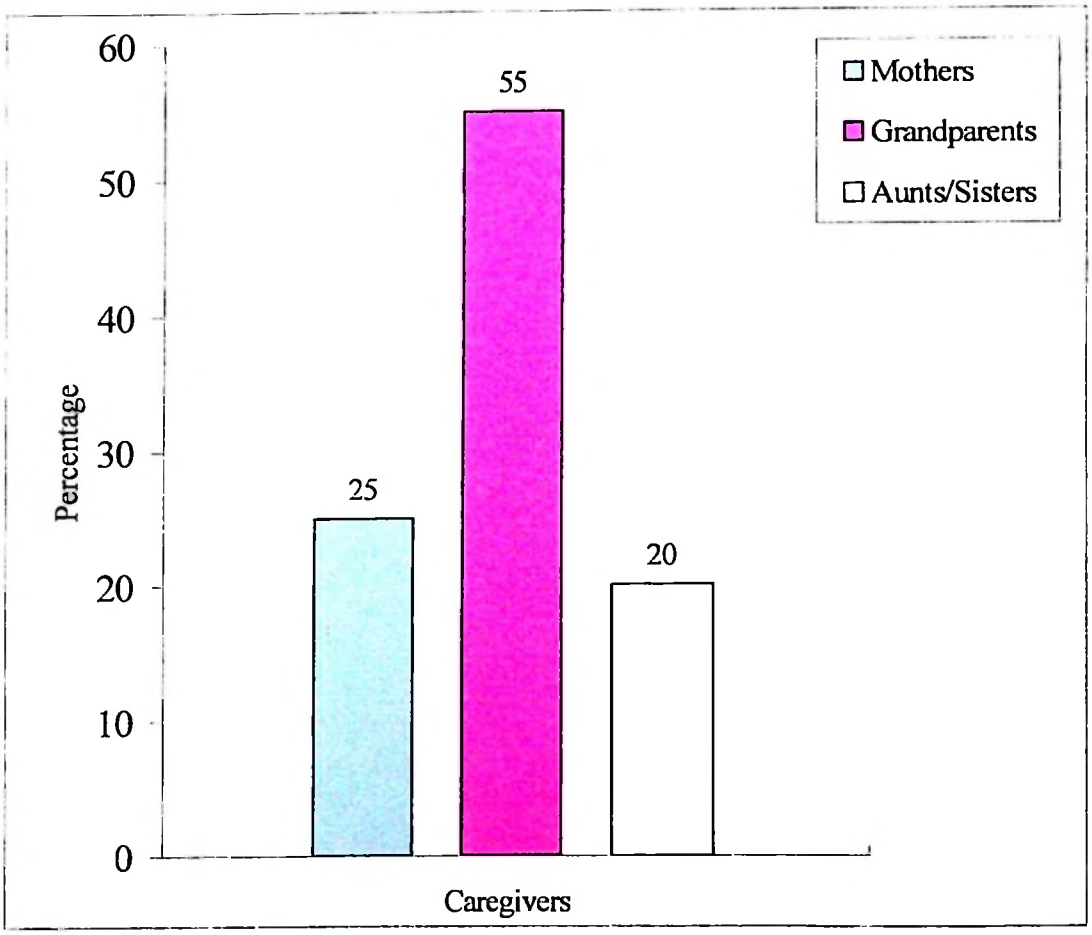

Figure 4: Proportion of orphans caregivers in affected households

4.3.2 Education level of caregivers by type of household

Majority of caregivers had achieved primary education. Over 80% among non-orphans caregivers had achieved primary education and 80% of orphans caregivers had achieved primary education level. Those who had achieved secondary education level the proportion is very low among orphans caregivers as compared to non-orphans caregivers at 2.5% and 10% respectively. The results further reveal that the proportion of orphans caregivers who had no formal or informal education was high than that of non-orphans caregivers. The results illustrated by (Fig. 5) show that 17.5% of orphans caregivers and 5% of non-orphans caregivers had no formal or informal education. These figures suggest that orphans caregivers were more disadvantaged in terms of education as this group had a relatively high proportion of individuals with no formal or informal education than non-orphans caregivers and also the proportion of those who have achieved secondary education is low compared to non-orphans caregivers.

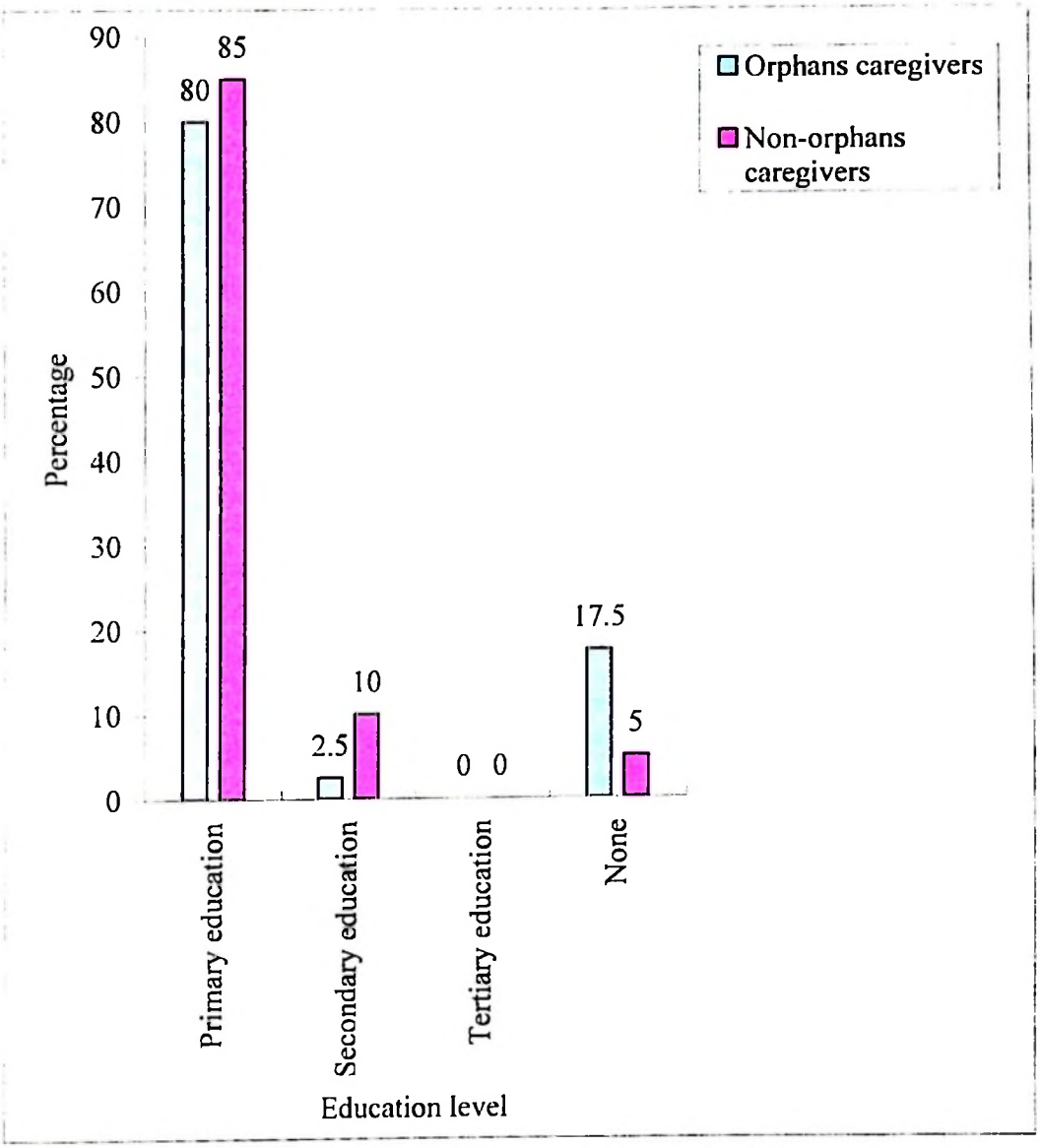

Figure 5: Education level of caregivers

4.3.3 Marital status of caregivers in affected households

The results of this study have indicated that, majority of caregivers were women, most of them unemployed. These women may also be more disadvantaged because some of them are either widows, divorced or separated. The results illustrated by (Fig. 6) indicate that over 50% of orphans caregivers were widows, 6% were either single or separated and the rest were married. This is similar to observations made in Kampala Uganda, whereby data on household structure revealed a high rate of widowhood, and that guardians were predominantly female (Gilborn *et al.*, 2001).

