# FACTORS ASSOCIATED WITH DIETARY INTAKE AMONG HIV POSITIVE ADULTS (18-65 YEARS) AT THE MILDMAY CENTER, KAMPALA, UGANDA

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# DECLARATION

I, **Nanziri Carol**, hereby declare that the work submitted in this dissertation is original and a result of my own study except where otherwise acknowledged. This thesis has not been submitted for another degree award in this or any other University or institute.

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# DEDICATION

I dedicate this piece of work to my dear loving mother, Mrs. Betty Nalubega Mwanjuzi, who taught me the best values in life of honesty and integrity and gave up all the freedom she could have had to support me through thick and thin.

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## May the Almighty God bless you all!

# ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral Drug
BMI	Body Mass Index
CDC	Centres for Disease Control and prevention
CD4+	Cluster of Differentiation 4
IDDS	Individual Dietary Diversity Score
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
HAART	Highly Active Antiretroviral Therapy
HDDS	Household Dietary Diversity Score
HIV	Human Immunodeficiency Virus
HSDS	Health Demographic Survey
HSSP	Health Sector Strategic Plan
MOH	Ministry of Health
MTCT	Mother-to-child Transmission
NGO	Non Governmental Organisation
PEPFAR	Presidential Emergency Plan For AIDS Relief
PHA's	People Living with HIV/AIDS
REE	Resting energy expenditure
ТМС	The Mildmay Centre
UDHS	Uganda Demographic and Health Survey
UNICEF	United Nations International Children's Emergency Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WHO	World Health Organization

## **DEFINITION OF TERMS**

Dietary intake refers to food and drink taken for purposes of nourishment.

**Dietary diversity** refers to the consumption of a variety of food groups considered an indicator for dietary quality and general nutritional adequacy.

Meal refers to food served or eaten at a given time during the day such as breakfast, lunch, supper.

**Nutrition** refers to the process by which food and drink eaten is digested and absorbed by the body to provide nourishment for normal growth, development and health.

**People with HIV/AIDS (PLWHA)** refers to people who have undertaken an HIV test and have been declared positive whether or not they show any symptoms of infection or AIDS disease.

Snack refers to foods usually eaten between meals.

## ABSTRACT

**Introduction:** Despite the internationally accepted recommendation for dietary diversity as a means to provide adequate nutrient intake for a healthy diet and achieving positive health outcomes such as reduced mortality (Michels et al, 2002 and James et al, 2004), little is known about dietary diversity and factors affecting it among People Living with HIV/AIDS (PLWHA) receiving care and support at The Mildmay Centre in Uganda.

**Objective:** To determine dietary diversity and factors associated with it among HIV positive adults (18 to 65 years) receiving care at the Mildmay Center, Uganda.

**Methods:** The study was descriptive and cross sectional in design with a sample size of 169 HIV/AIDS adult patients attending The Mildmay Centre that were selected consecutively on a walk in basis between October and December 2007. The data were collected using an interviewer-administered questionnaire including questions about their socio-demographic, economic, health status, 24 hour dietary recall and an individual dietary diversity score tool (FAO/Nutrition and Consumer Protection Division, version of May 2007) and focus group discussions. Descriptive statistics such as frequencies, proportions, means and standard deviation and cross tabulations followed by multiple logistic regression were employed in data analysis.

**Results:** The mean dietary diversity score of the study respondents was 4.99 (SD 1.37) with 62.7% of the respondents scoring at 5 and more food groups. The foods groups mainly consumed were staple foods and grains (96%); foods prepared with oil and fat (77%); beans, peas and lentils/legumes (73%); meats, poultry and fish (53%) and roots and tubers (51%). There was minimal consumption of vitamin A rich foods (10%) vegetables (15%) and fruits (21%). Further analysis of the study results identified that coming from the western region of Uganda was protective of low dietary diversity as compared to the North-Eastern region (OR 0.15, 95% CI 0.04-0.60) while having no a regular income (salary) and purchase of food as a main source of food posed a four and three -fold risk of having a low dietary diversity respectively (AOR 4.28 95% CI 1.53-11.98 & AOR 3.00 95% CI 1.06-8.51).

**Conclusions and recommendations:** More than half of adult clients (PHA's aged 18-65 years) receiving care at The Mildmay Centre Uganda have a moderately adequate dietary intake but less than 20% consume vitamin A rich foods, vegetables and fruits. A regular source of income (salary) and having main sources of food as own gardens and food support, rather than purchase, allows one to have adequate dietary intake. Other socio-demographic characteristics and individual health related factors in this study were not associated with dietary diversity. The nutritional education provided by health care providers at The Mildmay centre should encourage patients to increase on variety of food groups consumed including vitamin A rich foods, fruits and vegetables. Health care providers should support patients without regular incomes (Salary) and those who purchase food as main source of food to grow own gardens and access food support so as to improve their dietary diversity and therefore intake.

## **CHAPTER ONE**

#### **1.0 INTRODUCTION AND BACKGROUND**

## **1.1 Introduction**

Twenty years after the first clinical evidence of AIDS was reported, HIV/AIDS remains the most devastating disease, accounting for approximately 33.2 million people in the world currently living with HIV/AIDS. Of these, 32.9 million are adults. In 2007, approximately 2.5 million people were newly infected and over 2.1 million people died of HIV/AIDS. The number of new infections continues to increase daily (up to 1500). Africa has the highest HIV prevalence rates in the world ranging from <0.1%-28.0%. Sub-Saharan Africa (SSA) remains the worst hit region with AIDS as the leading cause of death in the region. Up to 90% of all HIV positive adults live in the Sub-Saharan Africa region (UNAIDS, 2008).

HIV/AIDS was discovered in Uganda in 1982 and the epidemic progressed and spread very fast throughout the country reaching a national prevalence of 18.3%, with some areas registering prevalence above 30%, by the end of 1992. By January 2006, over 2 million Ugandans were infected with HIV/AIDS and half of these died of HIV/AIDS related illness including malnutrition (UHDS, 2006). In 2007, the national prevalence stood at 6.4%. Overall, infections are higher in urban areas than in rural areas. Kampala District, the capital city of Uganda has the highest HIV/AIDS prevalence nationally at about 8% (UNAIDS, 2008).

In 1988, the importance of nutritional support was highlighted in preventing severe malnutrition, boosting the immune response and optimizing quality of life especially in improving response to treatment (Resler S, 1998). Nutrition is an important component of comprehensive care for the People living with HIV/AIDS (PHA's) and is particularly so in resource-limited settings where malnutrition and food insecurity are endemic. There is similarity in the cellular effects of malnutrition and HIV on the immune system compromising it by decreasing CD4 T-cells, suppression of delayed hypersensitivity, and abnormal B-cell responses (Scrimshaw et al, 1997). Providing sufficient food and nutrition to meet people's basic needs for health, growth and

development has been a long-standing challenge for African countries. This challenge is farther exacerbated by the emergence of HIV/AIDS. The effect of poor nutrition in the case of PHA's is more horrendous as they have to grapple with opportunistic infections. Dietary management of PHA's is key to sustaining the ability to continue participating in the workforce and contribute to socioeconomic development (Soyiri IN & Laar AK, 2004). Eating a diversity of foods is an internationally accepted recommendation for a healthy diet, and is associated with positive health outcomes such as reduced incidence of mortality (Michels et al, 2002). Dietary diversity is therefore a key concept that should be promoted in managing the nutrition situation of PHA's.

Dietary diversity is a qualitative measure of food consumption that reflects household access to a wide variety of foods, and is also a proxy of the nutrient adequacy of an individual's diet. Individual dietary diversity score (IDDS) aims to capture nutrient adequacy and many studies amongst people of different age groups have shown that its increase is related to increased nutrient adequacy of the diet. Dietary diversity scores have been positively correlated with increased mean micronutrient density adequacy of complementary foods (FANTA, 2006) and micronutrient adequacy of the diet in adults (Ogle et al, 2001; Foote et al, 2004).

Uganda has taken remarkable steps in addressing HIV/AIDS impact on nutrition, by developing the *National Nutrition Guidelines for PHA's*, which highlights the importance of good nutrition in HIV/AIDS (Uganda MOH, 2006). In addition to providing HIV/AIDS treatment, care and support, Uganda has also tried to address food insecurity by providing food aid and support for income-generating activities, a holistic approach to managing HIV/AIDS. Despite this, the gap between nutritional guidelines/packages and actual practice remains wide. The amount of nutrition education and counselling provided is not matched by the desired nutritional behavioural change.

#### 1.2. Background

The Mildmay Centre (TMC) is a non-governmental tertiary medical referral centre for management of HIV/AIDS located 6 kilometres from Kampala City on Entebbe Road. The medical centre was opened in 1989 and works in partnership with the Ministry of Health to offer comprehensive HIV/AIDS medical care to both adults and children but also provides training for both national and international health workers in the management of HIV/AIDS. By the end of 2008, TMC had a total of 9,730 clients registered for services. A total of 9 rural satellite clinics and 6 community outreach centers which serve 12,489 clients to date exist in the districts of Luweero, Mityana, Mukono, Kamwenge, Wakiso and Mpigi with a goal of reaching out to more PLWHA to provide HIV/AIDS care.

The medical care, open to patients four days a week, includes clinical care, nutritional care and support, psychosocial and spiritual counselling, physiotherapy, laboratory services, dental care, occupational therapy and social welfare. Sixty six percent of all patients seen at TMC are adults above the age of 18 years (TMC annual report, 2008). There are eight full time doctors including a physician. The nursing department consists of a team of nine registered nurses who triage participants and care for the very weak and sick patients as they wait to be seen by the doctors.

The nutritional unit under the family welfare department attends to an average of 70 patients per month and provided food aid to an average 30 families by April 2008. Thirty five percent of the patients seen for nutritional care and support are adults. Nutritional care for adults is provided through out patient services which include both the clinical and nutritional advice. This involves prescription of nutrient supplements or medications such as vitamins, minerals and heamatenics and provision of nutritional education for those who complain and present with symptoms and signs of nutritional deficiencies but also might have predisposing factors to inadequate dietary intake. Despite all these efforts, there is limited information about the diversity of foodstuffs consumed by the clients seen at the centre and no information is available on what factors influence it.

## **CHAPTER TWO**

#### 2.0 LITERATURE REVIEW

## **2.1 Introduction**

The impact of nutrition on HIV and disease progression is difficult to study. Biologically, there are multiple relations between HIV/AIDS and nutritional status. There is evidence that the chance of infection with the HIV virus might be reduced in individuals who have good nutritional status, with micronutrients, especially vitamin A, playing significant roles. At the same time, the onset of the disease and even death might be delayed in well-nourished HIV-positive individuals (FAO, 1999). Studies have shown that individuals who are severely malnourished [body mass index (BMI) <  $16.0 \text{ kg/m}^2$ ] have been found to have six times higher risk of dying in the first 3 months than those with a normal nutritional status (Zachariah et al, 2006). Other studies showed that clinical outcomes were comparatively poor and that the risk of death was comparatively high in HIV-infected participants with compromised micronutrient intake or status (Tang AM, 1997). Community-based research studies in the USA revealed that moderate weight loss (< 5%) and severe weight loss (5–10%) over a four-month period were associated with a subsequent increased risk of opportunistic infections and mortality, including Pneumocystis jiroveci (formerly P. carinii) pneumonia, cytomegalovirus and the Mycobacterium avium complex (Wheeler DA et al, 1998).

The causes of this high rate of malnutrition have been attributed to inadequate food intake, comorbidity, ignorance, poverty, taboos and life-styles. Nutrition scientists generally believe that healthy diets are diverse. In 1996, Hsu-Hage et al found that the nutrients essential for meeting nutritional requirements are not all usually found in a single food item but in a diet composed of a number of foods and diverse diets have been shown to protect against chronic diseases (McCullough et al. 2002).

