FOOD SECURITY SITUATION AMONG PEOPLE LIVING WITH HIV/AIDS IN MOROGORO MUNICIPALITY

BY

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ABSTRACT

A study to assess food security situation among people living with HIV/AIDS (PLWHA) in Morogoro Municipality was conducted using two non governmental organizations (NGO) that are dealing with such people, namely Faraja Trust Fund (FTF) and "Wanaoishi na Virusi vya UKIMWI Morogoro " (WAVUMO). The objectives of the study were to identify constraints and copping strategies by PLWHA in obtaining their daily meals, characterize the available nutritional guidelines for PLWHA. The awareness about linkages between nutrition and HIV was assessed, identification of organizations dealing with PLWHA in the area and characterize their activities. A cross sectional research design was adopted where purposive sampling method was used to obtain 90 PLWHA and 30 caregivers from the two NGOs. Interviews using structured questionnaires and focus group discussions were used to collect data. Key informants from various stakeholders were interviewed. The data were processed and analyzed using Statistical Package for Social Sciences (SPSS) computer program. Results indicated that, source of food for respondents contributed to constraints for PLWHA to obtain enough/nutritious foods. Majority of respondents (58.3%) depended on markets/shops for their food and failed to meet their daily meal requirements. This was mainly due to reduction in ability to produce (60.7%) and earn income (82.6%). Among the copping strategies for inadequate food adopted by PLWHA, skipping some meals ranked high (41.1%). Nine nutritional guidelines were available in Tanzania but none among them was easily accessed by PLWHA, caregivers even organizations dealing with PLWHA in the study. Six organizations dealing with PLWHA in Morogoro Municipality were

identified but only two provided food aids and one financial credits. It was concluded that most of PLWHA face food deficit contributed by not only unavailability and accessibility, but also lack of nutritional knowledge. It is recommended that governmental and NGOs should make nutritional guidelines available to PLWHA and caregivers together with providing capacity building supports which are long term solutions compared to food relief.

DECLARATION

I, Tapita Solomon Tuvana, hereby declare to the Senate of Sokoine University of Agriculture, that this dissertation is my own original work and has never been submitted for higher degree in any other University.

Tapita Solomon Tuvana — Date: 21/05/2007

The above declaration is confirmed

Prof. J. M. Msuya — Date: 21/05/2007

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DEDICATION

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ABREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ARV	Antiretroviral
ART	Antiretroviral Therapy
AMREF	African Medical and Research Foundation
CBO	Community Based Organization
CEP	CIDA Ethiopia Program
COUNSENUTH	The Centre for Counselling, Nutrition and Health Care
FAO	Food and Agriculture Organization
FANTA	Food and Nutrition Technical Assistance Project
FGD	Focus Group Discussion
FTF	Faraja Trust Fund
GDP	Gross Domestic Product
GHA-CDIN	Great Horn of Africa Community Development Initiatives in Nutrition
GIT	Gastro- Intestinal Tract
HBC	Home Based Care
HIV	Human Immunodeficiency Virus
ICRW	International Centre for Research on Women
IFPRI	International Food and Police Research Institute
KAP	Knowledge Attitude and Practice
LBW	Low Birth Weight
MDP	Municipal Director Profile

MoH	Ministry of Health
MTCT	Mother to Child Transmission
NACP	National AIDS Control Program
NEREF	Neema Orphans Relief Foundation
NFNC	Namibia Food and Nutrition Centre
NGO	Non Governmental Organization
PLWHA	People Living With HIV/AIDS
PMO	Prime Minister's Office
PMTCT	Prevention of Mother-to-Child Transmission of HIV
PI	Protease inhibitor
RCQHC	Regional Centre for Quality Care
RFE	Rapid Funding Envelope for HIV/AIDS
SPSS	Statistical Package for Social Sciences
TACAIDS	Tanzania Commission for AIDS
TFNC	Tanzania Food and Nutrition Centre
TzPPA	Tanzania Participatory Poverty Assessment
UNAIDS	Jointed United Nations Program on HIV/AIDS
USAID	United States Agency for International Development
UN	United Nations
VCT	Voluntary Counselling and Testing
WAVUMO	Wanaoishi na Virusi Vya UKIMWI Morogoro
WB	World Bank
WFP	World Food Program
WFS	World Food Summit

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Food security is attained when at all times, an individual or a community or a nation have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). Achieving food security requires sufficient physical supplies of food, adequate household access to these food supplies, and appropriate use of food to meet people's specific dietary needs.

Food security involves three distinct but interrelated aspects including: food availability, food access and food utilization. Food availability is achieved when sufficient quantities of food are consistently available to all people in the household, region or country. Food access is ensured when households and all people in them have adequate resources to obtain appropriate food materials for a nutritious diet. Food utilization refers to the proper biological use of food including quantity that is taken and used by an individual for different body metabolism (Bonnard *et al.*, 2002). A condition like Human Immunodeficiency Virus/Acquired Immune Deficiency Syndromes (HIV/AIDS) or any other disease has impact to all of the three aspects of food security. This is because it affects body functions and impairs ability to work hence hindering food security from individual level to national level (RCQHC, 2003).

Human Immunodeficiency Virus (HIV) is a disease caused by a retrovirus that damage the human immune system which then permits opportunistic infections to cause virulent and fatal diseases to an individual (USAID/FANTA, 2004). A person infected with HIV progressively develops Acquired Immune Deficiency Syndrome (AIDS). HIV continues to spread all over the world at an alarming rate. Today, HIV/AIDS epidemic is one of the most serious problems all over the world. It is worse in African countries (Piwoz and Preble, 2000). The pandemic status worldwide is 39.4 millions cases (UNAIDS, 2004). Majority of the cases are in Sub-Saharan countries which account for about 29.4 millions infected individuals. No other region of the world has a higher prevalence of the disease than sub Saharan Africa. By 2010, the number of AIDS related deaths are predicted to be twice as large as that from all other causes of deaths combined (Phaladze, 2005).

According to NACP (2002), Tanzania has a total number of 1.8 million people living with HIV/AIDS with an average prevalence rate of 8.8%. Morogoro region has 9% prevalence rate and ranks number six among the Tanzanian regions. It is however believed to be under estimated because of poor diagnosis and reporting (TACAIDS, 2003). TACAIDS (2003) gave an estimate of only one case being reported out of five; however, the data available are believed to reflect the trend of AIDS cases in the country. A recent report shows that 7.7% of women and 6.3% of men are infected with HIV/AIDS in Tanzania (TACAIDS, 2006).

Food is an essential need to everyone but most critical to PLWHA. IFPRI (2002) considered food as the most priority need to PLWHA especially in developing world

as compared to drugs or medical treatment. The interaction of food security and HIV/AIDS can be viewed from biologically point of view basing on food utilization, whereby special diet is needed following infection and progression of the disease. HIV/AIDS is a socio-economic issue that affects health, food availability and accessibility by an individual at household or community in general (USAID/FANTA. 2004).

Since a large number of people are now infected with HIV, there is a great to investigate their food security situation. Such information is important in order to develop strategies that can assist PLWHA in alleviating their food insecurity hence improve their nutrition status.

1.2 Problem statement and justification

PLWHA face a tremendous problem of gradual decrease in ability to engage in their productive activities hence reduction in economic ability. PLWHA use substantial amount of money for special medical care required (FAO, 2004). This increases their cost of living. Available data on Sub Sahara African countries show that in most of the severely affected communities, households were already food insecure even before HIV/AIDS struck (Piwoz and Preble, 2000). HIV/AIDS has increased the severity and frequency of food insecurity within households. It also created food insecurity among the previously food secure households and individuals.

Households with PLWHA are reported to utilize large portions of their income and time in providing care and support. UNAIDS (2001) reported that households with HIV/AIDS-affected members in rural Ethiopia spent an average of only 11.6 to 16.4

hours a week on agricultural work compared with 33.6 hours a week spent by households with non-HIV/AIDS-affected members.

The majority of population living in the Morogoroo Municipal area earn their income from working activities such as industrial works, mercantile and other service provision engagements. Others are involved in subsistence farming. However, little information is available on the effect that reduced ability to work has on the PLWHA in terms of earning income, and hence food acquisition. Without sufficient earnings, PLWHA will not be able to purchase the food they need (nutritious and adequate). Food security situation of the PLWHA in Morogoro Municipality is not well documented apart from general assumptions that they are likely to be facing difficulties. Such data are needed in order to plan realistic strategies or interventions to provide social and economic support to the PLWHA. It is important, for example, to clearly understand the constraints and coping strategies used by PLWHA in meeting their food requirements. Given the importance of nutrition to their wellbeing, it is also important to assess whether they do have access to the right information. The importance of nutrition to PLWHA has now increased because of wide spread use of ARV drugs in Tanzania.

This study was undertaken in order to fill such information gap by assessing the food security among people living with HIV/AIDS in Morogoro Municipality. It is expected that finding from this study will help to intervene the situation therefore provide support to PLWHA in Morogoro Municipality. The findings may also be applicable to other PLWHAs in similar socio-economic settings.

1.3 Objectives

1.3.1 Overall objective

To investigate the food security situation among people living with HIV/AIDS in Morogoro Municipality.

1.3.2 Specific objectives

(a) To determine the constraints faced by people living with HIV/AIDS (PLWHA) in meeting their individual or household food needs.

(b) To identify the coping strategies used by people living with HIV/AIDS in securing their individual foods.

(c) To identify and characterize the various available nutritional and dietary guidelines for PLWHA in Tanzania.

(d) To assess the awareness by PLWHA and their care givers about the key links between HIV/AIDS and nutrition.

(e) To identify various organizations institutions dealing with PLWHA and characterize their roles in providing food security related services to PLWHA in the study area.

1.3.3 Conceptual framework

For the purpose of meeting the above stated objectives, the conceptual framework was developed trying to link the identified variables (Figure 1). The conceptual framework considers food security to consist of food availability, accessibility, stability and utilization as dependent variables linked to a set of independent social economic variables including education, occupation and knowledge on agricultural

and non agricultural production. Coping strategies are also investigated in this study, which include selling of labour, selling child labour, skipping some meals, receiving food grants from relatives, borrowing food from shops and selling of assets.

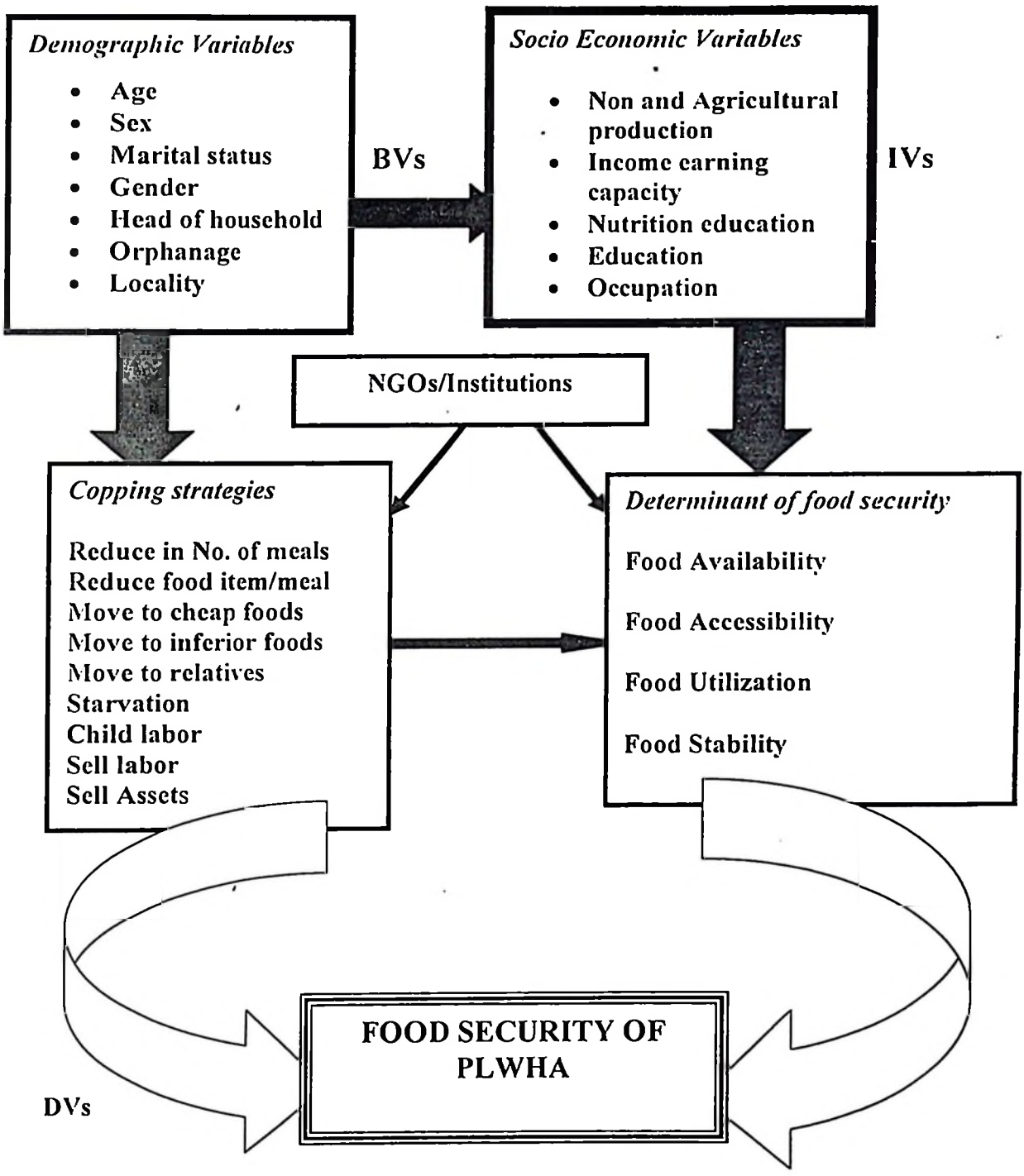

Figure 1: Conceptual frame work for food security of PLWHA

IVs- Independent Variables DVs- Dependent Variables BVs- Background Variables

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Overview

Food security is the condition when all people in the home, including young children, have access to adequate amounts and quality of food throughout the year (MoH-Uganda, 2003). To achieve this, households must not only have the ability to produce, purchase or store food but must also have adequate knowledge on how to use the food (MoH, 2003).

Although everyone knows how to eat, we all don't all know how to nourish ourselves (Bijlsma, 1997). Food adequacy is not only to have sufficient food but also know how to use it to provide balanced ration. Decision on what, when and how much to eat, is a complex process and its management differs from one individual to another. Issues like availability of food, taste, appetite, how much money and time we have, can influence the food we eat (Bijlsma, 1997).

Sick people, and in particular PLWHA, need special and healthy eating. Living with HIV means living with a weakened immune system which may result in easy to catch infections. Because of this, safe food and good nutrition is extremely important to maintain quality of life for PLWHA. With HIV/AIDS infection impairs absorption of nutrients and this necessitates special diets and frequent eating for PLWHA (COUNSENUTH, 2004). In essence, the relationship of HIV/AIDS to food security

is bi-directional. Food insecurity leads people into very risk behaviour that drives them into HIV/AIDS infection. On other hand, the impact of HIV/AIDS exacerbates food insecurity due to reduction in ability to work and produce (Lemke, 2005; Bachmann, 2003). HIV/AIDS has affected all dimensions of food security i.e. availability, stability, accessibility and utilization.

2. 2 PLWHA and their health status

2.2.1 Effect of HIV/AIDS to the human health

HIV belongs to a class of viruses called retroviruses. It attacks white blood cells by attaching itself to cells with the help of a specific surface protein called CD4 (RCQHC, 2003). This protein is present on white blood cells known as T helper lymphocytes and macrophages and as a result the retrovirus mainly infects these cells. The T helper cells help to stimulate the production of antibodies and multiplication of other white blood cells. The macrophages help to destroy infected body cells. As such they maintain the body immune mechanism (RCQHC, 2003) . The retroviruses attack these cells and thus the body immunity starts to deteriorate. With heavy infection of HIV, the immunity is totally diminished and an infected person develops AIDS.

AIDS cause wasting syndrome which is defined as a 10 percent weight loss of baseline body weight plus either chronic diarrhoea (i.e. two loose stools per day for more than 30 days) or chronic weakness and fever for 30 days or more in the absence of a concurrent illness or a condition other than HIV infection

(USAID/FANTA, 2004). Wasting is characterized by a loss of lean tissues. Lean tissues in the body are responsible for most of the body's metabolic functions including processing medications. The body starts to lose its major functions as damage to the immune system and weight loss progress. Other conditions include loss of appetite (Anorexia), fever, nausea and frequent vomiting and fungal infection caused by candida fungus (thrush), (USAID/FANTA, 2004). HIV/AIDS increase susceptibility of infection, poor response to medication, hair changes and hair loss (NFNC, 2004).

