# KNOWLEDGE, ATTITUDE AND PRACTICE RELATING TO NUTRITION AMONG PEOPLE LIVING WITH HIV/AIDS (PLWHA) IN IBADAN AND SHAKI, OYO STATE, NIGERIA

**BY**

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A Dissertation in the Department of Human Nutrition
Submitted to the Faculty of Public Health
In Partial Fulfilment of the Requirements for the Degree of

**MASTER OF PUBLIC HEALTH**
(POPULATION AND REPRODUCTIVE HEALTH NUTRITION)

**of the**

**UNIVERSITY OF IBADAN**

**May, 2012.**

## DEDICATION

Dedicated to **THE ALMIGHTY GOD**, the "El Shaddai", for His abundant grace, mercy, love, life and wisdom.

I also dedicate this work to my dearest wife, ***Dolapo*** and our ***Children***, my brother, ***Deacon Elisha Adebayo Adeniji,*** as well as to the loving memory of my parent ***Pa and Madam Jacob & Sarah-Ewedeyi Adeniji***, and lastly to ***Chief Michael Adeniyi Koleosho,*** the Babalaje of Shakiland and one of my great leaders and known renown Public Health Officers throughout Oke-Ogun area of Oyo State, Nigeria.

**ACKNOWLEDGEMENT**

I would like to express my profound gratitude to those who generously gave their time, resources, experience and insights during the period of this study. I acknowledge the guidance and wealth of experience received from my supervisor and mummy – Dr. Grace T. Fadupin, who did not only supervise the study, but spent quality time and finance to support me as a mother and was meticulous about it too. These greatly enhance the quality of this research work. It has been worth while experience learning from her.

Special thanks to the Head of Department and father to all – Prof. Isaac Olu. Akinyele for the untiring efforts and professional support received from him over the past few years. Out of his busy and tight schedule, he took time to provide valuable and insightful contribution needed to complete the study. I wish to express my gratitude to my other Lecturers in the Department and Faculty – Professor Tola Atinmo, Dr. Oladejo T. Adepoju (my brother, friend and Lecturer), Dr. R. A. Sanusi, Dr. Folakemi Samuel, Professor Ademola Julius Ajuwon (my friend and my mentor), Dr. Fredic Oshinamen, Dr. Oyedunni Arulogun, Dr. Olaniregun, Dr. Tunde Adedokun, Dr. Diran Oyewole, Dr. Ajayi and Dr. (Ms) Adeshina (Department of O. & G.) – for their love and enormous supports and contributions towards this course and success of this dissertation. Their supports and contributions throughout this study cannot be quantified. I wish to register my appreciation to the other members of staff in the Department of Human Nutrition, who are friendly and always ready to render services to us with love. As well, the Chief Medical Director and the entire staff of State Hospital Shaki, Baptist Medical Center, Shaki and Ade Oyo State Hospital, Ibadan. I thank Oluwafemi Isaac Dipeolu, Wole Oluwadumila, Baba Ajayeoba S. O., Titiloye M.O. – Lawyer (my brothers, friends and colleagues) and Ayodele Oginni, Tony and Oyeyemi for their assistance from time to time in the course of this study and in the analysis of the data generated during the study. I cannot but mention the names of some of my immediate juniors and friends– Mrs. Bukky M. Mustapha, Haja Kudus Olawoye (Iya Lalate), Haja Idayat 'Banke Yusuf and Lynda.

I would like to say big thank you to Mr.Adepoju (Baba gba Jesu of Baptist Medical Center Shaki) and all my colleagues and classmates (2007/2008 set); they all touched my

life in special ways most especially Elizabeth Tope Adeboye nee Olaomi. I will never forget all my friends and well wishers; their prayers, encouragement and financial assistance saw me through the conduct of the study. Few of them include: Brothers and Sisters ‘Niyi Oladeji, ‘Yinka Oladeji, ‘Wuyi Oladeji, Stephen Oladeji, Femi Adebayo, Alhaji Najeem A. Awodele and his entire household, Rt. Hon. Festus Wale Adegoke, Mr. Sunday Niyi Adeniji, and Mr. Okeniyi D.O.

To my family members – I am immensely grateful. I would like to express my gratitude to Dolapo Omolola Stella, my ***Inestimable Jewel;*** this is for you, and thank you for your support and being there for me from the beginning and always. May the good Lord recompense you. I thank her for her sacrifices, patience and understanding in the course of this study. Last, but not the least, to ***Damaris, Daniel, Deborah and Florence*** – my children for their love, prayers and consideration. You too will grow in grace and wisdom and you will become great in life by the special grace of God (Amen).

Most importantly my gratitude goes to the Almighty God for the wisdom, knowledge and abundant grace made available each time I called upon Him.

## ABSTRACT

Nutrition plays a critical role in promoting the health of People Living with HIV/AIDS (PLWHA). Nutritional problems strongly predict illness or death among PLWHA. However, the knowledge, attitude and practices relating to adequate nutrition by this group of people have not been adequately explored in Nigeria. This study was therefore carried out to determine the knowledge, attitude and nutritional practices among PLWHA who were attending Antiretroviral Therapy (ART) clinics in Ibadan and Shaki, Oyo State, Nigeria.

The study was cross-sectional in design. A total of 350 respondents were selected from two ART clinics: Adeoyo Maternity Hospital, Ibadan (200) and State Hospital, Shaki (150) using systematic random sampling technique. A semi-structured questionnaire consisting of information on socio-economic characteristics, a 58-point knowledge scale [classified as poor (score < 29 points), fairly good (score 29 – 34 points), good (score 35 – 40 points) and very good (score ≥41)], Likert scale for attitude and a 22-point nutritional practice scale [classified as adequate (≥50%) and inadequate (<50%)] was used for data collection. Weight, height and Body Mass Index (BMI) of the respondents were also measured. Nutritional status of the respondents was defined as underweight (BMI <18.5kg/$m^2$), normal weight (BMI=18.5–24.5kg/$m^2$), overweight (BMI=25.0–29.9kg/$m^2$) and obese (BMI ≥30.0kg/$m^2$). Data were analysed using, descriptive statistics, t-test and Chi-square test.

Mean age of respondents was 35.7 ± 11.4 years and majorities (70.9%) were Yoruba. The females (68.3%) were more than males (31.7%). Only 17.4% of respondents had no formal education while 19.4%, 27.1%, 16.9% and 36.1% had primary, secondary, post-secondary and tertiary education respectively. Majority of the respondents (76.0%) earned less than N10,000.00 per month. All the respondents were aware that adequate nutrition is crucial for their health and survival. The mean nutritional knowledge score of the respondents was 43.0 ± 4.6. There was no significant difference in the mean nutritional knowledge scores between male (42.4 ± 4.7) and female (43.2 ± 4.5). Majority (86.5%) agreed that malnutrition accelerates the progression from HIV to AIDS. More than half (63.7%) agreed that PLWHAs need better nutrition than those without HIV.

Many of the respondents (64.0%) had normal weight, and a significant difference was observed in the prevalence of underweight, overweight and obesity between the female (6.6%, 13.4% and 9.7%) and male (1.7%, 3.1% and 1.4%) respondents respectively ($p<0.05$). There was a significant relationship between nutritional status and education, occupation, monthly income and housing facility of the respondents. In other hand, there was no significant relationship observed between the nutritional status and either the nutritional knowledge or practices of the respondents.

People Living with HIV/AIDS had very good nutritional knowledge and positive attitudes, but adequate nutrition was only practised by about half of them. There is need to sustain awareness of and support for them to improve the practice of adequate nutrition which is crucial for their health and wellbeing.

**Keywords:** Nutritional knowledge, Nutritional practice, Nutritional status, PLWHA, Antiretroviral Therapy clinic.

**Word count:** 469

## ABBREVIATIONS

| | |
|---|---|
| **ACC/SCN** | Administrative Committee on Coordination, Subcommittee on Nutrition |
| **AED** | Academy for Educational Development |
| **AIDS** | Acquired Immune Deficiency Syndrome |
| **ART** | Antiretroval Therapy |
| **ARV** | Antiretroval |
| **BMI** | Body Mass Index |
| **$CD_4$** | Main target cells for HIV, the number of which decreases during HIV infection |
| **FANTA** | Food and Nutrition Technical Assistance |
| **FAO** | Food and Agriculture Organisation |
| **FMOH** | Federal Ministry of Health |
| **ILO** | International Labour Organisation |
| **GHAIN** | Global HIV/AIDS Initiative Nigeria |
| **HIV** | Human Immunodeficiency Virus |
| **HDL** | High density Lipoprotein |
| **IEC** | Information, education and communication |
| **IU** | International unit |
| **LDL** | Low density Lipoprotein |
| **LGA** | Local Government Area |
| **MUAC** | Mid-upper arm circumference |
| **MTCT** | Mother-to-child transmission |
| **NACA** | National Agency for the Control of HIV/AIDS |
| **NPC** | National Population Commission |
| **PEFAR** | Presidential Emergency for AIDS relief |
| **PLWHA** | People Living with HIV/AIDS |
| **PRECEDE** | Predisposing, Reinforcing and Enabling Constructs in Educational/Environment Diagnosis and Evaluation |
| **RA** | Research Assistance |
| **RDA** | Recommended daily allowance |

| | |
|---|---|
| **RNA** | Ribo nucleotide androgen |
| **SACA** | State Agency for the Control of HIV/AIDS |
| **SARA** | Support for Analysis and Research in Africa |
| **SES** | Socio economic status |
| **SMOH** | State Ministry of Health |
| **SPSS** | Statistics package for Social Science |
| **TB** | Tuberculosis |
| **UNAIDS** | United Nations Joint Programmes on AIDS |
| **UNICEF** | United Nations Children Fund |
| **UCH** | University Hospital College |
| **USCDCP** | US/ Committee for Diseases Control and Prevention |
| **WHO** | World Health Organisation |

## CERTIFICATION

I hereby certify that this study was carried out by Timothy Adeyemi ADENIJI in the Department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan, Nigeria.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the study

Human immunodeficiency virus (HIV) the causative agent of the Acquired Immuno Deficiency Syndrome (AIDS) is a Ribo nucleotide androgen (RNA) virus in the family of Retroviridae and subfamily Lentiviridae. Two types of HIV (HIV-1 and HIV-2) have been recognised with many subtypes particularly for HIV-1. AIDS is defined as a syndrome of immune dysregulation, dysfunction and deficiency. It is also defined as all situations involving immuno suppression as measured by absolute $CD_4$ lymphocytes count for $CD_4/CD_8$ ratio (Onwuliri, Emejulu, Braig and Agyo, 2004). The final stage of the disease condition caused by HIV is AIDS. AIDS represents the advanced stage of HIV infection during which the HIV–infected individual's immune system is unable to fight off the opportunistic infections. The immune system is a collection of cells and organs that work together to defend the body from germs or pathogens, which may cause illnesses (FMOH, 2003a; Park, 2002).

HIV is found in most human body fluids including blood, semen, vaginal fluids and breast milk. HIV can be transmitted through the following ways: unprotected sexual activity; contact with infected or contaminated blood or blood products; use of contaminated skin piercing instruments or equipment; and from infected mother to her child. The HIV is not transmitted by kissing, hugging, shaking of hands, mosquito or insect bites, coughing and sneezing, sharing of toilets or washing facilities, sharing of utensils or consuming food and drink handled by someone who has HIV and social contact in workplaces (Kidd and Clay, 2003; Park, 2002).

