NUTRITIONAL STATUS AND ASSOCIATED FACTORS AMONG ADULTS LIVING WITH HIV/AIDS ATTENDING CARE AND TREATMENT CLINICS IN ILALA DISTRICT, DAR-ES-SALAAM.

By

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A dissertation Submitted in partial Fulfillment of the Requirements for the Degree of Master of Public Health of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that she have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a thesis/dissertation entitled *Nutritional Status and Associated Factors among Adults Living with HIV/AIDS Attending Care and Treatment Clinics in Ilala District, Dar-es-Salaam* in fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

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Date: 18/10/2010

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DEDICATION

I wish to dedicate this work to my beloved parents, the late Mr. Anthony Kazimoto Ritte and my mother Eugenia Andrea Massawe for laying a good foundation for my life. What you invested in me was not in vain.

ABSTRACT

Food and nutrition interventions are critical components of a full response to the HIV/AIDS pandemic which is highly prevalent in sub-Saharan Africa, the region where malnutrition is already endemic. In recent years clinical care providers, program managers and other stakeholders increasingly recognize the critical importance of nutrition for the treatment of HIV and AIDS, but the interventions that link nutritional support to treatment are relatively new. Tanzania is one of the countries that suffer a huge burden of malnutrition and food poverty with approximately 2.2 million people living with HIV/AIDS. Despite the ongoing nutritional interventions provided in care and treatment clinics to people living with HIV/AIDS, a high proportion of these people still face nutritional problems with almost 29% of them being underweight. A cross sectional study was therefore conducted in Ilala district, Dar es Salaam region to determine factors associated with nutritional status among adults living with HIV/AIDS (PLWHA) attending care and treatment clinics (CTCs). A total of 412 adult patients attending care and treatment clinics in Ilala district were interviewed in this study. It was found that 18.4% of PLWHA were underweight basing on their body mass index; this prevalence was found to be equal to both males and females. However, those who were at younger age; never married; with no formal education; depended on family/friends for income and those residing in Kinondoni district were more at risk of being underweight. Statistical test showed that among the factors that had a significant association with the nutritional status of people living with HIV/AIDS were the kind of support that one was getting, living companion, alcohol drinking, duration of ART, and frequency of eating vegetable with meals. More efforts are required to advice, support and encourage PLWHA within social context of lives so that the current nutritional care and support services provided to them could give the best outcomes. Collaborative actions are required to solve this problem of poor nutrition among PLWHA.

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LIST OF ACRONYMS AND ABBREVIATION

AETC	The AIDS Education and Training Centres.
AIDS	Acquired Immune deficiency Syndrome
ART	Antiretroviral therapy
ARV	Antiretroviral
BMI	Body mass index
BWL	Body Weight Loss
COUNSENUTH	Centre for Counseling, Nutrition and Health Care
CTC	Care and treatment Centers
FANTA	Food and Nutrition Technical Assistance Project
FAO	Food and Agriculture Organization of the United Nations
FAQ	Frequently Asked Questions
HIV	Human Immunodeficiency Virus
MDG	Millennium Development Goals
MDH	Muhimbili-Dar city Council-Harvard collaboration
MUAC	Mid-Upper Arm Circumference
PI	Principal Investigator
PLWHA	People living with HIV/AIDS
PMS	Patient Monitoring System
RDA	Recommended Daily Allowance
SARA	Support for Analysis and Research in Africa
TSF	Triceps Skin Fold
UNAIDS	Joint United Nations Programme on HIV/AIDS
USA	United States of America
USAID	United States Agency of International Development
WFP	World Food Programme
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Food and nutrition interventions are critical components of a comprehensive response to the HIV/AIDS pandemic. As the virus continues to grow and shift, particularly in sub-Saharan Africa, communities, service providers, researchers, and donors recognize the need to address nutritional aspects of care. United States Agency of International Development (USAID) strengthens nutritional care and support for people living with HIV/AIDS (PLWHA), and has produced program guidance on nutritional care and support interventions, nutrient requirements of PLWHA, and food and nutrition complications of antiretroviral therapy (UNAIDS, 2009).

Nutritional status has been found to be an integral component of the overall health of individuals and populations. It is said to be one of the potential indicators of the overall well being of population and human resources development. Physical well-being and good nutrition are strongly related to obtaining an adequate amount of essential nutrients in foods that contain the right quantity of calories for the individual (Pressman *et al*, 1990).

Malnutrition, on the other hand is the outcome of group of factors such as poverty, inadequate access to food, illiteracy, large size families, poor environmental sanitation, lack of basic minimal health care, chronic illness such as AIDS, lack of personal hygiene, lack of easy access to adequate safe drinking water and lack of awareness on nutritional related issues. The manifestations of malnutrition could be seen in the prevalence of specific nutrient-deficiency disorders such as protein-energy malnutrition, anemia, night blindness, goiter, susceptibility to a number of infectious diseases, lack of resistance to illnesses, growth retardation (both physical and mental). Therefore PLWHA being among the groups most vulnerable to poor nutritional status, they require adequate nutritional support (Parvata *et al*, 1998).

The relationship between malnutrition and AIDS is well recognized. In fact, in Africa, AIDS was initially known as 'Slim Disease' because of the classic wasting syndrome typically experienced by persons with the disease. HIV infection compromises the nutritional status of infected individuals and, in turn, poor nutritional status can affect the progression of HIV infection. In recent years, considerable progress has been made especially in Africa, the region hardest hit by AIDS pandemic, to understand the biological mechanisms responsible for this relationship, and to start identifying nutritional interventions that may improve the quality and length of life for people living with HIV (Piwoz and Preble, 2000).

In 2004 the President of the United Republic of Tanzania ascribed prevention, care and treatment to be the main functions of the Ministry of Health and Social Welfare in the management of HIV and AIDS in Tanzania. The government of the United Republic of Tanzania launched a HIV/AIDS Care and Treatment program in October 2003 and since 2004 a rapid and large scale roll-out of anti-retroviral treatment has been ongoing. A number of partners joined the government in this undertaking. The support of implementation of care and treatment services at health facility level has been regionalized, with a number of partners each supporting one or multiple regions. As of March, 2009, the cumulatively reported number of patients ever started on ART was 235,012 and a total of 454,681 patients were reported to have been enrolled in care (Kilama *et al*, 2009). .

Although clinical care providers, program managers and other stakeholders increasingly recognize the critical importance of nutrition for the treatment of HIV and AIDS, interventions that link nutritional support to treatment are relatively new (Kuria, *et al.* 2006). Since HIV/AIDS epidemic is highly prevalent in populations where malnutrition is already endemic, nutrition should be regarded as a fundamental part of the comprehensive packages of care and support for people living with HIV/AIDS. As an urgent priority, greater political, financial and technical support should be provided for improving dietary quality and increasing dietary intake to recommended levels.

A good nutritional status is attained when the body gets enough and right kinds of food to meet its requirements for proper functioning, growth, repair and maintenance of health. Good nutrition is important for the well being of PLWHA because it strengthens the body's protection and recovery from diseases and helps maintain body weight and muscle thickness especially in the early stages of infection. This helps to delay progression of HIV infection to AIDS. Good nutrition also promotes adequate storage and availability of the required nutrients to meet the increased body's needs for nutrients caused by HIV/AIDS and opportunistic infections. According to WHO guideline, energy needs increase by 10% in asymptomatic HIV-infected adults and children, and, in adults with more advanced disease, by 20% to 30%. It is important that these energy requirements are met for maintaining the strength and independence of PLWHA while also making use of medicines bearable and helping the medicines work better (WHO, 2005).

PLWHA are vulnerable to poor nutritional status because their body's food requirements are increased yet they are subjected to various factors such as repeated infections and fever which increase energy needs; loss of appetite; reduced food intake due to eating problems; poor absorption of nutrients; nutrient losses in urine and stools; medication; depression and anxiety; reduced ability to care for oneself; tiredness and reduced access to and availability of food (WHO- FAO, 2002). Besides, people living with HIV infection (themselves or among family members) face not just sickness but also impaired productivity, declining income, and increasingly difficult choices among essential needs such as food, health care, school fees and house rent making it hard for them to prioritize (*A Synthesis of International Guidance, 2007).*

To benefit from good nutrition, PLWHA have to regularly monitor their weight. If there is any unintended weight loss over a period of a month, they should seek help from a health worker. They also have to eat a large enough quantity of food and include a variety of foods in their meals (WHO, 2008). They are also advised to seek health care immediately when they feel ill, adopt good personal, food, and water hygiene to prevent infections that can be

transmitted through food/water. Further advices include practicing a positive life style to maintain physical and emotional health, like avoiding alcohol and smoking, exercising frequently, and seeking psychosocial counseling if required.

Though good nutrition can help maintain and improve the quality of life of PLWHA, it is not sufficient on its own. Food helps boost and maintain immunity. However, when the viral load in the body is high, nutrition alone cannot fully replace the lost immunity.

Prevention and proper treatment of HIV related infections is important to avoid weakening the nutritional status further. Also the ARVs provided in care and treatment centers are vital because they reduce the viral load and the rate at which the body's immunity is destroyed. Therefore, placing patients on antiretroviral therapy is, in fact, related to improved nutritional status. In this era of potent antiretroviral therapy (ART), malnutrition has been recognized as a significant problem and correlates directly to mortality for HIV patients. The degree of malnutrition is highest among patients with advanced illness due to decreased intake of quality foods, increased energy requirements, and mal-absorption. As noted, nutritional deficiencies in people living with HIV/AIDS begin early and often go unrecognized. Therefore, optimizing nutritional status is a key objective in comprehensive management of clients who have HIV (USAID, 2009).

In this study, nutritional status and various factors that have association with it among PLWHA attending CTCs will be identified to find out if they are significant. Among the factors to be examined are psychosocial factors, dietary factors and perceived household food security. The results obtained will help in planning for relevant interventions to complement and improve the existing ones so as to form a comprehensive nutritional care to PLWHA.