The consequence of AIDS is loss of the ability to do productive work, reduction in thinking capacity and ultimate death. Cumulatively a nation loses potential people that would have been used to produce and increase the national economy (IFPRI, 2002). Government also uses a lot of money to care for the PLWHA, the money that could otherwise be used to purchase food.

2.2.2 HIV/AIDS and nutrient digestion, absorption and utilization

Sick people have impaired intake, digestion and utilization of the eaten food. This applies also to HIV/AIDS victims (COUNSENUTH, 2004). Opportunistic diseases which arise as a result of HIV/AIDS, contribute to poor intake of nutrients due to reduction in appetite. Diarrhoea and vomiting which are common to PLWHA, affects digestion and absorption of nutrients because there is reduction in time of food staying in stomach. Destruction of cells of the stomach also contributes to poor digestion and absorption.

For the case of nausea, vomiting or loss of appetite, patient should take the most delicious food in small portions but frequently. Food cooked with spices may help to add flavour and taste to make it more acceptable. It will also help to improve digestion when the digestion system is impaired (TFNC, 2003). Normally the virus slowly attacks the intestinal epithelium that metabolizes sucrose and maltose into glucose, hence making glucose not available to the body tissue. Equally the absorption of nutrients and water is gradually prevented (Mackean, 1988). This causes the onset of diarrhoea, as the food and water are not absorbed. Inability to absorb water and electrolyte, affects the water-salt balance in the blood and tissue fluid in the cells. Loss of glucose and water affects the liver and kidneys which slowly break down. HIV virus prevents the replacement of protein for the epithelial lining. The long lines of villi come to look like rows of eroded mountains and therefore reduce food absorption within the body (Mackean, 1988).

2.2.3 HIV/AIDS and exercises

People living with HIV/AIDS are required to carry on with their normal daily activities as far as they are not exhausted (TFNC, 2003). At least light exercises like working or slow running which will make their body active and improve most of metabolic activities within the body together with improve in appetite is necessary. In fact, even moderate physical activity can stimulate immune function, delay or prevent wasting, increase strength and endurance, and help one feel better (Steinberg, 2004).

There are two major types of exercise that can be beneficial for people living with HIV, namely resistance and aerobic. Resistance exercise (weight training) adds density and bulk to the muscles in your body. This type of exercise is probably the

most important for people with HIV because more muscle results to better immune function. Resistance training may include push-ups, pull-ups and deep knee bends, but is even more effective when weights are used (Steinberg, 2004). Aerobic (cardiovascular) training involves exercises that increase heart rate example walking, running, swimming or bicycling. Aerobic activity is not only great for the immune system, but it also decreases risk for developing heart disease and helps with weight management. While aerobic training is not advised for individuals experiencing wasting or unintentional weight loss, these individuals can benefit greatly from resistance training. In general, PLWHA should always try to do some form of physical activity at least every other day (Steinberg, 2004).

Participating in exercise can also result in psychological benefits (Perna *et al.*, 1999). Some of the benefits of exercise, such as decreased lipodystrophy, could also result in psychological benefits. Current exercise guidelines for persons with HIV/AIDS vary, depending on the stage of the person's HIV/AIDS, medications, functional capacity, and symptoms. It is recommended to consult with the person's physician before implementing a program (Bopp *et al.*, 2003). Most exercise prescriptions consist of endurance or resistance exercises, or a combination. It is important to have the client warm-up at a low intensity, followed by static stretching. Aerobic exercise should be moderate in intensity, as high-intensity exercise is thought to depress immune function. Ideally, one should start with 15 minutes and gradually increase to 40 minutes, three times per week. Resistance exercise should be performed three days per week, if possible, waiting a full day between sessions.

Exercises should target all major muscle groups, and should range in intensity, based

on the client's ability. Clients should begin with light exercises and gradually move to difficult one. After aerobic or resistance exercise is completed, the client should engage in cool-down exercise followed by static stretching (Stringer *et al.*, 1998). Throughout exercise, it is important to make sure the client stays properly hydrated.

2.2.4 Testing for HIV/AIDS

Although HIV- testing programs exist in Sub- Saharan Africa, many people still do not get tested and they get health care only when they are already severely compromised (Phaladze, 2005). Pregnant mothers and lactating mothers need early diagnosis of HIV infection which will help them to know their HIV status and take care of themselves more thoroughly, prevent infection or re-infection by having safer sex and seek nutritional support that is more specific to their needs. Early diagnosis will help enrolment to PMTCT and minimizing chances of infecting a baby (MoH-Uganda, 2003).

Testing in Tanzania is done either at voluntary basis or at point where sick person needs treatment that involve blood transfusion, or examination. However this is only possible where services are provided. This means that few cases are tested and data available at blood testing and volunteer counselling are underestimated (TACAIDS, 2006). Some churches request counselling and testing before marriage for the purpose of avoiding joining two people with different HIV/AIDS status. Data on VCT overestimate the prevalence white blood testing points underestimate it. For example in Temeke Municipal, the 2005 VCT test shows 20% prevalence while Blood Testing Centre (BCT) shows only 6.8% (CMAC, 2006)..

2.2.5 Antiretroviral drugs/therapy and nutrition

Antiretroviral drugs (ARV) or Antiretroviral Therapies (ART) are medication used to treat HIV/AIDS-related symptoms and opportunistic infections. Treatment of people living with HIV/AIDS using antiretroviral drugs are used to inhibiting viral replication and decreasing viral load. They significantly reduce the replication of HIV in the body and slow the progression of the disease (RCQHC, 2003). Emphasis for use of antiretroviral drug is being undertaken in most of developing countries as a result of local, national, and international campaigns as one of strategies in reducing the pandemic intensity. Never-the-less research shows that nutrition when properly used can be more relevant in treatment of HIV/AIDS than antiretroviral therapy (Gillespie and Kidayala, 2005).

There are strong interactions between working mechanisms of ARTs and food/ nutrition (Castleman *et al.*, 2004) which can significantly alter the expected results. Food consumed can affect drug efficacy, adherence to drug regimens and therefore nutrition status of PLWHA. Managing the interactions between ART and food/nutrition is a critical factor especially in resource-poor settings. It needs to maintain time for taking medicine, eating specific type of foods either before or after taking the drugs, to check CD4 counts almost every month for any necessary adjustment (TFNC, 2003). If properly managed, it effectively slows the progression of HIV/AIDS and improving the quality of life of PLWHA. A high-fat meal increases the bioavailability of certain drugs (such as NRTIs and reverse transcriptase inhibitors), whereas a diet high in macronutrients inhibits the bioavailability of other drugs (such as protease inhibitor [PI] indinavar) (Castleman *et al.*, 2004). Many

protease inhibitors for example, must be taken on an empty stomach to allow efficient absorption. Proper absorption of protease inhibitors results in the interruption of a key step in viral replication, thus yielding non-infectious HIV particles (Yeh *et al.*, 1998).

Other drugs (such as NRTI didanosine) should be taken 30 minutes before a meal, as food reduces absorption (Castleman *et al.*, 2004; WHO 2002). ARV management should therefore be drug-specific. Zinc supplements given with zidovudine (AZT) in stage-4 HIV were associated with a 50 percent decline in opportunistic infections and an increase in zinc-bound thymulin levels, which are critical for differentiation of T-cells (Mocchegiani and Muzzioli 2000). |Reduction in AIDS related deaths has already been reported in Botswana after distribution of ART (Phaladze, 2005). The ARV should be well explained to the PLWHA and given under close supervision such that food type and timetable is adhered to. ARVs are expensive and may not be afforded by many PLWHA. Few are given the therapy free through government subsidy where available. This does not deny the need of adequate and proper food to the patient (URT, 2003a).

2.2.6 Prevention of mother to child transmission (PMTCT)

Global estimates among breastfeeding populations show that, on average, 63 percent of children of HIV-positive mothers will not be infected by HIV; 7 percent will be infected during pregnancy, 15 percent during delivery, and 15 percent during the first two years of breastfeeding (Filteau *et al.*, 1999). Interventions that enhance immune function may significantly reduce transmission risks. Micronutrients may improve

epithelial integrity and thus reduce risk. Evidence from human studies of subjects of unknown HIV status in Tanzania and Bangladesh suggest that antioxidants (especially vitamin E), taken during late pregnancy and early lactation, may be important in reducing the risk of sub clinical mastitis (Filteau *et al.*, 1999) hence decrease the chance of HIV to the child. Vitamin A and zinc supplementation trials in India and Bangladesh have resulted in improved gastrointestinal barrier function (Fawzi *et al.*, 1998; Filteau *et al.*, 1999) which also reduce the chance of HIV transmission.

When breastfeeding is well managed, then chance of transmission is minimal. Piwoz and Preble (2000) in Kenya found that there is no significant difference in rate of transmission of HIV/AIDS infection between breastfed and those based on artificial formula (35.7% and 20.5% respectively). HIV+ mothers who opt on breast feeding are recommended on taking several preventive measures like expressing and discard breast milk if there are signs of engorgement, blocked ducts or inflammation etc. RCQHC (2003) reported breast milk being the best food for children regardless HIV/AIDS status of the lactating mother because of its characteristics. Human lactoferrin, with demonstrated inhibitory effects on E. coli and other pathogens, has been shown to prevent HIV. Lipid-dependent antiviral activity against HIV and other enveloped viruses and bacteria has also been identified in breast milk. A sulphated protein, glycoprotein mucin or glycosaminoglycan, also appears to inhibit the binding of HIV to CD4 receptors. There is a link between safe breast feeding and nutrition status of the respective lactating mothers. Study in Kenya by Nduati *et al.* (1995) shows a strong correlation between low CD4 counts and detection of HIV

DNA in breast milk. This indicates that proper feeding of infected lactating mothers is more crucial in maintaining high immunity and hence CD4 counts.

2.3 Nutrition for PLWHA

2.3.1 Nutrition and immunity

When HIV attacks a person, it impairs body's natural defence system against diseases and infections (MoH -Uganda, 2003), which may take years to produce illness in a person. However, the effects of the virus on nutrition can occur early in the course of disease. The time it takes for HIV infection to become full-blown AIDS depends on the general health and nutritional status before and during the time of infection. Many people live with the virus for ten years or more if they maintain good nutrition (MoH -Uganda, 2003). Vitamin and minerals are essential for PLWHA because they protect against opportunistic infection by ensuring that the lining of skin, lungs and gut remain healthy and that the immune system functions properly (FAO, 2002).

Among lactating mothers, multivitamin supplementation was also seen to lower mortality, reduce the risk of diarrhoea, and improve the CD4 counts in breastfeeding infants (Iliff *et al.* 2005). Result of a multivitamin supplementation MTCT trial which included supply of vitamin B, C, and E during breastfeeding was found to reduce HIV transmission (Iliff *et al*, 2005). The reduction was significant among lactating mothers with compromised immunological and nutritional status. Mortality among HIV-negative children was reduced, and HIV-free survival was significantly prolonged among children born to women with impaired immunological or nutritional status.

2.3.2 Nutrient requirements for PLWHA

The HIV infected person requires to compensate nutrients that are used for viruses, opportunistic infections, nutrient mal-absorption and altered metabolism (MoH-Uganda, 2003). In the absence of AIDS symptoms, HIV - infected person should increase energy intake by 10% over the level of energy intake for health HIV non-infected persons of the same age, sex and physical activity level. With symptoms together with those taking ARVs should increase more energy intake 20 - 30% (URT, 2005). PLWHA do not require more protein or fat than level recommended for health non-infected person but needs diverse diet rich in micronutrients.

When nutrient supplements are used in a proper way will help body meet nutrients demand. Prenatal micronutrients supplementation improves pregnancy and birth outcomes. In Malawi, vitamin A supplementation in HIV-positive pregnant women lowered the risk of low birth weight (LBW) by 30 percent, improved neonatal growth rates, and reduced anaemia among infants (Kumwenda *et al.*, 2002). A report from Tanzania on multivitamin supplementation (including folate, thiamine, riboflavin, niacin, and vitamins B6, B12, C, and E, but not A) indicated an approximately 40 percent reductions in foetal loss, LBW, and severe preterm birth. Multivitamins (but not vitamin A) also increased CD4 and CD8 cell counts (Fawzi *et al.*, 1998). In Zimbabwe, Friis *et al.*, (2004) found that multi-micronutrient supplementation significantly increased weight at birth.

2.4. PLWHA and economic capacity

Food security is one among necessary conditions for quality care for PLWHA. However the HIV/AIDS pandemic has exacerbated this problem because it profoundly reduces ability to earn income for PLWHA therefore impair economic growth of a nation (Phaladze, 2005). The ill person is often unable to work, reducing the income available to the household and/or the output from agricultural activity and any other income generating activities. Economic crisis resulting from the increasing related expenses such as costly medical treatments, extra care, special food and the reduced income as a result of labour loss aggravates food insecurity to family members (Gari, 2002).

Jamison *et al* (2001) reported that, affected households face severe economic constraint because of reduced income and increased health expenditures. The report further shows that the annual treatment costs of HIV/AIDS for households in nine Asian countries were more than twice per capita income in each country. These estimates exclude the costs of antiretroviral drugs. Bloom and Mahal (1997) predicted that economic costs of AIDS would be felt not by nations but rather by households where health expenditure by households is four to five times higher than the state expenditure. The authors also report reduced consumption of milk, meat, and eggs as a result of increased health-care expenditures. Gupta (1998) showed that 10 to 30 percent of the annual income of an individual may be spent on the treatment of illness (URT, 2003a).

Tanzania has been making significant economic progress but these improvements are threatened by the growing impact of HIV/AIDS which is a considerable roadblock to continued improvement in the eradication of widespread poverty throughout the country (URT, 2003b).Tanzania's future GDP is predicted to be 15-20% lower in 2010 than it would have been without the AIDS pandemic (URT, 2003b). Current age and gender distributions of reported AIDS cases in Tanzania reveal that the disease has the strongest impact on individuals in the prime of their working and child-bearing years, from 20-49 years. Young men who migrate to urban settings often become infected and cannot support their family, and the women left behind in rural areas have limited time for subsistent farming when they must care for the sick (ICRW, 2003). Scarce resources are spent to overcome opportunistic infections, and children often leave school to care for sick relatives.

2.4.1 HIV/AIDS and head of household

In several places, households remain under the head of either children or elders because HIV/AIDS is killing people in the prime of their lives, when they would normally be raising their children and practice their professions. In Uganda, more than 80 percent of the reported HIV/AIDS cases are among people with 15-45 years old (ICRW, 2003) who are mostly the heads of households. Since these people constitute a significant proportion of the productive work force, their eventual illness and deaths reduce the family labour force, jeopardizing income flow and food security. In Tanzania the most affected age is 15-49, whereby the prevalence rate for this group in Morogoro is 5.1 -10% (TACAID, 2006).

In some cases when parents are sick of AIDS, children have to resume some of the

responsibilities of head of household and help out by searching for wild foods or by working to boost household earnings in order to buy food (Gillespie and Kadiyala . 2005). This is mainly because ability of their parents to perform productive activities becomes tremendously reduced while health care costs increase. As a result, children's education suffers because of missed schooling; they may even be withdrawn from school altogether due to having no school fees. In Zimbabwe, 18 per cent of households with HIV/AIDS cases have removed one or more children from school as a coping mechanism in response to the lack of food (Gillespie and Kadiyala, 2005). Very young children, who are also victims, spend about 80% of their time looking after their parents (Help Age-Tanzania, 2004) a situation which can bring them into economical crises and sexual abuses.

2.4.2 Family size and food costs

Most of Tanzanian households have large families where main part of their budget is used for food (UN, 2004). On average a Tanzanian allocates 64% of his or her expenditure to food indicating the high cost of household food security (UN. 2004). This tends to increase with increase in members of household. Deaths of a parent in urban force children to be sent to the rural areas and be raised in extended families. Sometimes sick people are returned together with their families to the homestead where they wait for their deaths (IFPRI, 2002). Effect of this occur both to relatives. sick individuals and their family members due to increase in household size and change in life style. The overall effect is that as the HIV/AIDS infection spreads out there is a tendency of increased family size, further to that, the purchasing power of these families is reduced while the total cost for food increases hence food insecurity.