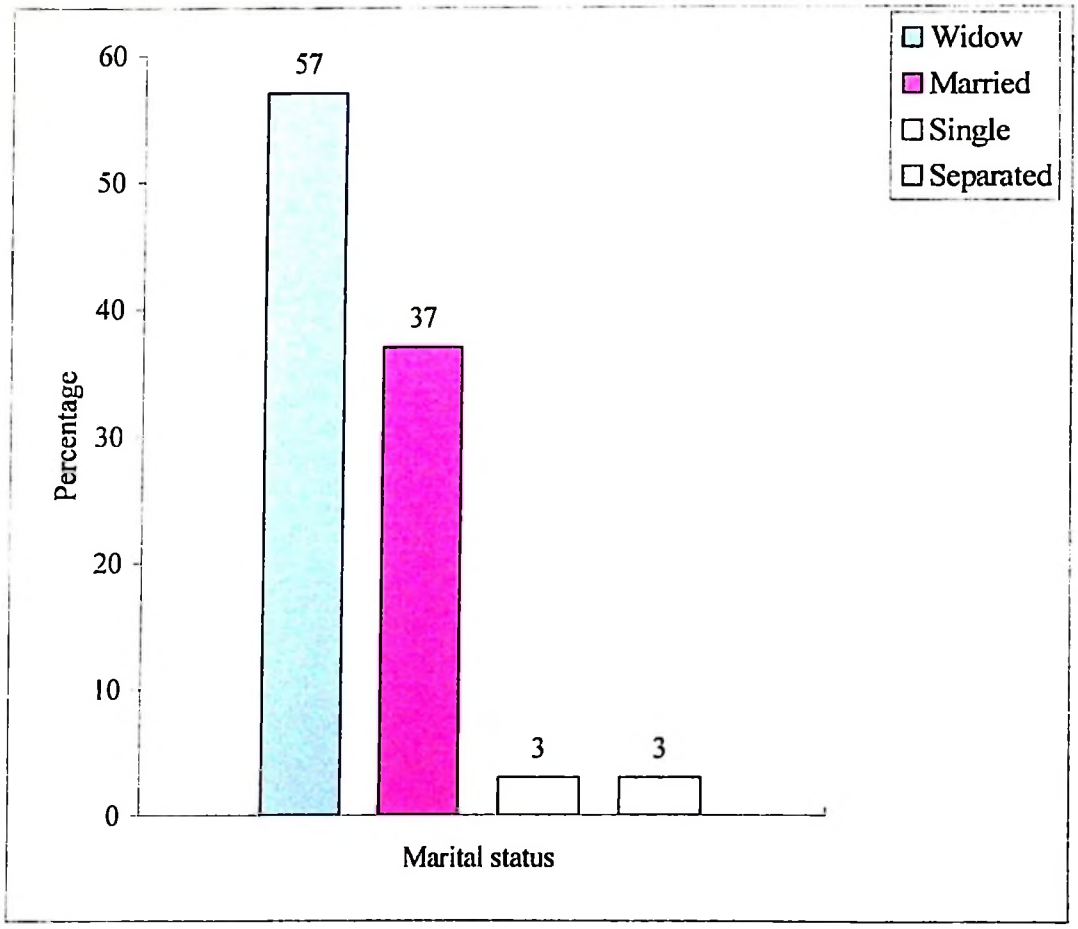

Figure 6: Marital status of caregivers in affected households

4.3.4 Employment of caregivers by type of household

Most of the caregivers interviewed were unemployed. The proportion of unemployed caregivers was almost the same for orphans and non-orphans caregivers. Over 90% of caregivers were unemployed in either type of households. Those who are unemployed largely depend on agriculture activities as their major economic activity. The results summarized in Table 7 show that over 70% of non-orphans caregivers reported agriculture as their main economic activity while those who were combine agriculture and petty trade represent 20%. Others were either depending on salaries, casual labour or local brewing. Among orphans caregivers those who depended on agriculture activities formed 50% and those who depended on local brewing as an economic activity comprised 12.5% among orphans caregivers while among non-orphans caregivers there was no local brewing as an economic activity. Others depended on casual labour and petty trade as their major economic activity. It is not surprising to find high proportion of caregivers unemployed and depending on agriculture activity as their major economic activities, these are the special features of rural communities. However it is an interesting finding that only 50% of caregivers in affected households depended on agriculture as their main economic activity while those depending on agriculture in non-affected households forms 71.7%. This is probably due to the reason that majority of orphans caregivers are grandparents who are themselves old and therefore unable to undertake agriculture activities. The results indicate a slight high proportion of orphans caregivers depending on local brewing and casual labour as their economic activity than their counterparts in non-affected households. The results show that 20% and 12.5% of orphans caregivers were depending on local brewing and casual labour. According to Maxwell *et al.* (2000), women ability to provide care is increasingly affected by the need to provide additional cash income for the household.

Older age, widowhood, unemployment for orphans caregivers will further increase the burden of care.

Table 7: Employment of caregivers by type of household

Variable	Orphans caregivers		Non-orphans caregivers	
	N	(%)	N	(%)
Employed				
Yes	2	5.0	3	5.0
No	38	95.0	57	95.0
Economic activity				
Agriculture	20	50.0	43	71.1
Petty trade	5	12.5	12	20.0
Salary	2	5.0	2	3.3
Local brewing	8	20.0	0	0.0
Casual labour	5	12.5	3	5.0

4.3.5 Income of caregivers

The results summarized in Table 8 indicate that majority of the caregivers had a daily income ranging between 500 and 1000 Tanzania shillings followed by those earning below 500 Tanzanian shillings. The proportion of those earning above 1000 Tanzanian shillings a day is very low for both orphans and non-orphans caregivers. Over 50% of non-orphans and orphans caregivers had a daily income ranging between 500 and 1000 Tanzanian shillings. From these figures, the average daily income of most caregivers in either type of household ranged between 500 and 1000 Tanzanian shillings.

4.3.6 Household expenditure

Household monthly expenditure is a reflection of economic status and also could be a reflection of purchasing power or priority the household attach to the items (Lorri *et al.*, 1997). The results summarized in Table 8 show that majority of orphans and non-orphans caregivers had a daily expenditure ranging between 500 and 1000 Tanzanian shillings.

The proportion of caregivers spending above 1000 Tanzanian shillings is very low. Those spending above 1000 make 11.6% and 13.3% for orphans and non-orphans caregivers respectively (Table 8). From these figures it is an indication that spending pattern follows income pattern with majority of caregivers earning between 500 and 1000 Tanzania shillings and spending between 500 and 1000 Tanzanian shillings followed by those earning and spending below 500 Tanzania shillings. This suggest that caregivers spend according to what they earn and it is more likely that most of the daily income is spent with no saving out of it as almost all income obtained in the day is spent on a single day. All caregivers in affected households reported high use of their income on food related items. This means that expenditure concentrate on basic immediate needs such as food and it is also an indication that these households did not meet food needs from their farm produce. The long-term needs such as education may not receive priority so as to meet the basic needs. NACP (1996) reported that household coping processes succeed in limiting the depth and duration of the short-term impact of adult death at the expense of serious long-term consequences. For example, after loss of parents schooling of older children may be sacrificed. These figures also suggest that most individuals in rural areas still live under 1 USD per day and therefore still poor and because most of the income is spent on food and food related items purchase, spending on other issues may be sacrificed. It is therefore becoming essential to economically empower women at Ilula so that they can effectively play the role in caring for AIDS orphans.

Table 8: Daily income and expenditure by type of household

	Orphans caregivers		Non-orphans caregivers	
	Income	Expenditure	Income	Expenditure
Below 500	(41.7)	(26.7)	(30.0)	(20.0)
Between 500-1000	(51.7)	(61.7)	(56.7)	(66.7)
Above1000	(6.6)	(11.6)	(13.3)	(13.3)

Note. The number in brackets are percentages.

4.4 Support for orphans

Support for orphans and vulnerable children is important if one aims to minimize the impact of loss of parents. It is also important to support family's response to handle the problem of orphans. Caregivers may not be able to meet all the needs of orphans and therefore some of the orphans needs may be neglected. The results presented in Table 9 indicate that majority orphans and non-orphans caregivers were not receiving any kind of support. The difference in the proportion of orphans caregivers receiving support is not statistically different from that of non-orphans caregivers $p = 0.243$ (Table 9). Over 80% of orphan and non-orphan caregivers were not receiving any kind of support from relatives, neighbors or Non Governmental Organization (NGO's). Among orphans caregivers those who were receiving support make 12.5% and were mainly supported by relatives such as sisters and daughters. Only one household reported TB drug from the hospital as support to for treatment. Remittance was mentioned as the kind of support among non-orphans caregivers who were receiving support and it was given to them regularly. Most caregivers indicated that support after completion of primary school was very important. This is probably due to the reason that most of non-orphans and some of orphans caregivers could afford sending children to primary education but fails to send them to secondary and tertiary education.