1.2 Statement of the Problem:

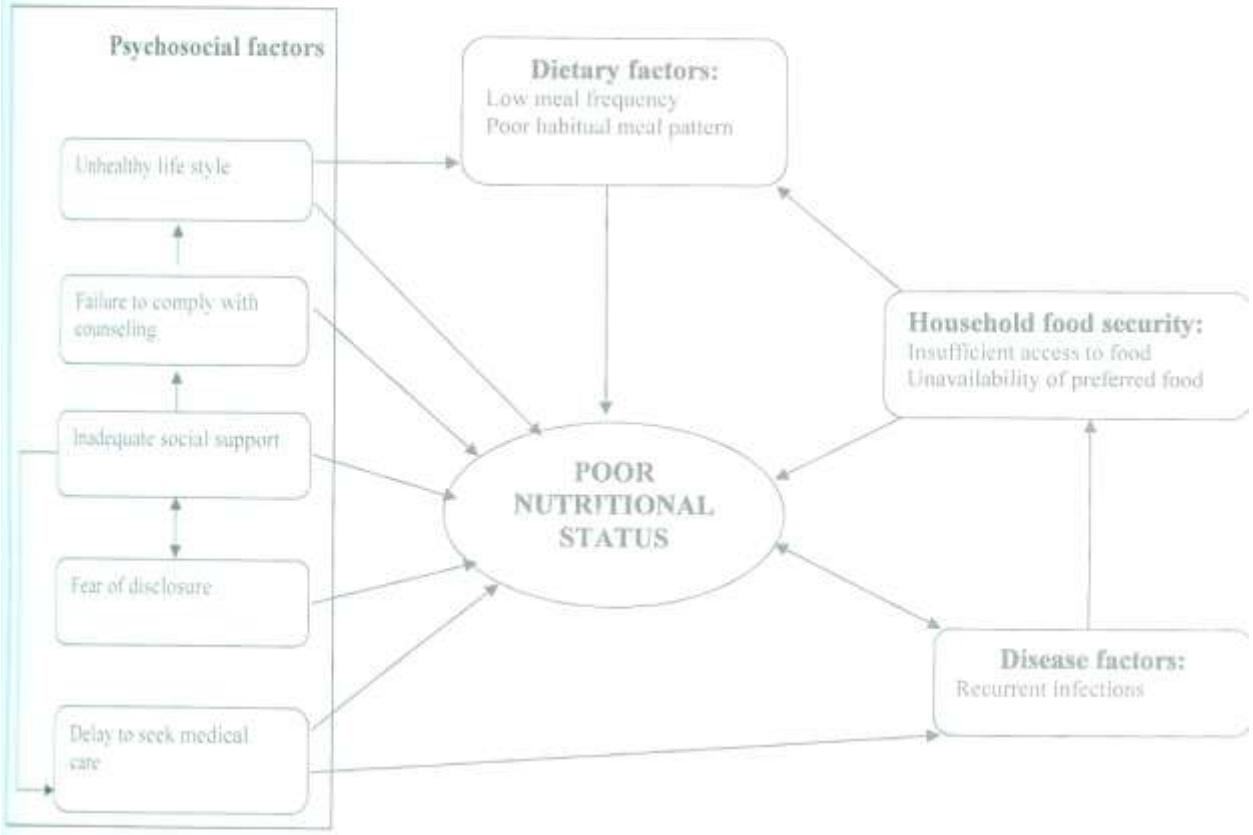
The effect of HIV/AIDS pandemic on the nutritional status of infected people is now widely known. Among the common known effects is severe muscle wasting and underweight due to decreased food intake and underutilization of nutrients in the food, attributed to conditions like diarrhea, nausea, vomiting, loss of appetite and recurring infections. Moreover, some social aspects like tiredness, isolation and depression reduce the appetite and the willingness to make an effort to prepare food and eat regularly. If these aspects are not carefully addressed, an individual's food intake can be severely hampered and adversely affect nutritional status (SARA and FANTA, 2009). Consequently the patients will end up with poor nutritional status which then affects the quality of their lives, diminish their life span and affects their medication.

Now that the world has fortunately became aware on the need to get antiretroviral therapy to millions of people living with HIV/AIDS in poor countries, this massive investment in care, support and treatment might not be fruitful if the people who finally receive treatment are not sufficiently well nourished to get the full benefit of the drugs. Therefore as it is stated on UNAIDS report of August, 2009 under Joint United Nations Programme on HIV/AIDS, optimizing the nutritional status of people living with HIV is a scientifically recognized best practice. Without proper nutrition, people living with HIV become malnourished and treatment is less effective. It is for that reason World Food Program is currently placing greater emphasis on the integration of nutritional care in the health sector.

According to a recent report by COUNSENUTH (2008), Tanzania suffers high levels of malnutrition and food poverty with more than one-fifth of its population being underweight and approximately 2.2 million people living with HIV/AIDS. Adding to this burden, the country has inadequate nutrition care services whereas only in the recent years nutritional counseling has been integrated in HIV/AIDS care and treatment programs as a novel service. However this initiative has been challenged by lack of sufficient and appropriate information

on what needs to be done to improve nutritional status of PLWHA. Other services provided to PLHWA have been initiatives to give medication, nutritional counseling and nutritional supplements. Nevertheless, a recent study done in Dar-es-salaam city, Tanzania found that 21.8% of people living with HIV/AIDS who attend care and treatment centers are underweight despite the ongoing nutritional interventions (Edwin, 2008). These findings suggest that despite provision of nutrition care and support to these people, a high proportion of them still face nutritional problems. This situation deserves further research to identify possible factors that may be related to the observed findings.

Conceptual framework for understanding the possible causes of poor nutritional status among people living with HIV/AIDS.



The above conceptual framework indicates the interrelationship between various contributory factors to poor nutritional status for PLWHA. According to the framework, poor nutritional status might be the result of interlinked causes like low meal frequency, poor habitual meal pattern insufficient access to food, unavailability of preferred food, recurrent infections, unhealthy life style, failure to comply with counseling, inadequate social support, fear of disclosure delay to seek medical care.

1.3 Rationale

People living with HIV infection are faced with the task of maintaining optimal nutritional status despite the increasing attacks to immune system reliability. Proactive nutrition intervention will result in fewer complications, leading to reduced cost of care and increased quality of life. Nutritional management is cost effective because it delays the progression of HIV; reduces the cost of medical care; reduces complications and hospitalizations; shortens the duration of hospital stay; improves effectiveness and tolerance to medications and treatments and also increases productivity and independence.

Clearly all malnourished individuals, HIV-positive or not, are in need of improved nutrition achievable through any appropriate and feasible means. Yet, good nutritional status is of high importance in maintaining quality of life to PLWHA. Thus, universal provision of nutrition counseling to all people living with HIV should intend to address the needs of nutritional improvement. But more knowledge may be needed including learning about diverse factors related to nutritional health that might increase the risk of poor nutritional status among PLWHA. This is a critical area for further research.

Considering all the emphasis put on the nutritional status of people living with HIV/AIDS, this study aimed at providing a basic understanding on various factors that are associated with nutritional status of people living with HIV/AIDS in Dar-es-Salaam who attend CTCs for care and treatment. This will help in improving and modifying nutritional care and support provided in these facilities.

Based on the few documented studies, little information is available on the context of nutritional status and associated factors among HIV positive adults in Tanzania. This study has therefore highlighted prevalent factors that are associated with nutritional status among people living with HIV/AIDS attending care and treatment centers in Dar es Salaam with a view of enriching the available literature and recommending appropriate interventions which can be integrated in the existing programs that provide nutritional care and support.

1.4 Research questions:

1. What is the status of nutrition and associated factors among PLWHA who attend CTCs in Ilala district? Are these factors significant in relation to the nutritional status of PLWHA?
2. How is the dietary pattern of people living with HIV/AIDS attending CTCs in Ilala district?
3. Is there any association between perceived household food security and nutritional status among PLWHA attending CTCs in Ilala district?

1.5 Research Objectives

1.5.1 Main objective:

To determine nutritional status and associated factors among people living with HIV/AIDS attending Care and Treatment Clinics (CTCs) in Ilala district.

1.5.2 Specific objectives:

1. To determine nutritional status using Body Mass Index (BMI) among PLWHA who attend CTCs in Ilala district.
2. To identify psychosocial factors associated with nutritional status among PLWHA attending CTCs in Ilala district.
3. To determine the association between nutritional status and perceived food security at household level among PLWHA attending CTCs in Ilala district.
4. To examine the dietary pattern of PLWHA who attend the CTCs in Ilala district in relation to their nutritional status.

Operational Definition of Terms

Dietary pattern: Refers to types of food consumed, frequency of meals consumption and eating habits.

Kind of Lifestyle: Are the habits related to smoking, drinking and physical exercises.

Normal weight: A person whose BMI is 18.50-24.99

Nutritional status: Is the interpretation of anthropometric measurements of body weight and height (Body Mass Index- BMI) expressed as Kg/m^2.

Obese: A person whose BMI is ≥ 30

Over weight: A person whose BMI is 25.0-29.99

Underweight: A person whose BMI is ≤ 18.49

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Nutritional Status and General Wellbeing among People Living with HIV/AIDS

Physical wellbeing and good nutrition are strongly related to obtaining an adequate amount of essential nutrients in foods that contain the right quantity of calories for the individual (Pressman, 1990).

Nutritional status is an integral component of the overall health of individuals and populations. Nutritional status is also a key indicator of poverty and hunger, poor health, and inadequate education and social conditions. Good nutrition is crucial to reach the health, education and economic goals contained in the Millennium Development Goals since good health, cognitive development and productivity cannot be achieved without good nutrition. Malnourished adults are less capable of performing work and are severely disadvantaged in terms of their social and economic security. Nutrition has a singularly important role to play in helping people living with HIV/AIDS and in mitigating the impact of the disease among affected household members (FAO, 2005).

2.2 Nutritional Status and HIV/AIDS

Before the emergency of AIDS epidemic in Africa in the early 1980s, the combined effect of interactions between infections, nutritional status and immune function were recognized. Infectious diseases, no matter how mild, influence nutritional status, and on the other hand, almost any nutrient deficiency, if severe enough, will weaken the ability to fight infection (Piwoz and Preble, 2000).