2.4.3 Health service costs

The cost of taking care of PLWHA in Nigeria was reported to be about $100,000 which was said to be currently lowered due to government subsidies on antiretroviral medication (Binswanger, 2000). The author also reported that triple therapy costs between $ 15 000 and $ 20 000 annually per patient in USA (including both drugs, tests and related costs). In Tanzania, Pallangyo and Laing (1990) estimated the average lifetime cost per HIV/AIDS case to be TAS. 55 917 (US$347) for adults and TAS. 37 541 (US$266) for children. The number of hospital days per HIV/AIDS patient was estimated to be 31.9 for adults and 21.6 for children. The cost has increased and is estimated to be TAS. 1 355 000 per person (TACAIDS, 2006)

In Tanzania PLWHA are supposed to be exempted from cost sharing in public health care facilities although in some areas like Muleba-Bukoba it rarely occurred in practice (TzPPA, 2002). PLWHA have to use all the resources they have for treatment and food. These alter the budget which could have been used for food instead to be spent for health services and ultimately the patient dies and leaving behind food unsecured household. Once there is nothing left to sell in order to meet cost for medication, patients go without medical treatments which also influence quality and amount of food and utilization (TzPPA, 2002).

2.4.4 Coping strategies by PLWHA

When a sick victim is a breadwinner then household members will be forced to find an alternative source of income for food and other necessary requirements. Decrease in food availability and access within the household force individuals to seek the

alternative way of obtaining food. The first strategy used is that of selling out properties by the family involved (TzPPA, 2002). Secondly, HIV/AIDS cause younger generations to be pulled out of school to boost the family's ability to provide care for the ill and to maintain its current livelihood or develop new livelihoods (IFPRI, 2002). Children may be forced to engage in child labour for attaining money for caring their sick parents or for attaining their daily requirements (IFPRI, 2002). Winrock International (2000) reported other coping strategies such as working hard in the farms to compensate the negative effects, obtaining assistance from relatives and friends, casual employment, cheap labour in other people's farms, loan from self-help groups, and wife inheritance.

Drop in ability to produce and depletion on household income occurs dramatically as more adults are affected. This follow continuous use of the savings, and once the savings are finished, the family seeks food support from relatives, borrows money or sells its productive assets (FAO, 2001). Household first dispose liquid assets held as stores of value before disposing productive assets (Figure 1), Maxwell and Frankenberger, 2002).

Savings and financial assets are usually the first to be depleted after the onset of AIDS. After this, non-productive assets, such as furniture, cooking utensils and clothes follow. Finally, households may have to sell off productive assets such as tools, draught animals, and land - although in systems of communal tenure, land sales may not be an option (FAO, 2001). Households are thus likely to have less working capital to finance their farming, and may as well see their fixed capital eroded (IFPRI, 2002).

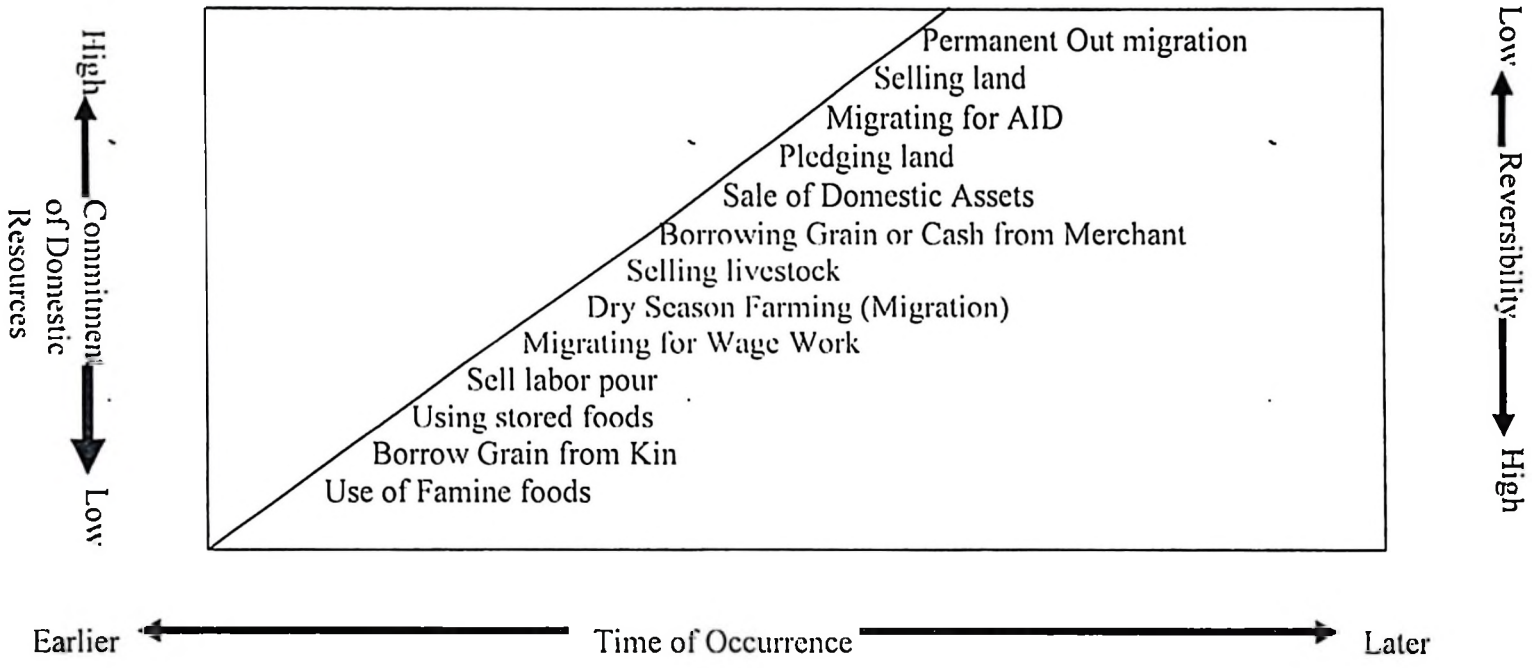

Figure 2: A model of responses to Food Shortage (Maxwell and Frankenberger, 2002).

2.5 Gender and PLWHA

HIV/AIDS affects both sexes but is not gender-neutral. Women, especially younger ones, are biologically more susceptible to contracting HIV than men in a given sexual encounter (IFPRI, 2002). Women are physiologically, economically, and culturally more at risk of HIV infection and AIDS (Gillespie and Kadiyala, 2005). Biologically women are more at risk because there is mounting evidence that the female genital tract can serve as a reservoir for HIV infection. Male-to-female transmission of HIV is two to four times more possible than that of female-to-male (Burger and Weiser, 2001). Furthermore, culturally women are less likely to negotiate condom use with husbands or other partners. The norm of virginity and the culture of silence regarding sex restrict adolescent girls' access to information about sex and heighten the risk of sexual coercion (Collins and Rau, 2000). All these put women at more risk to HIV/AIDS.

Women also have more limited access to health care and may receive inferior care. Studies of other infectious diseases show that women frequently wait longer than men before visiting health facilities and recent research reveals the possibility that a similar pattern holds for HIV care (Mocroft *et al.*, 2000). Shah *et al.*, (2001) in central Malawi found women in the patrilocal villages being more vulnerable to food insecurity. A newly widowed woman is expected to leave her husband's village and has no control over land and other assets she may have been using jointly with her husband. The death of the husband thus often results in the dissolution and relocation of the household. This means a widow from HIV/AIDS has less access to the

family's assets and more prone to food insecurity. When a household member becomes ill with HIV/AIDS, women's time is increasingly diverted to care and support away from food production, preparation and income-earning activities (ICRW,2003). When women are infected, it has a direct effect to food production and accessibility within a family because they are the one who are more productive in agriculture and small business in towns nowadays, and they contribute much also in home cares (IFPRI, 2002).

2.6 Social aspect to PLWHA

There have been continuous stigmatization at various levels to PLWHA. HIV-related stigma refers to all unfavourable attitudes, beliefs, and policies directed toward people perceived to have HIV/AIDS from relatives, close associates, social groups, and communities (Brimlow *et al.*, 2003). From the moment scientists identified HIV and AIDS, social responses of fear, denial, stigma and discrimination have accompanied the epidemic. Discrimination has spread rapidly, fuelling anxiety and prejudice against the groups most affected, as well as those living with HIV or AIDS people. Individuals affected (or believed to be affected) by HIV have been rejected by their families, their loved ones and their communities. This rejection holds true in the rich countries of the north as it does in the poorer countries of the south (AVERT, 2006). People living with HIV in most of Sub Saharan countries have been thrown out of their homes or their villages and left there hungry (IFPRI, 2002).

In some societies the infection is associated with minority groups or behaviours, for example, homosexuality. In some cases HIV/AIDS may be linked to 'perversion' and those infected will be punished (AVERT, 2006). Also, in some societies HIV/AIDS is seen as the result of personal irresponsibility. Sometimes, HIV and AIDS are believed to bring shame upon the family or community. Stigmatization makes health problems worse; puts people in danger and leads to social exclusion, humiliation and precarious dependency. The ways in which the social and physical consequences of HIV/AIDS combine makes it incomparably more destructive to people's wellbeing including food security (TzPPA, 2002).

PLWHA continue to be burdened by poor care and inadequate services, while those with the power to help do little to make the situation better. For example, in India it was reported that doctors in private hospitals tend to transfer patients with HIV/AIDS to government hospitals even if the case were possible to be attended there. These contributed to unnecessary overcrowding in these hospitals. It was also reported that PLWHA were receiving sub-standard medical care simply because they were HIV/AIDS victims (UNAIDS, 2001).

2.7 Tanzania national strategies in combating spread of HIV/AIDS

Since identification of the HIV/AIDS pandemic, Tanzania government has organized several programs for the purpose of confronting the pandemic (TACAIDS, 2003). Tanzania Commission for AIDS (TACAIDS) is leading an inclusive, multisectoral process to develop and apply national guidelines for providing nutritional care and support to PLWHAs. The purpose is to provide

policymakers, programs, caregivers, and PLWHA with sound guidance to improve the nutritional status of those infected by HIV/AIDS.

TACAIDS is to provide strategic leadership for a national multisectoral response to HIV/AIDS leading to the reduction of further infection, associated diseases and the adverse social economic effect of the epidemic. The objectives to meet the mission include:-

a) Develop strategic framework and national guideline to support planning, coordination and implementation of the national at all levels.
b) Develop and facilitate implementation of the national strategy for mobilization and utilization of resource for HIV/AIDS.
c) Establish and strengthen partnership of expanded response among all stake holders in government departments, PLWHA, private sector, FBO and NGOs, CBO.
d) Promote research of HIV/AIDS and find linkage with other research institutions.
e) Develop effective mechanisms for monitoring trends of the epidemic and the impact of HIV/AIDS interventions.
f) Establish and sustainably maintain on efficient and effective management capacity at TACAIDS.

The growing impact of the epidemic has shown that promotion of simple but important food-security, nutrition, and public-health interventions alongside and as a part of HIV/AIDS treatment initiatives is critical to an effective HIV/AIDS response. Home-based care (HBC) initiatives need to be holistic and extend beyond the person

infected by HIV to include family and household members. HBC programs are shifting from an exclusive focus on medical and nursing care to include counselling, food assistance, welfare support, school fees for orphans, and income generation for widows. But capacity is severely limited: most of these programs depend on overburdened community volunteers, whereby the government involvement is limited (UNAIDS, 2004).

2.8 Conclusion of the literature review

Since the identification of HIV/AIDS, much effort was directed in health, social and spiritual strategies for dealing with the pandemic. The new challenge calls for the acceleration of both short-term and long-term efforts to combat food unsecured situation and malnutrition in general, its effect on morbidity and mortality associated with HIV/AIDS. New capacities have to be developed and new resources sought. The Greater Horn of Africa Capacity Development Initiative in Nutrition (GHA-CDIN) has identified nutrition in the context of HIV/AIDS as an area of capacity development that urgently needs attention. Food security situation for PLWHA studies will help to cover the gap in knowing the nutrition context of HIV/AIDS and hence identify the appropriate strategies to deal with the current situation.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Description of the study location

The study was conducted in the Morogoro Municipality area. Information about the location, population, economic activities and health situation are provided below.

3.1.1 Location and population

Morogoro Municipality is one of the six districts making up the Morogoro administrative region. The other districts include Kilombero, Ulanga, Mvomero, Kilosa, and Morogoro Rural. Morogoro Municipality has a total land area of 260 sq.km which constitutes 0.4% of the total regional area. It is the business and administrative centre of the region. The Municipality has only one division which is subdivided into 19 administrative wards and 275 streets. The current population of the Municipality stands at 228,863 people in the ratio of 50.35% female and 49.65% male individuals (URT, 2003). The population growth rate is 4.6% per annum and the average income of a person per year is TAS. 185,000/= (URT, 2002). Immigration has increased from 3.7% in 1967 to 9.6% in 2002. The increase is due to various reasons including increase of factories, industries, and trading centres, expansion of agricultural activities and infrastructure (MDP, 2005). This rapid growth of population created a gap in service delivery, whereby the Municipal Council could not fulfil. The gap included inadequate health services, inadequate safe and clean water supply, shortage of housing and school facilities and inadequate infrastructure expansion including maintenance of roads (MDP, 2005).

3.1.2 Economic activities

Major economic activities in the Morogoro Municipality include industries of primary and secondary level, subsistence and commercial farming, small scale enterprises and commercial retail as well as whole sale. The main agricultural crops are sisal, rice and maize, which are grown in the periphery of the Municipality. Other crops include vegetables, fruits and yams.

3.1.3 Health situation

According to official statistics, Malaria is the leading disease in the area in terms of mortality while HIV/AIDS is the tenth (MDP, 2005). However HIV/AIDS is of great concern in Morogoro. By the end of year 2002 it had a prevalence rate of 8.6% where youth (15 - 24 age group) ranked high with prevalence rate of 8.9% compared to age groups of 25 - 34 and older ones who had prevalence rates of 8.7% and 8.1%, respectively (MoH, 2003).

3.2 The research design

A cross sectional survey design was used in this study where information was collected at a single point in time. This method was used because it is suitable for both descriptive and empirical analyses (Babbie, 1990). For the purpose of having access to PLWHA, two NGOs dealing with PLWHA in the Morogoro Municipality area were used to reach their members who were HIV/AIDS positive. These NGOs were namely WAVUMO and Faraja Trust Fund (FTF). The two NGOs are briefly described below.

(a) Faraja Trust Fund (FTF)

Faraja Trust Fund (FTF) is a non-governmental organization dealing with various development issues in the society including alleviating human suffering from HIV/AIDS through sustaining their self-help capacity to protect themselves against the effects of the AIDS epidemic. It was started in 1991. The NGO is providing integrated HIV/AIDS prevention and supportive care in the Morogoro Municipality and the surrounding localities. It has a total of 400 customers out of which about 200 are active members (FTF, 2002).

(b) *Wanaoishi na Virusi vya UKIMWI Morogoro* (WAVUMO)

"Wanaoishi na Virusi vya Ukimwi Morogoro" is a Swahili word meaning people living with HIV/AIDS in Morogoro. It is a non-governmental organization which provides support to individuals living with HIV/AIDS. Currently, WAVUMO has a total of 125 PLWHA individuals whereby active members are about 50 (WAVUMO, 2005).

3.3 Sampling procedure

3.3.1 Study population

People living with HIV/AIDS in the two NGOs (FTF and WAVUMO) formed the main population for this study. Members of the household who were involved in taking care of PLWHA (care givers) were also included. Others included management staff members of other stakeholders in the HIV/AIDS sector such as various institutions both governmental and non-governmental.

3.3.2 Sample size and sampling techniques

The sample size was based on active members of FTF and WAVUMO NGOs according to Fisher *et al.* (1991). The sample size in this case was 90 for PLWHA at 95% confidence level (Appendix 6). About 90% of the total sample were adults above 20 years old while children and adult of below 20 years were 10%. Sample for care givers was 30 respondents basing on willingness of an individual living with HIV/AIDS to be visited and whether the case was known by his/her family members. Four men and four women who were well informed among the PLWHA were selected to participate in focus group discussion.

Managements of FTF, WAVUMO and an organization that was providing voluntary counselling and testing services in Morogoro Municipality known as AMREF/"*Angaza*" nominated two officials to serve as key informants for each organization. One coordinator of HIV activities in the Morogoro region and one of the Municipal were also included as key informants and were visited.