## 2.2 Malnutrition and HIV: A vicious cycle

Nutrition and HIV are strongly related to each other since any immune impairment as a result of HIV/AIDS leads to malnutrition and malnutrition leads to immune impairment, worsens the

effect of HIV and contributes to more rapid progression to AIDS. Most of the host defence mechanisms are altered in protein energy malnutrition [PEM], as well as during deficiencies of trace elements and vitamins (Bendich and Chandra, 1995). Micro nutrient deficiencies associated with HIV vary across populations and according to disease stage; are associated with an accelerated progression of HIV infection to AIDS; and are predictive of AIDS-related mortality (Piwoz and Preble, 2000). Some infected people have increased nutrient mal-absorption even when asymptomatic (Keating et al., 1995). HIV acts by replicating inside the white blood cells from the point of infection, window period, through sero-conversion to asymptomatic and symptomatic phases. To eliminate the infection, the immune system plays an important role in recognizing and destroying this infection. The cells that mediate immunity include lymphocytes. Among these, CD4 cells are critical to the immune system. Both the immune system and the levels of the nutrients are correlated with the progression of the disease. This implies that malnutrition results in increased replication of HIV and the former is a result of HIV itself.

As a result of increased basal metabolic rate, to attack the HIV viral infection in acute cases, the body mobilizes fats and proteins later on resulting in weight loss, muscle wasting, weakness and nutrient deficiencies. In advanced stages, opportunistic infections that interfere with ingestion, digestion and absorption (i.e. mouth sores, lesions) and necrosis of the gastro intestinal tract set in. Poor nutrient absorption prevents the body from using the nutrients provided by foods and contributes to energy and nutrient losses, which will increasingly hamper the capacity of people living with HIV/AIDS to meet their increased nutritional needs. If mal-absorption of nutrients is not properly addressed, the deficit in energy and nutrients will increase and further weaken the person and their immune system and speed up the progression of the disease.

The relationship between HIV/AIDS and malnutrition is a classic example of the vicious cycle of immune dysfunction, infectious diseases, and malnutrition. As illustrated in figure 1, malnutrition can weaken the immune system and increase vulnerability to infections and may speed up the progression of HIV disease.





Nutrition is an important component of comprehensive care for the PLWHA and is particularly so in resource-limited settings where malnutrition and food insecurity are endemic. In SSA the malnutrition-HIV burden is estimated at 10.3% (Olalekan A Uthman, 2008). The World Health Organization and the Food and Agriculture Organization of the United Nations recommend a variety of foods for adequate nutrition (FAO/WHO, 2004). Literature from both industrialized and developing countries shows that diversity indices clearly reflect overall dietary quality (Torheim et al, 2004). Further studies revealed that individuals with a low dietary intake have a higher prevalence of underweight (Savy et al, 2005).

The Uganda situation with regard to nutritional status of adults with HIV is unknown, though data from UNICEF's nutrition interventions for PHA's in Kenya suggest that prevalence of under-nutrition (BMI <18.5) among adults varies between 15 percent and 65 percent (Kenyan Strategy for Nutrition and HIV/AIDS, 2007-2010). In rural Uganda, rates of all-cause mortality in HIV/AIDS subjects are much higher and progression times to death much shorter than in developed countries which is often aggravated by poor nutritional status (Morgan et al, 1997). In January 2003, PEPFAR, the largest public health initiative targeting a single disease in history was initiated to provide funds for HIV/AIDS activities aimed at providing comprehensive and integrated prevention, treatment, care and support services. PEPFAR's priorities include meeting the nutritional needs of PHA's, however most of the work done has been focused on children and pregnant women. Therefore there is need for research as far as nutrition of adult persons living with HIV/AIDS is concerned.

## 2.3 Factors affecting dietary diversity of HIV positive adults

The following factors have been found to be associated with dietary diversity, including: sociodemographic, economic, health-related factors and personal factors like knowledge, beliefs and perceptions associated with dietary intake.

## 2.3.1 Socio-demographic factors

It has been found that older adults in Botswana consume low food variety with inadequate dairy products, fruits, and vegetables, (35.2%, 59.3%, and 22.4%) respectively (Clausen et al, 2004). Another cross sectional study among elderly respondents in Sharpeville, South Africa comparing low mean dietary diversity score of (3.41 +/- 1.34) and food variety score (4.77 +/- 2.2) with poverty parameters confirmed household food insecurity in this community (Oldewage-Theron and Kruger, 2008). However an earlier study found that respondents in the older age group had a higher mean intake for all nutrients compared to their younger counterparts (Holcomb et al, 1995).

A study in Boston and Rhode Island revealed that 25% -35% of the women had dietary intakes of less than 75% of the daily recommended intakes for vitamins A, C, E and B-6, and iron and zinc and male-headed households showed greater food security according to Sebastian et al,

2005. In 1995 a study in Kansas by Holcomb also established that higher education is associated with the regular consumption of a wider variety of foods. In 2005 a study by Sebastian established that higher education is strongly associated with household food security. A cross sectional study in a semi-rural setting in Louisiana found that intake of cereals/breads, dairy products, fruits/100% fruit juices and vegetables was higher in subjects with more than 12 years of education (Deshmukh-Taskar, 2007).

A higher food variety score has been found associated with urban residence (Clausen et al, 2004). Other studies have established that urban residents have higher consumption frequencies for all food categories than rural residents (Holcomb et al, 1995) and that urbanization is accompanied by an improvement in micronutrient intakes (Vorster et al, 2005). Also a cross sectional study in a rural area of North-East Burkina Faso (West Africa) revealed an overall poor dietary quality with a mean DDS = 5.1 (1.7) food groups (Savy M et al, 2005).

There are other social factors associated to dietary intake that have been established. Married individuals have been found to consume more servings of snacks/desserts, but fewer servings of alcoholic beverages than those who were unmarried (Deshmukh-Taskar, 2007). There is also evidence of an obvious difference in the dietary scores between the ethnic groups and religion. Muslim women have been found to have the lowest scores whereas Christian women had the highest (Savy et al, 2005). A large household size has been found to have a positive impact on food security and dietary quality (Toulmin, 1986). While there is indication from past studies that there is positive association between cigarette smoking and alcohol use, these show evidence of little relation between these habits and nutrient intake (Marian Fisher and Tavia Gordon, 1985).

## 2.3.2 Socio-economic factors

A number of cross-sectional studies assessing determinants of dietary diversity in adult populations have found that dietary diversity is associated with socioeconomic status (Torheim et al, 2004; Savy et al, 2005; Hatloy et al, 2000). Household income as a proxy indicator for socioeconomic status has been found to be strongly associated with access to adequate food intake/food security (Sanusi et al, 2006). Food access that household members have is strongly associated with the control they have over household resources or income, particularly for women and their children (Linda Mayoux, 2006). Quantitative results from a US survey to establish the relationship between income and food insecurity indicated that lower income respondents were more likely to experience food insecurity (Nicholas T. Vozoris and Valerie S. Tarasuk, 2003).

A study by Turrell et al in 2002 on socioeconomic patterning of food purchasing showed that persons from disadvantaged socioeconomic backgrounds were less likely to purchase grocery foods that were comparatively high in fibre and low in fat, salt and sugar. Those employed in blue-collar (manual) occupations and residents of low income households purchased fewer types of fruit and vegetables, and less regularly, than their higher status counterparts.

### 2.3.3 Individual health-related factors

#### 2.3.3.1 Ill health

Higher diet quality has been found to be less associated with barriers such as feeling sick and fewer problems related to illness or medications (Scott et al, 1998). In Abidjan, a cross-sectional study with 100 HIV-infected respondents at different stages of the infection showed that dietary intakes of HIV-infected respondents are worsened by clinical events such as anorexia, catabolism, chronic infection, fever, nausea, vomiting, diarrhea, mal-absorption, metabolic disturbances, depression, and side effects of drugs and nutritional intakes are generally lower than recommended (Young, 1997).

Early studies demonstrated that reduced body cell mass and decreased serum albumin levels were associated with shorter survival in AIDS participants which was independent of the CD4 cell count (Kotler et al, 1998). A study with 119 respondents to assess the correlation between micronutrients intakes and immune status in HIV infected respondents established that Vitamin A, and D intakes were correlated with increase in CD4+ count (De Luis et al, 2002). A cross sectional study in Free State Region of South Africa identified a low micronutrient intake by all HIV/AIDS respondents, with a tendency towards a lower intake for those with a CD4+ count < 200cells/mm<sup>3</sup> possibly because of frequent occurrences of opportunistic infections (Casttebon et al,1995). A prospective study carried out in Boston and Rhode Island area among 516

individuals with HIV found that macronutrient but not micronutrient intake was statistically and inversely associated with decreasing CD4+ cell counts (Woods et al, 2002.) However a cross-sectional study in a South African Hospital with eighty-one HIV/AIDS respondents in different stages of disease, found that there was no association between disease stage and nutritional status or more advanced disease and micronutrient deficiencies (Dannhauser et al, 1999) although it confirmed that HIV/AIDS respondents from this population were malnourished.

#### 2.3.3.2 Nutritional counselling and education

Studies on the effectiveness of nutritional counselling as an intervention to improve health outcomes for HIV-positive respondents have shown that nutritional counselling about protein dietary intake improved health and nutritional status of respondents allowing them to lead longer and better quality lives especially in the absence of anti-retroviral therapy (Tabi et al, 2005). Dietary intake plays a critical role in maintaining optimal nutrition status and PLWHA may be unable to choose and eat a varied diet if they do not possess adequate nutrition knowledge (Meyer, 1994).

The potential for malnutrition is exacerbated by a lack of basic nutrition knowledge. Research has shown that a higher level of nutrition knowledge is positively and significantly associated with better dietary quality (Boulanger PM et al, 2000). A comparative study in Sudan illustrated the potential of a nutrition education program to creating more optimal nutrition (El Hiday and Zumrawi, 1992). In a prospective study of 45 HIV infected adults on nutrition attitudes via questionnaires, self report of having a good diet and a belief in the importance of diet to one's health was found to be positively correlated with better dietary quality.

Along with a paucity of appropriate, accurate and useful information related to HIV and nutrition, a lot of myths and misconceptions also circulate in the community; however very little is documented about this.

## 2.5 Measurement of Dietary Diversity

Obtaining detailed data on household food access or individual consumption can be time

consuming, expensive, and requires a high level of technical skill both in data collection and analysis. The dietary diversity questionnaire is a tool that provides a more rapid, user-friendly and cost-effective approach to measure changes in dietary quality at the household and individual level. Administration and scoring/analysis of the tools are straightforward and quick. Dietary diversity is a qualitative measure of food consumption that reflects household access to a wide variety of foods, and is also a proxy of the nutrient adequacy of the diet for individuals.

Dietary diversity score is created by summing either the number of individual foods or food groups consumed over a reference period. This may constitute a simple count of food groups that a household or an individual has consumed over the past 24 hours. Calculation is slightly different if used at household or individual level and carries different meanings. Household dietary diversity score (HDDS) reflects, in a snapshot form, the economic ability of a household to consume a variety of foods and its increase is associated with socio-economic status and household food security (Hoddinot & Yohannes, 2002). Individual dietary diversity score (IDDS) aims to capture nutrient adequacy. Many studies in several different age groups have shown that an increase in individual dietary diversity score is related to increased nutrient adequacy of the diet. Dietary diversity scores have also been positively correlated with increased mean micronutrient density adequacy of complementary foods (FANTA, 2006). The population-level statistics of interest for dietary diversity are the mean dietary diversity score and a measure of distribution of the scores, such as terciles.