A weight loss of about 6-7 kg for an average adult is one of the possible signs of the onset of clinical AIDS. When a person is already underweight, a further weight loss can have serious

effects. A healthy and balanced diet, early treatment of infection and proper nutritional recovery after infection can reduce this weight loss and reduce the impact of future infection. A person may be receiving treatment for the opportunistic infections and also perhaps combination therapy for HIV, these treatments and medicines may influence eating and nutrition. Good nutrition will reinforce the effect of the drugs taken. When nutritional needs are not met, recovery from an illness will take longer. During this period the family will have the burden of caring for the sick person, paying for health care and absorbing the loss of earnings while the ill person is unable to work. In addition, good nutrition can help to extend the period when the person with HIV/AIDS is well and working.

Nutritional status is a major predictor of survival and functional status among people living with HIV/AIDS. Nutritional problems may occur at any stage of the disease and can contribute to impaired immune response, accelerate disease progression, increase the frequency and severity of opportunistic infections, and impede the effectiveness of medications. Fortunately, many nutritional disturbances are preventable and manageable (Nerad *et al*, 2003).

Recently, a research conducted in Africa has shown that the progression of HIV/AIDS and the survival of infected adult individuals can be adversely affected by their nutritional status. Although malnutrition associated with HIV/AIDS is known to be the result of numerous processes, the degree to which nutrition remedy can positively alter the course of HIV disease among PLWHA in Africa is basically not known (Piwoz and Preble, 2000).

Another study was conducted in Paris by Niyongabo *et al* (1997), with the aim of measuring prevalence and analyze the characteristics of malnutrition among HIV-seropositive subjects attending an AIDS outpatient clinic and a day care center. It was found that among the 124 HIV-seropositive adults attending the clinic, 10 adults (8.1%) had severe malnutrition, whereas 16 (12.9%) had moderate malnutrition and 21 (16.9%) with intermediate malnutrition and the remaining 77 (62.1%) had normal nutritional status. This implies that the problem of

malnutrition is prevalent even to those patients attending AIDS care clinics and it thus needs close attention so as to improve survival and quality of life among PLWHA.

In Uganda, Nabiryo *et al* (2005) did an assessment of nutritional status among PLWHA and found that among 70 adult clients who participated in the study, 13.3% were underweight with a Body Mass Index of less than 19 while 55% of clients were at risk of becoming underweight. From these results it is evident that nutrition status amongst study participants was generally below normal standards justifying a need for nutritional intervention amongst PLWHA for improved quality of life.

Also in 1999 Niyongabo *et al* conducted prospective cross-sectional study in Bujumbura, Burundi to determine prevalence and analyze the characteristics and causes of malnutrition among inpatients in an HIV highly endemic area. Evaluation of nutritional status using anthropometry where the degree of malnutrition was defined by the percentage of body weight loss (BWL), calculated by reference to the usual body weight. The results were that; among 102 HIV seropositive patients, 25 (40.3%) of them had developed 'wasting syndrome' (BLW > 20%). It was further observed that among HIV seropositive subjects, the percentage of AIDS cases increased according to decreasing level of nutrition. Decreased fat free mass and tricipital skinfold thickness were associated with higher mortality rate among HIV seropositive subjects (10.8%) one week after admission.

These results imply that high prevalence of malnutrition observed among the inpatients investigated was mainly attributed by HIV infection. Thus strategies adapted to the African context should be developed to prevent, detect and treat malnutrition and associated factors, particularly among HIV seropositive subjects.

2.3 Factors Associated with Nutritional Status of PLWHA

The emergency of AIDS in the last decade has added a burden in improving nutrition situation in Africa that has been a challenge for decades. Among the factors associated with endemic malnutrition particularly in Africa involve combination of individual, household, community, national and international factors. Other factors which team up with HIV/AIDS to worsen the problem of chronic malnutrition in Africa include cultural beliefs and customs, poor economic status, and limited access to health and other social services (Piwoz and Preble, 2000). Therefore PLWHA face not just a challenge of the disease in improving their nutritional status, but also a long list of pre-existing factors that were not yet tackled before.

In assessing nutritional status, nutrition concerns should be considered by evaluating several factors that may influence nutrition. Such factors include those which may act as barriers to good nutrition like; lack of knowledge or motivation for self-care, poor appetite, lack of money for food, lack of facilities for food storage and preparation. Another group is lifestyle factors like smoking, substance abuse, frequent eating out, erratic eating patterns, hectic schedule and high stress. Additionally, some Physical problems such as poor appetite, nausea, fatigue, pain, weakness, mouth or throat pain, acid reflux and constipation may affect food and nutrient intake (AETC, 2006).

In fact there are often a large number of factors that compound the problem of malnutrition. It is therefore seldom likely to identify a single contributor to poor nutritional status or malnutrition in HIV infected individuals. On the other hand, a number of these factors are not always a direct effect of HIV infection but relate to a range of broader issues outside the individual. They include issues such as food production, supply and demand, food security, and individual's ability to access nutritional adequate food at all times. Also a diverse range of issues that all contribute to an individuals inability to consume a nutritionally adequate diet which can include issues such as poverty, a lack of food preparation skills, issues related to disclosure of HIV, stigma and discrimination. Other factors are those related to personal beliefs such as religious and cultural beliefs that affect the type of food, preparation and consumption of particular foods (NDD, 2004). Like in a study by Edwin (2008) when

assessing nutritional status, food security and coping strategies among people living with HIV attending Care and Treatment Centers in Dar es Salaam, it was found that reporting of food insecurity was significantly associated with underweight as it had a positive correlation to meals frequency. Also a study by Venter *et* al (2009) conducted in Ga-Randuwa, South Africa among HIV infected adults, showed that anthropometric parameters had significant, but poor, positive correlation with the CD4 cell count. Also the study group had been found to have a poor dietary quality which was found to be associated with poor nutritional status among PLWHA with low CD4 cell count.

A study conducted in Rwanda , found that the most common perceived palliative care needs of PLWHA were medical needs, psychosocial needs and the need for financial assistance (77%); home-based care (47%); nutritional support (44%); and pain relief and management of other symptoms (43%). Most PLWHA indicated these palliative care needs were unmet, in particular the need for pain relief, symptom management, financial assistance and nutritional support. Over 50% of health care professionals reported that they were not trained in palliative care. They indicated that inadequate policy and resources were the main obstacles to the provision of optimal palliative care. Addressing unmet palliative care needs would enhance the quality of life of PLWHA. In addition, developing policy related to the provision of palliative care and building the capacity of health care providers is essential for the provision of adequate palliative care services (Uwimana and Struthers, 2007).

Inadequate nutrition in people with HIV infection may also be contributed by factors that are associated with illness including conditions such as nausea, vomiting, or anorexia-that may prevent adequate intake of nutrients and medications; diarrhea infections that prevent absorption of nutrients and medications; systemic illnesses (including HIV itself) that create a catabolic state; and psychological conditions (such as depression) that impair patients' ability to nourish themselves. In addition, financial constraints may limit patients' access to nutritious food (AETC, 2006). Also Niyongabo *et al* (1999) in Bujumbura, Burundi found that malnutrition among HIV seropositive subjects was associated with TB and dysphagia.

2.3.1 Disclosure Status, Social Support and Nutritional Status

Disclosure of HIV test results to others is critical to HIV prevention and care in that it allows the individual to acquire social support for supportive and preventive actions when found HIV positive or negative. Normally, without disclosure, a person struggles to access social or medical services. Although disclosure of test results will not guarantee access to such services as they may not be available, but it assists in accessing the services. Thus, any intervention that increases disclosure of HIV test results can improve prevention, increase the number of spouses and regular partners who are tested and counseled, and increase access to services (Lugalla *et al*, 2008). In most cases, people stigmatize an individual who has, or is suspected of having, HIV/AIDS primarily because of fear of the disease. As a result, people may lose their socio-economic status, employment, income, housing, education, healthcare, and mobility. Loss of employment often leads to chronic poverty and homelessness, becoming a further barrier to effective treatment. Most PLWHA suffer or fear stigmatization. It is thought that the fear of stigma adversely influences people's health-seeking practices. HIV/AIDS care and support programs should also address the nutritional, social, financial, physical, and day-to-day needs of PLWHA (Aslanyan, 2004).

The WHO definition of palliative care includes early identification, assessment and treatment of pain and other social aspects. Palliative care is based on the principles of holistic care, with the main focus on enhancing quality of life for the terminally ill, by providing love and support, and controlling the suffering of patients and their families. As stated in a conference report by Setswe *et al* (2007), care and support is crucial for coping among PLWHA, in order to deal with medical and psychological issues at home, and in schools and communities. Fortunately palliative care services are available for PLWHA in most countries. The high demand for palliative care services is due to the fact that, although there are free ARVs, there are still no solutions to medical problems such as AIDS for people who need palliative care. Moreover, palliative care services need to be strengthened, due to their cost-effectiveness for the health care system. In most Africa countries access to palliative care is limited to patients

with conditions such as Karposi's Sarcoma, diarrhoea, cryptococcal meningitis, chronic pain, and genital herpes.

Miller and Rubin (2007) explain that understanding why, how, and to whom people living with HIV/AIDS disclose their diagnosis to others is a critical issue for HIV prevention and care efforts including nutritional care and support, but previous investigations of those issues in sub-Saharan Africa have been limited to one or two questions included in quantitative studies of social support or stigma. In their qualitative analysis that involved two male and two female focus groups comprising of persons living with HIV/AIDS (PLWHAs) in Nairobi, Kenya, they discovered several HIV status disclosure patterns that appear typical to Africa. These include (a) intermediaries as vehicles for disclosure to family, (b) indirectness as a communication strategy, and (c) church pastors as common targets for disclosure.