3.4 Type of data collected

3.4.1 Primary data

Three approaches were used to collect primary data which included interview with individuals living with HIV/AIDS, focus group discussions and interviews with key informants. Individual PLWHAs were interviewed face-to-face using a structured questionnaire containing both open and close-ended questions (Appendix 1). The questionnaire helped to obtain socio-economic information such as demographic

characteristics, occupation, education, income earnings, food availability and nutrition knowledge. The sampled respondents were approached by leaders of the organizations and asked for informed verbal consent to take part in the study. For the sake of privacy, interview was conducted at the organization's centre unless a respondent was willing to be visited at his/her home. Prior to the actual survey, the questionnaire was pre-tested using PLWHA from an NGO which was not included in this study for this case PLWHA from Temeke Municipal Council in Dar es Salaam. Necessary modifications were then made before the actual data collection begun.

Focus group discussions (FGD) involving men and women separately, were conducted at each organization to obtain general information from PLWHA. A check list was used to guide the discussions. On the other hand, key informants from FTF, WAVUMO, AMREF/ANGAZA and HIV coordination offices were interviewed on various issues pertaining to PLWHA such as welfare and policies.

3.4.2 Secondary data

Secondary data was obtained from published and un-published literature and reports from relevant HIV/AIDS coordinating offices. Also, reports and publications from other institutions and organizations (governmental and non-governmental) were used.

3.5 Data processing and analysis procedure

Qualitative and quantitative data collected were analysed differently. The former were obtained through focus group discussions, which was then summarized and

used for clarifying issues raised from quantitative data. On the other hand, quantitative data from questionnaires were coded and analysed using the Statistical Package for Social Sciences (SPSS) computer program in conformity with objectives of the study. Cross tabulation involving chi-square test was used to test for relationships between different variables.

3.6 Definition of study variables

Food security as a key variable in this study was measured using food entitlement indicators. They included ability to earn income, number of meals per day, assets ownership, frequency of consuming certain foods that are considered superior or inferior, and frequency of missing food or not being able to get the required food. Other variables included agricultural and non-agricultural sources of food, knowledge of the relationship between HIV and nutrition, access to recommendations on nutrition for PLWHA and social-economic conditions such as age, income and family status.

3.7 Ethical consideration

Confidentiality and a person's right and dignity were observed throughout the study. Main aim and approach of the study were clearly explained to the respondents before each one was asked for verbal consent to be interviewed. A respondent who could not agree was excluded from the study.

3.8 Limitation of the study

It was not possible to reach PLWHA who were not members of the two NGOs involved in this study. Not all PLWHA individuals in the community are ready to come forward and join such organizations where they are required to reveal their HIV status. In that regard, the reported food security situation of PLWHA may not reflect that of individuals who were not members of FTF or WAVUMO. However, unless the individual was of extremely different socio-economic status, the situation can be generalized.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1. Demographic and socio-economic characteristics of the sampled respondents

Variables that were considered under demographic and socio-economic characteristics included age, sex, marital status, education and occupation.

4.1.1 Sex and age distribution

The sampled respondents included 26 males and 64 females. Their age ranged between 12 and 70 years old with a mean of 36 years and standard deviation of 12.272. The majority were of the age between 21 to 45 years old as indicated in Table 1. Chi-square statistic testing for difference of age distribution between the two sex groups indicated that there was no significant difference at $P \leq 0.05$.

Table 1: Distribution of respondents according to their age and sex

Age of respondent	Percent		Chi-square value
	Male (n= 26)	Female (n= 64)	
20 years and below	11.0	7.8	.467
21-45 years old	65.4	71.9	
Above 45 years old	23.1	20.3	
Total	100.0	100.0	
P value 0.792(ns)		df = 2	

ns = not significant different at $P \leq 0.05$

It was reported by the NGOs' management staffs that men were always less active in most of the organizational programs. Confidentiality might be a factor contributing to such male's behaviour. Some HIV infected individuals within the community do not

like to be identified as it was also found in the study conducted in South Africa where PLWHA did not like their health status to be exposed to household members (Bachmann and Booyesen, 2003). Willingness of respondents to be interviewed was respected throughout this study and therefore men unwilling were not forced to participate although their names were in the organizations' register books. Responsibilities faced by women including taking care of the family may have forced them to expose their health situation for expectation of receiving some support (Lemke, 2005).

4.1.2 Marital status

The distribution of the respondents according to their marital status is presented in Table 2. The majority of the interviewed females were widows or separated compared to male respondents who were evenly distributed among the three categories of marital status.

Table 2: Distribution of respondents with respect to marital status

	percent		
Marital status	Male (n=26)	Female (n=64)	Total (n=90)
Single	34.6	25.0	27.8
Married	30.8	25.0	26.6
Widow(er)/separate	34.6	50.0	45.6
Total	100.0	100.0	100.0

4.1.3 Education level

Majority of respondents had primary school level of education (77.5%) while very few (1.1%) had education beyond secondary school (Table 3). Only 6.8% of the respondents did not attend any formal education while 4.5% were still students or pupils.

Table 3: Distribution of respondents according to their education level with respect to sex

Education level	Percent		
	Male (n=25)	Female (n=64)	Total (n=89)
No formal education	4.0	7.9	6 .8
Primary school level	76.0	78.0	77.5
Secondary school	8.0	10.9	10.1
Beyond secondary school	0.0	1.6	1.1
Student/pupil	12.0	1.6	4.5
Total	100.0	100.0	100.0

4.1.4 Occupation

Occupation in this study refers to any legal means at which an individual earns income, where income is broadly defined to include home production. self employment, salaries. wages and transfers (Bonnard, 2003). Distribution of the respondents according to their occupation is indicated in Table 4. Most of them were small businessmen/women (47.8%) where half of female interviewed were businesswomen (50.1%). Only 13.3% of respondents were peasant farmers which is not surprising because this study was conducted in Morogoro town where agriculture is minimal.

Table 4: Distribution of respondents according to their occupation and sex

Occupation	Percent		
	Male (n= 26)	Female (n=64)	Total (n= 90)
Peasant farmer	15.4	12.5	13.3
Formal employment	7.7	7.7	7.8
Small businessman/woman	42.3	50.1	47.8
Not working	34.6	29.7	31.1
Total	100.0	100.0	100.0

4.2 Constraints facing PLWHA in obtaining their food needs

In this survey, constraints to obtaining food needs refer to limitations in food availability and access that impede intake of proper food quantitatively and qualitatively (RCQHC, 2003a). From this survey, source of food, change in access to food and access to information about nutrition recommendations for PLWHA were assessed. Results of the assessment are summarized in Table 5, and each of the constraints is discussed in the next sections.

Table 5: Summary of reported situation of constraints facing PLWHA in obtaining their food needs

Constraints	Observations
Source of food	Majority of respondents (90%) reported to depend on purchasing food from shops/market.
Change in food access	There was a general reduction in ability to earn income by 51.1% of respondents, and 60.7% failed to produce enough food from their farm plots.
Access to appropriate information about nutrition for PLWHA	More than half of interviewed PLWHA (52.3%) were not aware of what they are required (recommended) to eat.

4.2.1 Source of food

Anything that will reduce ability to work and produce or earn income will result in reduction in ability to purchase food and hence low chances of meeting daily food

requirements. FANTA/USAID (2004) noted that very often lack of means to acquire food including income, to be the major cause for vulnerable individuals to suffer from hunger despite the availability of food in the community or markets. Only about half (58.3%) of the respondents who indicated to depend mainly from own food production reported to meet their food requirements (Table 6). On the other hand, this was reported by only 37% of those who purchased their food and none for those who were depending on relatives or friends. Results imply that depending on relatives or friends was not a reliable source of food. Similar situation has been noted by Bonnard (2003). It is likely that the stigma attached to HIV/AIDS inhibits PLWHA from seeking sufficient assistance from friends/relatives and also hinders community efforts to address the impact of the disease (RCQHC, 2003a).

Table 6: Reported experience of the respondents about ability to meet individual food requirements according to their main source of food

Main source of food	Respondent situation		Total (%)
	Meet requirements (%)	Do not meet requirements (%)	
Own Production (n=24)	58.3	41.7	100.0
Purchase (n=81)	37.0	63.0	100.0
Relatives/friends (n= 8)	0.0	100.0	100.0

4.2.2 Change in access to food

Two issues related with change in accessing food were investigated among the respondents. The two issues were namely, ability to produce food and ability to earn income.

(a) Ability to produce food

Table 7 shows the summary of findings on the percentage of respondents who reported on their situation of ability to produce food after being infected with HIV. More than half of the respondents (60.7%) reported to have faced reduction in ability to produce food. Illnesses which occur due to HIV/AIDS cause body weakness and therefore making an individual unable to work (Gari, 2002). To a farmer, reduction in ability to work results to significant reduction in land use, declining crop yields, changes in cropping patterns, reduction in the range of crops and diminished crop enterprise diversity, which can result in a poorer diet, lower economic returns and loss of soil fertility (RCQHC, 2003). On the other hand, widows do bear the added burden of taking care of the family despite of their health condition (IFPRI, 2002). Widows were the majority among the sampled respondents (Table 2).

Table 7: Distribution of respondents who were involved in producing food according to reported changes in ability

Reported situation of production	Frequency	Percentage
Reduced ability	37	60.7
No reduced ability	24	39.3
Total	61	100.0

(b) Ability to earn income

Income is obtained out of productive activities carried out by an individual PLWHA. Forty six out of 61 respondents (which is about 75%) reported to experience reduction in ability to earn income (Table 8). Looking at the reported situation of meeting food requirements, the Table also shows that 82.6% of respondents that were facing reduction in ability to earn income also felt that they were not able to meet their food requirements.

Lack of capital to improve small businesses possessed by majority of PLWHA was reported to be a main problem during focus group discussions. PLWHA are less attractive to group-based liability schemes practiced by many microfinance institutions because they can not meet conditions provided by these institutions especially for individuals having the obvious signs of the disease (IFPRI, 2002). Respondents faced two main problems namely failure to work as before they were infected with HIV/AIDS and capital inadequate for strengthening their businesses. Reduction in income especially for people living in town implies threat to food accessibility and availability since the majority purchased their food.

Table 8: Reported changes in ability to earn income of PLWHA and meeting food requirements

Situation of ability to earn income	Reported situation of food requirements		
	Meet the requirements (%)	Not meeting the requirements (%)	Total
Reduced ability (n=46)	17.4	82.6	100.0
No reduced ability (n=15)	6.7	93.3	100.0
Total (n=61)	14.8	85.2	100.0

Despite of reduction in ability to produce and earn income, there were some other factors which were reported to reduce financial capacity of PLWHA. The other factors included depletion of financial income and increase in medical expenses as shown in Table 9. In additional to these changes occurring to PLWHA, focus group discussions also reported a problem of having large number of dependants in their families.

Research conducted in Kagera indicated that survivors must contend not only with profound emotional loss, but also with medical and funeral expenses, plus the loss of income and services that a prime-age adult typically provides (WB, 1997).The direct impact of a death consists of the medical costs prior to death and the costs of the funeral. It appears that the reduction in financial capacity starts during the taking care of the lost partner. There after death of a partner who was a bread winner, the remaining cash will be used to maintain welfare for the remaining household members together with medical and care expenses for the remaining partner, costs being not proportional to income earned. This is what results in depletion of income and failure to get enough food for PLWHA. Bachmann and Booysen (2003) reported similar situation in Zambia, Uganda and Thailand where HIV/AIDS added expenses to make households food insecure. In this survey, only 14.4% of the respondents reported increase in medical expenses (Table 9). This may be caused by the free medical treatment, including ARV, provided to PLWHA from Morogoro Regional Hospital (especially for ARV) and from other service providers.

Table 9: Other reported causes of reduction in financial capacity of the interviewed PLWHA

Causes of reduction in financial capacity	Percentage		
	Affected	Not affected	Total
Depletion of income (n=16)	17.8	82.2	100.0
Increase in medical expenses (n=13)	14.4	85.6	100.0

4.2.3 Access to information about nutrition recommendations for PLWHA

Table 10 presents a summary of the reported situation of access to available nutritional guidelines (recommendations) for PLWHA. More than half of

respondents (52.3%) did not have access to nutritional recommendations (guidelines) on what they were required to eat. Available nutritional guidelines in the country were those produced by TFNC and COUNSENUTH (Tanzania), Ministry of Health-Uganda, Ministry of Health-South Africa, NFNC-Zambia, Piwoz and Preble-Sub Saharan Africa, Bijlsma-Zimbabwe, USAID/FANTA and FAO. Knowledge on how to handle different health conditions of PLWHA including what to eat at particular situations and how to use locally available foods can help to improve the living conditions of PLWHAs (TFNC, 2003).

Table 10: Distribution of respondents with respect to access to nutritional recommendations

Reported Access situation	Frequency	Percentage
Have access	43	47.8
Have no access	47	52.2
Total	90	100.0

Further analysis of the respondents who reported to have access to nutritional guidelines was undertaken specifically on their ability to follow the given recommendations. Results indicate that out of the 43 respondents (Table 11), 74.4% reported to follow the recommendations. Discussion with members of the management of the NGOs indicated that most of PLWHA tend to fear death and therefore try what they can to abide to most of instructions provided to them. They testified that most of their clients attain positive changes soon after joining these organizations. Phaladze (2005) reported similar findings in Botswana.

Table 11: Distribution of respondents who reported to have access to available nutritional guidelines according to their ability to follow the recommendations

Situation on ability to follow recommendations	Frequency (n=43)	Percentage
Able to follow	32	74.4
Unable to follow	11	25.6
Total	43	100.0

4.3 Coping strategies to deal with food shortage in households

Food shortage has made individuals and households to develop different strategies in order to cope with the situation (Ishengoma, 1998). Some of them are easy to recover while others are relatively difficult (Maxwell and Frankenberger, 2002). Table 12 summarizes the coping strategies that were mentioned to be used by the respondents. It appears that dietary modification strategies were the most common. They included skipping meals. reduction of food items in meals, move to relative cheap or inferior foods and reducing varieties of meals per week. Some non-dietary strategies were also common including dependence on relatives or friends and welfare-threatening selling of assets. Others included selling of labour and asking for food or monetary loans. Each of the named group of strategies is discussed below.

Table 12: Reported coping strategies for PLWHA in securing individual foods

Kind of strategy	Variable	Percentages (n=90)
Easy to recover	**Dietary modification**	
	Reduction of food items in a meal	32.2
	Move to relative cheap foods	33.3
	Move to relative inferior food	20
	Reduce varieties of meals per	22.2
	week Skipping some meals	41.1
	Starvation	3.3
	Non - dietary strategies	
	Selling labour Asking for food or	18.9
	monetary loans Depend on	17.8
	relatives/friends Sell of child	34.4
	labour Sell of assets, including	2.2
	productive assets	23.3
Moderately difficult to recover and welfare threatening	Sell of child labour	2.2
	Sell of assets, including productive assets	23.3

4.3.1 Dietary modifications

All the dietary modifications were ease to be recovered according to Maxwell and Frankenberger (2000). Skipping meals seems to have been adopted by majority (41.1%) while starvation had the lowest percentage (3.3%). Similar findings were obtained by Rugalema (1998) who reported that some PLWHA households were cutting back number of meals taken per day during food shortage. These results are

also compatible with the study conducted in Somalia where it was found that 57.3% of the study households depended on wild food, 49.6% reduced the number of meals per day, 48.1% reduced quantity of food eaten per meal, 48.8% moved to comparative low expensive foods while 39.2% sold child labour to obtain food (UN, 2004).

4.3.2 Non-dietary strategies

Those respondents who depended on relatives and friends for obtaining their food were the largest group (34.4%) followed by those who sold assets (23.3%) while those asking for food or monetary loans were 17.8%. About 19% sold their labour to obtain food. Anania (2003) reported similar findings among rural households in Kongwa Dodoma whereby 16.7 % were selling labour in the farms so as to cope with food shortage. A study in Kenya reported same copping strategies of obtaining assistance from relatives and friends, casual employment to work in other people's farms as labourers and asking for loans from self-help groups (Winrock International, 2000). However, depending on relatives for assistance did not work very well because as it was reported in Table 7 section 4.2.1. those who were depending on relatives in this survey could not meet their daily food requirements. Selling labour by PLWHA is contrary to recommendations given to PLWHA, which require them to do light works and avoid straining themselves due to reduction in body strength (TFNC, 2003).

4.3.3 Welfare threatening strategies

Strategies that are considered to threaten welfare of the individual PLWHA or their households are more difficult to recover after adopting them (Maxwell and Frankenberger, 2000). They are difficult to recover because they tend to leave a permanent effect to an individual or community concerned. They include selling of assets especially the productive ones and selling of child labour. Each of the strategy is discussed in the sections below.