## **CHAPTER THREE**

# 3.0 STATEMENT OF THE PROBLEM, JUSTIFICATION, CONCEPTUAL FRAMEWORK AND OBJECTIVES

## **3.1 Problem statement**

Despite the internationally accepted recommendation that eating a diversity of foods leads to a healthy diet, and is associated with positive health outcomes such as reduced mortality (Michels et al, 2002), there is inadequate information on dietary diversity among People Living with HIV/AIDS (PHA's) receiving care and support at The Mildmay Centre. Also little information exists on what factors influence dietary diversity among this group. Inadequate dietary intake to meet the increased metabolic demands associated with HIV infection is likely to affect nutritional status in PHA's (Piwoz and Preble, 2000), further lowering their immunity and hastening disease progression hence increased morbidity and mortality.

While there is limited documentation about adult under nutrition in Uganda, as most nutritional surveys reflecting nutrition are conducted in children; the Ministry of Health has taken remarkable steps in addressing nutrition among PLWHA by developing the national nutrition in HIV/AIDS guidelines (MOH, 2006) which describe how nutrition information and supplementation appropriate for PHA's should be provided.

The Mildmay Centre nutritional unit provides both counselling on nutrition and food supplements for HIV positive clients receiving care at the facility. However, there is no information as to whether the counselling provided has improved the dietary diversity of these clients. This study therefore will determine the dietary diversity among HIV positive clients receiving care at the Mildmay centre and will describe the relationship between factors such as nutrition knowledge, socio-demographic, economic and health related factors and dietary diversity among People Living with HIV receiving care at the Mildmay Centre.

## 3.2 Justification of the study

HIV infection has long been recognized to have a possible negative impact on the nutritional status of people living with HIV/AIDS leading to malnutrition. Inadequate dietary intake weakens the immune system increasing vulnerability to opportunistic infections and speeds up HIV disease progression. This in turn strains the minimal available resources and increases the burden on HIV care, treatment and support provided to Ugandans. Although the national nutritional guidelines for PHA's recommend intake of a variety of foods for adequate nutrient intake, records on dietary intake among PHA's provided with nutritional support does not reflect dietary diversity and is in fact non existent. Dietary diversity is a quick, cheap and cost effective measure of nutrient adequacy and could be a key concept in managing under-nutrition among PHA's to increase their survival and therefore sustain them as a workforce contributing to socioeconomic development particularly in developing countries.

This study will determine the dietary diversity score among PHA's receiving care at the Mildmay Centre and will provide information on the relationship between dietary diversity and socio-demographic, economic and health related factors among PHA's. The information generated will provide HIV/AIDS program managers at TMC and policy makers at national level with a foundation for appropriate nutritional interventions and useful information to improve HIV nutritional care programs particularly among adults.

## 3.3 Conceptual framework

HIV malnutrition, opportunistic infections and disease progression may be influenced by inadequate dietary intake. However, inadequate dietary intake is not just about the individual's social-economic status like income/occupation and source of food. This may also be affected by both individual and social factors such as age, gender and education and social factors such as marital status, nature of residence, ethnicity, and religion, taking of alcohol, smoking and number of people in household. Also individual health related factors like ill health or being unwell, taking of ART and septrin for prophylaxis of opportunistic infections, ones state of immunity reflected by CD4 cell counts and nutritional counselling/education received may directly affect dietary intake.





## **3.4 Research questions**

1. What is the dietary diversity score among HIV positive adults attending The Mildmay Center?

2. What factors are associated with dietary diversity scores among HIV positive adults attending The Mildmay Center?

## **3.5 Study Objectives**

## 3.5.1 General Objective

To determine dietary diversity and factors associated with it among HIV positive adults (18 – 65 years) receiving care at the Mildmay Center.

## 3.5.2 Specific Objectives

- 1. To determine dietary diversity among HIV positive adults attending The Mildmay Centre.
- 2. To determine the socio-economic and socio-demographic factors associated with dietary diversity of HIV positive adults attending The Mildmay Centre.
- 3. To determine the individual health related factors associated with dietary diversity of HIV positive adults attending The Mildmay Centre.

## **CHAPTER FOUR**

## 4.0 METHODOLOGY

## 4.1 Study area

The study was conducted at the Mildmay Centre (TMC). The Mildmay centre is a nongovernmental tertiary referral medical centre located 6 km south of Kampala, the capital city of Uganda, on Entebbe road in a city suburb called Lweza found in Wakiso District.

The Mildmay Centre provides holistic and comprehensive care for women, men and children living with HIV/AIDS related health problems and training for health workers in HIV/AIDS care. Services at the Centre include specialist medical and nursing care, counselling, pastoral care, physiotherapy, occupational therapy, children's day care and training. The Mildmay Centre has a total of 9 satelite clinics running in the districts of Luweero, Mityana, Mukono, Kamwenge, Wakiso and Mpigi. It is estimated that a total of 17,719 patients were registered for services by the end of 2008 (TMC annual report, 2008).

## 4.2 Study population

The study population comprised of HIV positive adults aged 18 to 65 years, registered for medical care at the Mildmay centre during the study period.

## 4.2.1 Eligibility criteria

## 4.2.1.1 Inclusion criteria:

• HIV positive adults aged 18 to 65 years attending The Mildmay centre during the study period that consented to participate in the study.

## 4.21.2 Exclusion criteria:

- Respondents who were too sick and un-able to get through the interview.
- Respondents whose previous 24 hour meals were unusual such as those eaten at feasts or special occasions away from home.
- HIV positive adults aged 18 to 65 years attending The Mildmay centre for the first time.

## 4.3 Study design

This was a cross-sectional study conducted from October to December 2007.

## 4.4 Sample size determination

The Kish-Leslie formula was used to determine the required sample size.

$$n = \underline{Z^2_{\alpha/2}} \underline{PQ}$$
$$\sigma^2$$

Where n = required sample size

 $Z_{\alpha/2}$ = 1.96 (Critical value of the standard normal distribution corresponding to error rate  $\alpha/2$  at the level of significance  $\sigma = 0.05$  (5%).

P = Estimated proportion of the population with inadequate dietary intake. A value of 10.3% representing the prevalence estimates of adult malnutrition, as a proxy for dietary quality in sub-Saharan African countries was used (Olalekan A Uthman, 2008).

Q = (1-P), which represents the estimated proportion of the population with adequate dietary intake.

Using the formula above

$$n = \frac{1.96^2 \times 0.897 \times 0.103}{0.05^2} = \frac{3.8416 \times 0.092}{0.0025} = 0.355$$

```
= 141.9
```

20% of the original sample size was added to cater for non-response making the sample of (141 +28) respondents.

### n = 169

## 4.5 Sampling procedure

All adults attending TMC during the study period who fulfilled the inclusion criteria were enrolled consecutively until the sample size was obtained. The principal investigator and the two trained research assistants were responsible for client recruitment and enrolment. On a daily basis, adults who came to the clinic were identified at the reception and were brought to examination rooms set aside for the purposes of the study. Clients were assessed through triage to ensure that they fulfilled the study criteria. After obtaining informed consent, clients who agreed to participate in the study were then interviewed using a semi structured questionnaire. The research assistants used were two registered nurses who used a pre-tested, pre-coded, standardized questionnaire to capture quantitative data. Due to the busy clinical activities, about 4 respondents were recruited daily.

Participants for focus group discussions (FGD's) were purposively selected from the client database. Once selected, the participants were contacted using their telephone numbers from the database and given an appointment to participate in the FGD's. Four FGDs were held including one for young men, young women (18 - 35 years), older men and older women (36 years and above). Each focus group comprised of six purposively selected clients. These groups were chosen because they were more likely to have similar characteristics in relation to dietary intake and lifestyles and therefore easier for clients to respond to questions while in these respective groups. In addition to the 6 members for each group, there was a time keeper, note taker and interviewer and a tape recorder was used. At the end of the exercise transcription was done by interviewer. This exercise lasted for two days where by each interviewer carried out two FGD per day and each lasting 50 minutes.

## 4.6 Study variables:

#### 4.6.1 Dependent variable

• Individual Dietary diversity score (IDDS).

## 4.6.2 Independent variables

Independent variables included:

- Age, gender and education status.
- Nature of residence, marital status, region of origin, religion and number of people in household.
- State of health and nutritional counselling/education received.

## 4.7 Data collection methods and procedures

#### 4.7.1 Quantitative data

Respondents were interviewed using a semi-structured questionnaire to capture their sociodemographic, socio-economic and individual health characteristics (Appendix 1).

To determine the type of foods eaten in the previous 24 hours, respondents were asked to tell the interviewer what they had eaten or drunk at specific time periods to represent the different meal types such as breakfast, lunch, supper and snacks times. The food and drinks mentioned were then recorded on a 24 hour dietary recall tool in the respective time periods of the day (Appendix 3).

## 4.7.2 Qualitative data

Focus group discussions were used to generate information about knowledge, beliefs and practices on nutrition among the respondents. Four FGDs, each group comprised of 6 purposively selected respondents were carried out. The 4 groups comprised of 2 groups for men and 2 for women of the young adult age group (18-35 years) and older adult age group (36-65 years) respectively. This was because the two age groups were expected to differ in dietary intake and life styles (Appendix 4). Data from focus group discussions was tape recorded in addition to note taking.

## 4.8 Quality control

#### 4.8.2 Training of research assistants

Two research assistants were recruited and trained to assist the principal investigator in the data collection exercise. These were registered nurses. Their role was to seek consent from selected respondents and proceed to carry out individual interviews. Their training included revision of all study tools to ensure common understanding of all questions, questioning and probing techniques to help minimize loss of the intended meaning and how to fill in the questionnaires.

## 4.8.3 Tools

Two data collection tools, namely the semi-structured questionnaire and FGD guide were used. The study tools were both in English and Luganda, the most common local language. Those translated into Luganda were used during interview with respondents who did not speak English.

## 4.8.4 Pre-testing of study tools

The questionnaire was pre tested for relevancy, ease of understanding and appropriateness on 10 HIV/AIDS clients at Entebbe Hospital during the training of research assistants. Thereafter adjustments and corrections were effected to the tools after review following the pretest.

## 4.8.5 Field editing of data

Interviewers were supervised and the interview process monitored by the principal investigator. The principal investigator checked the data for accuracy, consistency and completeness on a daily basis. Anomalies were corrected appropriately or by contacting respondents by telephone or in person on their next appointment date. The questionnaires were properly numbered and coded.

## 4.8.6 Data entry

Two data entry clerks were used to enter the data to ensure accuracy and consistency of data in EpiData software, version 3.1. Validation checks were applied to check if the responses and codes entered were consistent and within permissible range by running frequency tables and where necessary some fields were edited to create the correct files. Data files were then created and further checking done to ensure consistency and completeness. The FGD data was recorded and transcribed from the tapes and compared with the written notes to check for consistency, completeness and anomalies in the notes.

### **4.9 Data management and analysis**

## 4.9.1 Data management

4.9.1.1 Quantitative data

To determine the dietary diversity score of the respondents; the number of food groups eaten by respondents was determined by a count of a set food groups (Cereals, Vitamin A Rich vegetables and Tubers, White tubers and roots, Dark green leafy vegetables, Other vegetables, Vitamin A Rich fruits, Other fruits, Organ meat (iron rich), Flesh meats, Eggs, Fish, Legumes, nuts and seeds, Milk and milk products, Oils and fats). For example breakfast was considered to have been eaten between 6:00 and 10:00 am while snacks were considered to have been eaten before or after the major meal times of breakfast, lunch (12:00-4:00 pm) and supper (8:00pm-12:00 am).(Appendix 3)

Using the FAO/Nutrition and Consumer Protection Division recommended questionnaire for data collection on individual Dietary Diversity Score (IDDS) (FAO, 2007), a record of the 24 hour recall of all foods eaten by the respondents was taken and classified into the 12 food groups, namely; Cereals, Vitamin A Rich vegetables and Tubers, White tubers and roots, Dark green leafy vegetables, Other vegetables, Vitamin A Rich fruits, Other fruits, Organ meat (iron rich), Flesh meats, Eggs, Fish, Legumes, nuts and seeds, Milk and milk products, Oils and fats. Each food group eaten by a respondent was given a score of 1 and the total individual scores were computed. The total individual food scores were first categorized into terciles, namely Low IDDS terciles is equivalent to low dietary diversity (1 to 3 food groups); Medium IDDS terciles equivalent 4 to 5 food groups and High IDDS terciles means 6 or more food groups. For further analysis these groups were then dichotomized into two categories: where 0 to 4 was considered low dietary diversity score and 5 or more food groups was considered high dietary diversity score.