An assessment of PLWHA in Addis Ababa (2002) revealed that the most important needs of PLWHA were emotional and psychological, physical and socioeconomic, clinical and health care, and legal and human rights. However, PLWHA insisted that emotional and psychological well-being is their most important need. Participants also mentioned that they were facing problems related to attitude when trying to access care and support services. In general, community members had unsupportive and negative attitudes towards HIV/AIDS and PLWHA; as a result many PLWHA were afraid to disclose their HIV status. Accordingly, many tried to avoid support systems, thereby depriving themselves of the benefits available to them. On the other hand, it was observed that communities used to associate the provision of benefits with HIV/AIDS. Surprisingly, professional care and support staff as well as immediate family members were cited amongst the community groups who unfavorably linked acceptance of assistance and supplies with HIV infection. Such trends had led to higher levels of discrimination faced by PLWHA, resulting in their social isolation and actual discrimination.

A review by Mohanan and Kamath (2009) on family support for reducing morbidity and mortality in people with HIV/AIDS, family support affects PLWHA on many levels and includes financial assistance, support in the disclosure process, routine daily activities, and medical assistance or psychological support. Studies from developed countries as well as relevant non-intervention studies suggest that family support makes multiple levels of positive impact on people living with HIV/AIDS. However, from this review, it is suggested that more studies are required in developing countries learn more about the effects of family support in improving nutritional status and enhancing quality of life of HIV infected individuals within families so as to reduce morbidity and mortality from HIV/AIDS in these people.

Apart from assisting in adherence to treatment regimens, counseling and psychosocial support services can also do much to assist PLWHA overcome various social, psychological, and economic difficulties in their lives. The psychosocial problems of the HIV-positive can also be addressed by follow-up consultations, peer support groups, and emotional support provided by religious/spiritual leaders or trained counselors. In Eurasia for instance, psychosocial support for PLWHA is mostly provided by non-governmental organizations (NGOs) which however, is not enough in meeting the current needs. In resource-poor settings, psychosocial care can also be provided by lay persons, including family, friends, neighbors, and others in the community. Given technical assistance, these non-professionals can provide sustainable support that will require few, if any, outside resources (Aslanyan, 2004).

2.3.2 Household Food Security and Nutritional Status of PLWHA

According to the World Food Summit, 1996: "Food security exists when all people, at all times, 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."

Households can access food through purchases, own production, or food aid to obtain sufficient and nutritious food to meet their dietary needs and food preferences. Food

consumption frequency and dietary diversity are good proxy indicators to assess the access dimension of food security. Dietary diversity is highly correlated with household income, calorie and protein adequacy.

Food insecurity contributes greatly in the development of malnutrition in resource-poor and resource-adequate settings. In resource-poor settings, there is decreased or no adult labor in HIV/AIDS affected households. These households have less capacity to produce or purchase foods and have higher medical costs. (Spool and Torino, 2008). According to a study by Edwin (2008), among 446 PLWHA attending Care and Treatment Clinics, 52.2% of them were found to be food insecure. It was also found that food insecurity had a significant association with underweight among PLWHA.

Byron *et al* (2005) conducted a qualitative research with a sample of HIV patients who have either participated or not participated in the food program. It was found that the intervention provides an important source of food support to the most vulnerable patients on treatment and their households, contributing to greater dietary diversity, and playing an important role in the emotional well-being of clients by lowering stress caused by insufficient access to food. On the other hand, patients in the supplementation program also self-reported recovery of physical strength that allowed them to return to productive life and greater adherence to treatment. Observable improvements in patients' nutritional and health status acted as a catalyst for increased support from family and community. The main opportunity costs of participation in the program were transport and stigma associated with collection of food supplements.

Rob Noble (2008) in Zimbabwe where malnutrition is widespread, also reports that without food or the right nutrition, taking antiretroviral drugs can be so painful that people simply choose not to. People will always choose to go for food for their survival rather than taking pills with no immediate or obvious effect. For instance one of the health workers explained that taking antiretroviral drugs on an empty stomach is like digesting razor blades. The result

is that many simply do not take them. It is also well noted that as the family becomes poorer and the capacity of PLWHA to produce becomes less efficient, food and nutrition become less and less important or accessible (Massell, 2006).

According to Ivers *et al* (2009), efficient targeting of food assistance is vital to the management of scarce resources, although little information is available on how to direct such programs as to which individuals or households to target in locations where there is both high food insecurity and a high prevalence of HIV infection. Programs are often targeted to individuals receiving ART, but it is highly reasonable that food assistance would do better to those not yet requiring ART as it will prevent the progression of HIV disease and delay the need for ART. It is not clear how food or other nutritional support (whether supplements or nutritional education) is shared within families. However, within different types of households food is shared and allocated differently depending on demographic composition, who within the household is sick or has died, social standing, socioeconomic status, and other factors. Understanding the conflicting basis for sharing food is critical to improving the targeting of therapeutic food versus food intended for general household consumption.

On the other hand, Food and nutrition security indicators were found to be associated with treatment outcomes whereas Food aid contributed to functional improvement among adult PLWHA on ART for at least 3 months in a study that assessed the effect of household food and nutritional security on adherence to ART and treatment outcomes in Dire Dawa (Seifu, 2007). It was found that close to 90% of PLWHA on ART in Dire Dawa were food insecure and 30.1% had at least mild malnutrition using availability of enough food/money, meal frequency, dietary diversity, food aid and BMI as indicators to measure the household food and nutrition security situation of PLWHA.

Therefore, as Wook and Morris (2005) reported, it is very important to link nutrition and food security with the support and treatment needed by people living with HIV/AIDS to stay healthy. This is a disease that calls for an integrated approach that focus on people's physical,

nutrition and health needs and not medicine alone. According to Wook and Morris, AIDS patients in the Western world have never been allowed to starve while receiving antiretroviral treatment. We shouldn't allow it to happen elsewhere, either.

2.3.3 Dietary Pattern and Nutritional Status of PLWHA

Culturally based attitudes about food may seriously affect nutritional intake of individuals. As a matter of fact, it is necessary to consider the classification of foods, beverages, and medicines as they tend to vary with each cultural group. Although most traditional eating patterns are healthful, some food practices may need adjustment for better nutritional outcomes. Overall, good or adequate nutrition for PLWA is considered the consumption of a balanced healthy diet, consisting of locally available foods (animal foods, beans, fruits, nuts, starchy staples and vegetables), and clean water.

On the other hand HIV is associated with biological factors such as loss of appetite, gastrointestinal complications and oral and oesophageal sores that affect the individual's desire for food and ability to eat, leading to inadequate dietary intakes (Colecraft, 2008).
Thorough assessment of a patient's nutritional status will always require obtaining information concerning the personal dietary habits through comparing actual nutrient intake (based on food records kept by the patient) with the patient's nutrient needs based on factors such as age and sex (Pressman, 1990). Spool and Torino in 2008 documented that there is enough data to support that inappropriate food intake have negative impacts on immune functioning. Insufficiency of some of the micronutrients such as vitamin A, vitamin C, vitamin D, zinc, selenium, copper, and iron impair immune function. Also high content of dietary fatty acids, specifically saturated fat, contributes to immune suppression. Protein deprivation decreases many body functions including the production of inflammatory mediators that are needed to fight infection.

Kuria (2008) conducted a study in Kenya with the aim of establishing food consumption, dietary habits and nutritional status of people living with HIV/AIDS and adults whose HIV status is not established using a sample of 439 adults; 174 adults living with HIV/AIDS and 265 adults whose HIV/AIDS status was not established. The results showed that majority of PLWHA consume foods that are low in nutrients to build up the immune system and help maintain adequate weight, and there is little variety in the foods they consume. It was also found that, more HIV-positive adults (23·6 %) were undernourished (BMI of ≤18·49 kg/m^2). From these results, it was concluded that PLWHA consume foods that are low in nutrients to promote their nutritional well-being and health and also adults who are HIV-positive are more likely to be undernourished.

Also a study by Kim *et al* (2001) in USA, involved an analysis to determine the correlates of inadequate dietary intake among HIV-infected adults using a cross-sectional study with 463 men and 170 women (aged 21–70 years) with HIV infection. Dietary adequacy was evaluated by using 3-day diet records. The results were that only the absence of nausea and vomiting was marginally associated with higher energy intakes. Inadequate energy intake, which occurred in 38% of this population, was independently associated with female sex among non-dieters. A significant proportion of the study cohort (52%) was consuming less than the recommended dietary allowance of vitamin A. Inadequate protein intake, found in 11% of the study population, occurred more often in females, those without a care-giving adult in the household and individuals with reduced appetite. Therefore from the results it was recommended that studying dietary intake as a potential determinant of the clinical outcomes of HIV infection may be worthwhile.

Another study by Oguntibeju *et al* (2005), analyzed the baseline dietary intake of people living with HIV/AIDS in the African community of Bloemfontein using food frequency questionnaire. The dietary intake of both macronutrients and micronutrients in 35 HIV-positive AIDS patients was assessed. The patients demonstrated energy and dietary intake of major macronutrients higher than the estimated energy intake (EER) and recommended daily

allowance (RDA) respectively and this tended to be higher in males than in females. The result also showed that the mineral and trace element dietary intake exceeded the RDA/AI (adequate intake), except for iodine (82.9%) and selenium (40%). The majority of the patients reported adequate intake of most vitamins; however a relatively high percentage of the patients indicated an inadequate intake for folate (34.3%) and vitamin D (25.7%).
Therefore as anticipated the high dietary intake of major macronutrients and micronutrients helps in maintaining the nutritional status and in reducing wasting in the patients. However, further in-depth research is recommended to take care of high percentage of the patients with inadequate dietary intakes (Oguntibeju *et al* 2005).

As study findings by Burgin *et al* (2008) suggest, PLWHA are at increased risk for poor intakes of fruits and vegetables and depleted lean body mass. In that particular study HIV-positive persons were found to have significantly lower mean weight, BMI, upper mid-arm circumferences, arm muscle area and arm fat area. They were also less likely to use multivitamins, dietary supplements and fruit and vegetables in their diet.