These children have different needs, and caregivers may prioritize these needs differently. The results presented in Table 9 indicate that education of the child was mentioned as the first priority of support on both type of household with high proportion among orphans caregivers. Over 40% and 30% of orphans and non-orphans caregivers respectively opted for education as their potential area for support. While no one among non-orphans caregivers mentioned treatment as their first priority 12.5% of orphans caregivers mentioned treatment of diseases as the area they most need support. Also basic needs support was very important in affected households than it is in non-affected household. The results of the study as summarized in Table 9 indicate that 27.5% of orphans caregivers mentioned basic needs, as potential area they need support while among non-orphans caregivers it was 8.3%. ESAURP (2002) reported that supporting orphans in Tanzania was not a priority area that gave concern and that most funds allotted for HIV and AIDS related activities centered in prevention and treatment. It is now evident that for the already poor resources households, without support from the community or interventions, these households will sink deeper into poverty. It is therefore necessary to take measure that aim at supporting household's response to minimize the impact of HIV and AIDS.

Table 9: Support received by affected and non-affected families

	Orphans caregivers (n=40)		Non-orphans caregivers (n=60)		
	N)	(%)	N	(%)	χ^2 P-value
Supported					
Yes	5	12.5	2	3.3	0.243
No	35	87.5	58	96.7	
Who supports					
Relatives	3	7.5	2	3.3	
Religious organizations	2	5.0	0	0.0	
Government	0	0.0	0	0.0	
Neighbors	0	0.0	0	0.0	
Kind of support received					
Food	1	2.5	0	0.0	
Shelter	0	0.0	0	0.0	
Clothes	0	0.0	0	0.0	
Financial support	2	5.0	0	0.0	
Orphan Fostering	1	2.5	0	0.0	
Drugs	1	2.5	0	0.0	
Remittance	0	0.0	2	3.3	
Priority area of support					
Basic needs	11	27.5	5	8.3	
Education	18	45.0	19	31.7	
Financial	6	15.0	1	1.7	
Treatment	5	12.5	0	0.0	
Orphans fostering	0	0.0	0	0.0	
None	0	0.0	35	58.3	

4.5 Child feeding

4.5.1 Introduction

Child feeding starts with exclusive breastfeeding. At the age of 4-6 months many children cannot get enough energy and nutrients from breastfeeding alone, they need complementary foods and by the age of 6 months many babies can digest most of family foods and at the age of 9 months they become less willing to try new tastes and new foods. Breastfeeding and complementary feeding are most likely to be impaired when children loose their mother.

4.5.2 Food situation in the household

One of the impact of adult death in the households is food insecurity arising from reduction in harvest arising from reduced manpower to work in the field and reduced family income that leads to low purchasing power and therefore less access of foods from the markets. The results of the study as illustrated by (Fig. 7) indicate that majority of non-affected households had food for subsistence only. Over 70% of non-affected households reported to have enough food for subsistence to cover the current and next season. Some non-affected households had enough food for subsistence up to next season and extra for sale. Among non-affected households 13.3% reported to have inadequate food in the household even for a single season and were largely relying in food purchase from the market. The results illustrated by (Fig. 7) further reveal that over 80% of affected households had inadequate food to cover even a single season and some were desperately in need of food.

From these results it can be noted that orphans suffer food shortage compared to the non-orphan children because the higher proportion of non-affected households had enough food than affected households. This study has revealed that majority of caregivers are women and most of them grandparents. Inadequate food in the household increases the burden to grandparents and other orphans caregivers to effectively care for orphans.

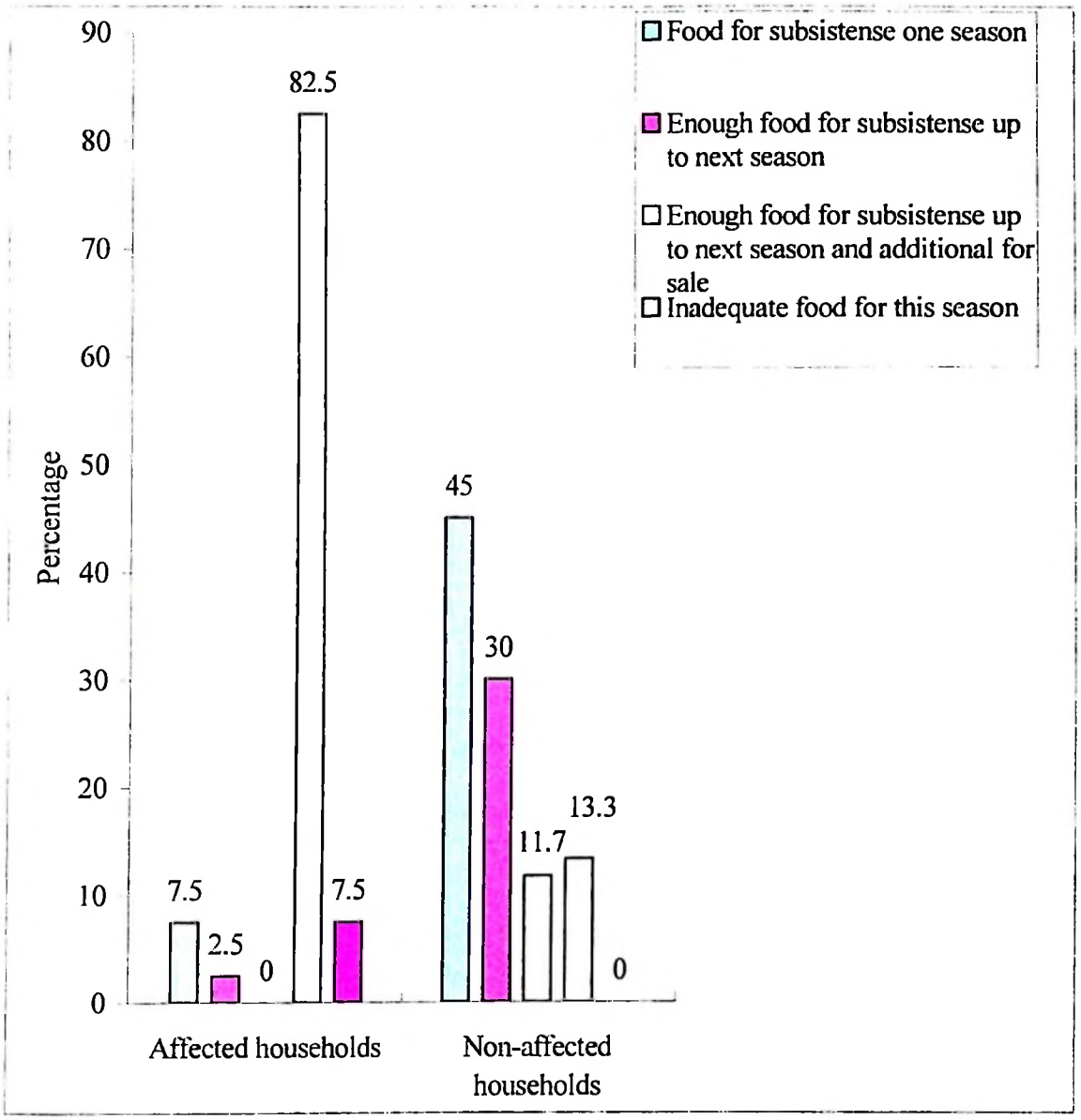

Figure 7: Food state by type of households

In addition short-term orphans feeding may be compromised to meet the long term feeding and therefore frequency and amount of food intake is likely to be reduced among orphans. According to UNAIDS (2002), in Kagera region AIDS death led to a general consumption drop of 33% and food consumption of 15%.

4.5.3 Breast-feeding

Breast milk is the best food for the baby and infants need to be fed on demand. Mothers are encouraged to exclusive breastfeed for at least four months and if possible six months. After four to six month mothers are encouraged to continue breastfeeding on demand up to two years. Breastfeeding is universal in most Tanzanian communities both rural and urban areas. The results summarized in Table 10 indicate that at the time of the survey there was no children were being exclusively breastfed. Most of the children were either complementary fed or receiving adults foods. This is because most of the children were above 6 months and in addition most orphans were not staying with their biological parents.