The factors associated with dietary diversity/intake were classified into socio-demographic, socio-economic, individual health and personal characteristics. The data was entered into a developed data entry screen using Epi Data software, version 3.1. It was then exported to STATA version 10 for analysis.

## 4.9.1.2 Qualitative data

The recorded audiotapes from the group discussions were transcribed and from the transcribed

conversations, patterns of experiences were listed by using direct quotes and paraphrasing common ideas. All data that related to the already classified patterns was identified and expounded on. Related patterns were then combined into sub-themes thus creating meaningful categories to which codes were assigned. Themes were identified by bringing together components or fragments/subthemes of ideas or experiences, which seemed meaningless when viewed alone.

## **4.9.2 Data analysis**

## **4.9.2.1** Quantitative analysis

Percentages of respondents with respect to food groups as per appendix 3 and number of meals eaten by each respondent in a 24 hour recall period were computed. Cross tabulations were carried out to test for association between respondent characteristics and dietary diversity score which is represented by the total number of food groups eaten by each respondent in the respective categories of 0-4 and 5+. The strengths of associations between respondent characteristics and individual dietary diversity scores (IDDS) were determined using odds ratios and confidence intervals.

A correlation coefficient test was run for all the independent variables. The variables that showed correlations with P $\leq$ 0.05 were ethnicity, marital status, education status, CD4+ cont and duration on ART. To control for possible confounders and effect modification, variables which were found to be significant in the bi-variate analysis together with those known to be associated with dietary intake from previous studies were run in the logistic regression model excluding those which were strongly correlated. The variables that were put in the model included age (18-29 years, 30-39 years,  $\leq$  39 years), gender (Male, female), education status( primary and less, secondary and more), nutritional counselling (Yes, No), source of income (Salary, others-traders, casual labourers and unemployed), region of origin/ethnicity (North/East, central west and south), CD4+ count(< 50 cells/mm3, 50-200 cells/mm3, > 200 cells/mm3) and source of food (Purchase, others- own garden and food aid).

Most of the variables that were put in the logistic model were coded in a binary format except

age and ethnicity that were coded 1-3. Each variable likely to be associated with dietary diversity would be coded one and the other in comparison zero. Using forward step wise elimination method a final model with predictors of dietary diversity was obtained. If there was a log likelihood ratio of P> 0.05, that variable would be left out of the model.

If the log likelihood ratio had a P< 0.05, that variable was left in the model. The best model with predictors of dietary diversity was then obtained having controlled for the potential confounders and effect modifiers. The best model is given in the equation below; Logit P (outcome) =  $\alpha + \beta 1$  agecat+  $\beta 2 + \beta 3$  genderbin +  $\beta 4$  coslng1+  $\beta 5$  incat +  $\beta 6$  ethno +  $\beta 7$  scrfdpur. These represent age, gender, counselling, income, ethnicity and source of food.

## 4.9.2.2 Qualitative analysis

Data from FGD's was analyzed by generating theme statements which were then formulated to develop story lines.

## 4.10 Ethical considerations

Scientific and ethical approval for the study was sought from Makerere University School of Public Health, Higher Degrees Research and Ethics Committee, and The Mildmay centre research committee. Informed consent was sought from each study participant to participate in the study. The study participant was assured of confidentiality for all information given as such the recorded tapes and questionnaires were kept under lock and key. They were assured that in the event of wanting to refrain from the interview at any one point, they were free to do so and there was no penalty for this action.

## 4.11 Dissemination of the study results

The study findings will be disseminated to Makerere University School of Public Health (MUSPH) and The Mildmay Centre management team. Information generated by this study will be presented at national and international conferences and published in peer-reviewed literature. The information will also be used by the national HIV/AIDS nutritional care programs to plan appropriately for improvement of nutritional care in HIV/AID'S patients.

## **CHAPTER FIVE**

#### **5.0 RESULTS**

A total of 169 respondents were interviewed during the period of data collection and provided data on their 24 hour recall of food groups consumed in the previous 24 hours. These respondents were also asked questions on their socio-demographic, economic and health related factors. In addition four (4) focus group discussions covering the following age groups: younger (18 to 35 years) men and women, and older (older than 35 years) men and women were conducted. Results of the analysis of both quantitative and qualitative data are hereby presented in text format, figures and charts.

## 5.1 Background characteristics of the respondents

The mean age of the respondents was 37.32 years (SD 8.55) with age range of 18 - 65 years. Seventy eight (78.1%) percent were female. More than half of the respondents (59.8%) had a CD4+ count greater than 200 cells/mm<sup>3</sup>.