HIV and AIDS remain the greatest health challenges of this age (UNAIDS, 2002). It has been stated that the AIDS phenomenon is nothing short of war on humanity. The heavy toll on human lives, large scale devastation and the emasculation of the human spirit occasioned by the scourge, attest to this (Akwa Ibom State SACA, 2005). Therefore, the HIV/AIDS epidemic is a global public health crisis which constitutes one of the most

serious challenges to the human race particularly in terms of its adverse effects on man's social and economic development. It devastates the lives of individuals, families and communities. Epidemic of HIV/AIDS is affecting all levels of the society including both the young and the old. Anyone can be affected by HIV and AIDS and all are vulnerable to it. The prevalence of the disease condition cuts across both developed and developing countries (Ogundipe, 2007). HIV and AIDS have caused more than 20 million deaths globally, with 83% (16 million) of these deaths occurring in sub Saharan Africa; 80% of children orphaned by AIDS live in this region and women make up more than 50% of the People Living with HIV and AIDS (PLWHA). It has been said that in sub-Saharan Africa, AIDS affects women disproportionately (Harries, Simeon, and Edwin., 2005), although no group of people is speared. HIV also affects nutritional status of all groups of people.

Nutritional status is defined as the measure of adequacy of nutrient intake of an individual or a population in relation to his or their health (Horwitz, 1983), which is strongly predictive of survival and functional status among people living with HIV/AIDS. Nutritional problems may occur at any stage of disease and can contribute to impaired immune response, accelerate disease progression, increase the frequency and severity of opportunistic infections, and impede the effectiveness of medications (HRSA Care Action, 2004).

HIV and AIDS therefore have direct impact on the nutrition of people living with HIV and AIDS, and for nutritionally vulnerable members in HIV and AIDS–affected households. For instance, people living with HIV face a vicious cycle in which repeated episodes of illness caused by HIV lead to malnutrition. Malnutrition in turn further accelerates the onset of AIDS. HIV damages a person's immune system, and the repeated illness that ensues reduces appetite; moreover, nutrients are lost from vomiting and diarrhoea, and the use of certain medications. Infections also interfere with the body's ability to absorb and use nutrients, which are needed to fight off HIV. This has serious consequences for the poor, who are more likely to be malnourished even before they become infected (Administrative Committee on Coordination, Sub-committee on

Nutrition –ACC/SCN, 2001; Haddad & Gillespie, 2001; Piwoz & Preble, 2000; Egal & Valstar, 1999).

Therefore to live a healthier life, all people, whether HIV-infected or not, need to be fast in nutritional knowledge, positive attitude to nutrition and adequate nutritional practices in order to meet their daily energy, protein and micronutrient requirements. So for a healthy person, good food and nutritional practice may help to make him or her strong for a long time and for an infected or a sick person, the right practice of food and nutrition may help him or her to get well (Serena Rajabium, 2001).

Knowledge is a range of information acquired by someone or a person that enhances such person's understanding of a subject; while attitudes reflect our likes and dislikes of the subject which determine our behaviour concerning the subject matter. They often come from our experiences or from those of people close to us. They either attract us to things, or make us wary of them. Sometimes they could be based on limited experience. We may form attitudes without understanding the whole situation (WHO, 1988; Rokeach, 1976). Generally, theory suggests that the more directly related knowledge is to behaviour, the more likely it is to have an impact on the behaviour, and also the more on the practices.

However, knowledge regarding nutrition and its influence on health and longevity has greatly increased over the last decades, yet few or no known work has been done on knowledge, attitude and practice relating to nutrition among the people living with HIV/AIDS in Ibadan and Shaki, Oyo State in particular and Nigeria in general.

## 1.2 Statement of problem

People with HIV–infection often exhibit progressive loss of weight and poor nutritional status. These problems, which may appear at all stages of the HIV–infection, may be explained by wrong selection of nutrients, inadequate intake of food as a result of ignorance, poverty, negative attitude to adequate nutrition and also anorexia and eating problems, impaired gastro-intestinal function, increased metabolic rate, secondary to opportunistic infections or the HIV infection itself. Studies from both industrialized and developing countries have shown that HIV–infected individuals have decreased absorption, excessive urinary losses and low blood concentrations of vitamins A, B1, B2,

B6, B12, C, E as well as foliate, beta-carotene, selenium, zinc and magnesium (FANTA, 2001). Compromising on nutritional status may therefore have a negative effect on the outcome of treatment, and may lead to malnutrition-related immune depression and rates of infection.

Malnutrition in turn increases both the susceptibility to HIV infection and the vulnerability to its various effects; any immune impairment because of HIV/AIDS leads to malnutrition and poor nutritional status. Conversely, malnutrition increases the severity of the HIV disease by further weakening the immune system, which decreases the body's ability to fight HIV and other infections. Thus, malnutrition can both contribute to and result from the progression of HIV. According to Piwoz and Preble (2000), the effect of HIV/AIDS on nutrition results in weight loss and the wasting that is common in people living with AIDS. Danielles (2008) added that infection with HIV/AIDS can lead to malnourishment, and studies have shown that progression of the disease can be increased by a poor diet. FANTA (2001) corroborated this while agreeing that deficiencies of total calories, protein, vitamin A, vitamin B6, vitamin B12, vitamin C, vitamin E, magnesium, iron, selenium, and zinc are associated with HIV, and normalization of these vitamin and mineral deficiencies may be linked to slower disease progression. Therefore, a person who is malnourished maybe due to ignorant, negative attitude towards adequate nutrition as well as inadequate practice of nutrition and then acquires HIV is more likely to progress faster to AIDS, because his/her body is already weak and cannot fight infection.

It may seem logical that higher levels of nutrition knowledge and more favourable attitudes towards nutrition would be associated with adequate diet intake, and good nutritional status all thing being equal; and so nutrition issues are of vital importance to HIV-infected persons. Although nutrition does not promise a "magic bullet", nutritional knowledge and right or positive attitude towards nutrition by the PLWHA may enhances their practice of feeding on balanced diet (adequate nutritional practices) as a means of survival as well as their good nutritional status.

However, despite the growing body of knowledge related to HIV/AIDS and Nutrition, little or nothing is known about the knowledge, attitude and practices relating to nutrition

among PLWHA in Ibadan and Shaki, Oyo State and in Nigeria. Hence, the justification for this study is contingent upon the importance of adequate nutrition to PLWHA for their nutritional status, wellbeing and longevity.

### 1.3 Justification

Sub-Saharan Africa accounts for more than 70% of all HIV and AIDS cases globally. The first AIDS case in Nigeria was reported in 1986. Since then, the epidemic has steadily grown. All the states of Nigeria have general population prevalence of over 1%. In Oyo State (one of the 36 States in Nigeria), there is no specific town or village that has not reported cases of AIDS. Oyo state has important international and inter-state border towns, which might play significant roles in the wide geographical distribution of HIV and which cut across adult and children (State Ministry of Health –SMOH, 2004).

Thus, in a country like Nigeria which may be considered a poor resource country, not only because the country is poor in natural and human resources but because access to basic things like adequate nutrition (food, accessibility to it, sanitation and good health care), shelter, and education are inadequate. Also in a situation where there is no cure for HIV/AIDS yet and many of the PLWHA cannot afford or access the ARVs which are to be taken for a lifetime; despite the fact that many projects (with limited time frame) providing free ARVs, having a good knowledge, attitude and practice of appropriate nutrition which according to James (2000), in the developing world, nutrition is the only form of therapy available in addition to other medical therapy, is known to be of significant important in the continuum management of HIV and AIDS.

### 1.4 Broad objective

The main objective of this study is to assess the knowledge, attitude and practices of nutrition in relation to the nutritional status of people living with HIV/AIDS (PLPWHA) in Ibadan and Shaki, Oyo State, Nigeria.

### 1.5 Specific objectives

The specific objectives of this study are to:

1. Describe the socio-economic characteristics of people living with HIV/AIDS;

2. Describe the respondents attitude towards the practice of adequate nutrition
3. Assess the anthropometric indices- (height, weight) and the body mass index (BMI) of the respondents;
4. Determine the relationship between the variables assessed (level of education, occupation, income, nutritional knowledge and nutritional practice) and the nutritional status of the respondents.

## 1.6 Research questions

The research questions are:

1. What are the socio-economic characteristics of people living with HIV in Ibadan and Shaki, Oyo State?
2. What are the level of nutritional knowledge, attitude and practices of PLWHA in Ibadan and Shaki, Oyo State?
3. What is the nature of the nutritional status of PLWHA in Ibadan and Shaki, Oyo State?
4. What are the relationship of the socioeconomic status, level of nutritional knowledge, attitude and practices on the nutritional status of PLWHA in Ibadan and Shaki, Oyo State?

# CHAPTER TWO

## LITERATURE REVIEW

### 2.1 HIV/AIDS and its Pathological Effects

Acquired Immune Deficiency Syndrome, (AIDS), is a syndrome caused by a retrovirus known as the Human Immunodeficiency Virus (HIV), which attacks and impairs the body's natural defence system against disease and infection. HIV, the causative agent of the Acquired Immune Deficiency Syndrome (AIDS) is a Ribo nucleotide androgen (RNA) virus in the family of Retroviridae and subfamily Lentiviridae. Two types of HIV (HIV-1 and HIV-2) have been recognised with many subtypes particularly for HIV-1. HIV is a slow-acting virus that may take years to produce illness in a person. During this period, an HIV-infected person's defence system is gradually impaired, and other viruses, bacteria and parasites take advantage of this "opportunity" to further weaken the body and cause various illnesses, such as pneumonia, tuberculosis and oral thrush. This is why the infections and cancers seen in HIV-infected individuals are called "opportunistic" (Onwuliri, Emejulu, Braig and Agyo, 2004).

The final stage of the disease condition caused by HIV is AIDS, it represents the advanced stage of HIV infection during which the HIV–infected individual's immune system is unable to fight off opportunistic infections. It should be noted that the immune system is a collection of cells and organs that work together to defend the body from germs or pathogens, which may cause illnesses (FMOH, 2003a; Park, 2002). AIDS is therefore defined as a syndrome of immune dysregulation, dysfunction and deficiency. It is also defined as all situations involving immuno suppression as measured by absolute $CD_4$ lymphocytes count for $CD_4/CD_8$ ratio (Onwuliri *et al*., 2004).

Meanwhile, healthy individual has about 10,000$CD_4$ cells per µL of blood. In HIV infected individual the number declines by about 40–80 cells per µL of blood yearly. Consequently, AIDS has further been defined as a situation when the $CD_4$ cells are fewer than 200 in the body especially for asymptomatic persons. The low $CD_4$ count is an indication of the damage done to the immune system and the overall health of the individual.

An estimated 40 million people are living with HIV and AIDS worldwide, according to a joint UNAIDS and World Health Organization report. As this population increases, nutrition is emerging as a critical factor in care of and support for these people, particularly in Africa (U.S. Centers for Disease Control and Prevention–US/CDCP, 1999). When a person starts having opportunistic infections, he/she has AIDS. The amount of time it takes from HIV infection to become full-blown AIDS depends on the general health and nutritional status before and during the time of HIV infection (Serena Rajabium, 2001). Traditionally such epidemics have tended to be identified with particular population groups, and have been distinguished as heterosexual, intravenous drug use (IDU), homosexual or based on blood transfusion (Semba and Tang, 1999).