Annan (2009) in South Africa, found that within the asymptomatic HIV infected population studied, comparing four dietary patterns which were observed, the predominantly animal based dietary pattern enhanced macronutrient, micronutrient and mineral intake, promoting better dietary quality, serum nutrient status and BMI. However, the least associations were observed for the staple based dietary pattern. Among the four main dietary patterns, the animal based dietary pattern showed a more desirable associations with nutrient intakes, body composition, serum lipids, albumin and liver enzymes. This implied that dietary intake influenced markers of nutritional and metabolic status in the study population. For this study it was postulated that certain dietary patterns were associated with better (quality and quantity) nutrient intake which in turn was associated with a more optimal serum nutrient status, consequently influencing nutritional anthropometrics, and metabolic integrity in HIV infection. However certain socio-demographic characteristics were likely to influence these

interrelationships for instance income could influence food availability and choice and thus reduce dietary intake.

In a study by Edwin (2008) where 21.8% people living with HIV attending CTCs were found to be underweight, higher BMI was found to be a function of high frequency of meals intake. It was also noted that those who took less than three meals per day were likely to be underweight. Moreover, in this study it was found that 88 (53%) of the respondents were eating less preferred food, 68(41.2%) skipped meals and 71(43%) were limiting food proportional size among household members reported as being coping strategies to the household food insecurity.

Planning options and diets must account for the obstacles that constrain PLWHA and households from adopting recommended practices. Food insecurity, psychosocial issues, stigma, and intra-household decision-making processes are factors that can prevent PLWHA from following appropriate diets and suitable meal timetables (Castleman *et al* 2003).

Therefore, as indicated in most literature, PLWHA are at increased risk for under nutrition and poor dietary habits. However, strategies to correct and prevent malnutrition among PLWHA must take into consideration prevailing factors that might hinder implementation of planned interventions. Conducting researches to study and explore such factors is among priority strategies.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

The study design used was analytical cross sectional.

3.2 Study Area

This study was conducted in Ilala district. Ilala district is one of the three administrative districts in Dar es Salaam, Tanzania, the others being Temeke and Kinondoni districts. According to 2002 National Population Census, the population of Ilala district is about 634,924. The district has an area of 273 km² and is commonly referred to as 'Downtown Dar', where much of the commercial, banking, and national offices are located. The district is divided into 3 divisions which are further subdivided into 22 wards. Ilala district has a number of local markets which supply a variety of food items from all over the country ranging from fresh fruits and vegetables to nuts and cereals of all types.

The mode of health service delivery in Ilala Municipal Council is based on curative, preventive and promotive health care and rehabilitative services provided by either private or government owned health facilities. Amana hospital, the only public hospital owned by the Ilala municipal council acts as district referral hospital. Muhimbili-Dar city council-Havard (MDH) project supports a total of 42 CTC's in Dar es Salaam. Out of these, 16 (38.1%) are in Ilala district, 18 (42.9%) are in Kinondoni and the remaining 8 (19%) are in Temeke district. Among these 16 MDH supported CTCs in the district, nine are in hospitals (3 public and 6 privately owned hospitals), two in public health centers and the remaining five are in public dispensaries. The MDH supported clinics are the only CTCs that provide nutritional counseling, support and follow ups to PLWHA.

HIV/AIDS is among the major top five killer diseases in Ilala district, others being malaria, tuberculosis, diarrhea and upper respiratory tract infections. In the year 2006, the Ministry of

Health and Social Welfare marked Ilala district as having highest prevalence rates of HIV infection with about 66,000 people living with HIV/AIDS, 70% of them being between the ages of 20-49 years.

3.3 Study Population

The study targeted adults of 18 years of age and above who are living with HIV/AIDS and attending selected Care and Treatment Clinics supported by Muhimbili-Dar city-Havard (MDH) in Ilala district. Adults were selected because they are able to give information; also they are the most affected age group. In addition, adults are usually neglected when it comes to studies related to assessment of nutritional status.

3.4 Sample Size Determination

Sample size was determined based on the following formula of a single proportion,

$$N = \frac{z^2 p(100-p)}{\varepsilon^2}$$

Where N = the required minimum sample size

p = estimated prevalence of poor nutritional status among PLWHA (put at 22%; Edwin, 2008).

ε = margin of error on p (set at 4%)

z = standard normal deviate corresponding to 95% confidence level (=1.96)

Substituting in the above formula,

$$N = \frac{1.96^2 22(100-22)}{4^2}$$

$$N = 412$$

Therefore the minimum sample size was 412 PLWHA.

3.5 Sampling procedure and eligibility

Simple random methods of sampling were used in selecting both CTCs and respondents. The selection of MDH supported CTCs in the district involved CTCs that are found in public health facilities only. The facilities were first stratified in categories of Hospitals (3 hospitals), Health Centers (2 health centers) and Dispensaries (5 dispensaries). Then a total of four CTCs (40%) were randomly selected out of the 10 CTCs that are found within these health facilities. From hospitals 2 CTCs were randomly selected, while one CTC was selected among the health centers and one from the dispensaries. In each selected clinic about one hundred and three patients were being selected from the appointment list one day before the due date. The picking of selected respondents for interview was done at the last point where all patients had to pass through to pick the date of the next appointment. Eligible participants were adult patients of 18 years of age and above regardless of whether they had started ART or not.

3.6 Data Collection Procedure

Both quantitative and qualitative data collection methods were used in this study. Data was collected using an interview guide with both open and close ended questions. The questions were initially written in English and then translated to Kiswahili language so as to ensure that they were clear and understood by the respondents. The interview guide had four sections as follows:

- Demographic and other characteristics
- Dietary pattern;
- Perceived household food security.

- Nutritional status assessment using Body Mass Index

During the field, interviews were done by Principal Investigator and the research assistants. The team managed to conduct an average of 45 interviews per day where each member interviewed not less than 15 respondents. Each interview guide was reviewed immediately after the interview to fill for any missing data.

3.6.1 Recruitment of Research Assistants

Two research assistants were recruited to assist during field work. Qualification of these assistants included a bachelor degree, preferably on nutrition, medicine or sociology; previous research experience on working with PLWHA; experience in interviewing respondents and good communication skills.

3.6.2 Training

The research assistants were trained for one day. The emphasis was on the purpose of the survey, how to recruit participants, the importance of ensuring quality data and how to maintain confidentiality of both the respondents and the information collected. The team was also trained on how to take and record the anthropometric measurements.

3.6.3 Pre-testing of the Interview guide

The pre-testing of the interview guide was carried out by the principal investigator and the two research assistants during the training sessions at Sinza Care and Treatment centre. This centre was not among the clinics that were selected for the study as it is in Kinondoni district.

The pre-testing aimed at checking how the target population was going to understand the tool and also to give opportunity to research assistants to exercise flexibility in the wording of questions and probing. Review of the interview guide was done following the pre-testing and necessary modifications were made.

3.6.4 Quality Control and Data Analysis

Collected data was edited during and after collection and adjusted for any missing information. The Principal Investigator supervised the filling of the interview guide to ensure quality data. PI was also available for clarifications as another means of quality control. Therefore, the risk of research assistants recording wrong responses on account of having misunderstood questions was minimized. Coding for the open ended questions was done by the team and thereafter data was entered by the PI. With a help of a statistician, the PI did data cleaning and analysis using Statistical Package for Social Sciences (SPSS) 11.0 for Windows software programme. Statistical significance of association was assessed using χ^2 test at a significance level of 0.05.

3.6.5 Permission to Proceed and Ethical Considerations

Ethical approval to conduct this study was obtained from Research Ethics Committee, Muhimbili University of Health and Allied Sciences. Permission to conduct the study in the study area was obtained from the Administrative Secretary of Ilala District Municipal Council. Subsequently, permission to carry out data collection was obtained from the CTCs administrative authorities who are in charge of these clinics. Study objectives, methodology and benefits such as improvement on nutritional care and counseling given in the CTCs were explained to those who agreed to participate. Only those who agreed were interviewed, and

were free to withdraw from the study during interview. Participants were assured of confidentiality by assigning them with numbers instead of names.

3.7 Study Variables

3.7.1 Dependent variable

Nutritional Status

Nutritional status was assessed by using Body Mass Index (BMI). BMI is a simple index of weight for height that is commonly used to classify nutritional status of adult individuals into categories of underweight, normal weight, overweight and obesity. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). BMI is a preferred indicator of nutritional status because it depends on two commonly and easily measured aspects of morphology, weight and height. Height measurements are taken when respondent stands erect and bare footed on a stadiometer with a movable headpiece. The head piece is leveled with skull vault and height is recorded to the nearest 0.5 centimeters. On the other hand, data on weight is obtained using a calibrated balanced-beam scale and weight is recorded to the nearest 100gms (0.1kg). Both measurements of weight and height were recorded in the interview guide at the end of the interview. BMI was then computed during data entry to get nutritional status of each study respondent. Reference was made from the WHO cut of points of BMI classification (see Annex 2).

3.7.2 Independent variables

Demographic and Other Characteristics

In this section variables included were age, sex, marital status, level of education, source of income, place of residence, description of the place, persons with whom one lives, dependants, kind of lifestyle (smoking, alcohol drinking, physical exercise), ART initiation, reported social support, ability to comply with nutritional counselling, disclosure status and reported health care seeking behaviour.

Dietary Pattern

Questions pertaining to the dietary habits of the respondents included variables such as; eating habits, habitual meals pattern including the variety of major types of food mostly consumed and meal frequency in an ordinary day.

Perceived Household Food Security

The information that was elicited in this section focused on the perceived ability to access food throughout the year and whether the preferred foods were available.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic characteristics of the study sample

Table 1 shows distribution of study respondents by sex. A total of 412 participants (68. 2% female) living with HIV/AIDS and attending Care and Treatment Clinics (CTCs) in Ilala district were interviewed and their body weight and height taken. Findings show that the highest proportion of females (37.4%) was in the age group 28-37 years. On the other hand, majority of the male participants were aged 38 years and above. In general, almost half (48.8%) of the respondents were either married or cohabiting (males 67.2% and females 40.2%), whereas, 16.7% of them were widowed. However more females (22.4%) reported to be widowed than males (4.6%).

With regards to education level, 80.9% and 68.7% of males and females respectively had primary education. Although the proportion of females who had never been to a formal school (14.2%) was higher than that of males (5.3%), more females compared to males had secondary school education and above (17.1% and 13.8% respectively).