(a) Selling of assets

About a quarter of the respondents (23.3%) sold their assets to earn food (Table 13). Types of assets reported to be sold included utensils, furniture, clothes, cars, sewing machines, houses and land plots. Similar findings were reported by IFPRI (2001), where people had to sell productive equipment or mortgage land to meet life expenses including health care and food. In Uganda, 65 percent of the AIDS-affected households sold household properties to pay for food and other care services (FAO, 2001). Selling of productive assets affects individuals and households welfare because the ability to regain the assets is difficult. For example, selling of sewing machine which was used for tailoring business implies that the individual has to stop making money from the business, and once the money obtained from the selling of the machine is over, the individual will remain with nothing.

Table 13: Kinds of assets reported to be sold by respondents in order to obtain food

Kind of asset sold	Assets involved	Percentages
Non productive assets	Utensils, furniture and clothes	61.9
Productive assets	Vehicles, sewing machines, land plots and houses	38.1
Total		100.0

(b) Selling of child labour

About 2.2% of respondents reported to send their children to work and purchase food using the payment they obtain (Table 12). Focus group discussions noted further that sometimes the children have to miss school in some days in order to work while in other circumstances they had to use some hours after school to obtain some cash for purchasing food for their sick parents. Winrock International (2000) reported similar situation in Kenya. IFPRI (2001) called the phenomenon a sacrifice of tomorrow's livelihood in order to survive today. Depriving children of education exemplifies the dilemma of the ultimately "destructive" copping strategy.

4.4 Access to information on nutritional recommendations for PLWHA and ability to follow them

Only few general concepts from nutritional guidelines that are available and widely distributed in Tanzania were included in the assessment. The concepts included recommended frequency of meals per day for PLWHA and need to use spices and nutrient supplements. Table 14 summarizes the results. More than half of the respondents (52.2%) reported to have no good access to nutritional

recommendations. It was also reported by TFNC (2003) and COUNSENUTH (2004) that nutrition knowledge for PLWHA was highly lacking among the majority of PLWHA and their care givers

In the focus group discussions it was also noted that the majority have never seen guidelines or recommendations directing them on what to eat. Few of them possessed some leaflets which were provided as reading materials in the organizations where they belonged. Other common source of recommendations was from counsellors during testing or during their quarterly meetings at the respective NGOs. Discussions with management staffs of both NGOs (FTF and WAVUMO) indicated that they were not aware of nutritional guidelines. They were only using some teaching materials they obtained from few trainings or seminars which they attended, most of which were already outdated and less applicable.

Table 14: Distribution of respondents according to reported awareness about various recommended nutritional concepts for PLWHA

Situation assessed	Response (%) n=90		
	Yes	No	total
-Have good access to nutrition guidelines for PLWHA –	47.8	52.2	100.0
Aware about the need to increase number of meals/day –	84.4	15.6	100.0
Aware about need for using spices in meals -	33.3	66.7	100.0
Aware about the use of nutrient supplements	48.9	51.1	100.0

4.4.1 Abiding to nutritional recommendations

Further analysis of the 43 respondents who reported to have good access to nutritional guidelines revealed that 74.4% were following them (Table 15) and that

only one quarter could not follow them. The results imply that if PLWHA were instructed on what they were supposed to do, the majority of them could follow. Management staffs of WAVUMO and Faraja Trust Fund also reported that the members were very keen to prolong their lives by accepting advices they were being given. Most of them had joined the organizations out of their own will expecting to get much support including learning new ideas on how to prolong their lives.

Table 15: Distribution of the respondents who indicated to have access to nutritional guidelines according to their ability to abide to the given recommendations

Situation of abiding to Recommendations	Frequency n=43	Percentage
Able to abide	32	74.4
Not able to abide	11	25.6
Total	43	100..0

However, Gillape and Kadiyala (2005) noted that people living with HIV/AIDS in resource-limited settings were unlikely to be able to follow food and nutrition recommendations, including ARV therapy, because of lack of access to required foods. Respondents in the current study were likely to have faced financial constraints and therefore failed to get the recommended food. The extent to which respondents in this study were able to abide to the recommended number of meals per day and use of nutrient supplements are presented below.

(a) Number of meals per day

Changes in metabolism occurring due to HIV infection cause the need for increased amount of food intake which may imply increasing number of meals per day (Piwoz and Preble, 2000). Results of the number of meals taken per day by the respondents

are summarized in Table 16. Nearly half of them (45.6%) were taking three meals only while those taking more than three meals together with some snacks were 7.8%. About a quarter of the respondents (27.8%) were taking less than three meals per day.

MoH-Uganda (2003) advises the nutrient intake for people living with HIV/AIDS to be increased by 10-30% of an individual with the same age and weight who is not infected. Amount of nutrients intake depend on the stage of infection whereby the one without symptoms is required to increase intake to 10% while those with symptoms should increase by 20-30%, indicating that number of meals per day need to increase. Failure to achieve increased food intake will result in muscle wasting and worsening conditions of the body (Piwoz and Preble, 2000). It is not surprising then that many PLWHA experience loss of bodyweight.

Table 16: Distribution of Respondents according to the reported number of meals per day

Number of meals taken per day	Frequency	Percentage
>3 with snacks in between	7	7.7
Three meals with some snacks	17	18.9
Three meals only	41	45.6
Less than three meals	25	27.8
Total	90	100.0

(b) Need for use of nutrient supplements

Vitamins and minerals are of potential importance to PLWHA due to their critical roles in cellular differentiation, enzymatic processes and immune system reactions (Piwoz and Preble, 2000). They are also required to help protection and speed up

recovery systems of the body (FAO, 2002). Taking into consideration small meals which are commonly taken by the PLWHA, it becomes necessary to take nutrient supplements. However, more than half of the respondents in this study (51.1%) reported that they were not taking the supplements (Table 17). Worse enough was that among the respondents who reported not to take nutrient supplements included some of those who were taking anti-retroviral (ARV) drugs. This is more dangerous because those given ARV are the ones having CD4 counts of less than 200, indicating reduced immunity and that they have great chances of being infected with opportunistic diseases. Ability to eat might be reduced by medicines they take which otherwise they would be required to take nutrient supplements to cope with the low intake.

Table 17: Distribution of respondents according to their status of taking nutrient supplements

Status	Frequency	Percentages
Taking nutrient supplements	44	48.9
Not taking nutrient supplements	46	51.1
Total	90	100.0

4.5 Nutritional Awareness of PLWHA and Care givers

4.5.1 Nutritional awareness of PLWHA

Nutritional awareness of the sampled PLWHAs was assessed by considering some common concepts of the relationship between nutrition and HIV/AIDS. Among the concepts covered included relation between nutrition and immunity, link between ARV and nutrition, management of poor eating appetite, importance of exercises and how to manage diarrhoea disorders which are common to PLWHA. The five issues are presented below.

(a) Relationship between nutrition and body immunity

Respondents were asked whether they knew the relationship between nutrition and body immunity. Table 18 summarizes the results whereby only 40% reported to know that good nutrition was necessary to improve body immunity and visa versa.

The fact that more than half of the respondents were not aware of the importance of good nutrition to their body immunity implies that the situation is very dangerous because they could not take any necessary measures that were based on nutrition actions. Experience has shown that many people live with the virus for ten years or more if they maintain good nutrition (MoH-Uganda , 2003). The HIV virus attacks the immune system but health eating can help to reduce the severity of the condition since nutrients like vitamins and mineral protect against opportunistic infections by helping the immune system to function properly (FAO, 2002).

Table 18: Distribution of PLWHA respondents according to their awareness about the link between body immunity and nutrition

Understanding the link	Frequency n=90	Percentages
Understands the link	36	40
Don't understand the link	54	60
Total	90	100

(b) Link between nutrition and ARV

Effective medical treatment can slow progression of HIV, reduce opportunistic infections, and ease symptoms. Food can interact with drugs and affect the drugs' efficacy. Drugs can also interact with foods and nutrients and negatively affect nutritional status (RCQHC, 2003a). PLWHA respondents were asked if they knew that

kind of interaction. Results are presented in Table 19. More than half of the respondents (55.6%) were not aware of the link between ARV and nutrition despite of the fact that among them some were taking ARVs.

Further analysis was done to distinguish between the respondents who were taking ARV/ART from those who were not. Results are presented in Table 20. Eighty two percent of the respondents who were currently taking ARV reported to know the link between nutrition and ARV compared to only 27.4% of those who were not taking them. The difference is statistically significant at $P \leq 0.001$. This may be contributed by education which is provided to infected individuals before they are provided with ARV. However there is still concern for the 17.9% of respondents who were taking ARV but who reported to know nothing on the nutrition requirements. Gillespe and Kadiyala (2005) reported that nearly 25 percent of individuals who were using ARVs in developed countries discontinued their treatment regime because of treatment failure of some sort. This failure might be caused by various factors such as failure to abide to the required nutritional recommendations. ARV are given to PLWHA with CD4 cell counts of less than 200 with appearance of clinical features (URT, 2005). Proper nutrition and other aspects like quality care on aspects of health and sanitation are then necessary to make the treatment effective.

Ignorance on the link between ARV and nutrition is likely to be contributed by un-availability of nutritional guidelines to the PLWHA. For example, the guidelines by TFNC (2003) has a chapter talking about this interaction in Swahili language which can easily be read and understood by majority of respondents as most of them have

primary school level of education. However, focus group discussions reported the problem of overcrowding of PLWHA at the Morogoro Regional Hospital during visitation for collection of ARV. Such a situation may not provide conducive environment for proper education and counselling.

Table 19: Distribution of PLWHA respondents according to their awareness of the link between nutrition and ARV

Understanding of the link	Frequency	Percentage
Understands	40	44.4
Don't understand	50	55.6
Total	90	100.0

Table 20: Distribution of respondents according to their knowledge on relations between nutrition and ARV distinguishing between those currently taking ARV/ART and the non-takers

Understanding of the link	ARV/ART status		
	Currently taking (n=28)	Not taking (n=62)	Chi- square Value
Understands the link	82.1	27.4	23.364
Don't understand the link	17.9	72.6	
Total	100.0	100.0	

P value = 0.000*** df = 1

*** Statistically significant at P≤ 0.001

(c) Management of lack of eating appetite

This study investigated whether PLWHA respondents knew how to deal with poor eating appetite when it occurs to them. Results are presented in Table 21. About three quarters (72.2%) did not know the right way of dealing with lack of eating appetite. Poor appetite is a common disorder occurring to PLWHA which needs proper management including provision of foods of interest in small amounts but frequently (TFNC, 2003). According to FAO (2002), there are several causes of loss of appetite

including infection, pain due to sores in the gut, depression, anxiety and tiredness. These conditions may last long hence one can end up starving. Patients and caregivers need to be educated on how to deal with causes of loss of appetite. For example, tiredness needs resting, sores in the gut need taking soft food in small amounts but frequently while depression needs counselling and comfort (TFNC, 2003). Failure to manage the situation may lead to starvation, which will cause weight loss and other negative consequences.

Table 21: Distribution of PLWHA respondents according to their reported understanding of dealing with poor eating appetite

Status of understanding	Frequency	Percent
Knows how to deal with it	25	27.8
Doesn't know	65	72.2
Total	90	100.0

(d) Need for exercise

About two thirds of the respondents (65.6%) indicated that it was important for people living with HIV/AIDS to do exercise, while the rest felt that exercises should be avoided (Table 22). Apart from making the body more active, exercise also contributes in improving appetite (FAO, 2002). Even light exercise could do much and it is recommended to have time for exercise in daily plan. Exercises help to build up muscles which are necessary in preventing weight loss which bring relief psychologically to PLWHA (DoH- SA, 2001). However, some PLWHAs don't realize that even walking a distance is also a good exercise (COUNSENUTH, 2003).

Table 22: Distribution of respondents according to their opinion on the importance of exercise for PLWHA

Response	Frequency	Percentages
Should do exercises	59	65.6
Should avoid exercises	31	34.4
Total	90	100.0

(e) Handling of diarrhoea condition

Diarrhoea may be caused by giardia, cryptosporidium and other pathogenic infections due to compromising immune system of PLWHA (Piwoz and Preble, 2000). In severe cases, diarrhoea causes dehydration, poor absorption of food, significant weight loss, malnutrition and general body weakness. In young children diarrhoea can quickly become serious and if not treated lead to death (MoH - Uganda, 2003). The current study wanted to assess the knowledge of PLWHA in dealing with diarrhoea and avoiding its effects. Results are presented in Table 23. The results show that more than half of respondents (53.3%) did not know what they were supposed to eat when they had diarrhoea complications. According to DoH-SA (2001) people having diarrhoea are required to take a lot of fluid about 8 or more cups per day. Water can be good but soups and fruit juices are more recommended.

Table 23: Distribution of respondents according to their reported knowledge of suitable foods for dealing with diarrhoea conditions

Type of food suitable for diarrhoea case	Frequency	Percentages
More fluid foods	42	46.7
More solid foods/don't know	48	53.3
Total	90	100.0

4.5.2 Nutritional awareness of care givers

Quality nutritional care and support to PLWHA can be provided by individuals who have good understanding of nutritional aspects of the respective condition. This is why different guidelines have been produced to help the care givers on how to deal with PLWHA. Nutritional awareness was assessed among a sample of 30 care givers. Concepts covered included appropriate number of meals per day, exposure to nutritional guidelines, management of diarrhoea condition and relationship between nutrition and immunity. Their opinions of how being a PLWHA could affect the household food security were also sought.

(a) Appropriate number of meals per day

Majority of the care givers were providing three or less meals per day and only 20% were providing three or more meals with some snacks per day (Table 24). Similar situations have been reported for families affected by HIV/AIDS in Uganda (FAO, 2002). This is an indication of food insecurity for PLWHA living in these families, because increase in nutrient requirement for them could not be met by that number of meals. The care givers were also asked about their opinion whether the numbers of meals they were providing to the PLWHA per day were enough or not. The majority of those who gave three meals only or less indicated that the meals were not sufficient (Table 25). It is interesting to note that for those who gave more than three meals and snacks were equally divided.

Table 24: Distribution of interviewed care givers according to reported number of meals they provided to the PLWHA they were attending

Number of meals	Frequency	Percentages
Three or more meals with snacks	6	20
Three meals only	12	40
Less than three meals	12	40
Total	30	100

Table 25: Cross tabulation of interviewed care givers according to number of meals they provided per day to PLWHA and their opinion on sufficiency

Number of meals	Opinions percentage		
	Sufficient	Not sufficient	Total
Three or more meals with snacks in between (n=6)	50.0	50.0	100.0
Three meals only (n=12)	33.3	66.6	100.0
Less than three meals (n=12)	8.3	91.7	100.0

(b) Exposure to nutritional guidelines and recommendations

There are several guidelines prepared in different languages to direct care providers on what they are required to do in caring for the PLWHA. Exposure of care givers to the available guidelines and recommendations that are provided by various authorities or organizations was assessed. The findings are presented in Table 26. The majority of the respondents (86.7%) reported to have never come across any of such guidelines or written recommendations. They indicated to use only experience and whatever knowledge they have. It appears that although the aim of preparing the nutritional guidelines is to help care givers to provide good services to PLWHAs, unfortunately, the majority of them have no access to these guidelines.

Most of guidelines including the Tanzanian national guideline by TFNC are developed without having strategies to how they will reach the intended user. On the other hand, unavailability of guidelines to users can be contributed to poor reading habit/culture. Mulinda (2001) reported that the lack of a reading culture was indeed true and affected,social and economic development of many communities in Africa. Moreover, it was reported that there were no reading material in most of African countries as markets were poor for reading matters due to lack of reading culture. Level of education of majority of respondents which is primary school level (section 4.1.3.) can also contribute to their poor exposure to nutritional guidelines.

RCQHC (2003b) suggested the possible way of disseminating nutritional guideline packages as printing, storing and distributing enough copies of the guidelines. Further to that, is advised to ensure the guideline, reach the appropriate institutions and people who need and can best use them, and lastly to orient potential users on the use of the guidelines.

Table 26: Distribution of interviewed care givers according to their status of having come across a nutrition guideline for PLWHA

Status	Frequency	Percent
Has seen a written guideline or recommendation	4	13.3
Has never come across any	26	86.7
Total	30	100.0

(c) Handling of diarrhoea

Care givers were asked to tell what kinds of food were proper to be given to an

individual with diarrhoea condition. The results are summarized in Table 27. Half of the interviewed care givers did not know the proper foods for a person having diarrhoea by thinking that hard foods were the proper ones because they are likely to block the diarrhoea. The remaining 50% of the respondents knew that they have to provide more liquid foods to replace body fluids lost through diarrhoea.