The HIV is found in most human body fluids including blood, semen, vaginal fluids and breast milk and it can be transmitted through the following ways: unprotected sexual activity; contact with infected or contaminated blood or blood products; use of contaminated skin piercing instruments or equipment; and from infected mother to her child. The HIV is not transmitted by kissing, hugging, shaking of hands, mosquito or insect bites, coughing and sneezing, sharing of toilets or washing facilities, sharing of utensils or consuming food and drink handled by someone who has HIV and social contact in workplaces (Kidd and Clay, 2003; Park, 2002).

The HIV/AIDS epidemic is a global public health crisis which constitutes one of the most serious challenges to the human race particularly in terms of its adverse effects on man's social and economic development. It devastates the lives of individuals, families and communities. In fact, everyone is vulnerable to HIV/AIDS. The prevalence of the disease condition cuts across both developed and developing countries (Ogundipe, 2007).

**2.2 Global and Sub-regional Prevalence of HIV/AIDS:**

AIDS has infected over 70million persons across the world since it was first identified in 1983. About one third of this number is already dead with more than 40 million persons still alive and living with the virus (Gayle, 2003; Onwuliri, Kanki, Umeh and Awari, 2003a & Onwuliri and Ikwuyatum, 2003b). One in twenty and one in ten Africans, aged

15-49 is HIV-positive, and more than 20 million Africans have already died because of the epidemic.

Across the continent, HIV shows a great geographical variance. Countries in Southern Africa form the epicenter of the global pandemic. South Africa counts more than one thousand new infections a day, the highest in the world, while in Botswana, Lesotho, Namibia, Swaziland and Zimbabwe at least one in five adults carries HIV. These are "hyper endemic" countries according to UNAIDS (2004) classification. In contrast, the general rates of infection in Western Africa have been consistently lower, with countries registering between 1% and 7% prevalence rates among adults. These are still generalized epidemics, with concentrated foci among certain sectors of the population, such as commercial sex workers and their clients. Eastern and Central Africa exhibits a mix between these two patterns. North Africa, by contrast, has low HIV prevalence, well less than 1%. In 2007 an estimated 1.7 million new HIV infections occurred in the region. Half the newly infected individuals in the region are young people aged 15–24 and a majority of them is women (UNAIDS, 2008).

About 95% and over 70% of all HIV infected persons live in developing nations and in sub Sahara Africa respectively. Also more than 70% of all AIDS deaths had occurred here in sub Sahara Africa. Sub-Saharan Africa remains the most affected region in the global AIDS epidemic. More than two-thirds (68%) of all people infected with HIV live in this region and more than three quarters (77%) of all AIDS deaths in 2007 occurred there. It is estimated that 1.7 million (upper and lower ranges: 1.5-2.0 million) people were newly infected with HIV in 2007, bringing to 22.5 million (20.9 - 24.3 million) the total number of people living with the virus. This represents 6.1% of the adult population (FAO/UNAIDS, 2000).

Unlike other regions, most people with HIV in sub-Saharan Africa are women, accounting for 61% of those living with HIV and AIDS. In India, around 4 million people are infected with HIV. The incidence of the disease is high in several Caribbean Countries, although the spread of the epidemic in Latin America has been slower than in

other regions and the epidemic is concentrated in urban areas (FAO/UNAIDS, 2000). Hence, HIV/AIDS remains the greatest health challenge of this age.

### 2.2.1 HIV/AIDS Prevalence in Nigeria with reference to Oyo state:

Most of the newly reported cases of HIV/AIDS are from sub-Sahara Africa. Since recording her first case of AIDS in 1986 Nigeria's HIV prevalence rate among pregnant women attending antenatal clinics in Nigeria from 1991 to 2010 shows that there was an increased steadily from 1.8% in 1991 through 4.5% in 1995 and peaked at 5.8% in 2001. Thereafter, it declined to 4.45 in 2005 and stabilized between 4.4% (2005) and 4.1% in 2010 (See figure 2.1) (HSS, 2010 in FMOH, 2010). Although the prevalence rate appears low, Nigeria ranks third in terms of the actual number of people infected with HIV after India and South Africa. Some parts of the country are worse infected than others, but no state or community is uninfected (FMOH, 2004).

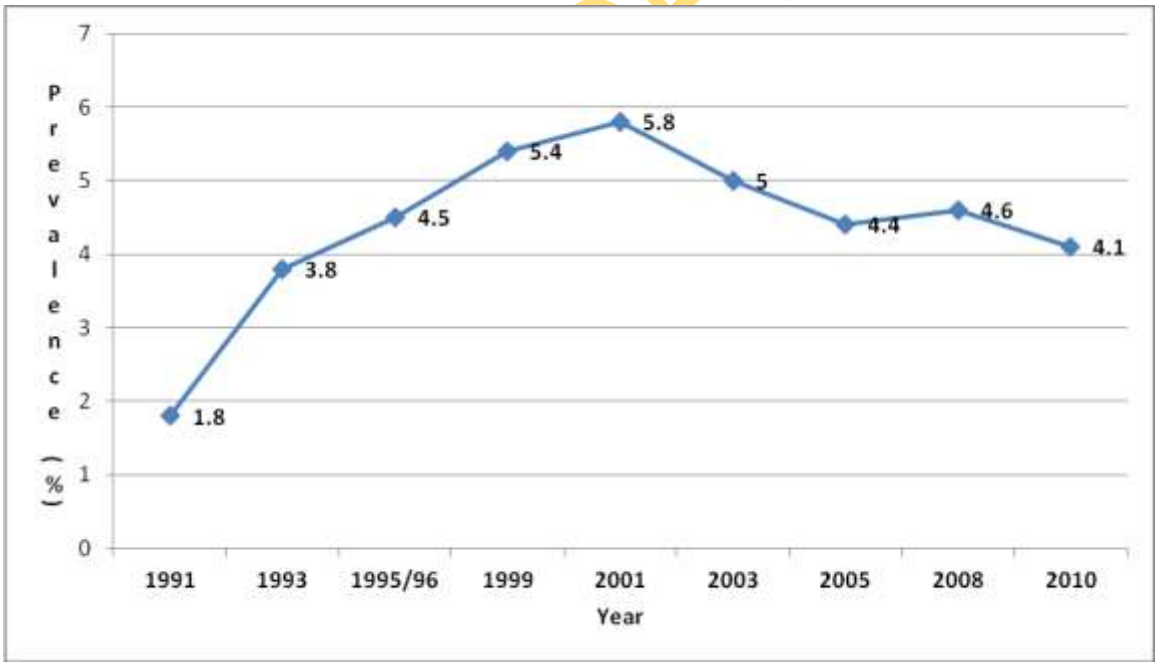
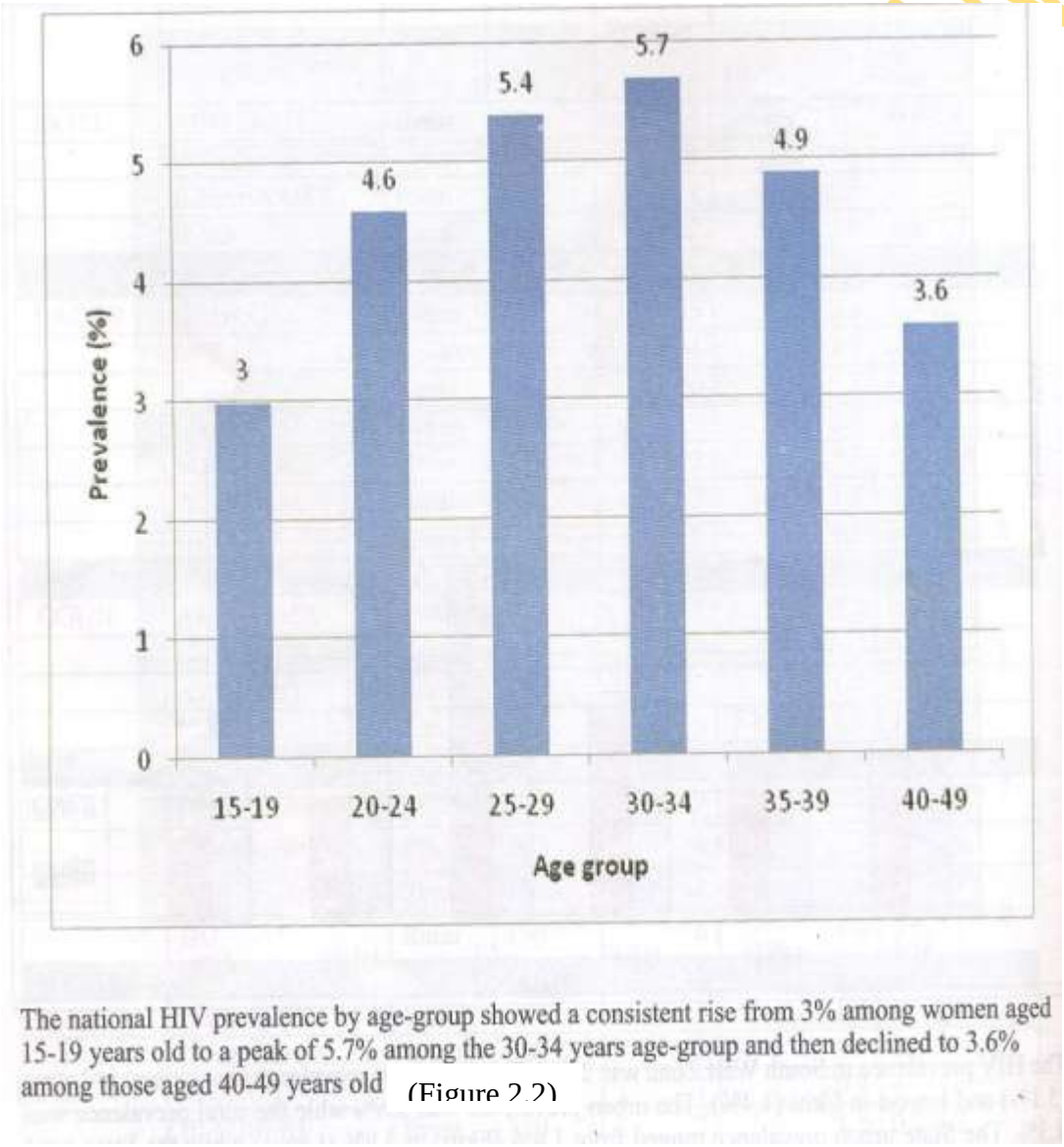



**Figure 2.1 National HIV Prevalence Tread from 1991 – 2010 (HSS 2010, in FMOH, 2010)**

The epidemic in Nigeria has extended beyond the commonly classified high-risk groups and is now common in the general population. With the adult prevalence rate at 5.8 % in

2001, the nation was said to be at the threshold of an exponential growth of the epidemic, however, in some communities, prevalence was more that 10%. HIV affects all age groups, but youths between the ages 20 – 29 years are more infected in Nigeria, though in some zones (South-South and the South-West Zones), there was a higher prevalence in the 15 – 19 years age group as reported in 2001 sentinel survey, shows the highest prevalence of 5.1% among women aged 40 – 49 years who participated in the survey (FMOH, 2004).




The national HIV prevalence by age-group showed a consistent rise from 3% among women aged 15-19 years old to a peak of 5.7% among the 30-34 years age-group and then declined to 3.6% among those aged 40-49 years old (Figure 2.2)

**Figure 2.2 National HIV Prevalence by age-group (HSS, 2010 in FMOH, 2010)**

As at 2005, an estimated 2.9 million (1.7 – 4.2 million) with approximately 300,000 adults) people were living with the virus, HIV (UNAIDS, 2006) in Nigeria. However, it is estimated that in Nigeria, around 2.85million people are living with HIV/AIDS and approximately 220,000 people died from AIDS in 2006 (UNAIDS, 2008). Sero-prevalence Sentinel Survey in Nigeria estimates that 296,320 adults and 73,550 children were newly infected in 2005 (FMOH (NACA), 2007) and estimated at 4.6% (FMOH, 2008).