Despite the fact that this study was conducted in Ilala district, only half (50.7%) of the respondents reside in this district. For both male and female participants, the main source of income was reported to be salary. Whilst the least mentioned source of income for females was spouse and family or friends (7.5%) spouse were never mentioned as a source of income among males.

Table 1: Socio-demographic characteristics of the study sample

Characteristics	Sex of respondents: Male N (%)	Sex of respondents: Female N (%)	Total N (%)
Age group			
18-27	6 (4.6)	30 (10.7)	36 (8.7)
28-37	35 (26.7)	105(37.4)	140(34.0)
38-47	45 (34.4)	100 (35.6)	145 (35.2)
48+	45 (34.4)	46 (16.4)	91(22.1)
Marital status			
Single	13 (9.9)	56 (19.9)	69 (16.7)
Married/cohabiting	88 (67.2)	113 (40. 2)	201 (48.8)
Divorced/Separated	24 (18.3)	49 (17.4)	73 (17.7)
Widowed	6 (4.6)	63 (22.4)	69 (16.7)
Education level			
No formal education	7 (5.3)	40 (14. 2)	47 (11.4)
Primary school	106 (80.9)	193 (68.7)	299 (72.6)
Secondary school and above	18 (13.8)	48 (17.1)	66 (16.0)
Place of residence			
Kinondoni	30 (22.9)	72 (25.6)	102 (24.8)
Ilala	69 (52.7)	140 (49.8)	209 (50.7)
Temeke	32 (24.4)	69 (24.6)	101 (24.5)
Income source			
Salary*	93 (71.0)	133 (47.3)	226 (54.8)
Spouse	-	21 (7.5)	21 (5.1)
Family friends	6 (4.6)	21 (7.5)	27 (6.6)
Petty business	16 (12.2)	40 (14.2)	56 (13.6)
No income	16 (12.2)	66 (23.3)	82 (19.9)
Total	**131 (31.8)**	**281 (68. 2)**	**412 (100.0)**

*Salary refers to monthly or daily earnings.

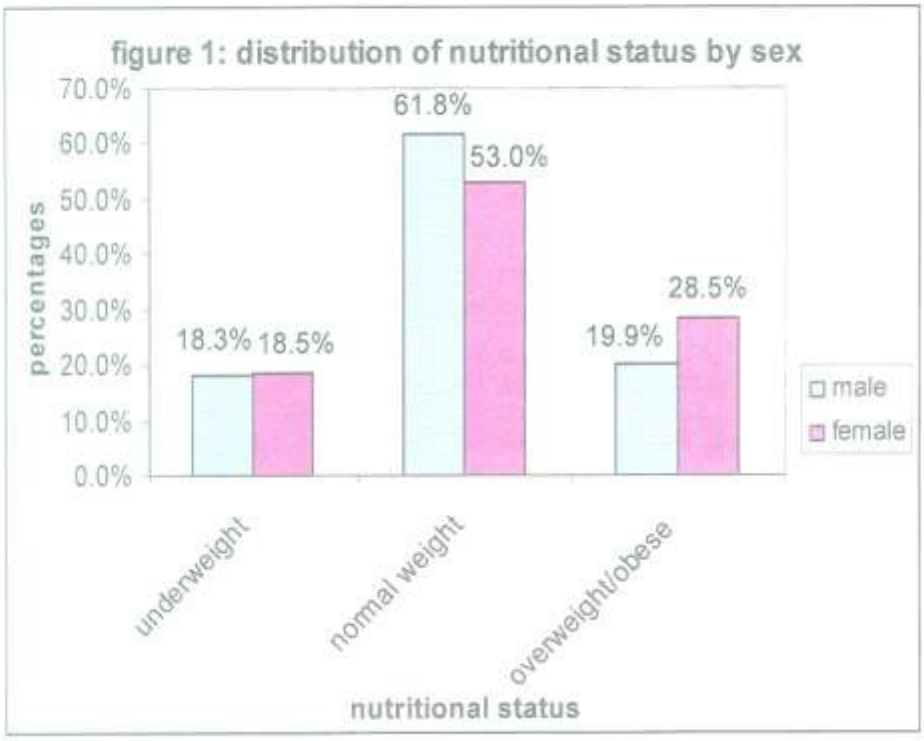
4.2 Nutritional status of the respondents by socio-demographic characteristics

The nutritional status of the study participants according to their body mass index (BMI) is shown on Table 2. Out of 412 respondents 76 (18.4%) were underweight, 230 (55.8%) had normal weight, 106 (25.7%) were either overweight or obese. The highest proportions of respondents who were underweight were among those aged 18-27 years (22.2%); who reported to be single (24.6%); who had no formal education (23.4%); coming from Kinondoni district (20.6%) and those who reported family or friends as their source of income (40.7%). Even though the general findings show that more than half of respondents had normal weight, majority were in the age group of 38-47 years (62.1%); widowed (59.4%); with no formal education (57.4%); Temeke residents (54.7%) and those whose source of income was petty business (58.9%). However, none of these socio-demographic characteristics has a statistical significant association with the nutritional status ($P>0.05$).

Table 2: Nutritional status according to socio-demographic characteristics

Characteristics	Classification of Nutritional Status by BMI				P-value
	Under/wt	Normal/wt	Overwt/Obese	Total	
	N (%)	N (%)	N (%)	N (%)	
Age group					
18-27	8 (22.2)	19 (52.8)	9 (25.0)	36	
28-37	29 (20.7)	69 (49.3)	42(30.0)	140	
38-47	22 (15.2)	90 (62.1)	33 (22.7)	145	0.3
48+	17 (18.7)	52 (57.1)	22 (24. 2)	91	
Marital status					
Single	17 (24.6)	38 (55.1)	14 (20.2)	69	
Married/cohabiting	31 (15.4)	116 (57.7)	54 (26.9)	201	0.6
Divorced/Separated	16 (21.9)	35 (47.9)	22 (30.1)	73	
Widowed	12 (17.4)	41 (59.4)	16 (23.1)	69	
Education level					
No formal education	11 (23.4)	27 (57.4)	9 (19.1)	47	
Primary school	50 (16.7)	169 (56.5)	80 (26.8)	299	0.7
Secondary school and above	15 (22.7)	34 (51.5)	17 (25.8)	66	
Place of residence					
Kinondoni	21 (20.6)	55 (53.9)	26 (25.5)	102	
Ilala	40 (19.1)	117 (56.0)	52 (24.9)	209	0.8
Temeke	15 (14.9)	58 (57.4)	28 (27.7)	101	
Income source					
Salary	38 (16.8)	127 (56.2)	61 (27.0)	226	
Spouse	6 (28.6)	11 (52.4)	4 (19.0)	21	0.2
Family/friends	11 (40.7)	14 (51.9)	2 (7.4)	27	
Petty business	9 (16.1)	33 (58.9)	14 (25.0)	56	
No income	12 (14.6)	45 (54.9)	25 (30.5)	82	
Total	**76 (18.5)**	**230 (55.8)**	**106 (25.7)**	**412 (100.0)**	

The distribution of nutritional status of respondents by sex as indicated in Figure 1 shows that majority of males (61.8%) had normal weight where as females were more likely to be overweight or obese than males. Both males and females had almost equal chance of being underweight (18.3% and 18.5% respectively). However, statistical test show that there is no significant association between sex and nutritional status as P-value= 0.08.



4.3 Association between receiving social support and nutritional status.

More than half of respondents who reported to get support as well as those who reported otherwise had normal weights (54.8% and 56.0% respectively). However, more (31.0%) of those who reported to be getting support were under weight as compared to those who reported no support (17.0%). Despite this observation, whether a person living with HIV/AIDS gets support or not, there is no significant association with nutritional status (P= 0.07) as observed on Table 3.

With regard to the kind of support received, more than half (52.6%) of those who reported to be receiving food support were underweight while among those who reported to be getting financial support, most of them (71.4%) had normal weight. As indicated on Table 3, the observed differences in nutritional status between kind of supports received are statistically significant (P=0.03) and thus, there is association between nutritional status and kind of support received.

Relating the nutritional status with how respondents described persons with whom they live, findings suggest that living with parents was more likely to be associated with underweight (39.5%); whereas participants living with dependants were more likely to be overweight or obese, and that this association was statistically significant (P= 0.01).

Table 3: Association between receiving support and nutritional status

Attribute	Classification of Nutritional Status by BMI				P-value
	Under/wt N (%)	Normal/wt N (%)	Overwt/Obese N (%)	Total N (%)	
Getting support					
Yes	13 (31.0)	23 (54.8)	6 (14. 2)	42	0.07
No	63 (17.0)	207 (56.0)	100 (27.0)	370	
Total	**76**	**230**	**106**	**412**	
Kind of support					
Financial	2 (14.3)	10 (71.4)	2 (14.2)	14	
Food	10 (52.6)	9 (47.4)	-	19	0.03
Psychosocial	-	6 (66.7)	3 (33.3)	9	
Total	**12**	**25**	**5**	**42**	
Living description					
Living alone	10 (15.4)	41 (63.1)	14 (21.5)	65	
Live with parents	15 (39.5)	16 (42.1)	7(18.4)	38	
Live with spouse	21 (12.8)	100 (61.0)	43 (26.2)	164	0.01
Live with relatives/ friends	29 (23.4)	64 (51.6)	31 (25.0)	124	
Live with dependants	1 (4.8)	9 (42.9)	11(52.3)	21	
Total	**76**	**230**	**106**	**412 (100.0)**	

4.4 Association between lifestyle factors and nutritional status

Over half of the PLWHA did not participate in physical exercises while a tenth of them were drinking alcohol. Cigarette smoking was less common among the group as only 7 of them (1.6%) reported to smoke cigarette. Most of the respondents (58.9%) who were not drinking alcohol had normal weight as compared to those who reported to be drinking alcohol (34.6%). On the other hand, more of those who were drinking alcohol were under weight and overweight/obese (19.2% and 46.1% respectively) when compared to those who were not (18.3% and 22.8% respectively). The association between alcohol drinking and nutritional status was statistically significant (P= 0.00) as shown on Table 4. Nevertheless the association between physical exercise and BMI was not statistically significant (P= 0.48).