Sixty two percent (62%) of the respondents were from the central region of Uganda as evidenced from the FGD's. "*Most of the people receiving care from this centre are locals who come from around here or live around Mildmay here. I think that is what explains the fact that most of us speak Luganda*", female FGD participant (36-65 years). Majority of the respondents (69.8%) were single (never married, separated/divorced and widowed). Nearly seventy percent (69.8%) lived in urban areas. More than three quarters (97.6%) of the respondents reported to have had any formal education. Only 21.9% of the respondents were in regular salaried employment. Only one of the respondents had not yet started ART and of those already in ART, 60.7% had started ART more than a year ago.
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Initial states         63.9%           Married (including cohabiting)         61         36.1%           Married (including cohabiting)         61         36.1%           Residence         -         -           Urban         118         69.8%           Rural         118         30.2%           Number of people in household         -         -           <.5	Marital status	27	14.270
Single (arc) function (spin arc) who we all (spin arc) (	Single (never married separated/divorced and widowed)	108	63.0%
Market (including contability)         Of         Softward           Residence         118         69.8%           Winder         51         30.2%           Number of people in household         5         30.2%           <	Married (including cohabiting)	61	36 1%
Number         118         69.8%           Rural         51         30.2%           Number of people in household $            <5$	Residence	01	50.170
Drugin         110         90.5%           Rural         51         30.2%           Number of people in household $2$ $3$ S         80         47.3%           Type of family $3$ $3$ Immediate         65         38.5%           Extended         104         61.5%           Smoking cigarettes $3$ $3$ Yes         5 $3$ $3$ No         164 $97.0\%$ $104$ Yes $38$ $22.5\%$ No         131 $77.5\%$ Education status $131$ $77.5\%$ None $4$ $2.4\%$ Primary $71$ $42.0\%$ Secondary $71$ $42.0\%$ Tertiary $28$ $16.6\%$ University $9$ $5.3\%$ Main source of income $1$ $12.0\%$ Professional (Salary carner) $37$ $21.9\%$ Trader $48$ $28.4\%$ Obmerce of food $1$ <	Linham	110	60.80/
Runa         31         30.2%           Number of people in household         5         50         89         52.7%           >5         80         47.3%         51         60           >5         80         47.3%         51         60           >5         80         47.3%         51         60           Smoking cigarettes         104         61.5%         61           Smoking cigarettes         97.0%         61         61           Yes         5         3.0%         60         61           No         164         97.0%         61         61           Yes         38         22.5%         60         60           No         1811         77.5%         60         60           Primary         71         42.0%         60         60           Secondary         57         33.7%         60         60           University         28         16.6%         90         5.3%           Main source of income         71         21.9%         71         60           Unemployed         48         28.4%         6.6%         91           Others (Own garden, food support) <td>Durol</td> <td>51</td> <td>09.8%</td>	Durol	51	09.8%
Number of people in nousehold         89         52.7%           >5         80         47.3%           Type of family         7.3%           Immediate         65         38.5%           Extended         104         61.5%           Smoking cigarettes         7         7           Yes         5         3.0%           No         164         97.0%           Yes         38         22.5%           No         131         7.5%           Education status         7         75%           Secondary         71         42.0%           Secondary         71         42.0%           Secondary         71         42.0%           Secondary         71         42.0%           Main source of income         7         7           Professional (Salary earner)         37         21.9%           Trader         48         28.4%           Casual labourer         26         21.3%           Umenployed         48         28.4%           Casual labourer         27         16.0%           Urchase         142         8.0%           Others (Own garden, food support)         2	Kurai Neuroben eferenzie in bernebeld	51	30.2%
$< 3^{\circ}$ $2.1\%$ $55$ 80 $47.3\%$ <b>Type of family</b>	Number of people in nousehold	00	50.7%
>>         80         47.3%           Type of family	< 5	89	52.7%
Jype of lamily         Immediate         65         38.5%           Extended         104         61.5%           Smoking cigarettes         Immediate         5         3.0%           Yes         5         3.0%         104         97.0%           Taking alcohol         164         97.0%         131         77.5%           Education status         77.5%         131         77.5%           Education status         71         42.0%           Secondary         57         33.7%           Primary         28         16.6%           Secondary         57         33.7%           Tertiary         28         16.6%           University         9         5.3%           Main source of income         101         2.84%           Professional (Salary earner)         37         21.9%           Trader         48         28.4%           Main source of food         101         50           Purchase         142         84.0%           Others (Own garden, food support)         27         16.0%           CD4 count         101         59.8%           So Colls/mm <sup>3</sup> 53         31.4%	>>	80	47.3%
Immediate         65         38.5%           Extended         104 $61.5\%$ Smoking cigarettes         1 $70\%$ Yes         5 $3.0\%$ No         164 $97.0\%$ Yes         38 $22.5\%$ No         131 $77.5\%$ Education status $131$ $77.5\%$ None         4 $2.4\%$ Primary $71$ $42.0\%$ Secondary $57$ $33.7\%$ Tertiary $28$ $16.6\%$ University $9$ $5.3\%$ Main source of income $ -$ Professional (Salary earner) $37$ $21.9\%$ Trader         48 $28.4\%$ Casual labourer $142$ $84.0\%$ Unemployed $48$ $28.4\%$ Main source of food $ -$ So cells/mm <sup>3</sup> $55$ $8.8\%$ Others (Own garden, food support) $27$ $16.0\%$ CD4 count $-$	Type of family		20.5%
Extended         104         61.5%           Smoking cigarettes	Immediate	65	38.5%
Smoking cigarettes         5         3.0%           Yes         3.0%         97.0%           Taking alcohol         164         97.0%           Taking alcohol         22.5%           No         131         75%           Education status         131         22.5%           None         4         2.4%           Primary         71         42.0%           Secondary         57         33.7%           Tertiary         28         16.6%           University         9         5.3%           Main source of income         1         1           Professional (Salary earner)         37         21.9%           Trader         48         28.4%           Casual labourer         48         28.4%           Main source of food         21.3%         21.3%           Purchase         142         84.0%           Others (Own garden, food support)         27         16.0%           CD4 count         53         31.4%           > 200 cells/mm <sup>3</sup> 53         31.4%           > 200 cells/mm <sup>3</sup> 53         31.4%           > 200 cells/mm <sup>3</sup> 101         59.8%	Extended	104	61.5%
Yes       5 $3.0\%$ No       164 $97.0\%$ Taking alcohol       1 $7.0\%$ Yes       38 $22.5\%$ No       131 $77.5\%$ Education status $131$ $77.5\%$ None       4 $2.4\%$ Primary $71$ $42.0\%$ Secondary $57$ $33.7\%$ Tertiary       28 $16.6\%$ University $9$ $5.3\%$ Main source of income $7$ $7$ Professional (Salary earner) $37$ $21.9\%$ Trader $48$ $28.4\%$ Casual labourer $36$ $21.3\%$ Unemployed $48$ $28.4\%$ Main source of food $7$ $7$ Purchase $142$ $84.0\%$ Others (Own garden, food support) $27$ $16.0\%$ $51-199$ cells/mm <sup>3</sup> $53$ $31.4\%$ > 200 cells/mm <sup>3</sup> $53$ $31.4\%$ > 200 cells/mm <sup>3</sup> $5168$ $99.4\%$ No $10$ $0.60\%$	Smoking cigarettes	_	2.004
No         164         97.0%           Taking alcohol         1         1           Yes         38         22.5%           No         131         77.5%           Education status $$	Yes	5	3.0%
Taking alcohol       38       22.5%         Yes       38       22.5%         No       131       77.5%         Education status       7       7         None       4       2.4%         Primary       71       42.0%         Secondary       57       33.7%         Tertiary       28       16.6%         University       9       5.3%         Main source of income       7       7         Professional (Salary earner)       37       21.9%         Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Main source of food       7       16.0%         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0%         CD4 count       53       31.4% $\leq 50$ cells/mm <sup>3</sup> 53       31.4% $> 200$ cells/mm <sup>3</sup> 53       31.4% $> 200$ cells/mm <sup>3</sup> 101       59.8%         On ART       7       7       100%	No	164	97.0%
Yes       38       22.5%         No       131       77.5%         Education status	Taking alcohol		
No       131       77.5%         Education status       7         None       4       2.4%         Primary       71       42.0%         Secondary       57       33.7%         Tertiary       28       16.6%         University       9       5.3%         Main source of income       7       7         Professional (Salary earner)       37       21.9%         Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Others (Own garden, food support)       27       16.0%         CD4 count       250 cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       59.8%       59.8%         On ART       7       168       99.4%         No       1       0.60%       1	Yes	38	22.5%
Education status         4         2.4%           None         4.0%         2.4%           Primary         71         42.0%           Secondary         57         33.7%           Tertiary         28         16.6%           University         9         5.3%           Main source of income $$	No	131	77.5%
None         4         2.4%           Primary         71         42.0%           Secondary         57         33.7%           Tertiary         28         16.6%           University         9         5.3%           Main source of income	Education status		
Primary       71       42.0%         Secondary       57       33.7%         Tertiary       28       16.6%         University       9       5.3%         Main source of income       9       5.3%         Professional (Salary earner)       37       21.9%         Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Main source of food       21.3%         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0%         CD4 count $=$ $=$ $\leq 50$ cells/mm <sup>3</sup> 15       8.8%         51-199 cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 59.8%       59.8%         On ART       7       101       59.8%         No       1       0.60%	None	4	2.4%
Secondary       57 $33.7\%$ Tertiary       28 $16.6\%$ University       9 $5.3\%$ Main source of income       7 $21.9\%$ Professional (Salary earner)       37 $21.9\%$ Trader       48 $28.4\%$ Casual labourer       36 $21.3\%$ Unemployed       48 $28.4\%$ Main source of food       2 $21.3\%$ Purchase       142 $84.0\%$ Others (Own garden, food support)       27 $16.0\%$ CD4 count $53$ $31.4\%$ $\leq 50$ cells/mm <sup>3</sup> $15$ $8.8\%$ $51-199$ cells/mm <sup>3</sup> $53$ $31.4\%$ > 200 cells/mm <sup>3</sup> $53$ $99.4\%$ No       1 $0.60\%$	Primary	71	42.0%
Tertiary       28       16.6%         University       9       5.3%         Main source of income       7       5.3%         Professional (Salary earner)       37       21.9%         Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Main source of food       7       7         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0%         CD4 count       7       16.0% $\leq 50$ cells/mm <sup>3</sup> 15       8.8%         51-199 cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       9.8%         On ART       7       7         Yes       168       99.4%	Secondary	57	33.7%
University       9 $5.3\%$ Main source of income $-$ Professional (Salary earner) $37$ $21.9\%$ Trader $48$ $28.4\%$ Casual labourer $36$ $21.3\%$ Unemployed $48$ $28.4\%$ Main source of food $21.3\%$ $21.3\%$ Purchase $142$ $28.4\%$ Others (Own garden, food support) $27$ $16.0\%$ CD4 count $=$ $=$ $50$ cells/mm <sup>3</sup> $15$ $8.8\%$ $51-199$ cells/mm <sup>3</sup> $53$ $31.4\%$ > 200 cells/mm <sup>3</sup> $101$ $59.8\%$ On ART $ -$ Yes $168$ $99.4\%$ No $1$ $0.60\%$	Tertiary	28	16.6%
Main source of income         Image: Constraint of the second of the	University	9	5.3%
Professional (Salary earner)       37       21.9%         Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Main source of food       28.4%         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0%         CD4 count       250 cells/mm <sup>3</sup> 15       8.8%         > 200 cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       59.8%         On ART       1       99.4%         No       1       0.60%	Main source of income		
Trader       48       28.4%         Casual labourer       36       21.3%         Unemployed       48       28.4%         Main source of food       28.4%         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0% $CD4$ count       250 cells/mm <sup>3</sup> 15       8.8% $51-199$ cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       59.8%         On ART       7       168       99.4%         No       1       0.60%	Professional (Salary earner)	37	21.9%
Casual labourer $36$ $21.3\%$ Unemployed $48$ $28.4\%$ Main source of food $28.4\%$ Purchase $142$ $84.0\%$ Others (Own garden, food support) $27$ $16.0\%$ <b>CD4 count</b> $50$ cells/mm <sup>3</sup> $15$ $8.8\%$ $51-199$ cells/mm <sup>3</sup> $53$ $31.4\%$ > 200 cells/mm <sup>3</sup> $101$ $59.8\%$ On ART $7$ $168$ $99.4\%$ No $1$ $0.60\%$	Trader	48	28.4%
Unemployed       48       28.4%         Main source of food       142       84.0%         Purchase       142       84.0%         Others (Own garden, food support)       27       16.0%         CD4 count $  \leq 50$ cells/mm <sup>3</sup> 15       8.8% $51-199$ cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       59.8%         On ART $ -$ Yes       168       99.4%         No       1       0.60%	Casual labourer	36	21.3%
Main source of food         Id2         84.0%           Purchase         142         84.0%           Others (Own garden, food support)         27         16.0% <b>CD4 count</b> -         - $\leq 50$ cells/mm <sup>3</sup> 15         8.8% $51-199$ cells/mm <sup>3</sup> 53         31.4%           > 200 cells/mm <sup>3</sup> 101         9.8%           On ART         -         -           Yes         168         99.4%           No         1         0.60%	Unemployed	48	28.4%
Purchase       142       84.0%         Others (Own garden, food support)       27       16.0% $CD4$ count       -       - $\leq 50$ cells/mm <sup>3</sup> 15       8.8%         51-199 cells/mm <sup>3</sup> 53       31.4%         > 200 cells/mm <sup>3</sup> 101       59.8%         On ART       -       -         Yes       168       99.4%         No       1       0.60%	Main source of food		
Others (Own garden, food support)       27       16.0% $CD4 count$ -       - $\leq 50 cells/mm^3$ 15       8.8% $51-199 cells/mm^3$ 53       31.4%         > 200 cells/mm^3       101       59.8%         On ART       -       -         Yes       168       99.4%         No       1       0.60%	Purchase	142	84.0%
CD4 count         Figure 10 mm $\leq 50 \text{ cells/mm}^3$ 15         8.8% $51-199 \text{ cells/mm}^3$ 53         31.4%           > 200 cells/mm^3         101         59.8%           On ART         7         7           Yes         168         99.4%           No         1         0.60%	Others (Own garden, food support)	27	16.0%
$\leq 50 \text{ cells/mm}^3$ 15       8.8% $51-199 \text{ cells/mm}^3$ 53       31.4%         > 200 cells/mm^3       101       59.8%         On ART	CD4 count		
51-199 cells/mm³       53       31.4%         > 200 cells/mm³       101       59.8%         On ART	$\leq$ 50 cells/mm <sup>3</sup>	15	8.8%
> 200 cells/mm <sup>3</sup> On ART Yes 168 99.4% No 10 0.60%	51-199 cells/mm <sup>3</sup>	53	31.4%
On ART         168         99.4%           Yes         1         0.60%	$> 200 \text{ cells/mm}^3$	101	59.8%
Yes         168         99.4%           No         1         0.60%	On ART		
No 1 0.60%	Yes	168	99.4%
	No	1	0.60%
Duration on ART	Duration on ART		
$\leq$ 1 year 66 39.0%	$\leq 1$ year	66	39.0%
1-2 years 24 14.8%	1-2 years	24	14.8%
> 2 years 78 46.2%	> 2 years	78	46.2%
Unwell within 2 weeks	Unwell within 2 weeks		
Yes 17 10.0%	Yes	17	10.0%
No 152 90.0%	No	152	90.0%

#### 5.2 Dietary diversity scores of the respondents

#### 5.2.1 Number of meals eaten by respondents per day

Figure 3 shows that more than half of participants (66%) had 3 to 5 meals per day. The median number of meals was 4 with an inter-quartile range of 3-5 meals per 24 hours.

Respondents in all the FGD's noted that while it would have been desirable for them to have at least 6 meals a day including the three main meals and snacks in between, they were not able to do these due to limited funds.

"Although I would have loved to eat as many snacks between meals as possible, but it is not easy, so I ensure that I eat breakfast, lunch and supper at the minimum to stay healthy", female FGD participant.



#### Figure 3: Frequency of meals per respondent per day.

"I rather miss lunch or any other meal but not supper, otherwise I will fail to sleep at night", male FGD participant (36-65 years).

Only 26% of the respondents reported to take a snack in the night. As seen from the following

statement made by one participant. "After supper, I just go straight to bed. I therefore do not need to have a snack in the night. It would also be difficult for me to keep awake just to be able to eat a snack at night", male FGD participant.



#### Figure 4: Meals eaten with in 24 hours.

#### 5.2.3 Variety of foods eaten by respondents

The most commonly eaten foods were grains/staple foods 163/169 (96%), pulses, legumes and nuts 123/169 (73%) with oils and fats 130/169 (77%) and the least eaten foods were mainly vegetables (less than 20%) as evidenced in the FGD response and Figure 5 below.

"It is easier for us to buy legumes and nuts for most of our meals. After all we eat mainly groundnut sauce for our meals". "Buying things like liver is too expensive for us. It is only rich people who eat such expensive foods", noted by female FGD participants.



Figure 5: Variety of food eaten within 24 hours.

#### 5.2.4 Dietary diversity with in 24 hours

Figure 6 below shows the distribution of the number of food groups that were eaten by respondents over a 24 hour period representing the variety of food groups eaten. Most respondents (46/169) 65% ate at least 6 food types and (63/169) 37% ate less than 5 food types. The mean number of types of food eaten was 4.99 (SD1.37) with a range of 1 - 8 food types. This is evidenced by the response below from the FGD.

"Because some of us live in our own homes, we are able to grow some of our food. So we are able to prepare variety for our meals such as cassava and tea for breakfast, for lunch we often have groundnut sauce and nakati and when we can we buy small fish for supper. In between, we tend to eat mandazi and the like", said a female FGD participant Table 2 below shows individual dietary diversity scores in terciles when the IDDS results were divided into terciles, where the lowest IDDS was represented by 1 - 3 food groups and the highest IDDS by 6 or more food groups. Majority of the respondents were in the high IDDS group.

 Table 2: Individual Dietary diversity scores in terciles

Tercile	Frequency	Percent
Low IDDS (1 – 3 food groups)	21	12.4
Medium IDDS (4 – 5 food groups)	88	52.1
High IDDS (6 or more food groups)	50	35.5

Only 12.4% of the respondents were in the lowest IDDS tercile.

#### Figure 6: Dietary diversity of food eaten within 24 hours.



The minimum dietary diversity score for achieving at least 50 % probability of adequate nutrient intake is 5 (Gina et al, 2007). Therefore data was further summarized to obtain two categories of individual dietary diversity scores (low and high IDDS), where 63 (37.3%) individuals were found with a low IDDS (1 to 4 food groups) category while 106 (62.7%) individuals had a high IDDS (5 and more food groups). Respondents reported that it was customary that different types of food stuffs would be eaten at different meals as stated below. *"What I eat for breakfast or a snack is usually different from what I eat for lunch or supper"*, Male FGD participant.