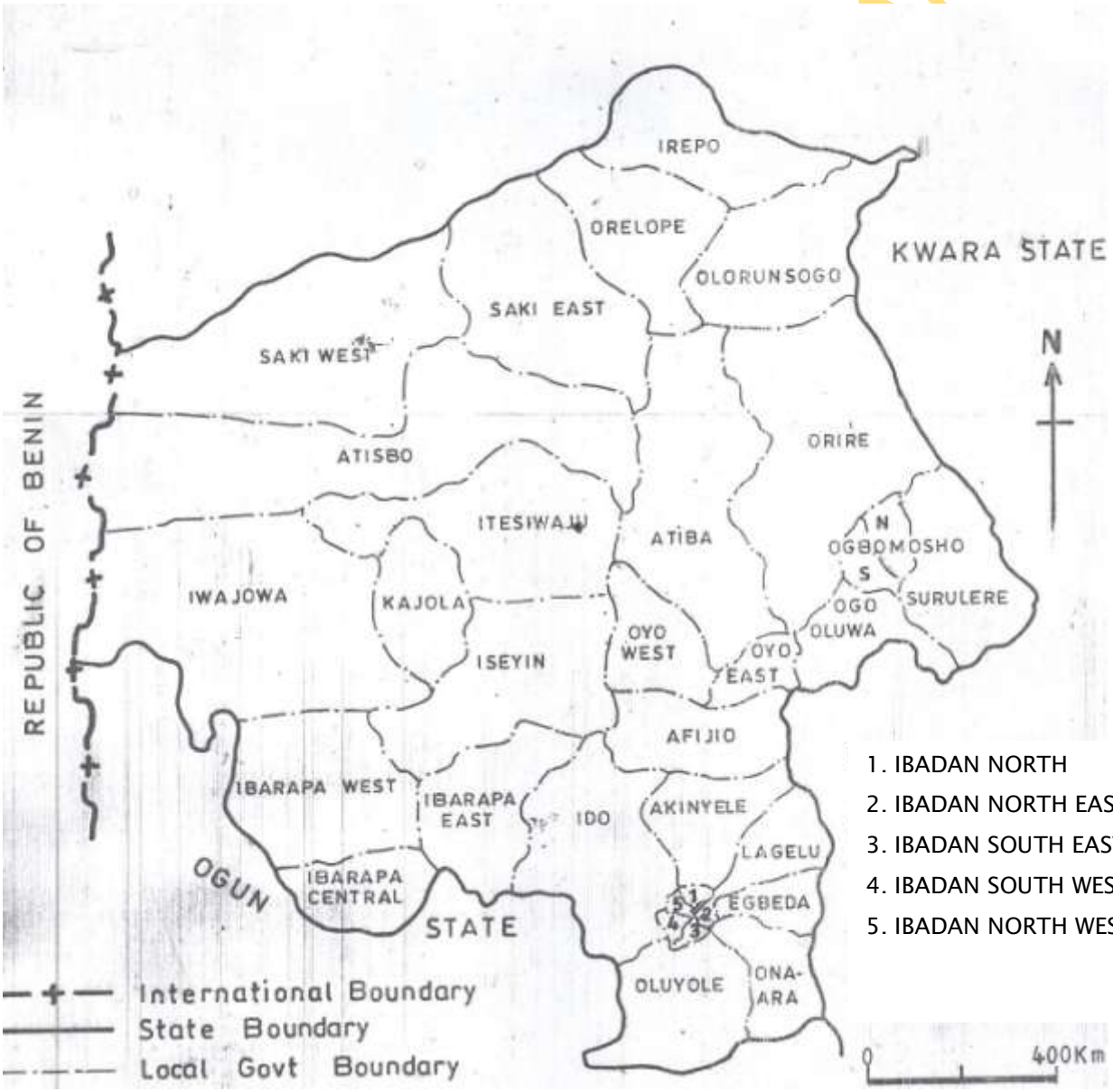



**Figure 2.3: Map of Oyo State of Nigeria showing her 33 LGAs**

Oyo state with Ibadan (one of the study locations) as the capital is one of the 36 states in Nigeria with a population of 5,591,589 (National Population Commission, 2006). It is located in the South West of Nigeria, bounded by Ogun, Osun, and Kwara states as well as the Benin Republic with high urbanization; and distance of 150km from Lagos and 659km from Abuja. The Yoruba ethnic group dominates Oyo state; however, it has significant population of non-Yorubas such as Hausa, Ibo, Nupe, Ijaw, Edo, Urhobo as well as non–Nigerians. Oyo state is one of the Border States in Nigeria as it shares international border with the Benin Republic. The state is divided into 33 administrative units (i.e. local government areas). The population distribution is about 60% rural and 40% urban. The predominant occupation of the people is farming, closely followed by trading. However, significant proportions are in the public service and private sector while others are engaged in one form of self–employment or another. The result of the national sero-surveillance study (State Ministry of Health, 2004) showed the followings for Oyo state:

1992 – 0.1 %

1994 – 0.2 %

1996 – 0.2 %

1999 – 3.5 %

2001 – 4.2 %

(Source: State Ministry of Health –SMOH-, 2004)

The plan of action figures, from the State Central Blood Screening Centre has shown an average sero-prevalence rate of 2 – 3 % among blood donors and women attending antenatal clinic up to the year 2010 as shown in figure 2.4 below.

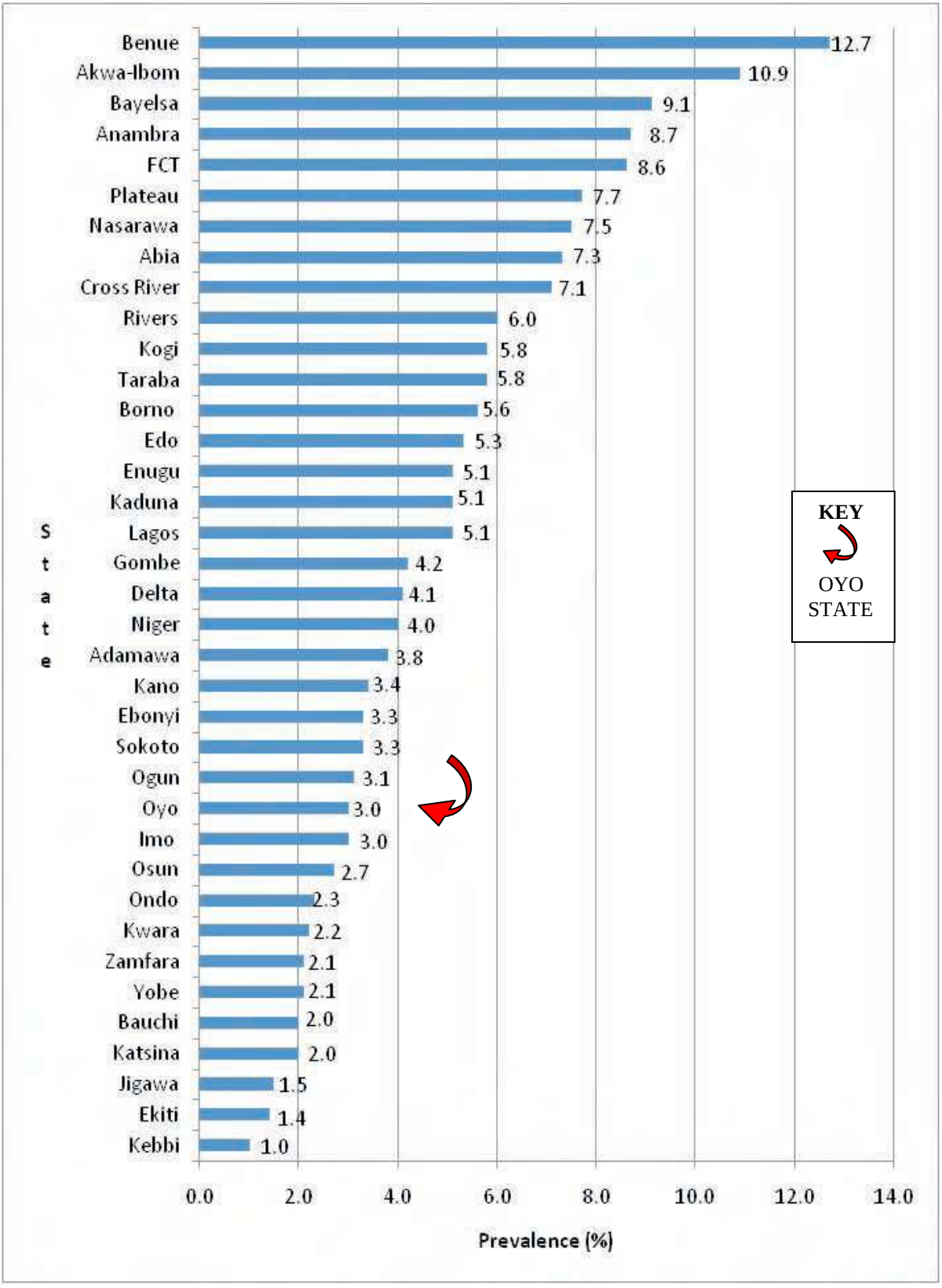



**Figure 2.4: HIV Prevalence by State (HSS, 2010 in FMOH, 2010)**

Oyo state has important international and inter-state border towns, which might play significant roles in the geographic distribution of HIV transmission. HIV/AIDS infections have been reported in adult and children. About 85 % of this infection is contacted through unprotected heterosexual intercourse (SMOH, 2004).

### 2.3 Socio economic Effects of HIV

HIV/AIDS is a social and a labour issues as much as a biomedical problem. It affects the workplace in a variety of ways: it strikes hardest at the most productive segment of the labour force and reduces earnings; and imposes huge costs on enterprises in all sectors through declining productivity, increasing labour costs, and loss of skills and experience. The most alarming long-term characteristic of the HIV/AIDS epidemic is its impact on life expectancy. Instead of reaching an average of 64 years, between 2010 and 2015, life expectancy in several Sub-Saharan countries will regress to an average of just 41 years – a reversal of most development gains over the past 30 years (FMOH 2003a). According to figures released by WHO in 2002, the number of people living with HIV/AIDS was 42 million. Of that figure, 38.6 million were adults and there were 3.1 million deaths from AIDS (http://www.nursingspectrum.com /International Nursing/News /Articles /Nurses Role HIV.htm). Today, the impact of the HIV/AIDS pandemic on children, families, communities and the nation is multi-faceted, enormous and wide reaching. For example, the number of children orphaned by AIDS in Nigeria has increased substantially to an estimated 1.2 million (FMOH, 2005). The pandemic is killing people in their most productive years, decimating the workforce, impoverishing households, shredding traditional safety nets and the social fabric of the communities, which is, for many, the only reliable support system. This is corroborated by the findings that the infection rate of HIV/AIDS is higher among women than men (UNAIDS, 2002; UNICEF, 2001).