4.5.3.1 Exclusive breast-feeding among orphans and non orphans

The results in Table 10 indicate that only 20% among orphans caregivers were able to provide information about exclusive breast-feeding of orphans, and these were mothers of children. The information on breastfeeding was missing for many orphans due to the reason that caregivers in affected households were not the biological parents of children and were composed of grandparents, aunts and other member of the extended family who didn't have the information of child feeding particularly breastfeeding when the child was staying with their mother. Those who breastfed, most of them did it for three months while among non-orphans caregivers 56.7% breastfed for 3 months. The results presented in Table 10 show that majority of the women exclusively breastfeed their children for three months while exclusive breastfeeding for four or six months as recommended by WHO is rarely practiced at Ilula.

Table 10: Time for exclusive breastfeeding

	Orphans		Non-orphans	
	N	(%)	N	(%)
1 Months	0	0.0	6	10.0
2 Months	1	1.7	15	25.0
3 Months	8	13.3	34	56.7
4 Months	2	3.3	4	6.7
6 Months	1	1.7	1	1.7

4.5.4 Complementary feeding

Over 30% of orphans caregivers were able to provide information about complementary feeding because they adopted children when they were below 5 years and in the complementary feeding stage. The results summarized in Table 10 show that among orphans caregivers 15% started complementary feeding between 2-3 months while most non-orphans caregivers started complementary feeding at the age of 4 months. Over 50% of non-orphans caregivers started complementary feeding at the age of 4 months and 23.3% started at the age of 3 months. The proportion of those who started complementary feeding at the age of 1 month, 5 months and 6 months is very low at 8.7% and 6.7% respectively. From these results it is an indication that some caregivers both orphan's and non-orphans caregivers deviates from WHO recommendation for exclusive breastfeeding for 4-6 months.

The results of the study indicates that some of orphans and non-orphans caregivers exclusively breastfed their children for 2 and 3 months and start complementary foods before 4 months. Other reports NBS (2000) have indicated that supplementation of breastfeeding with other liquids begin early in Tanzania and most of children aged 2-3 months receive supplements. Over 70% and 90% of orphan and non-orphans caregivers respectively reported the use of special complementary foods during complementary

feeding stage. Millet, rice, groundnuts and milk are types of foods widely used and 76.7% of orphan caregivers reported to have used these types of foods. Other foods included plain porridge, green vegetables, fruits, eggs and meat. It is therefore important to provide nutrition education about appropriate complementary feeding time for both orphans and non-orphans caregivers because early introduction of complementary foods especially under unhygienic condition is more likely to cause infections by foreign organisms to the child.

4.5.5 Frequency of food intake

If there is no enough food in the household, it is more likely that frequency of food intake will be reduced. The results presented in Table 12 show that among orphans, 45% were taking two meals a day while 55% were taking three meals a day. Those who took two meals went hungry in the morning compared to their counterparts who took breakfast, lunch and dinner. When compared to non-orphans, orphans received few meals a day than non-orphan children as 70% of non-orphans were taking three meals a day and 23.4% were fed on demand. The results further reveal that most orphans were eating in the same plate with adults. The result in Table 12 indicates that 10% of orphans who were below five years were eating on the same plate with adults and 11.7% of non-orphans who were below 5 years of age were eating on the same plate with adults. However among non-orphans some under five children were eating on separate plate with adult, which is the recommended practice.

The results summarized in Table 11 indicate that over 90% of orphans were receiving adult foods and most of these orphans aged above 2 years. The results indicate that 3.3% of non-orphans were receiving adult foods between the ages of 6-24 months. In addition 15% of

those who were between the ages of 2-5 years were receiving adult foods. The result presented in Table 12 show that all children who were taking adults foods were eating in the same plate with adults. These results suggest that the practice of eating from the same bowl with young children is still practiced at Ilula. With this practice going on there are possibilities that children are denied adequate amount of food as children have small stomach and tend to eat slow than adults who have large stomach and eat faster. It is recommended that young children eat on a separate plate with adult as they have low eating capacity and also that because children aged 2-5 years are highly affected by nutrition problems, frequency of food eating for them should be five times a day (MoH, 2002). According to Oniang'o (1988), by one year old the child should be accustomed to variety of foods and in addition to meals, the child should also be provided with snacks between meals and for 2 years old 3 meals a day may be sufficient provided the energy and nutrients content in foods are sufficient to cover the requirements and if not possible oil or sugar is added. Also 6 years old children need to eat as frequent as they can because they are still growing and have high energy requirement.

Table 11: Child feeding by age group

Age group	Orphans		Non-orphans	
	Complementary Feeding (%)	Adult foods (%)	Complementary Feeding (%)	Adult foods (%)
Below 6 months	0.0	0.0	1.7	0.0
Between 6-24 months	0.0	0.0	21.7	3.3
Between 25-59.9 month	1.7	8.3	6.7	15.0
Above 5 years	0.0	90.0	0.0	51.6

Table 12: Eating practice and frequency of food intake

Age group	Orphans		Non-orphans	
	Same plate (%)	Separated (%)	Same plate (%)	Separated (%)
Below 5 years	10.0	0.0	11.7	36.6
Above 5 years	90.0	0.0	51.7	0.0
Frequency of food intake per day	N	(%)	N	(%)
2 times	27	45.0	4	6.7
3 times	33	55.0	42	70.0
On demand	0	0.0	14	23.3

4.6 Immunization

After loss of parents the mother in particular and also if parents are sick and there is nobody to help to carry her parental duties, child immunization is likely to be ignored. The child may not be taken to the clinic and may miss immunization or may not be fully immunized or immunized but at an inappropriate time and the situation might be worse in areas where outreach immunization services are not undertaken. The results in Table 13 indicates that only 51% of orphans caregivers were able to provide information on immunization of orphans and the rest did not have information of orphans immunization. This was mainly due to the reason that orphans were staying with parents during this crucial time of preventive health interventions.

Among orphans who were known to be immunized about 42% were fully immunized at the appropriate age whereas all non-orphans were fully immunized at appropriate age. The immunization status of 48.3% of orphans was unknown (Table 14). And this is because most of the orphans were staying with parents at the time when they were supposed to be immunized. Worse still those who had adopted these children did not know the

immunization status of the children they care and they did not have MCH cards used for growth monitoring that could be used to check whether the child had received immunization or not. These figures suggest that if orphans are not immunized when staying with their parents, particularly the mother, they are more likely not to be immunized when adopted by members of extended families, and even if they are partially immunized, they are not likely to continue immunization when adopted if the guardian do not have the past information of immunization and even if they continue it is more likely to be at inappropriate time. Other reports (Mulenga *et al.* 1993, cited by Granger *et al.* 2001) have indicated that children in AIDS affected families are less likely to be fully immunized. It is important to make sure that children receive essential health care at the right time therefore any intervention to minimize the impact of parents loss should also focus on monitoring delivery of preventive health services to under 5 years orphans and also supporting parents and guardians who might themselves be unable to take children to the clinic. Outreach services such as mobile clinics can be used to reach these children so that like other children orphans also receive this important preventive health services at appropriate age and time.

Table 13: Proportion of immunized children

	Orphans		Non-orphans	
Immunized	N	(%)	N	(%)
Yes	31	51.7	60	100.0
No	0	0.0	0	0.0
Unknown	29	48.3	0	0.0
Total	60	100.0	60	100.0

Table 14: Proportion of immunized children at appropriate age

Immunization status	Orphans		Non-orphans	
	N	(%)	N	(%)
Full immunized at appropriate age	25	41.7	60	100.0
Full immunized at inappropriate age	0	0.0	0	0.0
Unknown	35	58.3	0	0.0

Table 15: Caregivers response as to why is immunization status is unknown

Reason	Orphans		Non-orphans	
	N	(%)	N	(%)
The child was with parents	32	53.3	0	0.0
No enough time	0	0.0	0	0.0
N/A	28	46.7	59	98.3

4.7 Nutritional status

4.7.1 Overview

Nutrition anthropometry is the measure of the variation of physical dimension and gross composition of the human body at different levels and degree of nutrition (Gibson, 1990). Nowadays anthropometric measurements are widely used in the assessment of nutritional status, when a chronic imbalance between intake of protein and energy occurs. They are of two types, growth that includes measurements of weight, height, mid upper arm circumference, head circumference, while others are measure of body composition that include measurements of body fat and fat free mass. In children, nutritional indicators serve as proxy indicators for their well-being because they reflect the burden of diseases in the community as well as caring practices (UNICEF 1998, cited by Preble *et al.* 2001). In this study weight, height and age were used to derive three key nutritional indicators which

are Weight-for-height, Weight-for-age, and Height-for-age for children aged up to 10 years and BMI-for-age for children aged beyond 10 years.