## 5.3 Factors associated with dietary diversity of respondents

# 5.3.1 Socio-demographic characteristics

Table 3 below shows associations between IDDS (in two categories, low and high IDDS) with the different socio-demographic characteristics.

		Dietary diversity		
Characteristics				
	Total	Low	High	Crude Odds ratio
	N=169 (%)	N = 63	n =106	(95% CI)
Age				
>39	59 (34.9)	21	38	1.00
30-39	85 (50.3)	31	54	1.04 (0.52-2.08)
18-29	25 (14.8)	11	14	1.42 (0.55-3.69)
Gender				
Female	132 (78.1)	43	65	1.00
Male	37 (21.9)	14	23	1.03 (0.48-2.19)
Marital status				
Married	61 (36.1)	20	41	1.00
Single	108 (63.9)	43	65	1.36 (0.70-2.63)
Residence				
Urban	118 (69.8)	44	74	1.00
Rural	51 (30.2)	19	32	0.99 (0.51-1.97)
Education status				
Secondary +	94 (55.6)	29	65	1.00
None & Primary	75 (44.4)	34	41	1.86 (0.98-3.53)
Religion				
Christian	151 (89.3)	58	93	1.00
Others	18 (10.7)	5	13	0.67 (0.22-2.00)
No. of people in household members				
<5	89 (52.7)	33	56	1.00
>=5	80 (47.3)	30	50	1.02 (0.54-1.90)
Type of family				
Immediate	65 (38.5%)	26	39	1.00
Extended	104 (61.5%)	37	67	0.83 (0.44-1.57)
Smoking cigarettes				
Yes	5 (3.0%)	1	4	1.00
No	164(97.0%)	62	102	0.41 (0.04-3.80)
Taking alcohol				
Yes	38 (22.5%)	10	28	1.00
No	131 (77.5%)	53	78	0.53 (0.23-1.18)
Place of origin				
North & East	15 (8.88)	9	6	1.00
Central	105 (62.1)	44	71	0.41 (0.14-1.24)
West	39 (23.0)	10	29	0.23 (0.07-0.81)*

Table 3: Relationship between socio-demographic characteristics and dietary diversity

\* Statistically significant finding at p=0.05

The only association which was observed to be statistically significant was region of origin. Respondents from the western part of Uganda were less likely have or were protected from a low IDDS compared to those from the North-eastern region of Uganda COR 0.23; 95% CI (0.07-

0.81).

#### 5.3.2 Socio-economic characteristics

Only 21.9% of the respondents in this study had full time employment and therefore had a a regular source of income as clearly evidenced by the phrase below.

Some of us who were previously employed either abandoned work or were laid off due to poor health. We therefore have to improvise with causal labour whenever we feel better. But it is not easy". "It is easier to get a job if you are strong physically than if you are sick all the time", Male FGD participant (36-65years).

Table 4 below shows that respondents who had other sources of income such as traders, casual labourers and unemployed, other than a regular income (salary) were three times more likely to have a low dietary diversity score as evidently put by an FGD participant.

. "If you have no regular source of income such as a salary it is not easy for you to keep changing your diet as you wish", Female FGD participant (18-35 years). "It is only the rich who can afford eating different foods all the time. Most likely for them what is eaten for lunch is not the same thing eaten for supper", Male FGD participant (36-65 years).

Persons who purchased food as their main source were twice more likely to have a low IDDS than those who had own gardens or food support as their main source of food.

Characteristics	Total	Dietary diversity		<b>Crude Odds ratio</b>
	N=169 (%)	Low	High	(95% CI)
		n = 63	n =106	
Main source of Income				
Salary				
Others (Traders, Casual	37 (21.9)	7	30	1.00
	·			31

Table 4	I: Relationship	) between	socio-eco	nomic cl	haracteristics	and o	lietary	diversi	ty
									- •/

labourers and unemployed)	132 (78.1)	56	76	3.15 (1.27-7.87)*
Main source of food Others (Own garden, food support) Purchased	27 (16.0) 142 (84.0)	6 57	21 85	1.00 2.35 (0.88-6.25)

\* Statistically significant finding at p=0.05

#### **5.3.3 Individual health-related factors**

There were various statements made by participants in the different FGDs which associated good and varied diets to good health.

"Feeding well is important to help gain body strength for more energy purposes and to improve on immunity", 45 year old male.

"Feeding well helps fight against diseases that come along with HIV and also help live a healthier life", 27 year old female.

"Without healthy feeding, some drugs may not react in the body since there are different drugs introduced daily for us who are taking ARVs", 36 year old Male

Respondents said that PLWHA should have a special diet especially when they are sick.

"When one is very sick he may need special meals for quick recovery", 46 year old female.

However participants observed that because of their limited income some times it is difficult to provide for themselves the patients special diets since it may lead to misunderstandings in the household.

"It is inconveniencing for the care takers to prepare a special meal especially if there's one PLWHA in the household, it may lead to discrimination in the home when the other people in the home get to know", observed female respondents in the two groups.

"Sometimes financial capability dictates what one eats and also when we are busy it is usually difficult to find time to eat as one may need to", 34 year old male. Table 5 below shows that none of the health-related characteristics studied were found to be significantly associated with dietary diversity.

Characteristics	Total	Dietary diversity		Crude Odds ratio
	N=169(%)	Low	High	(95% CI)
		n = 63	n =106	
Counselling				
Yes	12 (7.1)	1	11	1.00
No	157 (92.9)	62	95	7.19 (0.87-59.05)
CD4+ cell count				
<50	15 (8.8)	8	7	1.00
51-199	53 (31.4)	23	30	0.67 (0.21-2.12)
>200	101 (59.8)	32	69	0.41 (0.14-1.22)
<b>Duration on ART</b>				
Up to 1 year	66 (39.0)	28	38	1.00
1-2 years	24 (14.8)	7	17	0.56 (0.20-1.53)
>2years	78 (46.2)	27	51	0.72 (0.37-1.41)
Septrin prophylaxis				
Yes	164 (97.0)	57	104	1.00
No	5 (3.0)	3	2	2.6 (0.41-16.19)
Unwell within 2				
weeks				
Yes	17(10.0)	6	11	1.00
No	152 (90.0)	57	95	0.91 (0.32-2.60)

 Table 5: Relationship between individual health-related factors and dietary diversity

# n=168- One missing value

No statistically significant associations were observed between either counselling provided to clients by health providers, the level of CD4 count, being on septrin prophylaxis or duration on ART and having been un well within 2 weeks and food diversity scores of the respondents.

## 5.4 Multivariate analysis

Table 6 shows that region of origin; source of income and source of food were significantly associated with dietary intake. The other characteristics that have been found in previous studies to be associated with dietary intake like age, gender and counselling were not found significant.

Variables	Coefficient	AOR	95% CI
	estimate	( EXP β)	
	(β)		
Constant	-2.83		
Age (1=> 39 years)	0.20	1.23	0.74-2.02
Gender (1=Female)	0.03	1.03	0.46-2.30
Counselling (1=Yes)	1.81	6.09	0.73-50.60
Ethnicity (1= North/East)	-0.82	0.44	0.23-0.85*
Main source of income(1= Salary)	1.24	3.46	1.35-8.88*
Main source of food (1= Others)	1.09	2.97	1.08-8.21*

Table 6: The strength of association of socio-demographic/economic/health characteristics in logistic regression

\*Statistically significant finding at p=0.05

From the logistic regression model, it was noted that originating from the western or central part of Uganda was protective of a low dietary diversity score AOR 0.44; 95% CI (0.23-0.85). Having main source of food as purchase and having no regular source of income (casual labourers, traders, unemployed) were more likely to have a low individual dietary diversity score AOR 3.46; 95% CI (1.35-8.88) and AOR 2.97; 95% CI (1.08-8.21) respectively.

Table 7 below shows comparison between crude and adjusted odds ratios for variables included in the final logistic regression model.

Variable	COR	95% CI	AOR	95% CI
Age				
>39	1.00		1.00	
30-39	1.04	0.52-2.08	1.17	0.54-2.53
18-29	1.42	0.55-3.69	1.67	0.59-4.71
Gender				
Female	1.00		1.00	
Male	1.03	0.48-2.19	1.13	0.50-2.58
Counselling				
Yes	1.00		1.00	
No	7.19	0.87-59.05	5.97	0.72-49.62
Region of Origin				
North/East	1.00		1.00	
Central	0.41	0.14-1.24	0.22	$0.06  ext{-}0.81^{\#}$
West	0.23	0.07-0.81*	0.15	$0.04 - 0.60^{\#}$
Main source of income				
Salary	1.00		1.00	
Others	3.15	1.27-7.87*	4.28	1.53-11.98 <sup>#</sup>
Main source of food				
Others	1.00		1.00	
Purchased	2.35	0.88-6.25	3.00	$1.06-8.51^{\#}$

# Table 7: Comparison between crude and adjusted odds ratios for variables included in the final logistic regression model

COR indicates Crude Odds ratio, AOR Adjusted Odds Ratio.

\* Significant findings before adjustment at p=0.05

*# Significant findings after adjustment at p=0.05* 

#### **CHAPTER SIX**

#### 6.0 DISCUSSION

In this study, the majority of the respondents were found to consume a diversity of foodstuffs (raging from 5 to 8 food groups). Factors that were found to have a statistically significant association with a high dietary diversity score were a regular source of income (salary), having own garden and food support as main sources of food while coming from the North -Eastern part of Uganda was associated with a low dietary diversity score.

#### **6.1 Baseline characteristics**

This study shows that most of the respondents were female. This finding is similar to observations from other studies where women were observed to have better health seeking behaviours (David Lawson, 2004) and better at utilizing available health services than men (Damulira, 2006). However also more women (56%) in Uganda are infected with HIV than men and more women (23%) have been found to get tested for HIV than men (16%) (UDHS, 2006). No statistically significant association was observed between gender and dietary diversity (OR: 1.03 95%CI 0.48-2.19) contrary to findings from other studies which found that women were always more food insecure than men (Woods et al, 2002; Lena et al, 2005 & Sebastian et al, 2005). This variance maybe explained by the fact that other studies focused on household food security and micronutrient intake rather than individual dietary diversity.

#### 6.2 Dietary diversity in adults with HIV/AIDS

In this study population it was established that the majority of the respondents had a high dietary diversity score (5 or more food groups) and majority of the respondents had more than 3 meals per day. This study was conducted in the months of October to December, which is a season of harvest and so the increased number of meals was not surprising. The most commonly consumed foods were staple foods/grains (like matooke, posho and millet), fats and oils, peas, beans or lentils/legumes. This is supported by the fact that matooke, maize and other grains are Uganda's staple foods and are consumed at many of the meals but also lentils/legumes are cheaper to have. This is slightly contrasting to findings from a survey carried out in Tanzania

(Kinabo et al in 2006), which found that the frequency of consumption of meals was two to three meals per day during the wet and dry seasons respectively and the most commonly consumed foods were legumes and vegetables. The findings at The Mildmay centre are similar to findings from a Kenyan study which found that the most commonly eaten foods were grains at 95.5% and Oils and fats at 96.8% (Karanja et al, 2008). This similarity could be explained by the possibility that study respondents mostly grow the same foods that are influenced by the same East-African geographical location. This is also further supported by the fact that in the central region, most of the households usually use oils/fats during food preparation to fry their food.