According to the International Labour Organisation (ILO) Programme on HIV and AIDS and the World of Work (ILO/AIDS) report of 2005, over 40 million people around the world were infected with HIV. Out of this number, at least 26 million (65%) were workers aged 15 to 49 who were in the prime of their working lives. The enterprises and the national economies, as well as the workers themselves and their families feel the effects. The report states further that the epidemic stroked hard at the most vulnerable

groups in the society including the poorest of the poor, women and children, exacerbating existing problems of inadequate social protection, gender inequalities, and child labour (ILO/AIDS, 2005).

In many Sub-Saharan African nations, AIDS has destabilized the health systems, social protection, education, industry, the formal and informal agricultural sector, transport, political stability and civil society; hence, the overall cumulative impact will continue to ravage African economies in the near future and beyond. The magnitude and depth of HIV/AIDS impacts in sub-Saharan Africa are staggering. Livelihoods are being devastated and the food and nutrition security of millions of households is seriously undermined (Barnett and Rugalema, 2001). Sub-Saharan Africa is the region most affected, where HIV and AIDS is now the leading cause of adult morbidity and mortality. Most, if not all, of the 25 million people in sub-Saharan Africa who are living with HIV/AIDS would have died by the year 2020, in addition to the 13.7 million Africans already claimed by the epidemic (Barnett & Rugalema, 2001).

In the 30 Sub-Saharan African countries with the highest HIV and AIDS prevalence levels, the average life expectancy has already started to decline, standing at about 47years, roughly seven years lower than what would have been the case in the absence of the pandemic (Piwoz & Preble, 2000). With AIDS claiming so many people's lives, Nigeria's life expectancy has declined. In 1991 the average life expectancy was 53.8 years for women and 52.6 years for men. In 2007 these figures had fallen to 47years for women and 46years for men (WHO African Region: Nigeria WHO, 2008).

In sub-Saharan Africa, the epidemic is devastating businesses including industries. It is threatening every economic sector in many nations, targeting workers in both blue and white-collar positions, including health workers, government employees, farmers, students and teachers (Kermode Michelle, Wendy Holmes, Biangtung Langkham, Mathew Santhosh Thomas & Sandy Gifford 2005; UNAIDS, 2004a; UNAIDS, 2003a). Within the private and public sector, high levels of illness-related absenteeism and loss of skilled workers have led to lower profits, greater difficulty in delivering products,

services and higher costs for production, training and insurance (Semakula, Nabiryo, and Lukabo, 2004).

People living with HIV and AIDS are often impoverished (Lan, 2001); having a job is therefore extremely important to them. Employment allows them to eat nutritiously, pay for health care and live longer. Having HIV means one is more susceptible to loss of means of livelihood (Nattrass, 2004). A survey conducted by Thai Business Coalition on AIDS found that 45% of surveyed PLWHAs were unemployed or without a regular income; a total of 95% of them reported an income loss due to HIV (United Nations Joint Programmes on AIDS –UNAIDS-, 1997).

The impact of HIV/AIDS, which has also been felt across Nigeria, bears both social and an economic cost. AIDS has reduced the size of the labour force, destabilized families, and reduced drastically life expectancy. Consequently, income and food security are threatened for a significant proportion of the population (National Action Committee on HIV/AIDS–NACA, 2001). In a similar study conducted in a central region of Uganda in Monaco by Barbican and Kiruming (2001), it was observed that, adult mortality accelerates, and that the ability of households to cope and even survive will be seriously compromised (UNAIDS, 2004).

This is exactly the situation of Nigeria today as children were left to be at risk and vulnerable to so many things even HIV. Therefore, HIV/AIDS epidemic has had a devastating impact on health, nutrition, food security and overall socioeconomic development in countries that have been greatly affected by the disease. There is an urgent need for renewed focus on and use of resources for nutrition as a fundamental part of the comprehensive package of care at the country level according to WHO Technical Consultation on nutrient requirements for People Living with HIV/AIDS (2003).

## 2.4 Nutrition and Infection

Nutrition refers to how the body utilizes food for maintenance of life, growth, normal functioning of organs and tissues, production of energy and prevention of diseases. Nutrients required by the body are available in foods. Those required in large quantities

such as carbohydrate, protein and fat are known as macronutrients while those required in smaller quantities like vitamins and minerals are known as micronutrients (Federal Ministry of Health –FMOH-, 2011).

Healthy nutrition takes many forms and is understood differently in different countries and among different cultures. In general, healthy nutrition should be an integral part of daily life that contributes to the physiological, mental and social well-being of individuals. It is the combined effect of food, healthy and care (FAO/WHO, 1992). Nutritional well-being is determined by consuming **safe food** as part of an appropriate and balanced diet that contains adequate amounts of nutrients in relation to bodily requirements. The **healthy** and lifestyle of an individuals influences the extent to which food contributes to good social, mental and physical well-being. **Care** is shown by providing time, attention and support in the household and the community to meet the food and health needs of the adolescent and other family members (FAO/WHO, 1992).

Nutritional status is easily compromised during any type of infection. Generalized infections often result in reduced food intake and absorption of nutrients (Friis, 2002). Utilization and loss of nutrients are also increased during an acute infection. Additional characteristics of the infection (e.g., fever, mouth sores, and fatigue) can further contribute to poor nutrition. Medications used to treat an underlying infection can further contribute to poor nutritional status when they have side effects such as nausea, vomiting, and dry mouth or they alter taste or smell. In another hand, we have learned that with correct and adequate nutrition, which includes vitamin supplementation and a holistic approach to HIV and other infection as well, one can maintain health almost indefinitely if it was started early enough. In addition, if one starts when he is already ill, nutrition together with treatment of opportunistic infections can put them back on his feet and back in employment (James, 2000).

### 2.5 Nutrition and HIV/AIDS

An estimated 40 million people are living with HIV and AIDS worldwide, according to a joint UNAIDS/WHO report. As this population increases, nutrition is emerging as a critical factor in care of and support for these people, particularly in Africa (USCDCP,

1999). People infected with HIV have greater nutritional needs, and adequate diets are essential to promoting a strong immune response and helping people manage the symptoms and side effects of HIV–related illnesses and treatments (AED, 2010). Evidence has shown important links between improved HIV and AIDS outcomes and nutrition. Castleman, Seumo-Fosso, and Cogill, (2004) reported that adequate nutrition is necessary to maintain the immune system, manage opportunistic infections, optimize response to medical treatment, sustain healthy levels of physical activity, and support optimal quality of life for a Person Living with HIV/AIDS (PLWHA).

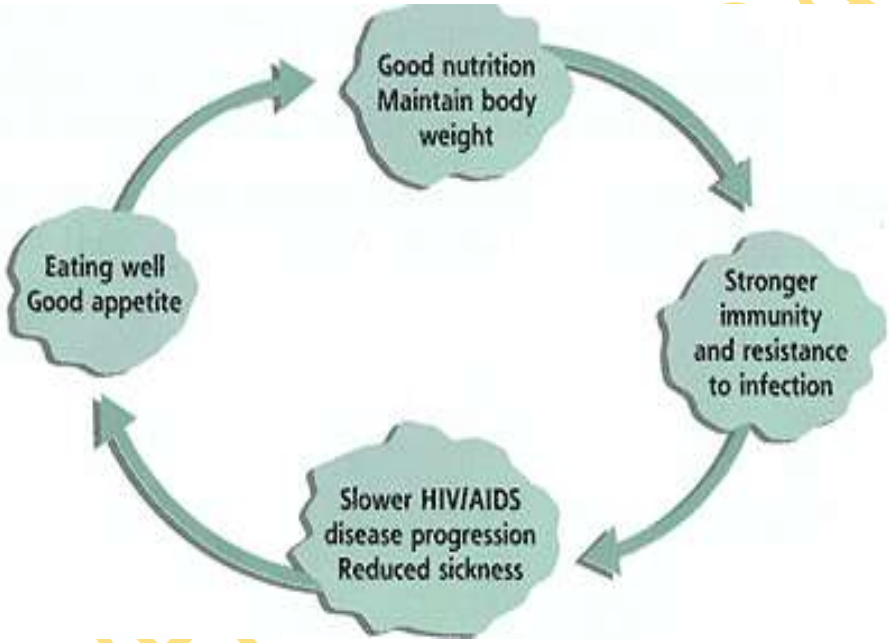



**Figure 2.5 Relationship between good nutrition and HIV/AIDS**

Source: Adapted from Piwoz and Prebel, (2000).

Good nutrition may contribute to slowing the progression of the diseases he concluded. And as such, nutrition education and counseling have been shown to be effective in improving body weight and body cell mass in PLWHAs (Rabeneck, Palmer, Knowles, Seidehamel, Harris, Merkel, Risser & Akrabawi 1998; McKinley, Goodman-Block, Lesser, & Salbe, 1994 and Dworkin, Wormser, Axelrod, Pierre, Schwartz & Seaton, 1990). It has also been shown that adequate nutrition in terms of energy, protein, fat and essential micronutrients may help mitigate the effects of HIV and AIDS–related symptoms such as diarrhea, nausea, vomiting, anemia, oral thrush, loss of appetite, and

fever (FANTA, 2004). This is because there is a strong relationship between nutritional status and immune system function and integrity (FMOH, 2011).

For HIV–positive women, optimal nutrition during pregnancy increases weight gain and improves maternal nutrition which, in turn, improves birth outcomes. For HIV–exposed infants, adequate nutrition counseling and support can lower the risk of HIV transmission from mother to child and increase HIV–free survival of infants (WHO, 2005a). For HIV–positive children, safe feeding practices and improved dietary intake are critical to regain weight lost during opportunistic infections. Periodic vitamin A supplementation in HIV–positive children also reduces illness and death and improves growth according to Piwoz (2004a).

However, diet history of Persons Living positively with HIV and AIDS are usually observed to assess the dietary intake levels, specifically the types and amounts of food eaten (including food accessibility, utilization and handling) and use of supplements and medications. So also factors that affect food intake, such as food availability, appetite, eating patterns, medication side effects, traditional food taboos, lifestyles (smoking, alcohol, physical activity, caffeine intake, use of social drugs), psychological factors (stress and depression), stigma, and economic factors. Lwanga (2001) said that recommendations for nutritional care and nutrition priorities vary, depending on the underlying nutritional status of the person and the extent of HIV disease progression.

Malnutrition, conditions of nutritional deficiency (including under-nutrition and micronutrient deficiencies) includes over-nutrition that impairs health, intellectual activity; adaptive behaviour, education, productivity and well-being, and can induce death (Horwitz, 1983). It can be related to various factors, such as infections which lead to poor appetite and mal-absorption, poverty, and lack of access to food, sanitation and/or health services (WHO, 1996).

### 2.5.1 Effects of HIV on nutrition

AIDS is well known for causing severe weight loss known as wasting. In Africa, the illness was at first called “slim” because sufferers became like skeletons. Yet body

changes are not only seen during AIDS; less dramatic changes often occur in earlier stages of HIV infection. The weight loss during HIV infection tends to be in the form of lean tissue, such as muscle. It has long been known that weight loss strongly predicts illness or death among people with HIV. In children, HIV is frequently linked to growth failure. This is in agreement with one large European Collaborative study, when concluded that children with HIV were on the average around 7.0kg (15 lbs) lighter and 7.5cm (3 inches) shorter than uninfected children at ten years old (European Collaborative Study, 2003).

HIV/AIDS affects nutrition in the following ways:

**Reductions in food intake** – Reductions in food intake may be due to painful sores in the mouth, pharynx, and/or oesophagus. Fatigue, depression, changes in mental state (sometimes due to specific nutrient deficiencies), and other psychosocial factors may also play a role by affecting a person's appetite and interest in food. Economic factors also affect food availability and the nutritional quality of the diet. Side effects from medications – including nausea, vomiting, metallic taste, diarrhoea, abdominal cramps and anorexia – also result in lower dietary intakes (Piwoz and Preble. 2000).