4.7.2 Characteristic and health status of orphans

Orphans with a mean age of 118.05 months were older than non-orphans with a mean age of 76.133 months. This suggest that most of orphaned children were school aged children, youth or adolescent children actively involved in various activities within and outside the household.

4.7.3 Nutrition status of children aged below 10 years

Table 16: Mean Z-score for three nutritional indicators for orphans and non-orphans

	Orphans (n =32)	Non-orphans (n =48)	
Indicator	Mean (Range)	Mean (Range)	T-test P-value
Weight-for-height	-0.09 (-1.10, 2.18)	0.34 (-2.06, 2.34)	0.09
Weight-for-age	-1.06 (-2.87, 0.51)	-0.85 (-1.59, 3.11)	0.32
Height-for-age	-1.45 (-3.56, 0.73)	-1.74 (-5.22, 2.01)	0.34

The mean Height-for-age Z-scores for non-orphans was lower than that of orphans while the mean Z-score for Weight-for-age and Weight-for-height were lower for orphans than non-orphans. There was no significance difference in key nutritional indicators between orphans and non-orphans. The results presented in Table 16 show that the difference in mean Z-scores for Height-for-age, Weight-for-age and Weight-for-height were not statistically different between orphans and non-orphans children at 5% level of significance p = 0.34, 0.32 and 0.09 for Height-for-age, Weight-for-age and Weight-for-height respectively. Though the difference in the proportion of malnourished orphans and non-orphans is not statistically different and also the mean Z-scores are not statistically different orphans were more wasted and underweight than non-orphan children as their

mean Z-score tend to shifts to the negative side from zero which is considered the median value of the expected value for the reference distribution i.e. –0.091 and 0.34 for orphans and non-orphans respectively for wasting and -1.06 and -0.85 for orphans and non-orphans respectively for underweight. However this study indicates that non-orphans were more stunted than orphans with mean Z-score of –1.74 compared to -1.45 for orphans. According to WHO (2003), a mean Z-score significantly lower than zero means that the entire distribution has shifted downwards, suggesting that most, if not all individuals have been affected. From the figures above, both orphans and non-orphans were stunted but stunting was much pronounced among non-orphans than orphans probably due to the reason that most non-orphans were young children who were failing to grow or might have not caught up to their height. Inadequate food in affected households might be one reason that has contributed to shifting downwards from zero for the mean Z-score for Weight-for-age and Weight-for-height among orphans.

4.7.3.1 Weight-for-height

Low Weight-for-height is considered an indicator of acute under nutrition (thinness or wasting and it is generally associated with failure to gain weight or loss of weight. The results presented on Table 16 indicate a slightly higher proportion of wasted children of 6.3% and 5.8% among orphans and non orphans respectively. The results summarized in Table 20 reveals that the proportion of children who were wasted among orphans and non-orphans is not statistically significant ($p = 0.503$). It should be noted that, though the proportion of wasted children was slightly higher for non-orphans than for orphans, the mean Z-score for Weight-for-height have indicated that orphans were more affected in terms of wasting than non-orphans. This indicates the importance of using mean Z-score that describes the nutritional status of the entire population directly without resorting to a

subset of individuals below a set cut-off point. Based on these findings, it is evident that wasting occurs in both orphans and non-orphans and though the proportion of wasted children might not be statistically different between orphans and non-orphans one group might be more affected than the other. According to NBS (2003), if there is no food shortage the prevalence of wasting is usually below 5% even in poor countries and when exceeds 5% it is in an alarming stage given parallel increase in mortality. The finding of this study as illustrated by (Fig. 8) indicates prevalence above 5% in both orphans and non-orphans with 5.8% and 6.3% among orphans and non-orphans respectively. This is alarming, as there were significant numbers of deaths among under five orphans. According to UNICEF (2001), wasting in for under five children in Tanzania stood at 6%, which is almost the same in this study. This is an indication that older children were also wasted just like young children.

Table 17: Weight-for-height

	Orphans n =34		Non- orphans n =48	
Indicator	N	(%)	N	(%)
Severe wasting	1	2.9	0	0.0
Moderate wasting	1	2.9	3	6.3
Normal	32	94.1	45	93.8
Total	34	100.0	48	100.0

4.7.3.2 Weight-for-age

The results presented on Table 18 indicate a slightly higher proportion of underweight children among non-orphans of 12.5% as compared to orphaned children at 11.8% respectively. The results summarized in Table 20 further indicate that the proportion of under 10 years children who were underweight among orphans and non-orphans is not statistically different ($p = 0.4795$). Though the proportion of underweight children is not different between orphans and non-orphans the mean Z-score for Weight-for-age have

indicated that orphans were more underweight than non-orphans as their mean Z-score for Weight-for-age have shifted to the negative side of zero (the median of the expected value for the standard reference distribution) than that of non-orphans. Based on this finding, it is a clear indication that underweight occurs in both orphan and non-orphan children but orphans are more affected. Although according to UNICEF (2001), underweight in Tanzania was estimated at 27%, older children above 5 years might have masked underweight in this study and therefore a lower proportion being underweight as compared to the country prevalence.

Table 18: Weight-for-age

	Orphans (n =34)		Non- orphans (n =48)	
Indicator	N	(%)	N	(%)
Severe underweight	0	0.0	1	2.1
Moderate underweight	4	11.8	5	10.4
Normal	30	88.2	42	87.5
Total	34	100.0	48	100.0

4.7.3.3 Height-for-age

Low Height-for-age is considered an indication of chronic under-nutrition (shortness or stunting), which is frequently associated with poor overall economic conditions and or repeated exposure to adverse conditions. The results presented on table 19 indicate a slightly higher proportion of stunted children among non-orphan children than orphaned children of 29.6% than orphaned children at 23.5%. According to UNICEF (2001), stunting for under five children in Tanzania stood at 42%. The lower proportion of stunted children in this study as compared to the country prevalence is probably due to the reason that this study incorporated assessment of nutritional status of adolescent children who are reported to be relatively less susceptible to malnutrition than young children and also a

small sample in the study. The results summarized in table 20 further indicate that the proportion of under 10 children who were stunted among orphans and non-orphans is not statistically different (p = 0.075). Though the proportion of stunted children was not different between orphans and non orphans, the mean Z-score for height-for-age have indicated that non-orphans were more stunted than orphans as the mean Z-score for Height-for-age have shifted more than that of orphans downward from zero which is considered as the standard reference for the distribution (WHO, 2003). Based on this finding, it is an indication that stunting occurs in both orphan and non-orphan children and though the proportion of stunted children might not be different one group may be more affected. Non-orphans were found to be more stunted than orphans probably due to the reason that orphans were older children than non-orphan children and therefore it is possible that orphans had already caught up to their height while non-orphans were still growing or are failing to grow and have not yet caught up to their height.

Table 19: Height-for-age

Indicator	Orphans (n =33)		Non- orphans (n =48)	
	N	(%)	N	(%)
Severe stunting	3	8.8	9	18.8
Moderate stunting	5	14.7	10	20.8
Normal	26	76.4	29	60.5
Total	34	100.0	48	100.0

Table 20: Malnutrition of orphans and non-orphans

Indicator	Orphans		Non-orphans		χ^2 P value
	N	(%)	N	(%)	
Wasting	2	5.8	6	6.3	0.503
Underweight	4	11.8	6	12.5	0.4795
Stunting	8	23.5	19	29.6	0.075
Total	14	41.1	31	48.4	