This study found that consumption of legumes which are generally cheaper was higher than animal products such as meat and fish. Dietary intake of vegetables was poor with only a small proportion of respondents (13.3%) eating vegetables in the 24 hours prior to the study. Within the nutrition department of Mildmay, PLWHA are often counselled on increased intake of vegetables although based on these findings; the dietary information is not translated into action. The other reason for this could be that most clients do not have regular sources of income (salary) and will normally eat a staple and legume at main meals other than vegetables and animal products. This was stated by one of the FGD participants as *"It is easier for us to buy legumes and nuts for most of our meals. After all we eat mainly groundnut sauce for our meals"*. *"Buying things like liver is too expensive for us. It is only rich people who can afford such expensive meals"*, noted by female FGD participants.

In this study a large proportion of the respondents (63%) had a fairly adequate dietary diversity score of 5 or more food groups consumed in the previous 24 hours. "Because some of us leave in our own homes, we are able to grow some of our food. So we are able to prepare diverse meals including cassava and tea for breakfast, for lunch we often have groundnut sauce and nakati and when we can we buy small fish for supper. In between, we tend to eat mandazi and the like", said a female FGD participant. This contrasts with finding from other studies which observed that more than a half of adults with HIV have an inadequate dietary intake (Jean et al, 2001 and Woods et al, 2002). This contrast maybe explained by the fact that nearly all of the respondents in the study were already on ART therapy and therefore probably had better health than patients

studied in the other studies. The other studies could also have comprehensively looked at the dietary intake of the PLWHA for longer periods of time compared to the 24 hour period that was used in this study. The other difference could also have been created because of geographical variations as well as timing of the studies e.g. a study conducted in a season of harvest compared to one conducted in a planting season. Lastly, while in this study dietary diversity scores were used, the study cited used standard recommended dietary allowances (RDA) for micronutrients (Jean et al, 2001).

#### 6.3 Socio demographic factors

In this study clients of older age group (> 30 years) had a higher diversity score especially those above the age of 39 years (OR: 1.23 95%CI 0.74-2.02). This finding, though not statistically significant, was similar to studies done in the United States of America where it was found that study respondents in the older age groups had a higher mean intake for all nutrients compared to their younger counterparts (Holcomb et al, 1995). However studies done in Southern Africa found that older adults consumed low food variety (Clausen et al, 2004 & Oldewage-Theron, 2008). This finding could be explained by the difference in study populations in these studies. Majority of respondents in this study were in the middle age, mean age of 36 years yet the other studies had geriatric respondents who were above 60 years of age with unknown HIV status.

In this study, no statistically significant association was observed between educational status with dietary diversity although the UDHS 2006 showed a difference in dietary diversity between people of limited or little education in comparison to the people who were more educated. This finding contrasts to findings from other studies which established that higher education is associated with the regular consumption of a wider variety of foods (Clausen et al, 2004 & Holcomb et al, 2005). This difference can be explained by the fact that the study populations of the latter studies were of unknown HIV status unlike this study whose respondents were all HIV positive. This could also be further explained by the fact that the PLWHA at the Mildmay Centre are often provided with nutrition education and counselling as they seek services at the centre regardless of their educational background and this has improved the basic nutrition knowledge.

Some studies report that urban residents have higher consumption frequencies for all food categories than rural residents (Holcomb et al, 1995) and urbanization is accompanied by an improvement in micronutrient intakes (Vorster et al, 2005). In this study majority of the respondents were living in an urban setting (69.8%). However this study found no statistically significant association between dietary diversity and area of residence (Urban/Rural) (OR: 0.99 95%CI 0.51-1.97). Lack of statistical significance could be explained by the limited sample size used in this study. The other explanation for this difference could be because the area of residence in this study was self reported by respondents and therefore very subjective.

Region of origin was associated with high dietary diversity. Respondents originating from western Uganda carried a lower risk of having low dietary diversity score compared to those originating from the North and East of Uganda. This finding is similar to one from a study done in rural Burkina Faso (West Africa) which showed evidence of an obvious difference in the dietary scores between the ethnic groups (Savy et al, 2005). This could be influenced by the fact that the North-Eastern region of Uganda has often been affected by unfavourable weather conditions such as droughts and floods but also political insurgencies which all affect food security. For this reason, people from the western region then exhibited the healthy worker effect of appearing to have a lower risk of low dietary diversity.

In this study no statistically significant association was observed between one's religion and dietary diversity (OR: 0.67; 95% CI: 0.22-2.00). This finding is contrary to Savy and others (2005) who found influence of religion on diversity scores with Christian women having the highest scores while Muslim women had the lowest scores. These findings are different probably because this study had fewer Muslims and other non-Christians unlike the other study which had a slightly larger proportion of non-Christians. Uganda's communities are largely Christian with more than 60% of the population being Christian (UDHS, 2006). Marital status in this study was also not independently associated with dietary diversity. However other studies have shown that married individuals consume more servings than unmarried individuals (Deshmukh-Taskar et al, 2007). The difference in these findings could possibly be explained by the fact that the study

populations in these two studies are different and have different social and culture norms that govern marriage. Other social behaviours such as taking alcohol and smoking cigarettes in this study showed no association with dietary diversity (OR: 0.41, 95%; CI: 0.04-3.80) and (OR: 0.53; 95% CI: 0.23-1.18) respectively. This is supported by findings from Marian Fisher and Tavia Gordon in 1985 which reflected no relation between smoking and alcohol baits and diet among men. However, this could perhaps be due to the fact that majority of respondents in this study were females and also very few respondents in this study reported taking alcohol, 38 (23%), and smoking cigarettes, 5 (3%).

#### 6.4 Socio economic factors

Only 21.9% of the respondents had regular incomes (Salary). The reason could be job losses due to frequent ill health as evidenced by a participant from this FGD statement. "Some of us who were previously employed either abandoned work or were laid off due to poor health. We therefore have to improvise with causal labour whenever we feel better. But it is not easy". "It is easier to get a job if you are strong physically than if you are sick all the time", Male FGD participant (36-65years).

This study revealed a statistically significant association between a regular income (salary) and dietary diversity (AOR: 4.28 95%CI 1.53-11.98). Respondents who had irregular income were four times more likely to have a low dietary diversity as noted from the FGD's. "If you have no regular source of income such as a salary it is not easy for you to keep changing your diet as you wish", Female FGD participant (18-35 years). This finding is similar to several studies done in West Africa and other parts of the developing world which found that dietary diversity was higher among those living in better socioeconomic contexts (Torheim et al, 2004; Savy et al, 2005 & Deshmukh et al, 2007). Lower income respondents have been found to experience food insecurity (De Marco et al, 2007) and have the inconsistent dietary patterns (Davis et al, 1998). Turell et al, in 2002 found that persons from disadvantaged socioeconomic backgrounds were less likely to purchase grocery foods that were comparatively high in fiber and low in fat, salt and sugar and those employed in blue-collar (manual) occupations and residents of low income households purchased fewer types of fruit and vegetables, and less regularly, than their higher status counterparts. The most probable reason for these findings could be that respondents with a regular income are more likely to have access to food and have adequate food security resulting

in a more diverse diet. This study also found that there was a statistically significant association with source of food (purchased or not) and dietary diversity. Respondents who had other sources of food as their main source of food security were more likely to have a more diverse diet (AOR: 3.00 95%CI 1.06-8.51). This finding is similar to findings from a study by Kwon and others (2001) which found that households with farms and gardens have greater food security than those without. This could be explained by the fact that people with other sources of food have easy food source alternatives to supplement their food purchasing power and are more likely to have a diversified diet.

#### 6.5 Health-related factors associated with dietary intake

In this study, no statistically significant association was observed between nutrition counselling with dietary diversity (AOR: 5.97 95%CI 0.72-49.62). This finding contrasts to findings from a study done in West Africa which established that HIV positive respondents responded favourably to nutrition counselling about dietary intake as evidenced by an improvement in weight (Tabi et al, 2006). This could be explained by the fact that in the setting where the study was done, nearly all the respondents were regularly provided counselling on nutrition (93%) in the nutrition unit of Mildmay Centre.

Higher diet quality has been found to be less associated with barriers such as feeling sick and fewer problems related to illness or medications (Scott et al, 1998). An earlier study showed that dietary intake of HIV-infected patients is worsened by clinical events such as anorexia, catabolism, chronic infection, fever, poor nutrient intake, nausea, vomiting, diarrhea, malabsorption, metabolic disturbances, lack of access to food, depression, and side effects of drugs and nutritional intakes are generally lower than recommended (Young, 1997). Also a study by De Luis DA in 2002 found that low CD4+ counts were associated with inadequate nutrient intake. These findings are contrary to findings from this study which found no statistically significant association between dietary diversity with, immune status/CD4 cell count, taking medication such as ART and septrin for prophylaxis and ill health (OR 0.41: 95% CI 0.14-1.22), (OR 0.72: 95% CI 0.37-1.41), (OR: 2.6 ; 95% CI: 0.41-16.19), (OR: 0.91 ; 95% CI: 0.32-2.60) respectively. This difference in findings might be explained by the fact that most study respondents,102 (60%) had been on these medications for more than a year, a period in which

most drug related clinical events are less likely to happen. Only 17 (10%) of the respondents reported having been unwell during the time of the study. In addition, most respondents may also have had several opportunities for nutritional education from health workers and learnt how to individually cope, have better health and manage the complications using basic dietary interventions. These findings could be explained by the fact that this study was looking at general dietary intake in relation to food groups unlike the latter studies which focused on nutrient intake as the study outcome.

#### **6.6 Study limitations**

- This study excluded respondents from the TMC satellite clinics and community outreach sites and therefore reduces inference power on all PLWHA served by the Mildmay Centre Uganda. However majority of patients are seen at the mother center in Lweza where the study was done.
- One of the assumptions in this study was that the 24 hour recall period provided an indication of an individual's habitual diet. However this effect was minimised by excluding respondents that had had un-usual dietary intake in previous 24 hours such as feasts at functions and celebrations.
- Due to the purposive sampling of study respondents, the very weak or very sick were inadvertently excluded. This makes the study results less generalizable to all PHA's at different stages of ill-health.
- The study used dietary diversity as a proxy measure for dietary quality which does not specifically measure the recommended nutrient intake. However this has been proven by previously done dietary studies to adequately reflect nutrient adequacy.
- The study data collection tools were translated in to only one local language-Luganda, which could have created interviewer and respondent bias however Luganda is the commonly used and therefore understood local language by majority of the Ugandan population and data collection was made easier by use of interviews by trained research assistants using pretested and edited tools.

# **CHAPTER SEVEN**

## 7.0 CONCLUSION AND RECOMMENDATIONS

#### 7.1 CONCLUSIONS

The following can be concluded from this study;

- More than half of clients (PHA's, 18 to 65 years) receiving care at The Mildmay Centre on Entebbe Road consume a moderately adequate diversity of foods and number of meals per day. It was however noted that less than 20% there was inadequate intake of vitamin A rich foods, vegetables and fruits.
- Of all the socio-demographic characteristics in this study, only region of origin was associated with dietary diversity. Coming from the western region was protective of a low dietary diversity as compared to the North-eastern region.
- Regular source of income (salary) and other sources of food such as own garden and food support other than purchase allow one to have increased dietary diversity.
- Nutritional counselling, taking of ART or septrin, level of CD4 cell count and having been un well within 2 weeks of the study were not associated with of dietary diversity in this study.

#### 7.2 RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are hereby made:

- The nutritional education provided by health care providers should encourage patients to increase diversity of dietary intake focusing on a variety of recommended food groups including vitamin A rich foods, fruits and vegetables. This can be guided by development and use of job aids during nutritional counselling.
- Health care providers should support patients, without regular incomes (Salary) and those whose main source of food is purchase, to grow own food gardens and access available food support so as to supplement their source of food to improve their dietary intake.

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## APPENDICES

## Appendix 1: Questionnaire for respondents (English)

Please circle the chosen option(s) or write the appropriate answer in the space provided.