**Nutrient mal-absorption** – Nutrient mal-absorption accompanies frequent bouts of diarrhoea commonly experienced by people with HIV/AIDS. In addition, some HIV–infected people have increased intestinal permeability and other gut defects, even when asymptomatic, that contribute to nutrient mal–absorption. It is believed that HIV infection of the intestinal cells may also cause epithelial damage and nutrient mal-absorption. Mal-absorption of fats and carbohydrates is common at all stages of HIV infection in adults and children. Fat mal–absorption, in turn affects the absorption and utilization of fat–soluble vitamins further compromising both nutrition and immune status (Piwoz and Preble, 2000).

**Metabolic alterations** – Changes in metabolism may occur because of severely reduced food intake as well as from the immune system's response to HIV infection. Anorexia, fever, and the break down of muscle frequently accompany this response. When the body responds to invading pathogens, it releases pro-oxidant cytokines and other reactive oxygen species. This leads to the increased utilization of "anti-oxidant" vitamins

(vitamins A, E, C and beta-carotene) as well as utilization of several minerals that form antioxidant enzymes (such as zinc and selenium). Oxidative stress occurs when there is an imbalance between the pro-oxidants and anti-oxidants, causing further damage to cells, proteins, and enzymes. Oxidative stress is believed to increase HIV replication and transcription, leading to higher viral loads and disease progression (Piwoz and Preble, 2000).

**Increased energy and protein requirements** – The body's cytokine-mediated reactions to infection adversely affect energy and protein metabolism. The result is an increase in energy and protein requirements of people living with HIV and AIDS. This increase ranges from about 10-15% for energy requirements among asymptomatic HIV-infected persons, to up to 50% for protein requirements. This translates roughly into an additional 300 kcals. and 25g. of protein per day, this could be met through snacks or an extra serving of the family meal (Piwoz and Preble, 2000).

### 2.5.2 Nutritional implications of HIV/AIDS

**Disease progression**

Malnutrition, one of the nutritional problems increases both the susceptibility to HIV infection and the vulnerability to its various effects; any immune impairment because of HIV/AIDS leads to malnutrition and poor nutritional status (See figure 2.6)

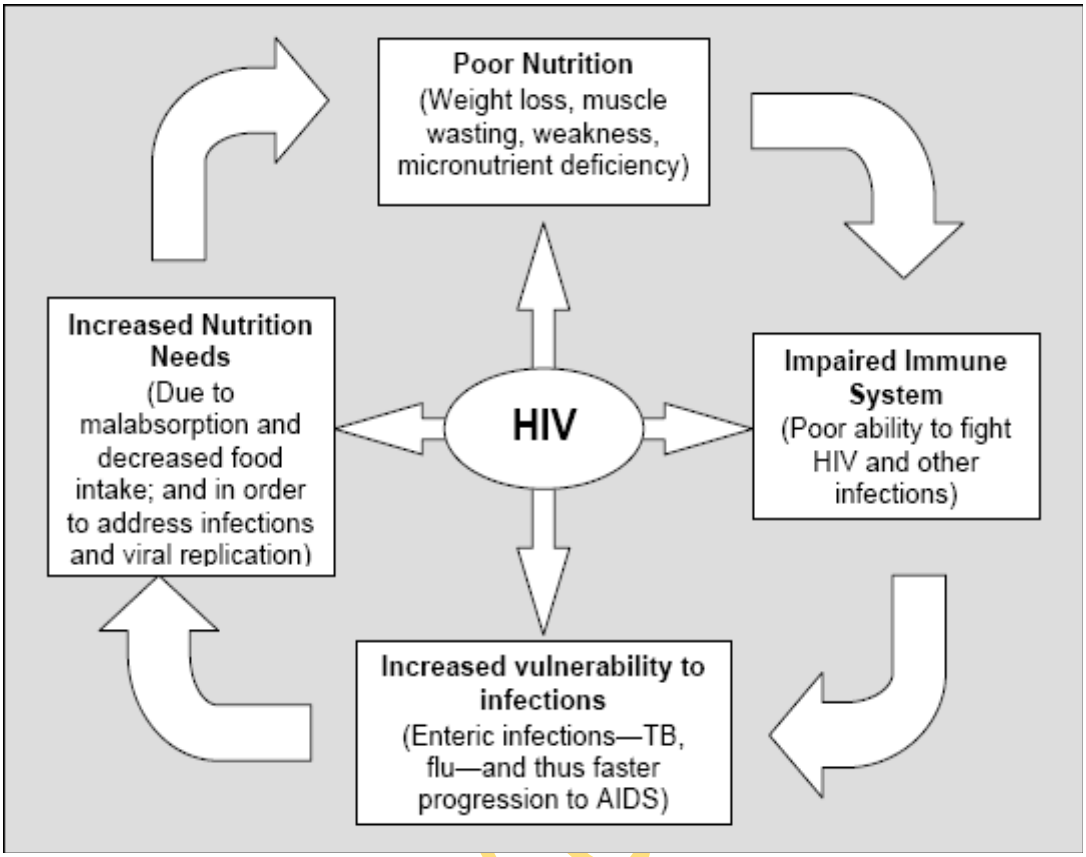



**Figure 2.6 The cycle of malnutrition and infection in the context of HIV and AIDS**

Source: FANTA Project, (2001). Paediatric AIDS, RSA Nutrition/HIV guidelines.

At an individual level, HIV infection essentially accelerates the vicious circle of inadequate dietary intake and disease that leads to malnutrition (See Figure 2.5). The overall effect is a spiralling deterioration of immune function and clinical status that contributes directly to repeated morbidity and the eventual early death of the infected individual unless the cycle is broken (FANTA Project, 2001). Timely improvement on nutrition therefore can help to strengthen the immune system, prevent weight loss, and delay disease progression. So it is of paramount importance that persons living with HIV and AIDS (PLWHA) have very good nutritional knowledge, positive attitude towards and adequate nutritional practices and access to nutritional care and support.

In order to maintain good nutritional status and help optimise immunity, nutritional deficiencies and loss of weight and lean body mass must be prevented or at least

minimised. Because evidence shows that some nutritional deficiencies can be reversed by timely and adequate nutritional therapy. Nutritional care and support for PLWHA can help manage HIV-related complications, promote response to medical treatment, delay disease progression, and increase the patient's quality of life by maintaining strength, comfort, level of functioning and dignity (James, 2000).

Malnutrition also increases the risk of HIV transmission from mothers to babies and the progression of HIV infection (Piwoz and Preble, 2000). Mother-to-child transmission (MTCT) or vertical transmission of HIV is a major nutritional issue. MTCT may occur during pregnancy, at birth, or via breastfeeding. In a recent study, exclusive breastfeeding has been seen to confer a significantly lower risk of HIV transmission than partial breastfeeding. Observational data, according to Coutsoudis, Pillay, Spooner, Kuhn, and Coovadia, (1999) have shown that three-month-old infants of HIV–positive women who were breastfed exclusively have the same risk of contracting HIV as infants who were never breastfed. In contrast, infants who were partially breastfed had a significantly higher risk. A follow-up prospective study of 551 HIV-infected pregnant women in South Africa has shown that infants exclusively breastfed for 3 months or more had no excess risk of HIV infection over 6 months than those never breastfed (Coutsoudis *et al*., 2001).

Several biological mechanisms could explain why exclusive breastfeeding might be protective compared with partial breastfeeding. These include reduced exposure of the infant to bacterial contaminants and food antigens, thus reducing immune activation (Cebra, 1999), increased integrity of the intestinal wall (Goto, Torun & Pearson, 1999), development of micro-flora that limit adhesion and growth of pathogenic organisms (Mackie, Sghir & Gaskins, 1999) and reduced risk of sub-clinical mastitis, which occurs during breast engorgement (Willumsen *et al*., 2000). Infants of mothers who have an adequate vitamin A status might have a reduced risk of vertical transmission (Friis, 1998). These are the predominant direct effects of HIV/AIDS and state of nutrition on infected individuals.

### 2.5.3 Effects of caring capacity and HIV/AID on the Nutritional Status

Care is shown by providing time, attention and support in the household and the community to meet the food and health needs of the adolescent and other family

members (FAO/WHO, 1992). In many poor households, even those uninfected by the pandemic, child-care may be compromised in the short term to ensure food security in the long term. Any adverse effects on the quality or quantity of child-care of such decisions are likely to be exacerbated by shocks such as HIV/AIDS, which may drastically reduce household caring capacity (FAO/WHO, 1992). These are other important indirect effects of nutrition at the household and community levels; which may be brought about by, for example, a diminished capacity of caregivers to care for themselves, their young children, or AIDS-infected household members (Coutsoudis *et al*., 2001).

Nutrition is essential to maintain health for all children; they require a high caloric intake to sustain growth. Increased caloric requirements due to stress, decreased nutrient absorption, and altered intake may, singly or in combination, lead to growth failure in children with HIV infection. Early identification of growth deceleration, and consultation with a paediatric nutritionist when it is identified, are integral components of comprehensive care for children with HIV infection. Similarly, according to Kristen (2003), when an HIV-positive woman becomes pregnant, additional nutritional considerations are warranted. Compared to routine prenatal nutritional assessment and intervention, pregnant HIV-positive women have increased needs to promote a healthy outcome (Kristen, 2003).

### 2.5.4 Meeting nutrient requirements by PLWHA

Food is essential for life, providing the fuel the body needs to function and the building blocks that make up cells, tissues, and organs. The energy provided by food is expressed in terms of calories. The body at any point in time requires a certain number of calories simply to carry out its basic metabolic functions such as respiration and maintenance of body temperature (ACC/SCN, 1998).

Additional calories are needed to support physical activity, fight infection, and rebuild damaged tissues. If a person does not take in enough calories, fat is broken down to provide fuel. Once the fat is consumed (or if an individual's metabolism is disrupted due to illness) lean body mass (muscles and organs) is then used for fuel and raw materials. Conversely, if a person takes in more calories than needed, the extra energy will be stored as fat (ACC/SCN, 1998).

The average person needs about 10-20 calories per pound (2.2kg) (depending on physical activity level and other factors) to maintain a stable body weight. HIV-infected individuals have higher nutritional requirements than normal, particularly with regard to protein (up to 50.0% increase), and energy (up to 15.0%). They are also more likely to suffer a loss of appetite, and anorexia, thus reducing dietary intake at the very time when requirements are higher. Research shows that the onset of the disease and even death might be delayed in well-nourished HIV-positive individuals, and diets rich in protein, energy and micronutrients help in building resistance to opportunistic infections in AIDS patients (ACC/SCN, 1998). However, not all food is equal; while all contain calories; different foods vary widely in the nutrients they provide therefore it is important to encourage and promote dietary diversification so that we can have adequate diet comprises of the following components.

**Carbohydrates:** The major energy-giving- foods in Nigeria are Carbohydrate-rich foods (e.g. staples, sugars), fats and oils. Staples make up the bulk of foods consumed by Nigerians and they are generally cheap and readily available. Carbohydrates are classified as simple or complex; complex carbohydrates take more time to break down, and thus provide fuel over a longer period. Despite the recent popularity of "low carb" diets, most nutrition experts recommend that carbohydrates – primarily complex ones – should make up at least 50.0% of one's total daily calorie intake. Simple carbohydrates are found in processed sugar, honey, fruit and juice, and lactose (milk sugar). Complex carbohydrates are found in grain products such as bread, pasta, and rice; legumes; and starchy foods such as corn, potatoes, winter squash, and root vegetables (ACC/SCN, 1998).