Table 4: Association between lifestyle factors and nutritional status

Lifestyle factors	Classification of Nutritional Status by BMI				P-value
	under/wt N (%)	Normal/wt N (%)	Overwt/Obese N (%)	Total N (100%)	
Alcohol drinking					
Yes	10 (19.2)	18 (34.6)	24 (46.1)	52	
No	66 (18.3)	212 (58.9)	82 (22.8)	360	0.00
Physical exercise					
Yes	28 (18.4)	86 (56.6)	38 (25.0)	152	
No	48 (18.5)	144 (55.4)	68 (26.1)	260	0.48
Cigarette smoking					
Yes	-	7 (100.0)	-	7	
No	76 (18.8)	223 (55.1)	106(26. 2)	405	
Total (100%)	**76**	**230**	**106**	**412**	

4.5 Association between ART initiation, duration of ART and nutritional status

Of all the interviewed persons, 339 (82.3%) had already initiated use of Antiretroviral Treatment (ART) and 221 (65.2%) of them had been on drugs for more than one year. As shown on Table 5, more than half (56.9%) of those who had started ART were found to have normal weight while a higher proportion (19.5%) of them were underweight as compared to those who had not started ART (13.7%). However, more of those who had not started ART (35.6%) were found to be overweight/obese as compared to those who had started (23.6%). Despite the observed discrepancy in nutritional status, the association was not statistically significant between initiation of ART and nutritional status (P=0.17).

When considering the duration of ART, highest proportion (60.2%) of those who had been in ART less than six months had normal weight followed by those who had been in ART for more than one year (57.5%). However, those who were in ART for more than a year had the lowest proportion of the under weights (14.0%). The chi-square test revealed that there is an association between duration of ART and nutritional status with a P-value of 0.00.

Table 5: Association between ART initiation and nutritional status

	Classification of Nutritional Status by BMI				
	Under/wt	Normal/wt	Overwt/Obesity	Total	P-value
ART Initiation	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Started ART					
Yes	66 (19.5)	193 (56.9)	80 (23.6)	339	
No	10 (13.7)	37 (50.7)	26 (35.6)	73	0.17
Total	**76**	**230**	**106**	**412 (100.0)**	
Duration of ART					
<6 months	24 (27.3)	53 (60.2)	11 (12.5)	88	
One year	11 (36.7)	13 (43.3)	6 (20.0)	30	0.00
More than one year	31 (14.0)	127 (57.5)	63 (28.5)	221	
Total	**66**	**193**	**80**	**339 (100.0)**	

4.6 Association between nutritional status and behavioral factors.

Majority of participants (62.8%) who had not disclosed their HIV status had normal weight. Those who had disclosed had higher proportion of the under weights (19.8%) than those who had not (7.0%). Furthermore overweight and obesity was higher among respondents who had not disclosed their serostatus compared to their colleagues who had disclosed (30.3% and 25.2% respectively) However, there is no association between disclosure status and nutritional status as P= 0.11 (Table 6).

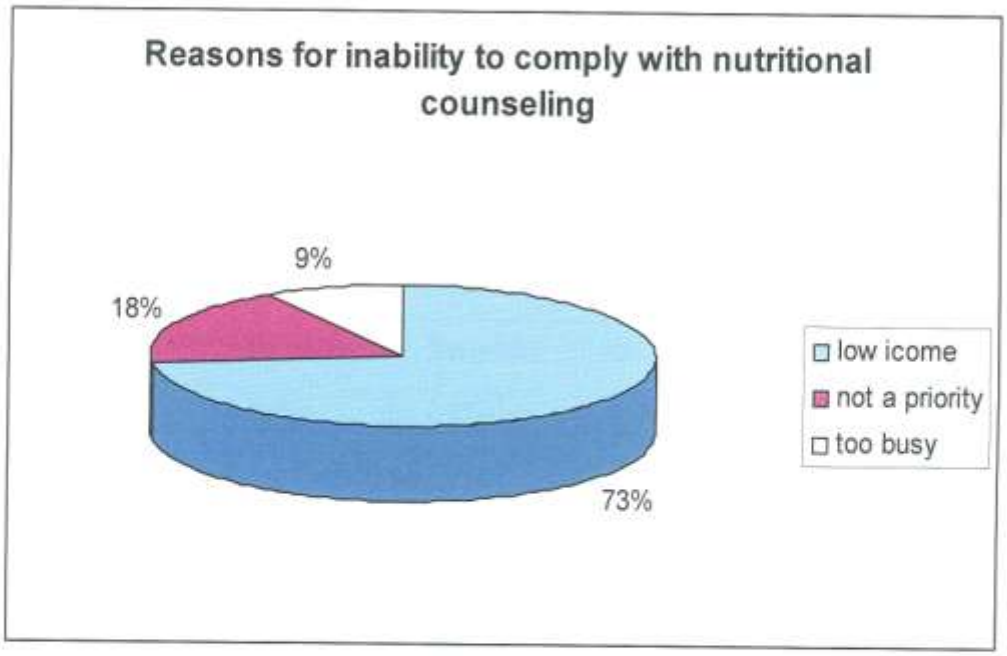
Study findings also reveal that 373 (90.5%) of PLWHA attending CTCs in Ilala seek health care from hospitals once they fall sick. However, whether one attends hospital, wait until he/she is seriously sick or undertakes self treatment was not significantly associated with one's BMI as displayed on Table 6. Similarly compliance with nutritional counseling did not seem to significantly influence nutritional status (P>0.05).

Table 6: Association between nutritional status and behavioral factors

Variable	Classification of Nutritional Status by BMI				P-value
	Under/wt N (%)	Normal/wt N (%)	Overwt/Obese N (%)	Total N (100%)	
Disclosed					
Yes	73 (19.8)	203 (55.0)	93 (25.2)	369	
No	3 (7.0)	27 (62.8)	13 (30.3)	43	0.11
Total	**76**	**230**	**106**	**412**	
Health seeking behavior					
Attend hospital	71 (19.0)	204 (54.7)	98 (26.3)	373	
Wait until serious	1 (5.9)	13 (76.5)	3 (17.6)	17	
Self treatment	4 (18.2)	13 (59.1)	5 (22.7)	22	0.36
Total	**76**	**230**	**106**	**412**	
Able to comply with counseling*					
Yes	37 (15.1)	146 (59.3)	63 (25.6)	246	
No	37 (24.7)	75 (50.0)	38 (25.3)	150	0.08
Total	**74**	**221**	**101**	**396**	
Missing*				16	

*missing=16, respondents who were never counseled on nutrition

Figure 2:



Majority of the respondents (73%) among those who reported to ever been counseled, mentioned low income as the main reason for inability to comply with nutritional counseling as shown in Figure 2.

4.7 Association between perceived household food security and nutritional status

Table 7 displays responses from the participants when enquired as to whether the foods they prefer were available and whether they were able to access them. Most of them felt that foods were available (380/412) and over a quarter (26.6%) of those responding affirmatively were overweight or obese. Surprisingly, respondents who perceived adequate availability of preferred foods were more likely to be underweight (18.7%) compared to those who perceived otherwise (15.6%). However, the observed association is not statistically significant (P= 0.44).

Regarding ability to access food, less than half of the respondents (152/412) were able to access the preferred foods. Subsequently, the highest proportion of underweight (20.7%) and least proportion of respondents who were overweight/obese (22%) were among participants who could not access their preferred foods. However, the ability to access these foods was not significantly associated with the body mass index of the respondents (P=0.11).

Table 7: Association between perceived household food security and nutritional status

	Classification of Nutritional Status by BMI				
Perceived Food security	Under/wt N (%)	Normal/wt N (%)	Overwt/Obese N (%)	Total N (100%)	P-value
Availability of food					
Yes	71 (18.7)	208 (54.7)	101 (26.6)	380	
No	5 (15.6)	22 (68.8)	5 (15.7)	32	0.44
Ability to access food					
Yes	23 (14.6)	84 (53.6)	50 (31.8)	157	
No	53 (20.7)	146 (57.3)	56 (22.0)	255	0.11
Total	**76**	**230**	**106**	**412**	

4.8 Dietary pattern among respondents in relation to nutritional status

With regard to dietary pattern as shown on Table 8, more than half of respondents 273 (66.3%) reported to be taking three meals per day where as majority of them335 (81.3%) mentioned home as their common place of taking meals. Furthermore, eating vegetables with meals was found to be a common practice among study respondents as compared to fruits.

Respondents who reported to be taking one meal per day as well as those who were frequently taking their meals at either hotels or restaurants were more likely to be underweight (20.0%

and 21.4% respectively) than those who reported otherwise. On the other hand, those who reported to rarely include fruits in their meals had higher proportion (22.4%) of underweights than those who never missed fruits in their meals. However the association between number of meals, place where people eat and consuming fruits with meals did not significantly influence nutritional status.

Findings further suggest that respondents who always included vegetables in their meals had a higher chance of being overweight/obese and less chance of being underweight (31% and 13.9% respectively). The association between eating vegetables with meals and body mass index was found to be statistically significant (P= 0.01).

Table 8: Association between dietary pattern and nutritional status

Dietary pattern	Classification of Nutritional Status by BMI				P-value
	Under/wt N (%)	Normal/wt N (%)	Overwt/Obese N (%)	Total N (100%)	
Number of meals/day					
1 meal	4 (20.0)	12(60.0)	4 (20.0)	20	0.98
2 meals	12 (17.4)	38 (55.1)	19 (27.5)	69	
3 meals	51 (18.6)	151 (55.1)	72 (26.3)	274	
>3 meals	9 (18.4)	29 (59.2)	11(22.5)	49	
Place of taking meals					
Home	69 (19.4)	197 (55.5)	89 (25.1)	335	
Street food vendors	4 (9.3)	27 (62.8)	12 (28.0)	43	0.52
Hotel/restaurant	3 (21.4)	6 (42.9)	5 (35.7)	14	
Fruits with meals					
Always	13 (10.2)	72 (56.3)	43 (33.5)	128	
Very often	19 (21.8)	51 (58.6)	17 (19.6)	87	0.2
Rarely	44 (22.3)	107 (54.3)	46 (23.4)	197	
Vegetables with meals					
Always	30 (13.9)	119 (55.1)	67 (31.0)	216	
Very often	30 (25.6)	69 (59.0)	18 (15.4)	117	0.01
Rarely	16 (20.2)	42 (53.2)	21(26.6)	79	
Total	**76**	**230**	**106**	**412**	

CHAPTER FIVE

5.0 DISCUSSION

This study aimed at determining the nutritional status and associated factors among adults living with HIV/AIDS (PLWHA) attending Care and Treatment Clinics (CTCs) in Ilala district.