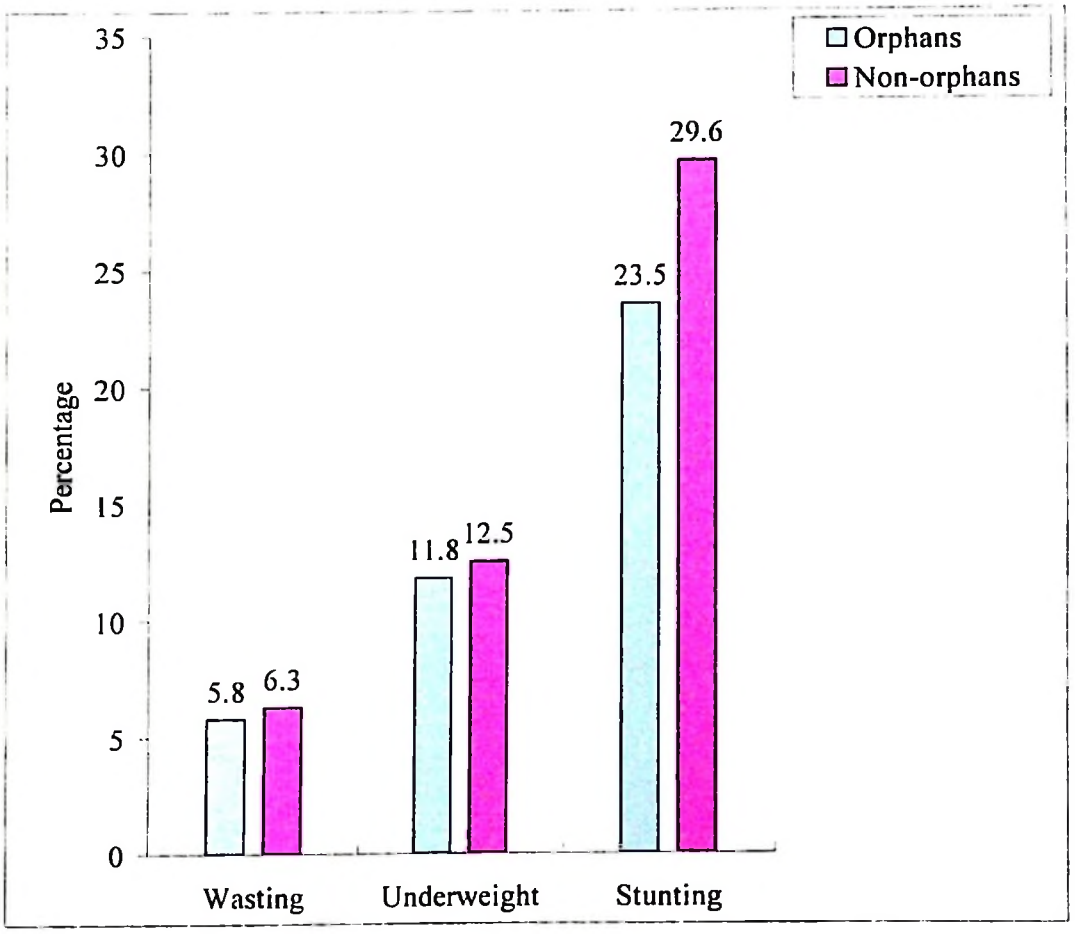

Figure 8: Malnutrition of children aged up to 10 years

When data for prevalence of malnutrition are compared between orphans and non-orphans, wasting, underweight and stunting show the same pattern. The results illustrated by (Fig. 8) indicate high level of stunting among both orphans and non-orphans followed

by underweight and then wasting. This suggests that there is still high level of stunting among under 10 children at Ilula-Iringa. Stunting is more prevalent than wasting in most of Sub-Saharan Africa (Victoria 1992, Sommerfelt *et al.* 1994, cited by Maxwell *et al.* 2000). The results summarized in Table 20 have indicated that the difference in the proportion of wasting, underweight and stunting is not statistically different between orphans and non-orphans.

This is an indication that malnutrition occurs through factors that cut across in both types of households and though the proportion of malnourished children is the same for orphans and non-orphans, the extent of malnourishment basing on the mean Z-score for orphans and non-orphans seems to be different. Therefore when comparing malnourishment between orphans and non-orphans it is important to look at both the proportion and the extent of malnourishment between the two groups and therefore the use of means of Z-scores becomes important in nutrition studies so as to determine which group is more affected.

4.8 Acute nutrition state by type of household

Low Weight-for-height or BMI-for-age is considered as an indicator of acute under-nutrition (thinness or wasting) and is generally associated with failure to gain weight or a loss of weight. BMI-for-age is also used to assess overweight and at risk for overweight. The results summarized in Table 21 indicate the nutritional status of adolescent children aged beyond 10 years based on BIM-for-age.

Table 21: BMI-for-age for adolescents aged 10-15 years by type of household

	Orphans		Non-orphans	
	N	(%)	N	(%)
Malnourished	6	23.1	5	41.7
Normal	20	76.9	7	58.3
Total	26	100.0	12	100.0

Basing on Weight-for-height and BMI-for-age as indicators of acute nutrition state, the results presented in Table 22 indicate that the proportion of acute malnourished children was 23.3% and 25% for non-orphans and orphans respectively. Though the proportion of those suffering from acute malnutrition was slightly higher in orphans than non-orphans, the results of analysis reveal that this difference in acute malnourishment between orphan and non-orphan children is not statistically significant ($p > 0.05$). Therefore concluding that the proportion of AIDS orphans cared by member of the extended families and non-orphans cared by their parents suffering from acute malnourishment is the same.

Table 22: Acute nutrition status based on Weight-for-age and BMI for Age

Variable	Non-orphans (n = 60)		Orphans (n = 60)		
	N	(%)	N	(%)	χ^2 P-Value
Malnourished	14	23.3	15	25.0	0.415
Normal	46	76.7	45	75.0	
Total	60	100.0	59	100.0	

4.8.1 Acute nutrition state by gender

Vulnerability to malnutrition between males and females differs. The results of the study show that the proportion of male children who were malnourished is higher than that of female children. The results summarized in Table 23 indicate that the proportion of those

who were suffering from acute malnutrition were 32.7% for males and 17.6% for females. This difference in the proportion of acute malnourishment between male and female children is statistically significant ($p < 0.05$) with boys being more malnourished than girls. According to Nyange (2001), it was found that boys were more malnourished than girls and that the chance of malnutrition is reduced in male-headed households. According to Mbunda *et al.* (2001), 46% of male children were found to be stunted while female constituted 42.5%. Among males 6.9% were wasted while female who were wasted represented 5.9%. In addition, 30.4% of males were underweight while 28.4% of females were underweight.

Table 23: Acute malnourishment by gender of children

Variable	Males (n = 52)		Females (n = 68)		
	N	(%)	N	(%)	P-value
Malnourished	17	32.7	12	17.6	0.028
Normal	35	67.3	56	82.4	
Total	52	100.0	68	100.0	

4.9 Nutritional status by age category

Many studies concentrate on addressing the nutritional status of under five children and there is a tendency to ignore the nutrition status of school-age children. In this study the nutritional status of under five children was compared with children aged between 5-10 years. Young children are reported to be more susceptible to malnourishment than older children (Mbunda and Mathew, 2001). The results summarized in Table 24 indicate that the mean Z-score for underweight and stunting was not statistically different at 5% level of significance for under five years children and those aged above 5 years. However the difference in the mean Z-score for wasting was significantly different at 5% level of

significance p = 0.011 with older children being more wasted than young children. This is probably due to the reason that majority of older children were orphans who at the same time came from households that were less secure in terms of food security and also struggling to meet their basic needs. It might also be due to ignoring the nutrition of older children and therefore they become malnourished just like young children. Though the difference in mean Z-score for underweight was not statistically different, children aged above 5 years were more underweight than under five children. In addition the results summarized in Table 24 indicate that under five children were more stunted than children aged between 5-10 years. Contrary to an expectation that young children would be more malnourished than older children, as they are more susceptible to malnutrition, this study indicates that older children were more wasted and underweight than young children. This is probably due to the reason that older children were mainly orphans who were struggling to meet the basic needs in the household. According to ACC/SCN (2002), wasting which reflects acute malnutrition is not common in school-age children, as the case it is with underweight and stunting. In addition, young children were more stunted probably due to the reason that they were failing to grow and have not yet caught up to their height compared to older children who might have caught up with their height. In addition some older children might have been exposed to poor nutrition when they were under five and did not catch up to their height when they were above 5 years and also because stunting can seldom be reversed. These results suggest that malnutrition is still a problem at Ilula-Kilolo district in Iringa, and both young and older children get malnourished.

Table 24: Mean Z-score for wasting, underweight and stunting by age category

Indicator	Age category	(n)	Mean	T-test (P-value)
Wasting	Below 5 years	41	0.4746	0.011
	Above 5 years	39	-0.4970	
Underweight	Below 5 years	41	-0.8060	0.280
	Above 5 years	39	-1.0628	
Stunting	Below 5 years	41	-1.8728	0.086
	Above 5 years	39	-1.3597	

The results summarized in Table 25 indicate that the proportion of children who were currently ill or had suffered illness in the past two weeks was not statistically difference at 5% level of significance p = 0.34. However, there was more under five years deaths reported among orphans in affected households than among non-orphans and that this difference was significant at 5% level of significant p = 0.001. From these findings it is an indication that orphans cared by members of the extended families were orphans who have survived the deaths of their parents. According to Hunter (2001), the likelihood of children dying in infancy is 40% higher in Sub Saharan Africa than in any other region in the world. However evidence from Uganda indicates that improving investment in child survival intervention are outweighing the impact of HIV and AIDS.