**Protein:** Protein provides the building blocks of lean body mass. When a protein-rich food is consumed, it is broken down into amino acids, which are reassembled to create enzymes, hormones, and bodily tissues. Most nutrition experts recommend that protein should contribute about 15.0–20.0% of the total calories in a person's diet. Good sources include meat, poultry, fish, eggs, dairy products, tofu, nuts, and legumes (e.g., dried beans, lentils). HIV infected asymptomatic and symptomatic people do not require additional protein beyond the intake level recommended for healthy non- infected people of the same age, sex and physical activity level. Data are insufficient to support an

increase in protein requirements due to HIV infection above normal requirements. (WHO Technical Consultation on Nutrient Requirements for People Living with HIV/AIDS, 2003)

**Fats:** Fat in food is a source of energy and has a high concentration of calories. Excess energy from any source (not just fatty food) is converted to fat in the body and stored for later use. Cholesterol (found in animal products like meat and eggs) and triglycerides are present in food, but are also produced when the body metabolizes sugar and saturated fat. Everyone needs some dietary fat, but getting too little is rarely a problem. More important is the type of fat. Saturated fats promote elevated blood levels of Low Density Lipoprotein (LDL) "bad" cholesterol, which can clog arteries and increase the risk of cardiovascular disease. Saturated fat is found in meat, butter, tropical oils (e.g., coconut, palm), and "trans" fats or hydrogenated oils (which are chemically altered to make them solid at room temperature). Polyunsaturated fats (found in safflower, sunflower, corn, and soybean oils) are generally considered more healthful, and monounsaturated fats (found in olive and canola oils, nuts, seeds, and avocados) can help raise levels of High Density Lipoprotein (HDL) "good" cholesterol, which protects against heart disease. A balanced diet also contains essentially fatty acids, including omega-3 (found in flax and cold-water fish). Most experts say fats should make up no more than 25.0 – 30.0% of total calorie intake, with less than 10.0% being saturated fat.

According to Seumo-Fosso and Cogill (2003), HIV-infected asymptomatic people should increase energy intake by 10 percent over the level of energy intake recommended for healthy, non HIV-infected people of the same age, sex, and physical activity level. HIV-infected symptomatic people should increase energy intake by 20.0 – 30.0% over the level of energy intake recommended for healthy, non HIV-infected people of the same age, sex, and physical activity level. The recommendation during the symptomatic phase range from 20.0 – 30.0% because energy needs increase as the disease progresses and opportunistic infections worsen.

**Fibre:** Also known as, "roughage," fibre is indigestible plant matter such as cellulose. Insoluble fibre plays an important role in digestion, helping food move smoothly through the colon (large intestine); this type of fibre is found in the skin and pulp of many fruits

and vegetables, whole grains, popcorn, and seeds. Soluble fibre helps stabilize blood sugar and may reduce LDL cholesterol levels; this type of fibre is found in oatmeal and oat bran, legumes, nuts, and fruits such as apples, oranges, pears, and grapes (ACC/SCN, 1998).

**Vitamins and minerals:** Along with the "macronutrients" described above, a balanced diet also contains many "micronutrients," organic and inorganic substances necessary for proper biological functioning. Water-soluble vitamins (B and C) are excreted in the urine and must be consumed more often; fat-soluble vitamins (A, D, E, and K) are stored in the liver and can reach toxic levels if taken in large doses. Most vitamins must be obtained from food, although the body manufactures vitamin D when the skin is exposed to sunlight and bacteria in the gut produce others. Minerals (including the electrolyte chloride, potassium, and sodium) are inorganic substances found in the environment. The body needs several trace elements in tiny amounts, including boron, chromium, cobalt, copper, iodine, manganese, molybdenum, selenium, and zinc. Cooking and processing can destroy some vitamins and minerals.

**Antioxidants:** Free radicals are unstable oxygen molecules that contain unpaired electrons. This allows them to set off damaging chain reactions when they bind with and "steal" electrons from other molecules in the body (a process known as oxidative stress). Antioxidants scavenge and neutralize free radicals. By disrupting the oxidation process, antioxidants help protect cells from damage. Antioxidants include vitamins C and E, beta-carotene, the minerals selenium and zinc, and glutathione.

**Phytochemicals:** Among the advantages of obtaining nutrients from a balanced diet rather than supplements is that there are substances in whole foods that may offer unrecognized benefits. While most vitamins and minerals were isolated early in the 20th century, plant compound called phytochemicals are now being discovered. Among these are allyl sulfides (in garlic and onions), anthocyanins (in blueberries and blackberries), carotenoids (including beta-carotene in orange fruits and vegetables, lycopene in tomatoes, and lutein in dark green leafy vegetables), catechins (the tannins in green and black tea), flavonoids (in dark chocolate, red wine, tea, and many fruits), isothiocyanates (in broccoli and other cruciferous vegetables), limonoids (in citrus fruits), and

sulforaphane (also in cruciferous vegetables). Some phytochemicals work as antioxidants, but others appear to have different mechanisms of action **(**Liz Highleyman, 2006).

Though micronutrient needs for people living with HIV/AIDS are largely unknown, the recommendation is not to exceed two times the recommended daily allowance (RDA). The following levels of intake have been recommended, and needs to be updated regularly as research findings are obtained.

- Vitamin A: 13,000 – 20,000. IU or 2 – 4 times the RDA (Vitamin A RDA = 5,000 IU)
- Vitamin E: 400 – 800 IU
- Vitamin B: High-potency vitamin B complex, e.g., B25 or B50 with Niacin and B6
- Vitamin C: 1,500 – 2,000mg
- Selenium: 200mcg
- Zinc: 1 RDA (12 – 19mg)

### 2.5.5 Foods that may aggravate HIV/AIDS Symptoms

However, some foods should be avoided because they aggravate the commonly occurring symptoms of HIV/AIDS. These foods may speed up disease progression through infections or have so little nutritional value that they do not help improve nutritional status (Lwanga, 2001).

Examples of such foods include raw eggs, and dairy products from unpasteurized milk that may contain bacteria, particularly Salmonella that are harmful to the already weakened immune system of the HIV-infected person; undercooked meats and chicken that may contain bacteria that are harmful to the already immune-compromised HIV-infected person and "Junk" foods such as chips, biscuits, and sweets that have little nutritional value, and sweets and sugar that may promote the growth of fungi (thrush).
Others are alcohol and coffee that decrease appetite and interfere with metabolism. Alcohol may interact with some medications, decreasing their efficacy; smoking may increase the amount of free radicals in the body, which may be injurious to it; and expired foods, acidic foods, foods with preservatives, and oily foods that aggravate symptoms related to diarrhoea, nausea or vomiting, loss of appetite, and mouth and throat sores (Lwanga, 2001).

## 2.6 Nutritional status and Anthropometric indices

Nutritional status is defined as the measure of adequacy of nutrient intake of an individual or a population in relation to their health (Horwitz, 1983). Assessing the nutritional status of groups of children is an essential part of monitoring the health of a community (WHO, 1996). Nutritional assessment in the community serves as appropriate data gathering processes to enable accurate planning and implementation of interventions to reduce morbidity and mortality associated with under-nutrition (Horwitz, 1983). Good nutrition improves quality of life and health of PLWHA. This is why it is important to monitor nutritional status of an individual (WHO, 1996).

Nutritional assessments of people living with HIV and AIDS are necessary because they experience changes in body composition (decreased weight and body cell mass and fat accumulation), morbidity status that may affect eating and food utilization, and food intake. They are conducted to; identify and track body composition changes and trends to determine the effectiveness of nutrition therapy in slowing the progression of disease; offer tailored treatment and management based on the assessment result and address concern and fears about physical health status.

Anthropometric measurements remain the most practically useful means for the assessment of the nutritional status of a population (WHO, 1996). The use of appropriate anthropometric indicators allows the identification of the nature and extent of protein energy malnutrition in the community. Therefore, for PLWHA the following anthropometric measurements are to be conducted regularly to assess and monitor body weight and composition. These include Percentage change in weight or Body Mass Index (BMI) over time to gauge wasting and lean body mass measurement to establish the proportion of body composition that is muscle. Body cell mass is a comparison of weight and volume; circumferences of the waist, hips, mid-upper arm, and mid thigh as indicators of wasting or body composition, and skin folds measurements, which can provide an estimate of total body fat. Another body circumference that should be measured is the fat accumulation behind the neck, known as the “buffalo hump.” This is caused by fat mal-distribution because of altered metabolism in ART, and is associated with wasting.

Although weight is often used to measure body mass or composition, obvious sources of error in the context of HIV and AIDS include fluid overload (e.g. severe renal or hepatic disease, hypo-albuminemia, or intravenous hydration) or fluid deficits (e.g. dehydration from diarrhoea or poor fluid intake). Body weight measures are therefore not the most effective for differentiating between changes in lean tissues or fat. Measures of body cell mass (the metabolically active tissue compartment in the body) are superior to body weight measures in the presence of HIV infection because they correlate better with mortality.

### 2.6.1 Body Mass Index (BMI)

The BMI is one of the simple techniques suitable for the assessment of the nutritional status of adults aged 20 – 60 years in emergency-affected populations. BMI is based on a weight-to-height ratio that is considered a good index of body fat and protein stores. Body stores are of interest because they reflect the stores needed to cope with physiological stress due to reduced intake and increased demands due to increased activity, and diseases. Thus, BMI is an equation that relate weight to height (weight in kilograms divided by height in meters squared) or BMI = Weight/Height$^2$ (kg/m$^2$). Adults who have a healthy nutritional status would be expected to have body stores or BMI within a certain range. BMI below 18.5kg/m$^2$ indicates that a person is **underweight**; 18.5 – 24.9kg/m$^2$ are **normal weight**; 25.0 – 29.9kg/m$^2$ are **overweight**; and 30.0kg/m$^2$ or above are **obese** (WHO, 1996).

Quetlet (1871) first introduced this in order to eliminate the confounding effects of height on weight. In normal adults, the ratio of the weight to the square of height is roughly constant, and a person with a low BMI is underweight for their height. BMI reflects protein and fat reserves, which in turn reflect functional reserves including the ability to survive nutritional deficit and some diseases.

BMI may be appropriate for population-level assessments of chronic under-nutrition. In 1988, researchers proposed the use of BMI to define and diagnose chronic under nutrition**.** This classification provides a useful framework for the analysis of height and weight data from chronically undernourished adult populations (Food & Nutrition Library version 3.0, 2004).

There is an increasing body of evidence that low BMI is related to both increases in morbidity and mortality and, in fertile-age women, to the chances of having low birth weight babies. In addition, BMI is known to be highly correlated with both fat and fat-free mass, although these associations may vary with age, sex and ethnicity. It is important to realise that, to date, no consensus on a definitive method has been reached; none of the anthropometric indices described above can be considered a gold standard, although Body Mass Index (BMI) has often, mistakenly, been treated as if it were. Opara, Umoh, & John, (2007) corroborate this, in his study, when concluded that anthropometric parameters alone were not a good index of the health status of PLWHA, because their anthropometric parameters did not reflect the clinical status of the respondents.