Table 27: Distribution of care givers knowledge on how to handle diarrhoea condition

Response	Frequency	Percent
Eat more fluid foods	15	50.0
Don't know	15	50.0
Total	30	100.0

(c) Relationship between nutrition and body immunity

The results of the assessment of the understanding of the relationship between body immunity and nutrition are presented in Table 28. The majority of the care givers (86.7%) reported to know that good nutrition reduces chances of PLWHA to be attacked by opportunistic diseases. When age and sex of care givers were analysed (Table 29), women were 70% of respondents and 56.7% were between 26-55 years old. This indicates that since majority of care givers were women at bearing age, they were receiving some nutritional knowledge during antenatal clinics (MDP, 2005). This might have contributed to their knowledge on the link between nutrition and immunity. This understanding on the link can be a good base for educating care givers on the particular requirements of PLWHA at different stages of their health status. Preparations of food in proper methods and use of spices to deal with different disorders due to virus infection (COUNSENUTH, 2004), could also be taught to care

givers to improve their knowledge for the betterment of PLWHA.

Table 28: Distribution of the interviewed care giver understands of the relationship between nutrition and immunity

Understanding of the relationship	Frequency	Percent
Knows the relationship	26	86.7
Don't know the relationship	4	13.3
Total	30	100.0

Table 29: Distribution of care givers according to their age when compared to their sex.

Age of respondent	Sex percentage		
	female	male	Total
Below 18 years	3.3	6.7	10.0
Between 18-25	13.3	0.0	13.3
Between 26-55	36.7	20.0	56.7
More than 55	16.7	3.3	20.0
Total	70.0	30.0	100.0

(e) Opinion on effect of PLWHA on household food security

Table 30 presents the results of what the interviewed care givers thought was the main effect (cause) in which having a PWLHA in the household resulted in food insecurity. Forty percent of the care givers felt that it was because much time was spent providing care to PLWHA hence less time was available for productive activities. On the other hand, 30% of care givers had the opinion that if the infected individual was the bread earner for the household, then the household would greatly be affected. The remaining 30 percent could not see any linkage.

It is now known that HIV/AIDS not only weakens and kills the strongest producers of food and income but also affects responsibility of home care givers and damages the farming systems (RCQHC, 2003). A study in South Africa (Bachmann and

Booysen, 2003) reported the median number of hours that home care givers spent with ill PLWHA to be 5 hrs per day as compared to only 3.5 hours spent with patients of other sicknesses.

Table 30: Distribution of the interviewed care givers according to their reported opinions on how having PLWHA in household leads to food insecurity

Reported way in which food security is affected	Frequency	Percentages
Spend much time in providing care	12	40
If infected individuals are the bread earners in households	9	30
No effect or link	9	30
Total	30	100

4.6. Organizations dealing with PLWHA in Morogoro

Different governmental and non-governmental organizations dealing with HIV/AIDS were identified together with programs they were running. It was learned from the coordinator of HIV/AIDS activities in the Morogoro Municipality that many NGOs and CBOs have been claiming to be involved with supporting PLWHAs. However, in reality only few organizations were actively involved. Care was therefore taken to identify only organizations that were truly involved. Findings are summarized in the Table 31. Six organizations were identified whereby only two were governmental (one at Municipal level and the other at the regional administrative level). NEREF was reported to serve Mazimbu ward which has a population of 52 656 with expectation of expanding its services to Mwembesongo and Kihonda wards out of 19 wards of Morogoro Municipality.

Table 31: Organizations within Morogoro Municipal Council dealing with HIV/AIDS and Activities conducted

Sn	Name of organization	Activity conducted	Beneficiaries	Type
1	Faraja Trust Fund (FTF)	-Small credits, Voluntary testing and counseling, traditional medicines, Legal support, home based care, nutrition education to PLWHA and care givers, Food aids, care for infected orphans.	400 PLWHA	Local NGO
2	WAVUMO (Wanaoishi na Virusi vya UKIMWI Morogoro)	-Testing and counseling, Health care, medication services, home based care, nutrition education to PLWHA, Food aids and support for orphans, school facilities to children of PLWHA parents.	125 PLWHA	Local NGO
3	AMREF/ANGAZA	-Voluntary counseling and testing	All the people in Morogoro Municipality	International NGO
4	Morogoro Municipal Council	-Medical treatment for opportunistic diseases and debilitating chronic diseases like TB, diabetes; ARVs, food support (e.g. maize flour), coordinates the HIV/AIDS activities through the established HIV/AIDS local committees	All the people in Morogoro Municipal ity	Governmental Organization
5	Morogoro Regional Hospital	- Voluntary counseling and testing, health care and treatment, ARV/ART	All the people in Morogoro Regional area	Governmental Organization
6	NEREF (Neema Resource Foundation)	-Care for orphans due to HIV/AIDS	48 Orphans	NGO

NGO- Non Governmental Organization

On the other hand, AMREF/"*Angaza*" reported to receive an average of 300 individuals per month from different corners of the Municipality who went for voluntary testing (Table 32). The table shows that a total of 1932 individuals went for testing between January and June 206 whereby 170 individuals were HIV positive, the majority being female.

Table 32: Number of individuals who visited AMREF/"*Angaza*" in Morogoro Municipality for voluntary Counselling and Testing between Jan - June 2006

Month	Male visited			Female visited			Total		Total all
	-ve	+ve	Total	-ve	+ve	Total	-ve	+ve	
January	137	6	143	118	19	137	255	25	280
February	152	6	158	126	24	150	278	30	308
March	177	6	183	141	11	152	318	17	335
April	118	7	125	101	18	119	219	25	244
May	191	5	196	140	25	165	331	30	361
June	211	15	226	150	28	178	361	43	404
Total	986	45	1031	776	125	901	1762	170	1932

Food security issues were observed to be minimal in all these organizations except for supplying some food aid occasionally. Bornnard (2003) reported the idea that HIV/AIDS is not like most other food security shocks that are of limited duration and magnitude. With HIV/AIDS we are often talking about permanent adjustments and changes in livelihood strategies. We are also talking about effects that are still progressing along with the progression of the epidemic. There is also a great need to identify and support ways that the community and local players can address their problems (IFPRI, 2002). In general, the main concern is sustainability of any food and nutrition supports to PLWHA since the problems they are facing are of life long.

4.7 Available nutritional guidelines for PLWHA

Nine guidelines were found to be available in Tanzania. Out of the nine, only two were Tanzanian based while four were from other African countries (Table 33). On the other hand, three of the guidelines were international.

Further analyses of the nine guidelines are summarized in Table 34. The analysis is based on their accessibility and contents with regard to:-

- Recommendations with respect to different age groups of PLWHA
- Proper handling of HIV/AIDS disorders
- Proper ways of conducting nutritional counselling
- Use of ARV/ART and different herbal therapies for managing various conditions of HIV/AIDS.

Each of the aspects covered in the analyses is discussed in the next section.

Table 33: Nine nutritional guidelines available in Tanzania (Showing the authors and year of publication)

Sn	Title of the guideline	Author	Year of publication
1	National guideline for nutritional care and support for People Living with HIV/AIDS	TFNC	2003
2	Lishe kwa watu wanaoishi na virusi vya UKIMWI (nutrition for people living with HIV/AIDS)	COUNSENUTH	2004
3	Nutrition care and support for people living with HIV/AIDS in Uganda	MoH -Uganda	2003
4	South African national guidelines on nutrition for people living with TB, HIV/AIDS and other chronic debilitating conditions	MoH- South Africa	2001
5	Living Positively , nutrition guide for people with HIV/AIDS - Zimbabwe	Bijlsma	1997
6	HIV/AIDS: A Guide for Nutritional Care and Support	USAID/FANTA	2004
7	Living well with HIV/AIDS, A manual on nutritional care and support for people living with HIV/AIDS	FAO	2002
8	HIV/AIDS and Nutrition. A review of the literature and recommendations for Nutritional care and support in Sub-Saharan Africa	Piwoz and Preble	2000
9	Nutrition Guideline for care and support for people living with HIV/AIDS	NFNC	2004

4.7.1 Accessibility of nutritional guidelines

Only two guidelines namely TFNC and COUNSENUTH were Tanzanian based and in Swahili language which is the common communication language for most of the Tanzanians. The remaining seven guidelines were in English which was likely to be a major limit for most of users in the country. Some of them were obtained in the respective organizations such as COUNSENUTH and TFNC while others were available in public libraries. But most of them were electronically available either online through websites or in CD-based forms. All these sources were not easily

accessible to majority of PLWHA and their care givers, which confers with the findings in sections 4.4 and 4.5.2.

Through discussions in focus groups and interviews with key informants from both the NGOs and Municipal Council's HIV/AIDS Coordinator, they were not aware on the existence of these guidelines even on where they could be found. It was expected that TFNC guideline would be widely available in the country because it has national coverage. However, it seems that since its publication in 2003, it has not reached much of the targeted population.

4.7.2 Nutrition recommendations with respect to different age groups of PLWHA

Things which are covered in different nutritional guidelines include proper handling of PLWHA with respect to their different special age groups. Infants from day old up to 10 years, youth/adolescent, pregnant mothers, and lactating mothers are considered as special groups because of specifications and elevated level of nutrients requirement (TFNC, 2003; Ministry of Health-Uganda, 2003; USAID/FANTA, 2004; NFNC, 2004). Bijlsma (1997) and FAO (2002) guidelines do not talk about nutritional handling of special age groups. It may be due to their dates of publications which are more than 4 years back when there were relatively less information on the nutrition aspects for PLWHA. Only TFNC (2003) and USAID/FANTA (2004) guidelines have provided advice on nutrition recommendations for adolescents while others have not. Adolescents are physically and sexually more active and whenever they get pregnant their nutrient requirements become greater than the requirement of

a pregnant adult woman (FANTA/USAID, 2004). Prevention of mother-to-child-transmission (PMTCT) is another crucial area which has been covered by all the guidelines except for FAO, MoH-SA and Bijlsma-Zimbabwe.

4.7.3 Recommendation of proper handling of HIV/AIDS disorders

All the nine guidelines have pointed out disorders which are likely to occur to HIV/AIDS infected individual and its proper management. Some guidelines pointed out some spices which were believed to prevent, heal or reduce disorder's intensity. For example, TFNC (2003) pointed out the use of ginger to stop nausea and vomiting, improve digestion and stop diarrhoea, stomach pains and reducing intestinal gas. Biljsima (1997) recommended use of fenugreek seeds for stopping diarrhoea. An individual is required to swallow 1 teaspoon of seeds with water, expected to have pain and cramps relief together with stopping diarrhoea within 12 to 24 hours. Use of different guidelines expose PLWHA to different ways of handling disorders since the instructions differ from one guideline to another.

4.7.4 Nutritional counselling

Most of the guidelines (six) provide instructions on the proper ways of conducting nutritional counselling. MoH-Uganda (2003) and COUNSENUTH (2004) provide directions and procedures on how to conduct counseling in general while FAO (2002) shows how to take care of people living with HIV/AID. It further explained on how care givers and other household members should safely live with PLWHA.

4.7.5 Use of ARV/ART and herbals therapies

MoH-South African guideline did not write anything with connection to ARVs or herbal use for PLWHA. On the other hand, MoH-Uganda (2003) and Bijlsima, (1997) guidelines have focused on the use of herbs rather than ARVs. They provide a wide range of herbs including how they can be used and the expected benefits. It seems Bijlsima published the guideline at the time when the ARVs were not widely found in the market. Instructions provided are easily to be followed by majority of PLWHA as they are simple and straight. On contrary, FAO (2002), TFNC (2003) and COUNSENUTH (2004) cover both herbs and ARVs indicating types of ARVs and types of foods to be consumed and expected complications which might arise. These guidelines were published during the time of wide distribution and utilization of ARVs, and therefore the demand on the direction on how to deal with ARVs was also high.

Piwoz and Preble (2000) has touched on the use of ARVs in reduction of mother-to-child transmission (MTCT) as supported by research findings from different countries. On the other hand, FANTA/USAID (2004) provided a very technical direction on different use of ARVs linking to different conditions like CD4 levels, nutrition status and whether breastfeeding or not. It also provides instructions on the medication which can be suitable in resource limited countries basing on WHO directions.

Table 34: Summary of the nine identified nutritional guidelines that are currently available in Tanzania showing concepts covered including the language used

	Nutritional concepts	GUIDELINES								
		Uganda guideline	FAO guideline	TFNC guideline	COUNSENUTH guideline	Sub-Saharan Africa guideline	South African guideline	Zimbabwe guideline	USAID/ FANTA guideline	NFNC guideline
Information about books	Language	English	English	Swahili and English	Swahili	English	English	English	English	English
	Author/ Organization/ Authority	MoH-Uganda	FAO	TFNC	COUNSENUTH	Piwoz and Preble	DoH-SA	Bijlsma M.	USAID/ FANTA	NFNC - Zambia
	Year of publication	2003	2002	2003	2004	2000	2001	1997	2004	2004
	No of pages	72	95	49	81	43	36	45	106	113
	Chapters	Eight	Eight	Six	Twelve	Six	Seven	Ten	Six	Eleven
Issues covered	Relationship of HIV and nutrition	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Nutrition for HIV infected infant	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
	Infected children to 5 years old	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
	Infected adolescents	No	No	Yes	No	No	No	No	Yes	No
	Infected adult	Yes	No	Yes	No	Yes	Yes	No	No	Yes
	Infected Pregnant mothers(PMTCT)	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
	Infected lactating mothers	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes
	Complications Of HIV/AIDS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	HIV and use of ARV	No	No	Yes	Yes	No	No	No	Yes	Yes
	Use of herbs	Yes	Yes	Yes	No	No	No	Yes	No	Yes
	Hygiene concept of PLWHA	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes
	Use of nutrient supplements	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
	Nutritional counseling	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes
	Important recipes for dishes suitable for PLWHA	No	Yes	Yes	Yes	No	No	Yes	No	No
	Essential nutrients and their sources	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Key

MoH-Uganda	Ministry of Health Uganda	DoH-SA	Department of Health South Africa
FAO	Food and Agriculture Organization	TFNC	Tanzania Food and Nutrition Centre
NFNC	Zambia Food and Nutrition Centre	COUNSENUTH	The Centre for Counseling, Nutrition and Health Care
USAID/FANTA	United State Agency for International Development/Food and Nutrition Technical Assistance Project		

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Reduction in the ability to produce food or any income were reported to be main constrain facing the PLWHA in obtaining their required food. On the other hand, lack of working capital to improve small businesses was reported to constrain a good proportion of the interviewed PLWHA.

Several coping strategies were mentioned to be used by the PLWHA in the study area to deal with food shortage. Dietary modification strategies were the most common although some few non-dietary strategies were also reported. Dietary modification strategies included skipping meals, reduction of food items in meals, consumption of relative cheap or inferior foods and reducing varieties of meals per week while non-dietary strategies included dependence on relatives or friends. Among the dietary modifications strategies skipping some meals were found to be adopted by majority while starvation had the lowest percentage. For non dietary strategies, dependence on relatives and friends was reported by the majority however this strategy did not work very well because none of them managed to meet their daily food requirements. On the other hand, selling of assets and child labour to earn food were reported by few respondents.

It was also found out that there were nine nutritional guidelines for PLWHA available in Tanzania either in public libraries or electronically as online through websites or in CD based forms. Two guidelines are based in Tanzania, another five are based in other African countries namely Uganda, Zambia, Zimbabwe, South Africa and Sub Saharan Africa. The remaining two guidelines are prepared by international organizations namely FAO and USAID/FANTA. Out of the nine guidelines available, none was easily accessible to the PLWHA or their care givers in the study area. It was not surprising therefore that the that nutritional awareness of PLWHA and their care givers about the important linkages between nutrition and HIV was found to be very low.

Seven organizations, governmental and non governmental in the study area were dealing with PLWHA. Among them, only two were providing nutritional support while majority provided medical and other kinds of support. Food support was provided occasionally as food relief depending on financial situation. Capacity building such as provision of credit and entrepreneurship skills, which were most potential, were only provided to few members by one organization i.e. Faraja Trust Fund.

Basing on the above results it can be concluded that PLWHA in the study area are facing food unavailability and inaccessibility together with limited nutritional knowledge on how to deal with HIV/AIDS situation.