Table 25: Current illness among orphans and non-orphans children

		Orphans (n = 60)		Non-orphans (n = 60)		
Variable	Response	N	(%)	N	(%)	χ^2 P-value
Current ill or illness in the past 2 weeks	Yes	2	3.3	4	6.7	0.34
	No	58	96.7	56	93.3	

Table 26: Under five deaths among orphans and non-orphans

Variable	Response	Orphans (n =40)		Non-orphans (n = 60)		χ^2 P-value
		Number (N)	Percent (%)	Number (N)	Percent (%)	
Under five deaths reported in the household	Yes	10	25	2	3.3	0.001
	No	30	75	58	96.7	

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Conclusion

Based on the major findings of this study there is no compelling evidence that indicates that AIDS orphans were more malnourished than non-orphans. The results of the study have indicated that the proportion of acute malnourished orphans and non-orphans was not statistically different. However the mean Z-score have indicated that though the difference in the mean Z-score for all three key nutrition indicators was not different, orphans were more wasted and underweight than non-orphans and non-orphans were more stunted than orphans. This indicates that undernutrition is experienced in both orphans and non-orphans children and though the proportion of malnourished children might be the same one group might be more affected than the other. Also, given the high mortality among under five AIDS orphans and few under five orphans in the study area, it is more likely that survival bias might be a factor that have influenced this finding. This is because, since the sample comprised of children of unknown HIV status it is possible that these children are those who have survived the death of their parents. From this argument one can say that children in affected families may get more malnourished than children in non-affected households only if they contract HIV from their parents and also that their chances of surviving when they are under five are very narrow. It is therefore reasonable to conclude that surviving AIDS orphans cared for by members of extended families in the community are in general not at greater risk of becoming malnourished than non-orphan children in the same community.

This further suggests that, factors that contribute to poor nutrition in orphans are more likely to be the same factors that contribute to under nutrition among non-orphans and here a complex nature of malnutrition problem is further justified.

Contrary to an expectation that young children would be more malnourished than older children, this study has indicated that older children were also malnourished like young children. Therefore the nutrition status of school aged children should not be ignored as this group of children need to be healthy for better performance in school.

Though the proportion of malnourished children was the same between orphans and non-orphans, affected households were more disadvantaged in term of food security than non-affected households. Also most of these households and orphans had no support from relatives, government or non-governmental organization. These households have indicated that support to families becomes an important area to reduce the burden of care for those who care for orphans. Since the poor are most vulnerable to food deficits and malnutrition, it is important to increase their purchasing power so that they can have economic access to food if they do not have physical access though both are essential.

Also the information on the use of preventive health services is largely missing for orphaned children, and therefore it is more likely that children who are not immunized when staying with their ill parent might not be immunized when adopted by foster parents or guardians due to lack of information on the preventive health service received by the child while staying with parents.

5.2 Recommendations

1. If policies and interventions are designed to combat malnutrition among orphans it is very important that they target both orphans and non-orphans in the community because this study has indicated that though non-orphans had both parents and were more advantaged in terms of food security in the household than orphaned children, this could not transform into better nutrition. Despite having a food surplus, Iringa had higher levels of malnutrition than other parts of the country and this led to the Iringa Nutrition Project (INP). It is more likely that some reasons that contributed to higher rate of malnutrition while the households had enough food during the 1980s are the reasons still contributing to malnourishment among non-orphans. It is therefore important to undertake further research that quantify care practices and establish to what extent each practice influences nutrition status of the child an activity that was beyond the scope of this study.

2. Basing on the finding of this study, older children were malnourished just like young children. Therefore tackling the nutritional problems of both under five and school-aged children might help improve the nutritional status of children in the community and the country at large.

3. Because most of the orphans caregivers were found to be women who are unemployed, some of old age and that majority of them were widows, it is becoming important to support these caregivers so that they can effectively care for the orphans. These caregivers need support in areas of food, treatment, secondary education and vocational trainings for orphans. The government of Tanzania has abolished school fees for primary education and this has helped most of these

children as most orphans were also attending school or have received primary education, but further support is needed for secondary and tertiary education. Also, when food support is offered in the community, it is important that affected households receive high priority.

4. Also, under-five mortality among orphans is an area of concern, as there was significant number of under five deaths reported among orphans than it was for non-orphans. It is therefore important to monitor growth of these children under circumstances such as loss of parents. Therefore putting all children who have parents suffering from AIDS and related terminal illness under nutrition surveillance to monitor their growth as well as to make sure that they receive important preventive health services at appropriate time for their age as recommended by WHO becomes important aspect of nutrition interventions.

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APPENDICES

Appendix 1: Questionnaire for orphans

IDENTIFICATION

Name of the District:.....
Name of the Ward: .....
Name of the Village: .....
Household Identification number:.....
Name of the child.....
Age of the child.....

1. Age category
   Below 5
   Between 5-10 years
   Above 10 years
2. Tribe of the child
   1. Hehe
   2. Bena
   3. Others (Specify)

3. Gender of the child
   1. Male
   2. Female

4. Education level of the child
   1. Nursery
   2. Primary
   3. Secondary
   4. None

ANTHROPOMETRIC MEASUREMENT OF THE CHILD

Indices	Value
Age (yrs)	
Weight (kg)	
Height (cm)	
Mid Upper Arm Circumference (cm)	

NATURE OF CAREGIVERS

5. Who is the current care provider/guardian?
    1. Mothers
    2. Grandparents
    3. Grandmother only
    4. Grandfather only
    5. Aunt
    6. Sister
    7. Uncle
    8. Brother
    9. Stepmother

6. Age of care provider/guardian
    1. Between 10-20 years
    2. Between 21-30 years.
    3. Between 31-40 years.
    4. Over 40 years

7. Education level
    1. I didn't get education.
    2. Primary education
    3. Adult education.
    4. Secondary education.
    5. Tertiary education.

8. Are you indigenous in this area?
    1. Yes.
    2. No.

9. Tribe
    1. Hehe
    2. Bena
    3. Other (specify)

10. Marital status
    1. Widow
    2. Married
    3. Single no children
    4. Single parent
    5. Separated
    6. Divorced

11. Number of children in the household.

12. Are you employed?
    1.Yes
    2. No

13. What is you major economic activity.
    1. Agriculture
    2. Business
    3. Employed
    4.Other (Specify)

14. Is the child attending school?
    1. Yes
    2. No

If not give reason.....

15. Is there alternative caregiver in your absence?
    1. Yes
    2. No

If no, where do you take children?

1. Leave them at home.
2. Other relatives.
3. Neighbors
4. Take them to workplace
5. Others (Specify)

16. What is the source of income in your household?
    1. Agriculture
    2. Petty trade.
    3. Petty trade and agriculture activities
    4. Casual labour
    5. Others (specify)

How much do you earn a day from your major economic activity?
1. Below 500 TSHS
2. Between 500-1000 TSHS
3. Between 1100-2000 TSHS
4. More than 2000 TSHS

How much do you spend a day?
1. Below 500 TSHS
2. Between 500-1000 TSHS
3. Between 1100-2000 TSHS
4. More than 2000 TSHS

On what items do you spend large part of your income?

1. Food and food related items
2. Treatment/Medicine
3. Cloth
4. Shelter
5. Others (Specify).....

17. When did parents die?

Parents	Year of death	Cause of death
Mother		
Father		

FOOD SITUATION AND FEEDING

18. Food situations in the household
    1. Good
    2. Not good

Where do you put your family in the following groups?

1. Enough food for subsistence one season only
2. Enough food up to next season
3. Inadequate food even for this season
4. Enough food till next season and extra for sale
5. Desperately in need of food

If you don't have food, then where do you get it?

1. Purchase
2. Assisted by relatives
3. Assisted by the government
4. Assisted by NGO's
5. Others (Specify)

19. What kind of needs do you think the child is missing ?
    Food
    Clothes
    Drugs/treatment
    Shelter
    Education
    Others (Specify)
20. In what area of support do you give high priority? Arrange them in order of importance
    1. Food
    2. Education
    3. Cloths
    4. Shelter
    5. Financial support
    6. Others (Specify)

21. Current feeding stage of the child
    1. Exclusive breastfeeding
    2. Complementary feeding
    3. Adults foods

22. How long did you exclusive breastfeed
Do you still breastfeed
    1. Yes
    2. No

23. Do you use or have ever used special weaning foods?
    1. Yes
    2. No

Do you still use special weaning foods?
    1. Yes
    2. No

What type of food did you or are you using?.....
.....
.....