5.1 Socio-demographic characteristics of study participants

This study has shown that majority (69.2%) of the PLWHA were between the age of 28-47 years among which female participants were dominant. The age profile presented in this study is similar to what Niyongabo *et al* (1997), Tang *et a*l (2002), Opara *et al* (2007), Venter *et al* (2009) and Bukusuba *et al* (2010) found. Further observation made were that about half of the respondents were either married or cohabiting the same as what was found by Opara *et al* (2007) and Bukusuba *et al* (2010). Regarding the level of education and source of income, majority of the PLWHA had primary school education and were wage earners, an observation which is not different from the findings of Bukusuba *et al* (2010), Othieno *et al* (2009) and Burgin *et al* (2008). However, a striking finding was that only half of the study respondents that were attending CTCs in Ilala district resided in Ilala. This implies that mostly PLWHA prefer to seek health care services far from their residential areas perhaps due to fear of stigma.

5.2 Nutritional status by Body Mass Index (BMI)

The findings show that more than half of the PLWHA attending CTCs in Ilala district had normal weight. However, 18.4% of them were found to be underweight which suggests that the problem of underweight is still prevalent among adults living with HIV/AIDS, even those who attend the Care and Treatment Clinics in urban settings where poverty is less than in rural areas. This prevalence of underweight among PLWHA was what was also found in

previous studies by Burgin *et al* (2008), Edwin (2008), Kuria (2008), Nabiryo *et al* (2005), Tang *et al* (2002) and Niyongabo *et al* (1997).

In this study it was found that majority of those who were underweight were among the younger ones (18-27 years); those who had no formal education; and those who depended on family or friends as their source of income. This is similar to what is suggested in other studies that the younger age groups and illiterate persons living with HIV/AIDS might be at risk of underweight due to lack of knowledge and motivation for self care (AETC, 2006).

Distribution of nutritional status by sex showed that females were at higher risk of being overweight or obese compared to males a finding similar to what was observed by Venter *et al* (2009). However, the proportions of underweight were almost similar both to males and females suggesting that people living with HIV/AIDS are at equal risk of being underweight.

5.3 Psychosocial factors associated with nutritional status

Psychosocial factors need to be addressed in conjunction with nutritional care and support given to PLWHA for better outcome of nutritional status. In this study factors like support, persons with whom one's live, lifestyle factors and some behavioral factors and their association with body mass index were determined. However, the factors that were found to be significantly associated with the nutritional status of PLWHA were the kind of support that one was getting, who one was living with and drinking of alcohol. This is similar to what Uwimana and Struthers (2007) who reported that psychosocial needs and the need for financial and food assistance had to be met to enhance the nutritional status of PLWHA. Also Aslanyan (2004) found that factors such as social, financial, physical and daily needs of persons living with HIV should be addressed in HIV care and support programs. Family support had also been recognized as a contributory factor in improving nutritional status of PLWHA (Mohanan and Kamath, 2009). In addition, it has been noted that individuals who are disadvantaged for socioeconomic or cultural reasons may have difficulty maintaining good nutritional status (Xuereb, 2004). Similar findings concerning effect of alcohol use on

health status of PLWHA were documented in a study by Othieno *et al* (2009) who found that alcohol use among PLWHA had a profound effect not only in adherence to treatment regimen but also in the physical well being of individuals and it directly influence nutritional status of PLWHA.

Although factors like disclosure of HIV serostatus were found to have no association with one's body mass index in this study, it is the opposite of what was found by Lugalla *et al* (2008) and Miller and Rubin (2007) who reported that disclosure of test results is critical in acquiring social support and health care thus influencing the nutritional status of an individual. The observed difference might be due to the extent to which participants disclose these results and to whom they disclose. As for the case of this study, majority of respondents had disclosed only to either their spouses or one of the family members with a condition of keeping it as a secret.

Whilst health seeking behavior is documented in other studies as among the factors that might have a direct influence on the nutritional status of PLWHA, it was found to have no association with the body mass of respondents in this study. The discrepancy of these findings might have been caused by the validity of responses from the study participants.

5.4 Anti Retroviral Therapy (ART) and its association with nutritional status

More than three quarters (82.3%) of PLWHA who participated in this study had already started the use of ART and more than half of them (65.2%) had been in the therapy for more than a year. This suggests that majority of the study population were those who had been living with HIV/AIDS for more than a year. Furthermore, it was observed that those who had started ART had a higher risk of becoming underweight as compared to their counterparts although there was no significant association between ART initiation and body mass index. This agrees with the findings of Tang *et al* (2002) that regardless of ART use, weight loss was a predominant feature in PLWHA, even though the duration at which one was in ART on the other hand had shown a significant association with the nutritional status of PLWHA.

5.5 Association between perceived household food security and nutritional status

Availability and accessibility of sufficient and nutritious food in the household might not guarantee nutritional security of household members unless important decisions concerning what food is to be purchased, prepared and consumed (demanded) and how the food is allocated within the household. In households where distribution is unequal, even if the measured aggregate access is sufficient, some individuals may suffer from food deficiency. The same is true if the composition of the consumed food is unbalanced. Inadequate household food security however, is among the major underlying causes of malnutrition as is always displayed in conceptual frameworks of malnutrition (UNICEF, 2000)).

In this study, majority of PLWHA reported that the foods of their preference were available in abundance although more than half were not able to access the food. The major reason that was associated with inability to access food was financial constraint. With regard to the context of food security, these findings mean that more than half of PLWHA were food insecure since they were not able to access the food. This is similar to the findings by Edwin (2008), Spool and Torino (2008), Massel (2006) and Seifu (2007).

There had been no significant association observed between perceived household food security and the nutritional status of PLWHA as far as this study is concerned, although those who were not able to access food were more likely to be underweight than those who could access food. This is different from what was observed by Edwin (2008), Ivers *et al* (2009) and Seifu (2007). The dissimilarity of the study findings might be due to difference in the way PLWHA perceive their household food security since responses in this study were based on one's perception.

5.6 Nutritional status of PLWHA in relation to their dietary pattern

Observations made concerning dietary pattern among PLWHA attending the CTCs in Ilala district revealed that more than half of them (66.5%) were eating three meals per day and about three quarters reported to be taking their meals most frequently at home. However, a

significant number of respondents said that they rarely consume fruits with their meals just like what was observed by Burgin *et al* (2008). On the other hand all these attributes were found to have no influence in the nutritional status of respondents as P>0.05. This is found to be different from what was observed by Annan (2009), Kuria (2008) and Kim *et al* who found that dietary patterns had a significant association with body mass index. The observed difference might be due to the study methodology employed in studying the dietary pattern of respondents within respective studies. On the contrary, consuming vegetables with meals was found to have a significant association with the nutritional status of adults living with HIV/ AIDS at P=0.01. Those who reported to always or very often consume vegetables with their meals were more likely to have normal weights as compared to those who consumed vegetables rarely. These findings agree with those of Annan (2009), Burgin *et al* (2008) and Kim *et al* (2001).

Limitations

1. The interview guide which was used as a tool for data collection could only produce reported information, therefore some of the respondents might not have given honest responses.
2. The study covered respondents from urban areas, furthermore only those attending MDH supported clinics. Therefore the sampled population could not be the best representative for all PLWHA.
3. The design of the study could not establish the causality of underweight; it could not tell which came first between HIV/AIDS and underweight.
4. The use of ART might have been a confounder in nutritional status outcomes.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

People living with HIV/AIDS attending Care and Treatment Clinics in Ilala district, Dar es Salaam have been found to have problems with their nutrition as underweight was observed to be common among them. This scenario has overwhelmed the tremendous efforts done by the government and non-government organizations to provide nutritional care and support to these people. Issues like social support, behavioral factors, lifestyle attributes, dietary pattern of PLWHA and the general social context of people living with HIV/AIDS have a profound effect on the nutritional status of these people. However there is so far no care and treatment centre that provides nutritional support to PLWHA that seem to address these issues in their totality. If nutritional care and support programs could also integrate the issues of social support and counseling, the burden of underweight among PLWHA might be further reduced. This is evident as some respondents who participated in this study were claiming that they had no one to share their emotions even when they come to clinics. What they usually do is come for drug refill and receive a date for the next visit; surprisingly they are not even given nutritional counseling on regular basis but rather only once during the first visit. Efforts should be taken to improve these services especially regarding social aspects surrounding PLWHA in order to improve their nutritional status as well as the quality of their lives.

6.2 Recommendations

1. Since alcohol consumption was significantly associated with poor nutrition status in this study, it is recommended that PLWHA should be regularly counseled on the importance of reducing alcohol intake in order to improve and maintain their nutritional status.
2. Majority of People living with HIV/AIDS who were interviewed in this study reported not to be doing physical exercises, it is better that they are regularly counseled and strongly encouraged to routinely do physical exercises so as to keep them well.
3. It is also important to establish within CTCs a special program to follow them regularly so as to ensure that social factors that were found to be significantly associated with nutritional status in this study like living companions and the kind of social support are taken care of.
4. Despite the length of period that one has been on ART use, important and critical issues regarding nutritional well-being need to be equally and frequently discussed with PLWHA attending care and treatment clinics. This is to make sure that they all adhere to the counseling that they get from the start and live accordingly, this is due to the fact that duration that one had been on ART showed significant association with nutritional status in this study.

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