5.2 Recommendation

Based on the key findings highlighted in this study there are some important recommendations which are worth noting with respect to improvement of food security for PLWHA. They include the following:-

a) Nutrition needs to get more attention in providing care to PLWHA. The current care providers, including organizations dealing with PLWHA, were devoting much attention to health and medical care. Attention should be directed to care givers by providing them with nutrition awareness in caring for PLWHA. Care givers spend much time with the PLWHA and therefore they need to be well familiar with the important linkages of nutrition and HIV so that they provide quality care.

b) Nutrition guidelines which are currently available should be made more accessible to care givers/providers in order to improve nutritional package delivered to PLWHA. Organizations that are dealing with PLWHA should make efforts to obtain them and then disseminate widely to the target individuals. Such efforts should include translating them to more appropriate language i.e. Swahili, which can be understood by many. Similarly, instead of compiling them in large documents, which might be too expensive the most important messages can be printed in simple leaflets which can be distributed widely.

c) Although food aid remains an important and necessary support to PLWHA, it only provides short term solution to the problem of food shortage. There is therefore need to think of other approaches that can provide long term solutions to

the noted problems of reduced abilities to produce food and earning income. Such approaches may include providing capacity building to the PLWHA to enable them to have more access to food. A good example includes provision of entrepreneurship skills by training and giving credits which have low interest rates.

d) There is a need to undertake further studies to assess food security situation of the PLWHA who are not members of the two organizations that were included in this study (i.e FTF and WAVUMO). While it is generally assumed that the majority of them are likely to have a better situation and therefore did not see any need of joining such supportive organizations, there could be some pockets who were not. It could be that some social pressures in the communities where they live have prevented them from coming out to join the organizations. Such social pressures include fears associated with stigmatization, which is still strong in the society in Tanzania.

REFERENCES

Anania, B. (2003). Copping strategies of rural household to food and livelihood insecurity in semi-arid areas of Tanzania. A case study of Kongwa - Dodoma. Special project for Award of Bachelor degree at Sokoine University of Agriculture, Morogoro, Tanzania. 28pp.

AVERT. (2006). HIV/AIDS stigma and discrimination. International AIDS charity. [http://www.avert.org/aidsstigma.htm.] site visited on 01/07/ 2006.

Babbie, E.R. (1990). *Survey Research Methods*. Wsdstrorth Publishing Company. Belmount, Calfonia. 395pp.

Bachmann, M. O. and Booysen, F. L. R. (2003). Health and economic impact to HIV/AIDS on South African households. *BMC Public Health* 3(14): 1471 - 2458.

Binswanger, H. P. (2000). Scaling up HIV/AIDS programs to national coverage. *Journal of Science* 288 (5474): 2173-2176.

Bijlsma, M. (1997). *Living Positively*. Nutrition guide for people living with HIV/AIDS. Second edition. Muntare City Health Department Publisher`, Zimbabwe. 53pp.

Bloom, D. and Mahal, J. A. (1997). Does the AIDS epidemic threaten economic growth? *Journal of Econometrics* 77: 105-124.

Bonnard, P. (2003). *Food Security Programming in HIV/AIDS Contexts*. FANTA/ USAID. Washington. DC. 22pp.

Bonnard, P., Haggerty, P., Swindale, A., Bergeron, G. and Dempsey, J. (2002). Report of the food aid and food security assessment. In: *A review of the Title II Development Food Aid Program. FANTA,* Washington, DC. pp 34-41.

Bopp, C., Philips, K., Fulk, L. and Hand, G. (2003). Clinical implications of therapeutic exercise in HIV/AIDS. *Journal of the Association of Nurses in AIDS Care* 14(1):73-78.

Brimlow, D. L., Cook J. S. and Seaton, R. (2003). Stigma and HIV/AIDS. [http://hab.hrsa.gov/publications/stigma/front.htm] site visited on 01/07/ 2006.

Burger, H. and Weiser, B. (2001). Biology of HIV-1 in women and men. *Clinical Obstetrics and Gynecology* 44 (2): 137-143.

Castleman, T., Seumo-Fosso, E. and Cogill, B. (2004). Food and nutrition implications of antiretroviral therapy in resource limited settings. *Technical note no 2.* Washington, DC. pp 7 - 20.

CMAC. (2006). "*Hali ya UKIMWI Manispaa ya Temeke*" (HIV/AIDS situation in Temeke Municipality). In: *Proceedings of the Training of Trainers (TOT) Workshop*, 10- 12, July, Temeke, Tanzania. 6pp.

Collins, J. and Rau, B. (2000). *AIDS in the context of development.* Social Policy and Development, Paper No 4. UNRISD and UNAIDS, Geneva. pp 213-218.

COUNSENUTH. (2004). "*Lishe kwa watu wanaoishi na Virusi vya UKIMWI*" (Nutrition for people living with HIV/AIDS). RFE, Dar es salaam, Tanzania. 81pp

DoH-SA, (2001). Department of Health South Africa, *South African National Guidelines on Nutrition for People Living with TB, HIV/AIDS and Other Chronic Debilitating Conditions.* UNICEF, South Africa. 23pp.

FAO, (2001). The Impact of HIV/AIDS on food security. In: *Proceedings of the Committee on World Food Security*, 27th Session, 28 May - 1 June 2001. Rome, Italy. pp 24-27.

FAO, (2002). *Living Well with HIV/AIDS.* A manual on nutritional care and support for people living with HIV/AIDS. FAO, Rome, Italy. 97pp.

FAO, (2004). HIV/AIDS and Food security. Food and Agriculture Organization of the United State. [http://www.fao.org/hivaids] site visited on 20/03/ 2005.

Fawzi, W. W. R. L. and Mbise, E. H. (1998). A randomized trial of vitamin A in relation to mortality among human immunodeficiency virus-infected and uninfected children in Tanzania. *Journal of Paediatric Infectious Diseases* 18 (2):127-133.

Filteau, S. M., Rice, A. L. and Ball, J. J. (1999). Breast milk immune factors in Bangladeshi women supplemented with retinal or beta-carotene. *Journal of Clinical Nutrition* 69: 953 - 958.

Fisher, A. A., Laing, J. E., Stoeckel, J. E. and Townsend, J. W. (1991). *Handbook for Family Planning Operations Research Design.* Population Council, New York. 77pp.

Friis, H., Gomo, E., Nyazema, N., Ndhlovu, P., Krarup, H., Kæstel, P. and Michaelsen. K. F. (2004). Effect of multi-micronutrient supplementation on gestational length and birth size: A randomized, placebo-controlled, double-blind effectiveness trial in Zimbabwe. *American Journal of Clinical Nutrition* 80 (1): 178-184.

FTF. (2002), Faraja Trust Fund. Newsletter. April, 2002. Morogoro, Tanzania. 8pp.

Gari, J. A. (2002). *Agro-biodiversity, Food Security and HIV/AIDS Mitigation in Sub-Saharan Africa.* Strategic issues for agricultural policy and programme responses. FAO, Rome - Italy. pp 1- 6.

Gillespie, S. and Kadiyala, S. (2005). *HIV/AIDS and Food and Nutrition Security, From Evidence to Action.* Food Policy Review 7, International Food Policy Research Institute. Washington DC. 184pp.

Gupta, I. (1998). Planning for the socioeconomic impact of the epidemic: In: *The Impact of HIV/AIDS in India.* Ed. P. Godwin. FAO, Delhi, India. pp 12-19.

Help Age- Tanzania (2004). *Older People in the Fight Against AIDS in Tanzania.* Help Age International. Rapid Funding Envelop, Tanzania. pp 1-3.

ICRW. (2003). International Centre for Research on Women, Transcending boundaries to improve the food security of AIDS-affected households in rural Uganda. *Information Bulletin.* [http://www.icrw.org/docs/aids_foodsecurity_1003.pdf] site visited on 30/04/2006.

IFPRI. (2002). International Food Policy Research Institute, *AIDS and Food Security Annual Report.* IFPRI, Washington DC. 20pp.

Iliff, P. J, Piwoz, E. G., Tavengwa, N. V., Zinguza, C. D., Marinda, E. T., Nathoo, K. J., Moulton, L. H., Ward, B. Jm and Humphrey, J. H. (2005). Early exclusive breastfeeding reduces the risk of postnatal HIV-1-transmission and increases HIV-free survival. *AIDS* 19(7): 699-708.

Ishengoma, C.G. (1998). The role of women in household food security in Morogoro rural and Kilosa districts. Thesis for Award of PhD Degree at Sokoine University of Agriculture. Morogoro, Tanzania. 239pp.

Jamison, D. T., Sachs, J. D. and Wang, J. (2001). The effect of the AIDS epidemic on economic welfare in Sub-Saharan Africa. *CMH Working Paper Series*, Paper No. WG1: 13. Commission on Microeconomics and Health, WHO, Geneva. 27pp.

Kumwenda, N., Miotti, P. G., Taha, T. E., Broadhead, R., Biggar, R. J., Jackson, J. B., Melikian, G. and Semba, R. D. (2002). Antenatal vitamin A supplementation increases birth weight and decreases anemia among infants born to human immunodeficiency virus-infected women in Malawi. *Clinical Infectious Diseases* 35 (5): 618-624.

Lemke, S. (2005). Nutrition security, livelihoods and HIV/AIDS: Implications for research among farm worker households in South Africa. *Public Health Nutrition*: 8 (7): 844 -852.

Maxwell, S. and Frankenberger, T. (2002). *Household Food Security: Concepts, Indicators, Measurements.* A technical review. UNICEF, New York, USA. pp 89 -100.

Mackean, D. G. (1988). Life Study. Education and HIV/AIDS. [http://www.geocities.com/aids_holisticspng/report_42.htm] site visited on 30/04/2006.

MDP. (2005). *Morogoro Municipal Council Profile*. Planning unit. Morogoro, Tanzania. 19pp.

Mocchegian, E. and Muzzioli, M. (2000). Therapeutic application of zinc in human immunodeficiency virus against opportunistic infection. *Journal of Nutrition* 130: 1424S - 1434S.

Mocroft, A., Gill, M. J., Davidson, W. and Phillips, A. N. (2000). Are there gender differences in starting protease inhibitors, HAART, and disease progression despite equal access to care?. *Journal of Acquired Immune Deficiency Syndromes* 24 (5):475-482.

MoH. (2003). Ministry of Health,. *HIV/AIDS/STI Surveillance Repor*t. NACP report number 17. Dar es Salaam, Tanzania. 64pp.

MoH-Uganda. (2003). Ministry of Health-Uganda . *Nutritional Care and Support for People Living with HIV/AIDS in Uganda.* Guidelines for service providers. USAID/FANTA, Uganda. 72pp.

Mulinda, G. K. (2001). Can reading research in Africa be done in isolation?. The influence of literacy, education, publishing and the book Industry on reading in Africa. In: *67th IFLA Council and General Conference*. August 16-25, 2001, Uganda. pp 1-3.

NACP, (2002). STIs: *A Newsletter on Sexually Transmitted Infection. Issue No.1*, July-September. Ministry of Health, Dar es Salaam, Tanzania. 7pp.

Nduati, R. W., John, G. C. and Richardson, B. A. (1995). Humana immuno deficiency virus type 1-infected cell in breast milk. Association with immuno- suppression and Vitamin A deficiency. *Journal of Infection Diseases* 172: 1461 - 1468.

NFNC, 2004. National Food and Nutrition Commission, *Nutrition Guideline for Care and Support for People Living With HIV/AIDS.* Ministry of Health, Lusaka, Zambia. 113pp

Pallangyo, K., and Laing, R. (1990). Background study on alternative approaches to managing opportunistic illnesses of HIV-infected persons: costs and burden on the Tanzanian health care system. *W.B/W.H.O Study*, [http://people.brandeis.edu/~shepard/confront_aids_chapter_12e.pdf] site visited on 15/5/2006.

Perna, F. M., LaPerriere, A., Klimas, N., Ironson, G., Perry, A., Pavone, J., Goldstein, A., Majors, P., Makemson, D., Talutto, C., Schneiderman, N., Fletcher, M. A., Meijer, O. G. and Koppes, L. (1999). Cardiopulmonary and CD4 cell changes in response to exercise training in early symptomatic HIV infection. *Medicine and Science in Sports and Exercise* 31: 973-979.

Phaladze, N.A. (2005). Quality of life and the concept of living well with HIV/AIDS in Sub-saharan Africa. *Journal of Nursing Scholarship* 17:121-123.

Piwoz, E. G. and Preble, E. A. (2000). *HIV/AIDS and Nutrition:* A Review of the Literature and Recommendations for Nutritional Care and Support in Sub Saharan Africa. SARA, US. Agency for International Development, Washington, DC: 43pp.

RCQHC. (2003a). Regional Centre for Quality of Health Care. *Nutrition and HIV/AIDS. A Training Manual.* FANTA, Kampala, Uganda. 70pp.

RCQHC. (2003b). *Developing and Applying National Guidelines on Nutrition and HIV/AIDS.* Hand book. FANTA, Kampala, Uganda. 78 pp.

RCQHC. (2004). Regional Centre for Quality of Health Care. *Nutritional Care for People Living With HIV/AIDS (PLWHA)* .RCQHC, FANTA, Kampala, Uganda. 36pp.

Rugalema, G. H. R (1999). Adult mortality as entitlement failure. AIDS and crisis of rural livelihoods in a Tanzanian village. Thesis for Award of PhD degree at Institute of Social Studies, The Hague, Netherlands. pp 17 -67.

Shah, M. K., Oshome, N., Mbilizi, M. and Vilili, G (2001). *Impact of HIV/AIDS on Agriculture Productivity and Rural Livelihoods in the Central Region of Malawi.* Care International in Malawi, Lilongwe, Malawi. pp 23-28.

Slater, R. and Wiggins, S. (2005). Responding to HIV/AIDS in Agriculture and Related Activities. *Natural Resource Perspectives*; Number 98. 6pp.

Steinberg, E. (2004). Exercise and HIV/AIDS. AIDS survival project. Georgia, Atlanta. [http://www.thebody.com/asp/mayjun04/exercise_hiv.html] site visited on 14/05/ 2006.

Stringer, W., Berezovskaya, M., O'Brien, W., Bech, K. and Casaburi, R. (1998). The effect of exercise training on aerobic fitness, immune indices, and quality of life in HIV+ patients. *Jounal of Medicine & Science in Sports & Exercise 30(1): 11-16.*

TACAIDS. (2003). Tanzania Commission for AIDS, *National Multi-Sectoral Strategic Framework on HIV/AIDS 2003-2007.* National HIV/AIDS Policy. Dar es Salaam, Tanzania. 22pp.

TACAIDS. (2006). Tanzania Commission for AIDS, *Quarterly Report*. Dar es Salaam, Tanzania. 5pp.

TFNC. (2003). Tanzania Food and Nutrition Centre, *Mwongozo wa Kitaifa Kuhusu Matunzo na Huduma za Lishe kwa Watu Wanaoishi na Virusi vya UKIMWI na Wenye UKIMWI.*(Guideline for care and nutrition for People living with HIVI/AIDS} UNICEF/NACP. Tanzania. pp 15-32.

TzPPA. (2002). Tanzania Participatory Poverty Assessment, Vulnerability and Resilience to Poverty in Tanzania. Causes, Consequences Main Report. [http://www.webcare.md/] site visited on 15/03/2006

UN. (2004). United Nations,Standing Committee on Nutrition. Nutrition in Crisis situation Vol 3. [http://www.unsystem.org/SCN/archives/nics03/index.htm] site visited on 05/04/2006

UNAIDS. (2001). India : HIV and AIDS-related discrimination, stigmatization and denial. [http://data.unaids.org/Publications/IRC-pub02/JC587-India]. Site visited on 01/07/2006.

UNAIDS. (2004). Report on the global AIDS epidemic. [http://www.webcare.md/] site visited on 05/04/2006

URT. (2002). The United Republic of Tanzania, *Morogoro Regional Socio Economic Profile*. National Bureau of Statistics and Morogoro Regional Commissioner's Office. Dar es Salaam, Tanzania, 229pp.

URT. (2003a). The United Republic of Tanzania. *2002 Population and Housing Census General Report*. Central Census Office, National Bureau of Statistics, President's Office Planning and Privatization. Dar es Salaam, Tanzania. 203pp.

URT. (2003b). The United Republic of Tanzania, *HIV/AIDS Care and Treatment Plan, 2003-2008*. NACP, Dar es Salaam, Tanzania. 101pp.

URT. (2005). The United Republic of Tanzania, *Guidelines for Home Based Care Services,* National Aids Control Program. Ministry of Health, Dar es Salaam, Tanzania. 84pp.

USAID/FANTA. (2004). HIV/AIDS: *A Guideline for Nutritional Care and Support.* 2nd Edition, FANTA/AED, Washington DC. 103pp.

WAVUMO. (2005). WAVUMO profile. *WAVUMO News Leaflet*, Morogoro, Tanzania. 5pp.

WB, (1997). Confronting AIDS Public Priorities in a Global Epidemic. *A world Bank Policy Research* Report. Oxford University .Press, United State. Pp 207 - 243.

WFS, (1996). World Food Summit, World food security. In: Rome declaration. November, Rome, Italy. pp 13-17.