24. How many times a day do you feed the child?
    1. Two times
    2. Three times
    3. Four times
    4. On demand
    5. Others (specify)

How much do you give the child?.....

25. Are all members eating together in the same plate?
    1. Yes
    1. No

    If no explain.....

26. When did you start complementary feeding?
    1. After 1 month
    2. After 2 moths
    3. After 3 months
    4. After 4 months
    5. After 5 moths
    6. After 6 moths
    7. Others (specify)

27. When did you or do you expect to stop breastfeeding
    1. After 2 months
    2. After 3 months'
    3. After 4 months
    4. After 5 moths
    5. After 6 months
    6. After one year
    7. After 2 years
    8. Others (specify)

28. Do you pay for education for children?
    1. Yes
    2. No

If yes what do you pay for in school
    1. School fees
    2. Various contributions to school (Specify)

29. Dou you receive any support in caring for the children?
    1. Yes
    2. No

If you receive support who is assisting you.....

What kind of support do you receive?
    1. Financial
    2. Food
    3. Shelter
    4. Drugs
    5. Others (Specify)

30. Is the child sick/ill?
    Yes
    No

If he/she is ill, for how long.....

Did you seek medical services?
1. Yes
2. No

If not why.....
31. Who pays for medical expenses?
    1. Parents
    2. Guardians
    3. Any member of the family

32. Is the child immunized?
    1. Yes
    2. No

Is the child fully immunized?
    1. Yes
    2. No

Mention immunization received by the child
1.....
2.....
3.....
4.....
5.....

33. Is the child attending MCH Clinic?
    1. Yes
    2. No

If no give reasons.....

34. Do you have MCH card for monitoring growth?
    1. Yes
    2. No

If the child is not fully immunized give reason.....

IMMUNIZATION HISTORY/STATUS

Circle immunization given to the child

Immunization	First	Second	Third	Booster
Polio	At Birth	2 months	3 months	12 months
BCG	At Birth or 6 moth	-	-	-
DTP	3 Months	4 months	5 months	12 months
Measles	6 or 9 month	-	-	-

BCG = Bacilli Calmette – Guerin vaccine
DTP = Diphtheria - Tetanus – Pertussis vaccine

Appendix 2: Questionnaire for non-orphans

IDENTIFICATION

Name of the District:.....
Name of the Ward: .....
Name of the Village: .....
Household Identification number.: .....
Name of the child.....
Age of the child.....

1. Age category
   1. Below 5
   2. Between 5-10 years
   3. Above 10 year

2.Tribe of the child
   1. Hehe
   2. Bena
   3. Others (Specify)

3. Gender of the child
   1. Male
   2. Female

4. Education level of the child
   1. Nursery
   2. Primary
   3. Secondary
   4. None

ANTHROPOMETRIC MEASUREMENT OF THE CHILD

Indices	Value
Age (yrs)	
Weight (Kg)	
Height (cm)	
Mid Upper arm Circumference (cm)	

NATURE OF CAREGIVERS

5. Who is the current care provider/guardian?

   1. Mothers
   2. Grandparents
   3. Grandmother only
   4. Grandfather only

5. Aunt
6. Sister
7. Uncle
8. Brother
9. Stepmother

6. Age of care provider/guardian
    1. Between 10-20 years
    2. Between 21-30 years.
    3. Between 31-40 years.
    4. Over 40 years

7. Education level

    1. I didn't get education.
    2. Primary education
    3. Adult education.
    4. Secondary education.
    5. Tertiary education.

8. Are you indigenous in this area?
    1. Yes.
    2. No.

9. Tribe
    1. Hehe
    2. Bena
    3. Other (specify)

10. Marital status

    1. Widow
    2. Married
    3. Single no children
    4. Single parent
    5. Separated
    6. Divorced

11. Number of children in the household.

12. Are you employed?
    1.Yes
    2. No

13. What is you major economic activity.
    1. Agriculture
    2. Business
    3. Employed
    4.Other (Specify)

14. Is the child attending school?
    1. Yes
    2. No

If not give reason.....

15. Is there alternative caregiver in your absence?
    1. Yes
    2. No

If no, where do you take children?

    1. Leave them at home.
    2. Other relatives.
    3. Neighbors
    4. Take them to workplace
    5. Others (Specify)

16. What is the source of income in your household?
    1. Agriculture
    2. Petty trade.
    3. Petty trade and agriculture activities
    4. Casual labour
    5. Others (specify)

How much do you earn a day from your major economic activity?
    1. Below 500 TSHS
    2. Between 500-1000 TSHS
    3. Between 1100-2000 TSHS
    4. More than 2000 TSHS

How much do you spend a day?
    1. Below 500 TSHS
    2. Between 500-1000 TSHS
    3. Between 1100-2000 TSHS
    4. More than 2000 TSHS

On what items do you spend large part of your income?
    1. Food and food related items
    2. Treatment/Medicine
    3. Cloth
    4. Shelter
    5. Others (Specify)

FOOD SITUATION AND FEEDING

17. Food situations in the household
    1. Good
    2. Not good

Where do you put your family in the following groups?

1.Enough food for subsistence one season only
2.Enough food up to next season
3.Inadequate food even for this season
4.Enough food till next season and extra for sale
5.Desperately in need of food

If you don't have food, then where do you get it?

1. Purchase
2. Assisted by relatives
3. Assisted by the government
4. Assisted by NGO's
5. Others (Specify)

18. What kind of needs do you think the child is missing and?

1. Food
2. Clothes
3. Drugs/treatment
4. Shelter
5. Education
6. Others (Specify)

19. In what area of support do you give high priority? Arrange them in order of importance.

1. Food
2. Education
3. Cloths
4. Shelter
5. Financial support
6. Others (Specify)

20. Current feeding stage of the child

1. Exclusive breastfeeding
2. Complementary feeding
3. Adults foods

21. How long have you exclusively breastfeed your child

1. 1month
2. 2 months
3. 3 months
4. 4 months
5. 5 months
6. 6 months

22. Do you still breastfeed

1. Yes
2. No

23. Do you use or have you ever used special weaning foods?
    Yes
    No

Do you still use special weaning foods?
1. Yes
2. No

What type of food did you or are you using?.....

24. How many times a day do you feed the child?
    Two times
    Three times
    Four times
    On demand
    Others (specify)

How much do you give the child?.....

25. Are all members eating together in the same plate?
    1. Yes
    2. No

    If no explain.....

26. When did you start complementary feeding?
    After 1 month
    After 2 moths
    After 3 months
    After 4 months
    After 5 moths
    After 6 moths
    Others (specify)

27. When did you or do you expect to stop breastfeeding
    1. After 2 months
    2. After 3 months'
    3. After 4 months
    4. After 5 moths
    5. After 6 months
    6. After one year
    7. After 2 years
    8. Others (specify)

28. Do you pay for education for children?
    1. Yes
    2. No

If yes what do you pay for in school
1. School fees
2. Various contributions to school (Specify)

29. Dou you receive any support in caring for the children?
1. Yes
2. No

If you receive support who is assisting you.....

What kind of support do you receive?
1. Financial
2. Food
3. Shelter
4. Drugs
5. Others (Specify)

30. Is the child sick/ill?
1. Yes
2. No

If he/she is ill, for how long.....

Did you seek medical services?
1. Yes
2. No

If not why.....

31. Who pays for medical expenses?
1. Parents
2. Guardians
3. Any member of the family

32. Is the child immunized?
Yes
No

Is the child fully immunized?
1. Yes
2. No

Mention immunization received by the child
1.....
2.....
3.....
4.....

33. Is the child attending MCH Clinic?
    1. Yes
    2. No

If no give reasons.....

34. Do you have MCH card for monitoring growth?
    1. Yes
    2. No

If the child is not fully immunized give reason.....

IMMUNIZATION HISTORY/STATUS

Circle immunization given to the child

Immunization	First	Second	Third	Booster
Polio	At Birth	2 months	3 months	12 months
BCG	At Birth or 6 moth	-	-	-
DTP	3 Months	4 months	5 months	12 months
Measles	6 or 9 month	-	-	-

BCG = Bacilli Calmette – Guerin vaccine
DTP = Diphtheria - Tetanus – Pertussis vaccine