1. Socio-demographic information
1.1Individual factors
<b>1.1.1</b> Gender/ Sex:
[1] Male [2] Female
<b>1.1.2</b> How old are you? (Years)
<b>1.1.3</b> Please state your tribe?
I am a

**1.1.4** Please state your religion?

- [1] Protestant [4] Seventh day Adventist
- [2] Catholic [5] Other (Specify) -----

[3] Muslim

1.1.5 What is your current marital status?

[1] Single (Never married, separated/divorced)

[3] Married (Including cohabiting)

**1.1.6** What is the highest level of education you have attained?

- [1]None [4] University education
- [2] Primary education [5] Tertiary education

[3] Secondary education

## 1.2 Social factors

**1.2.1** Please describe your current residence.

[1] Urban [2] Rural

**1.2.2** How many people are living in your household?

Total number of ----- people.

**1.2.3** If there are more than 2 people in your household, please specify which one of these categories they belong to.

[1] Immediate

[2] Extended

**1.2.4** Do you smoke cigarettes?

[1] No [2] Yes

**1.2.5** Do you drink alcohol?

[1] No [2] Yes

## 2. Socio-economic information

**2.1** What is your main occupation?

[1] Student [4] Casual worker/part-time

[2] Employed [5] Farmer

[3] Business (Self employed) [6] Unemployed

[7] Other (Specify) -----

**2.2** Are you the head of your household?

[1] No [2] Yes

**2.3** If no, what is the occupation of the head of the household?

[1] Employed [4] Farmer

[2] Business (Self employed)	[5] Unemployed
[3] Casual worker/part-time	[6] Other (Specify)

2.4	What	is	the	main	source	of food	for	vour	household?
	, , mai	10	une	mann	504100	01 1000	101	Jour	nousenoia.

[1] Purchase (Market/grocery store)	[4] Welfare/NGO support
-------------------------------------	-------------------------

[2] Household farm/garden [5] Other (Specify) ------

[3] Relatives and friends

## 3. Health factors

**3.1** What have you been treated for today?

-----

**3.2** What was your last CD4 cell count?

# 3.3 Are you taking ARV's?

[1] Yes [2] No

3.4 If yes, what combination of ARV's are you taking?

**3.5** How long have you been taking ARV's?

- [1] At least 6 months [4] 2- 5 years
- [2] 6 months -1 year [5] > 5 years
- [3] 1-2 years

**3.6** Have you had any side effects from taking the ARV's in the last 1 month?

[1] Yes [2] No

**3.7** If yes, please specify what side effect(s).

\_\_\_\_\_

# 8 Are you taking septrin?

[1] Yes [2] No

3.9 If yes, have you had any side effects from taking the septrin in the last 1 month? [2] No [1] Yes **3.11** If yes, please specify what side effect(s). \_\_\_\_\_ 3.12 Have you been unwell in the last 2 weeks? [2] No [1] Yes 3.13 If yes, have you been taking any drugs? [1] Yes [2] No 3.14 If yes, have you had any side effects? [1] Yes [2] No **3.15** If yes, please specify what side effect(s). \_\_\_\_\_ **3.16** If yes, please specify what side effect(s). \_\_\_\_\_ 3.17 Have your ever had nutritional counselling at The Mildmay Centre? [1] Yes [2] No 3.18 If yes, what was the nutritional counseling about? [1] Drugs [2] Infection/illness [3] General feeding [4] Others (Specify) -----

3.19 If no, give the reason why you did not?

## Appendix 2: Questionnaire for respondents (Luganda)

Tikinga ko ansa emu oba wandiika mu ka bangirize akukuweledwa okudamu ebibuuzo binno wammanga.

#### 1. Ebimu kubikukwatako

1.1 Gwe ngoomuntu

1.1.1 Obutonde:

[1] Mussajja [2] Mukazzi

**1.1.2** olina emyaka emmeka?

-----

1.1.3 Oliwa kabiraki?

-----

## 1.1.4 Oliwa diininki?

[1] Mupolotestanti [4] Museveniside

[2] Mukatoliki [5] Endinni endale yonna -----

[3] Musilamu

## 1.1.5 Olimufumbo?

[1] Yee

[2] Nedda

1.1.6 Wasooma paka wa?

[1]sasomelako dala [4] Univasite

[2] Pulayimale [5] Tekiniko

[3] Sekenndale

## 1.2 Ebifa gyoobeela

**1.2.1** Ekitundu kyobeela mu.

[1] Tawuni [2] Kyaalo

**1.2.2** Enju ebeeramu abantu bameeka?

-----

1.2.3 Famile ya kikkaaki?

[1] Abazaadde naabanababwe.

[2] Oboluganda abalala oba nabemikwaano.

1.2.4 Onya sigala?

[1] Nedda [2] Yee

#### 1.2.5 Onywa ko kumwenge?

[1] Nedda [2] Yee

# 2. Ebikwaata kubyenfunna

2.1 Mulimu gwangelikki gwofunamu a kasente okwebeezaawo?

[1] Silina [4] Gya lejja lejja

- [2] Gwamusaala [5] Bya kulimma
- [3] Bizinensi

#### 2.2 Gawakulila amakka?

[1] Nedda [2] Yee

**2.3** Bwoba sigwe akulila ammaka, agulila akola mulimo gwangeli kki okuffuna sente ezibabeezaawo?

[1] Silina
[2] Gwamusaala
[5] Bya kulimma
[3] Bizinensi

2.4 Emmere essinga gye mulya ewaka mugifuna mutya?

[1] Tugigula mu butaale [4] Ekitongole kyekigituwa

[2] Munimiiro yaffe [5] Ewalala wonna

[3] Mubobooluganda naabemikwaano

#### 3. Ebikwaata kubulamuu bwo.

3.1 Leero baku janjabyeeki?

3.2 Obusilikale oba sidifooyo elimeeka mu biseera binno?

3.3 Watandiika okumila edagala epya obba ealavizi?

[1] Yes [2] No

3.4 Bwoba omila ealavizi, katulabeeko ku zoomila?

3.5 Ealavizi ozimillidde banga ki?

[1] Emyeezi tegisuuka mu 6

[4] Wakatti wemyaaka 2 ne 5

[2] Wakkatti wemyeezii 6 months noomwaaka gummu [5] Gisuuka mumyaaka 5

[3] Wakatti womwaka gummu ne 2

3.6 Ealavizi zaakuyissa buubbi?

[1] Yee [2] Needa

**3.7** Obo zakuyisa bubbi, kikki ekyabaawo.

\_\_\_\_\_

**3.8** Omulila seputulini buligyo?

[1] Yee [2] Nedda

3.9 Bwobba omila seputulini ,alinna obulabbe bwonna bwaakutuusaaako?

[1] Yee [2] Nedda

3.11 Bwabba akuyiisa bubbii, kiki kyenyinni ekikutuukako?.

\_\_\_\_\_

3.12 Obadde mulwadde mu wiiki ebirri zinno eziyisse?

[1] Yee [2] Needa

3.13 Bwobbaa obadde mulwadde, Obadde olikudagalla?

[1] Yee [2] Nedda

3.14 Eddagala lilinna obulabbe bwonna bwelyakuleetedde?

[1] Yee [2] Nedda

3.14 Bwelibba lyakuleteede obullabbe, kiki ekyakutuuseeko kyenyini.

\_\_\_\_\_

3.15 Wali osomeseedwaako abasawo ba Mildmay ebikwaata ku kulya oba okweliisa ?

[1] Yee [2] Nedda

3.16 Bwobba wasomesebwaako, biiki byebakusomesaako?

[1] Dagala

[2] Mubulwadde

[3] Okweeliisa

[4] Ekilala kyonna -----

**3.17** Bwobba tosomesebwangako, mundowooza yo, olowooza kki ekyabagaana okusomessa ku byendya?

\_\_\_\_\_

# Appendix 3: 24 hour dietary recall tool

Please fill in a	listing of a	ll the foods	and drinks that we	re eaten the p	revious night and day.
· · · · · · · · · · · · · · · · · · ·		···· J · · · J		· · · · · · · · · · · · · · ·	

Time	Food/	Method of preparation
	Drink/Fruit/Vegetable	(Fried/boiled)
12:00am-06:00am		
00.00 10.00		
08:00pm-12:00am		
04.00 00.00		
04:00pm-08:00pm		
12.00		
12:00pm-04:00pm		

10:00am-12:00pm	
06:00am-10:00am	

# Appendix 4: 24 hour dietary recall-Dietary diversity score tool

# READ THE LIST OF FOODS.

PLACE A ONE IN THE BOX IF THE FOOD IN QUESTION WAS EATEN, PLACE A ZEA	RO
IN THE BOX IF THE FOOD WAS NOT EATEN.	

A Any Matooke, posho, millet bread, bread, noodles,						
biscuits, cookies, or any other foods made from millet, sorghum, maize, rice,						
wheat, or maize, oats	A					
B Any pumpkin, carrots, or sweet potatoes that are						
yellow or orange inside?	B					
C Any white potatoes, white yams, manioc, cassava or any	,					
other foods made from roots or tubers?	C					
D Any dark, green, leafy vegetables such as cassava leaves,						
bean leaves, kale, spinach, pepper leaves, taro leaves, and						
amaranth leaves?	D					
E Any other vegetables?	E					
F Any ripe mangoes, ripe papayas or [INSERT ANY						
OTHER LOCALLY AVAILABLE VITAMIN A-RICH						
FRUIT?	F					
G Any other fruits?	G					

Appendix 5: Focus group discussion guide

#### Perceptions, beliefs and attitude about feeding in HIV

1. What do you understand by healthy feeding?

2. Should PLWHA'S pay much attention to their feeding habits? (Why?)

**3.** In your opinion, what would you regard as the important foods that PLWHA'S should feed on?

4. Do you take extra effort to think about what you eat?

**5.** Give a reason for your answer.

6. What type of foods do you consider to make up a good quality diet?

7. How many main meals do you think should a good quality diet have in a day (24 hr period)?

8. How many snacks times should a good quality diet have in a day (24 hr period)?

9. Do you think PLWHA's should have a special diet?

**10.** Give a reason for your answer.

**11.** What is the source of the information from 6.3 above?

e.g Formal education, Media, From the community, From the health workers

12. Which of these sources would you consider reliable? (Why?)

13. How else would you have liked to get information about how to feed well?

- 14. What are the major influences on what you eat?
- 15. What is your general view about the nutritional services at the Mildmay centre?
- 16. What do you think should be done to improve nutritional services at the Mildmay Centre?

Appendix 6: Participants' consent form

TheMildmayCentreUganda

## **Research Participant Information and Consent Form**

## **DESCRIPTION OF THE RESEARCH**

You are invited to participate in a research study about factors affecting food intake of adults aged 18-65 years living with HIV/AIDS attending The Mildmay centre.

# WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this research you will be asked to fill in a questionnaire about yourself and the foods you will have eaten in the previous 24 hours or take part in a focus group discussion about general views of people living with HIV/AIDS on feeding. Radio tape recording for those who will have accepted to take part in the group discussions will be done and will only be listened to by the researcher. Your participation will last approximately 30 minutes.

## ARE THERE ANY RISKS TO ME OR BENEFITS FOR ME?

We do not anticipate any risks or expect any direct benefits to you from participation in this study.

## HOW WILL MY CONFIDENTIALITY BE PROTECTED?
While there will probably be publications as a result of this study, your name will not be used. Only group characteristics will be published.

## WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?

You may contact Dr Nanziri Carol, the student researcher, or the mildmay centre research officers on telephone number 0772518045 to ask any questions about the research at any time and if you have any questions about your rights as a research subject, contact The Mildmay Centre Research Officer on telephone number 0312-210-200. Your participation is completely voluntary. If you decide not to participate or to withdraw from the study it will have no effect on any services or treatment you are currently receiving.

Your signature indicates that you have read this consent form, had an opportunity to ask any questions about your participation in this research and voluntarily consented to participate. You will receive a copy of this form for your records.

Name of Participant (please print): \_\_\_\_\_

Signature

Date