WHO, (2002). *Scaling up antiretroviral therapy in resource limited settings.* Guidelines For public health approach. WHO, Geneva. 46pp

Winrock International, (2000). AIDS Endemic in Kenya*: Changing Liveliood*s *and Coping strategies of the Affected in Selected groups.* Winrock International, Nairobi Kenya. pp 16 - 31.

Yeh, K. C., Deutsch, P. J., Haddix, H., Hesney, M., Hoagland, V., Ju, W. D., Justice, S. J., Osborne, B., Sterrett, J. A., Stone, E., Woolf, E. and Waldman, S. (1998). Single dose pharmacokinetics of indinavir and the effect of food. *Antimicrobial Agents and Chemotherapy* 42(2): 332 - 338.

APPENDICIES

Appendix 1: Questionnaire for people living with HIV/AIDS

A. BACKGROUND INFORMATION

1. District: 01. Morogoro Municipality [ ]
   02. Out of Morogoro Municipality [ ]
2. Division.....
3. Ward name .....
4. Village/street name: .....
5. Gender of the interviewee. 01 Female [ ]
   02 Male [ ]
6. What is your age? ---------- years
7. What is your marital status?
   [ ] 01 Single [ ] 02 Polygamous Married
   [ ] 03 Monogamous Married [ ] 04 Widow(er)
   [ ] 05 Divorced/ Separated [ ] 06 Living together
   [ ] 06 Other (specify)
8. What relation do you have with the head of household?
   [ ] 01 Head of household **Go Qn 13** [ ] 02 Wife/husband
   [ ] 03 Child [ ] 04 Relative
   [ ] 05 Other (specify.....
9. (if not head of household) what is the name of head of your household ?
   .....
10. Gender of the head of the household 01 Female [ ]
    02 Male [ ]
11. What is the age of head of your household? ---------- years
12. What is the marital status of the head of your household?
    [ ] 01 Single [ ] 02 Polygamous Married
    [ ] 03 Monogamous Married [ ] 04 Widow(er)
    [ ] 05 Divorced/ Separated [ ] 06 Living together
    [ ] 07 Other (specify)

13. What is your education level?

[ ] 01 No formal schooling [ ] 02 Adult literacy

[ ] 03 Only few years in Primary School [ ] 04 Completed primary school

[ ] 05 Secondary School [ ] 06 Beyond Secondary School

14. What is your occupation?

[ ] 01 Peasant [ ] 02 Formal employment

[ ] 03 Casual employment [ ] 04 Informal employment

[ ] 05 Businessman/women [ ] 06 Others (specify) ---

15. What is your religion?

[ ] 01 No religion [ ] 02 Christian

[ ] 03 Moslem [ ] 04 Traditional

[ ] 05 Other (specify) ----------

B. Constrain facing in obtaining their food needs

16. What are your staple foods? 1. ---------- 2. ----------

3. ----------

17. What is the main source for the most of your staple foods?

[ ] 01 Own production [ ] 02 Purchase

[ ] 03 Aid from relatives/friends [ ] 04 Loan/grants

18. How long is it from the time you knew you were HIV positive?

[ ] 01 ≤ One years long [ ] 02 Two to four years

[ ] 03 five years to ten years [ ] 04 > ten years

19. When did you start participating in organizations' activities?

[ ] 01 after testing and recognize that I am infested

[ ] 02 ---- years from the time I reorganized that I am infested.

20. Do the food available in your household enough to meet your requirements?

[ ] 01 Yes [ ] 02 No

21. Are there any changes on the ability to obtain your food when compared to the period before knowing that you are infected?

[ ] 01 Yes [ ] 02 No go to qs 23

22. If yes, What are the cause of those changes (you may tick more than one, if mentioned)

[ ] 01 Reduction in ability to produce food

[ ] 02 Reduction in ability to earn income

[ ] 03 Depletion of household income

[ ] 04 Increase in medical and care expenses

[ ] 05Discrimination by household member

[ ] 06 Any other reason(s) [specify] ----------

C. Coping strategies

23. How then do you get your food during household food deficit

[ ] 01 Selling household assets Go to qn 24

[ ] 02 Receiving assistance from friends and relatives

[ ] 03 Involved in casual employment

[ ] 04 sending children to work Go to qn 25

[ ] 05 Any other reason(s) [specify] ----------

if answer is 02,03,05 then go Qn 26

24. If selling of assets, what type of asset do you dispose?

[ ] use of savings and financial assets

[ ] Sell of non-productive assets like furniture, cooking utensils

[ ] sell of productive assets like land, draught animals

[ ] sell of fixed capital like houses

Go Qn no 26

25. If depending on children for food , how are they involved in obtaining food?

[ ] They were not taken to school hence working full time

[ ] Dropping out of school for full time child labour

[ ] Still in school but missing some days for working

[ ] Still in school but generating income after school hours

26. How many meals do you have per day?

[ ] More than three meals per day with some snacks

[ ] Three meals per day

[ ] Less than three meals per day

27. Is there any changes in type of meals that you used to consume between before and after being infected?

[ ] 01 Yes [ ] 02 No

28. As a people living with HIV/AIDS, do any of the following changes happened to you?

	Yes	No
Skipping of meals because of food shortage	[ ]	[ ]
Adjustment of meals by reducing number of items in a meal	[ ]	[ ]
From expensive type of meal to relative cheaper one	[ ]	[ ]
From food considered to be superior to inferior	[ ]	[ ]
Reduction in varieties of foods per meal/per week	[ ]	[ ]
Reduction in quantity of the food (meal)	[ ]	[ ]

D. Nutrition knowledge

29. Is there any need of increasing frequency of food intake for PLWHA?

[ ] 01 Yes [ ] 02 No

30. Whether yes or no, why do you think so?

---

31. PLWHA should avoid exercise because may cause injury to them?

[ ] 01 Yes [ ] 02 No

32. Do you use spices like Gallic, ginger. Cinnamon, cloves in your diet?

[ ] 01 Yes [ ] 02 No

33. What is the importance of these spices in the diet of PLWHA?(may tick more than one)

[ ] They improve appetite.

[ ] They improve digestibility and absorption of food

[ ] healing of some minor health problems like fungus, flu e.c.t

[ ]I don't know

E. abiding in recommendation on nutrition and dietary practices

34. Have you ever heard about the guidelines used in directing PLWHA on the proper diet to take?

[ ] 01 Yes Go to No. 36 [ ] 02 No

35. If no, how do you get directions on the proper diet for your condition?

_____ Go to No 38

36. Do you manage using the direction you are given in the guideline?

[ ] 01 Yes Go to No. 40 [ ] 02 No

37. If no, then why? _____

38 What kind of foods which can be given to people with diarrhoea complications?

Food which are in fluid form [ ]

More solid foods to stop diarrhoea [ ]

39. What do you think you can do when you loose your appetite?

Wait until you feel like eating [ ]

Force eating because it is life [ ]

Eat more fruits, small portions but frequently [ ]

41. Do you think there is link between nutrition and immunity for PLWHA?

[ ] 01 Yes [ ] 02 No Go to Qn 43

42. If yes, why do you think so?

[ ] Ability to link with fight against opportunistic diseases

[ ] Know that there is connection but fail to give relevant reasons

F. Use of antiretroviral drugs/therapy

43. Are you aware on the medications which are used to boost resistance to illness and build strength for PLWHA?

[ ] 02 No [ ] 01 Yes Go to number 48

44. If no, will you like to have information on this kind of medication?

[ ] 01 Yes [ ] 02 No Go to qn 48

45. Are you currently taking HIV medications?

[ ] 01 Yes [ ] 02 No

46. Do you know any link between HIV medications and nutrient intake?

[ ] 01 Yes [ ] 02 No Go to qn 48

47. If yes, what is the link between HIV medication and nutrient intake?

[ ] may cause reduction in nutrient efficiency

[ ] may inhibit metabolism of some nutrients

[ ] may inhibit absorption of some elements

[ ] cause nausea, vomiting, loss of appetite, change in taste

[ ] Hinder absorption, distribution, metabolism and excretion of medicine

G. Nutritional supplements with respect to dieting PLWHA.

48. Have you ever used nutrients supplements?

[ ] 01 Yes Go to qn 52 [ ] 02 No

49. If no, do you know about nutrient supplements?

[ ] 01 Yes [ ] 02 No END

DISCUSSION

50. Do you think that nutrient supplements are as equal importance as food?

[ ] 01 Yes [ ] 02 No

51. Where resources are limited, do you think purchase of nutrient supplement can rank first before food?

[ ] 01 Yes [ ] 02 No

52. Whether yes or no, why do you think so?----------

53. Which between the two statements is more correct?

[ ] Nutrient supplements should be used to complement a balanced diet and not substitute it

[ ] Nutrient supplements should be used to substitute a balanced diet and not complement it

Appendix 2: Focus group discussion guide

Area A: Food security constraints -

1. What are constrains that PLWHA face in meeting their daily food requirements?

Area B: Coping strategy with respect to food security -

2. What are the coping strategies used by people living with HIV/AIDS in securing their individual food requirements in the following aspects:-

- Getting cash (income) to buy food/medications.
- Necessary labor in assisting those activities which you are unable to do.
- Necessary support in social aspect, medical, spiritual
- Daily meals

Area C: Link between nutrition and HIV/AIDS -

3 Is there any link between the good nutrition and people living with HIV/AIDS

Area D: Organizations in Morogoro which deals with HIV/AIDS

4. What NGOS/institutions do you know in Morogoro that deals with HIV/AIDS?
5. Are you aware on what exactly do they do?

Area E: Expert Recommendations on the food security -

1. What guidelines/recommendations have you head with respect to nutrition for people living with HIV/AIDS?
2. How accessible are these guidelines/recommendations to you ?
3. If these recommendations/guidelines are not accessible to you, how then are you getting nutritional direction with respect to your condition?.

Appendix 3: Checklist question for key informants

1. Is there any program you are running with respect to food security for PLWHA?

   [ ] 01 Yes [ ] 02 No Go to qn no 5

2. If yes, what is it?

-

3. Are there any problems in running those program(s)?

[ ] 01 Yes [ ] 02 No Go to qn no 5

4. If yes, what are those problems?

---

5. Are there any recommendations that you are providing to PLWHA with respect to their nutrition?

   [ ] 01 Yes [ ] 02 No Go to qn no 7

6. If yes, what are those recommendations?

-

7. On your experience, do you think PLWHA abides to the recommendations with respect to nutrition you are providing to them?

[ ] 01 Yes [ ] 02 No Go to Qn no 9

8. If not, what do you think are the main causes?

-

9. What do you think needs to be done to facilitate food security to PLWHA?

-

10. With the current food security situation for PLWHA in Tanzania, do you think the ARVs introduction will be successful?

[ ] 01 Yes [ ] 02 No

11. Whether yes or no, why do you think so?

-

12. Which organizations/institutions are you working in collaboration (linkage or networking) with in relation to nutritional education, food preparation, processing, preservation for your clients?

-

13. If no networking, then how do your client obtain these knowledge?

Appendix 4: Questionnaire for household with PLWHA

A. NGO from which client come from. 01 FARAJA [ ]
02 WAVUMO [ ]

1) What is your name? ----------

2) Sex of respondent 01 Female [ ]
02 Male [ ]

3) What is your age? ----------years

4) Maritual status of respondent

[ ] 01 Single [ ] 02 Polygamous Married

[ ] 03 Monogamous Married [ ] 04 Widow(er)

[ ] 05 Divorced/ Separated [ ] 06 Living together

[ ] 07 Other (specify)

5) what is the position of respondent in the household?

[ ] 01 Head of household (Go to qn. 16) [ ] 02 Child

[ ] 03 Relative [ ] 04 Husband/wife

[ ] 05 Others (specify) ----------

6) (If not head of household), Can you please tell me the name of head of household? ----------

7) Sex of head of household 01 Female [ ]
02 Male [ ]

8) Age of head of household ---------- years

9) Marital status of head of household?

[ ] 01 Single [ ] 02 Polygamous Married

[ ] 03 Monogamous Married [ ] 04 Widow(er)

[ ] 05 Divorced/ Separated [ ] 06 Living together

[ ] 07 Other (specify)

10) Education level of head of household?

[ ] 01 No formal schooling [ ] 02 Adult literacy

[ ] 03 Only few years in Primary School [ ] 04 Completed primary school

[ ] 05 Secondary School [ ] 06 Beyond Secondary School [ ] 07 Student

11) Occupation of head of household?

[ ] 01 Peasant [ ] 02 Formal employment

[ ] 03 Casual employment [ ] 04 Informal employment

[ ] 05 Businessman/women [ ] 06 Others (specify) --------

12) Religion of head of household?

[ ] 01 No religion [ ] 02 Christian

[ ] 03 Moslem [ ] 04 Traditional

[ ] 05 Other (specify) ----------

I would like to have information about infected individual you are living with

13) What is the age of the infected individual you are living with? ----------

14. How many meals do you have per day?

[ ] More than three meals per day with some snacks

[ ] Three meals per day with snacks

[ ] Three meal only per day

[ ] Less than three meals per day

15) Do you think numbers of meals you are taking are enough for PLWHA?

[ ] 01 Yes Why ----------

-

[ ] 02 No Why ----------

-

Use of spices'

16) Do you use spices like Gallic, ginger. Cinnamon, cloves in your diet?

[ ] 01 Yes [ ] 02 No

17) Do you know the importance of spices to PLWHA?

[ ] Yes [ ] No

18) If yes, what is the importance of these spices in the diet of PLWHA?(may tick more than one)

[ ] They improve appetite.

[ ] They improve digestibility and absorption of food

[ ] healing of some minor health problems like fungus, flu

Ability to follow nutrition recommendations

19) Have you ever seen/reading guidelines/books/leaflets directing on what are nutrient requirements for PLWHA.

[ ] 01 Yes Go to qn 21 [ ] 02 No

20) If no, where do you get nutrition recommendations for the infected member of your household? _____

23) Did you manage to follow the directions regarding nutritional care for PLWHA given to you?

[ ] 01 Yes Go to qn 25 [ ] 02 No

24) If no, what was the reason? ----------

Nutritional knowledge for PLWHA

25) What kinds of foods are suitable for people with diarrhoea complication?

Food which are in fluid form [ ]

More solid foods to stop diarrhoea [ ]

26) Why do you think so? ----------

27) What do you think you can do when you loose your appetite?

Wait until you feel like eating [ ]

Force eating because it is life [ ]

Eat more fruits, small portions but frequently [ ]

[ ] Others (specify) ----------

28) Do you think there is link between nutrition and immunity for PLWHA?

[ ] 01 Yes [ ] 02 No Go to qn 30

29) If yes, why do you think so?

[ ] Ability to link with fight against opportunistic diseases

[ ] Know that there is connection but fail to give relevant reasons

30) Why do you think PLWHA are recommended to take fruits and vegetables more frequently? ----------

31) Does presence of PLWHA in your home affect food security of the household?

[ ] 01 Yes [ ] 02 No

32) If yes, why do you think so? ----------

33) Is there any contribution in house hold food availability provided with PLWHA you are living?

[ ] 01 Yes [ ] 02 No

34) If yes, are there any changes in ability to ear food when compared to the former condition when he was not infected?

[ ] 01 Yes [ ] 02 No

35) If yes, what is the cause of those changes?----------

36 How did you realize that your household member is infected with HIV/AIDS

He/she shared out of her/his own will [ ]

I come to know during treatment when he/she was sick [ ]

I was informed by other people not him/herself [ ]

Others (specify) ----------

Appendix 5: Calculation for sample size

Basing on the population size (Fisher, 1991) which is less than 10,000 individual, the formula used to obtain sample size which is significantly acceptable, the formula used is:-

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

Where:-n = sample size when population is greater than 10.000

Z= standard normal deviate, set at 1.96 (in simple at 2.0) corresponding to 95 % Confidence level.

P = proportion in the target population estimate to have a particular characteristic;

If not known use 50%

q = 1.0 - p

d = degree of accuracy desired, set at 0.05 or 0.02

Therefore sample size will be

$$n = \frac{Z^2 pq}{d^2} = \frac{(1.96)^2 (0.9 \times 01)}{(0.05)^2} = \frac{3.8416 \times 0.09}{0.0025} = 138.30$$

Because the population for this study is less than 10,000 then the sample size will be

$$n_1 = \frac{n}{n} = \frac{138.30}{1\ 38.30} = 89.04 = 89$$

$$1 + \frac{}{N} \qquad 1 + \frac{}{250}$$

Basing on proportionality of members in these two NGO's Sample from Faraja Trust will be 50 while from WAVUMO will be 40. Sample of care givers will be 30 from both NGOs.