**Weight:** The use of weight alone to assess nutritional status should be limited to monitoring purposes because it is confounded by height. Weight is appropriate for monitoring the progress of patients suffering from long-term morbidity, recovering from disease or surgery, or during nutritional rehabilitation within a therapeutic feeding centre. To measure weight the scale pointer must be at zero before taking a measurement, the person is required to dress in light clothes and take off shoes. Women should remove scarf, stand straight and unassisted on the centre of the balance platform; and the weight should be recorded to the nearest 0.1kg.

To measure height, the person is required to remove his/her shoes, stand erect, looking straight in a horizontal plane with feet together and knees straight. The heels, buttocks, shoulder blades and the back of the head should touch against the wall; and it should be recorded to the nearest 0.5cm (FANTA, 2005).

However, knowledge, being a range of information acquired by someone, or a person's understanding of the subject as backed up by a theory, suggests that the more directly related a particular area of knowledge is to behaviour, the more likely it is to have an impact on that behaviour, and also the more on the practices (WHO, 1988; Rokeach, 1976). In the findings of Wahba, Anaafa, Saleh, Mekkawy and Ahmed (2006), 90.9% of respondents believe that food and nutrition play a great role in maintaining or improving overall health, male respondents were more knowledgeable than females (67. 7% and 62.

1% respectively). It was reported that 85% of the respondents believe in the health benefits of certain foods, and 90% are interested to know more about functional foods. On a neutral ground, two groups of researchers conducted meta-analyses of studies examining the relationship between nutritional knowledge and health benefit. They both found significant relationship, although the estimated effect-sizes were small. Axelson *et al*., in Morton (1997) hypothesized that among the possible reasons for the small effect-sizes were problems of measurement with the variables under examination and/or a lack of correspondence between the measures of dietary intake and knowledge or attitudes.

Lack of correspondence between measures may be a problem in many studies, since nutrition-related knowledge is a broad area that can range from an understanding of the chemical structure of a nutrient to a practical ability to prepare tasty low fat meals. In a longitudinal study of factors predicting dietary change, Smith *et al*., in Morton (1997) found improvement in applied knowledge of food selection to be significantly associated with dietary change. Other types of nutrition-related knowledge, such as awareness of diet-disease relationships and knowledge of food guide serving recommendations were found to have significant effects on dietary status.

Increase in parents' nutrition-related knowledge has also been found to lead to improvement in the diets of their children. Koblinsky *et al*., in Morton (1997) found that nutrition education programs can have a positive effect on Head Start parents' nutrition-related behaviours and can lead to improvement in the diets of children who have been eating fewer than the recommended number of servings of nutritious foods.

Lucy Kibaki (2007) at a ceremony to award the nutritionist of the year in Nairobi, organized by Kenya Coalition for Action in Nutrition –KCAN, (2007), noted that lack of nutritional knowledge among people is a major cause of malnutrition in the country. She further called on Kenyans to create a culture of health. Kenya's First Lady, Mrs. Lucy Kibaki that encourages self individual diet and exercise plans which will help prevent disease and malnutrition. Citing statistics of the world health organization WHO, the First Lady said, poor nutrition causes nearly one in three people to die pre maturely or suffer disabilities.

She therefore called for increased measures to educate people on the need to embrace healthy dietary practices noting that a regular intake of proper mix of nutrients enables human bodies to resist infection and illness. In this connection, the First Lady urged Kenyans, particularly those living with HIV/AIDS to ensure they have a well balanced diet that contains all the nutrients the body needs. According to the First Lady, "A well balanced diet will increase their resistance to infection, boost their immune system, improve the response to treatment for opportunistic infections and delay the rate of progression of HIV/AIDS." She noted that in spite of the knowledge that lack of proper diet makes an individual vulnerable to diseases, unhealthy diet, particularly insufficient nutrient intake has continued to be a major source of poor health in Kenya and the world in general. The First lady admonishes all Kenyans in general to observe good nutrition, which include regular exercise, avoidance of smoking and excessive alcohol as well as avoidance of fast foods that are deficient in nutrients.

Beside ignorance, the First lady noted that poverty is another major cause of malnutrition which has made it impossible for most people to access basic necessities such as a balanced diet, health care, safe drinking water and sanitation. “Worldwide, it is currently estimated that more than 1 billion people live below the poverty line and are therefore unable to afford nutritious food for themselves and their families" (Lucy, 2007). She at the same time called upon the food industry to fully shoulder its primary responsibility for producing safe and healthful foods and making sure that all products are handled properly until they reach the consumer. Also that it is essential that consumers understand their role in ensuring food safety saying consumers must know how to handle and prepare foods to ensure they are safe. She added that, this is the only sure way to overcome many health challenges.

In a study in Uganda which aimed to investigate the gaps in nutritional knowledge, attitudes, and practices and their relationship with socio-demographic characteristics in an urban population of women living with HIV and AIDS in Uganda, most women (89.5%) reported being trained on the importance of nutrition for people living with HIV and AIDS (PLWHA) and 99.5% believed that it is very important to consume a balanced diet (Bukusuba, Kikafunda and Whitehead, 2010). On the contrary, only 21.8%

consumed at least three meals per day and 39.8% at least six food-groups. They also reported higher dependency on starchy staples while foods of animal origin and fruits that play vital immunity and protective roles were inadequately consumed. The results of bivariate analysis of the study indicated that consumption of a diversified diet was significantly associated with access to food-aid (p=0.006), possibly because access to food-aid reportedly enhances the ability of the household to access other food items (Bukusuba, Kikafunda, & Whitehead, 2010).

In another study on the nutritional knowledge and attitudes toward food and nutrition of non-institutionalized elderly persons, findings were then examined in relation to these individuals' actual dietary behaviour, measured as nutrient intakes and the purchase of healthy foods and vitamin/mineral supplements (Grotkowski & Sims, 1978). On the basis of data from three-day food records per participant from three groups of elderly, it was found that, with the exception of energy and calcium intakes mean nutrient intakes were satisfactory. Those who ate with others and who consumed more snacks had the most satisfactory diets. Socioeconomic status and nutritional knowledge were the key independent variables as regards nutrient intake. A pattern of attitudes and beliefs, such as a belief that nutrition is important, a tendency to regard food and supplements as medicine, a belief in taking vitamin/mineral supplements, and weight-reducing misconceptions, acted as intervening variables to mediate the link between the independent variables and the dependent variables (dietary practices) (Grotkowski & Sims, 1978).

Wiita & Stombaugh (1996) conducted a study to examine changes in nutrition knowledge, intakes, attitudes, and behaviours as well as health status of 22 female adolescent runners. Over the period of the study, respondents experienced physical growth and improved athletic performance. Although their mean score on a test of basic and sports nutrition knowledge remained stable at 67%, after 3 years more runners correctly responded to statements about carbohydrate and fat. However, few responded correctly to statements regarding fluid intake and skipping meals. Although runners increased the percentage of calories consumed as carbohydrates, they significantly decreased their mean energy intake, thus lowering carbohydrate intake. They

significantly lowered protein, calcium, potassium, and sodium intakes. The incidence of possible eating disorders increased, as did stress fractures. Over 3 years, nutrition knowledge did not improve, the quality of dietary intakes decreased, incidence of eating disorders and stress fractures increased, and menstrual irregularities remained high.

In a related study on the food practices and nutrition knowledge of high school athletes currently participating in interscholastic sports and differences in terms of selected sports variables, the results of the study indicated that the female athletes had better knowledge of nutrition but poorer food practices than the male athletes (Douglas & Douglas, 1984). There were also significant relationship between sport forms, seasons, and nutrition knowledge and food practices. High school athletes perceived their best source of nutrition knowledge to be their parents. Also results on the nutrition knowledge component of the instrument showed that, out of 48 possible answers, the correct mean was 26.4, while out of a possible score of 5, the mean score for food practices was 2.2. Because a positive relationship existed between the number of sport seasons and nutrition knowledge and food practice scores, sport participation may be a catalyst for learning about nutrition (Douglas & Douglas, 1984).

Knowledge and adequate practice of nutrition and its influence on health and longevity is important most especially relating to People Living with HIV/AIDS. It may seem logical that higher levels of nutrition knowledge, more favourable attitudes toward nutrition and adequate nutritional practices would be associated with better diet quality which will invariably reduce rate at which HIV degenerate to AIDS.

However, beside nutritional knowledge, other factors that play important role in adequate nutritional practices include Socio-Economic Status (SES). Given that SES is a complex construct which includes; income, education and occupation (Adler, Boyce, Chesney, Folkman, Kahn & Syme, 1994), therefore, it is important to try to establish the contribution of different socio-economic variables to the variation in nutritional knowledge, adequate nutritional practices and nutritional status. As Lars, (2009) concluded in his study, that higher educational level and being socio-economically better off were associated with more beneficial infant feeding practices.

## 2.7 Conceptual framework

Theories and models are very important tools in health education, basically because they provide the basis for understanding individual behaviour and those factors that influence such behaviour enabling programmes to be developed to provide solutions and basis for planning appropriate intervention (Brieger, 2002).

Theory has been considered a systematic organized knowledge applicable in a relative wide variety of circumstances devised to analyzed, predict or otherwise explain the nature of behaviour of a specified set of basically considered as a virtual construct of proposed causal linkages among a set of concepts believed to be related to a particular public health problem. Mcleroy, Bibeau, Steckler & Ganz (1988) emphasizing the important of models within the context of an ecological perspective stated that behaviour results from interaction between the individual and the environmental determinants. Such as biological perspective stated that behaviour results from the interaction between the individuals and the environment determents such as biological, physical, socio-cultural and structural sphere, which facilitates it. This position therefore means that in planning research and interventions programmes in health education, it is vitally important to consider not only the individual and his micro-level factor, but influential environment and social forces that are involved in generating or facilitating the individual's behaviour. Most models accommodate a combination of certain aspects of theories within it construct which enable clearer understanding and diagnosis of health behaviours.

### 2.7.1 The PRECEDE Framework Model

The PRECEDE framework or model was developed by Lawrence Green and his colleagues for problem solving and the facilitation of health education programme planning. The acronym PRECEDE means "Predisposing, Reinforcing and Enabling Constructs in Educational/Environment Diagnosis and Evaluation" (Parent, Kahombo, Bapitani, Garant, Coppieters, Levêque, & Piette, 2004). Developed in 1970s, this component of the model posits that an educational diagnosis is needed to design a health promotion intervention, just as a medical diagnosis is needed to design a treatment plan (NIH, 2005). The PRECEDE model emphasizes planning interventions by focusing on the expected outcomes of actions based on epidemiological, social, behavioural,

environmental, educational, organizational, administrative and political diagnoses of a social, health and/or educational situation.

The PRECEDE model is a useful and an appropriate framework for the planning and implementation of programmes to encourage healthy behaviours. It provides a road map for designing health education and health promotion programmes (Anderson and McFarlane, 1988; Green and Kreuter, 1991; Hazavehei, 2003).

According to the framework, any behaviour is caused by some behavioural antecedents. These antecedents could be differentiated into three typologies – predisposing, enabling and reinforcing factor (Green and Kreuter, 1991).

**Predisposing Factors**

The predisposing factors, which influence behaviour, include knowledge, attitudes, values, and beliefs. The presence or absence of knowledge about adequate nutrition, attitudes to food and nutrition, and the prevailing beliefs relating to food and nutrition can therefore influence the way anybody perceives food or adequate nutritional practices (Green *et. al*., 1991).

**Reinforcing Factors**

The enabling factors refer to the presence or absence of resources. The examples of resources of interest include money, foodstuff, skills in preparing food and facilities. The presence or absence of any of these variables has potentials for influencing the behaviours of PLWHA or their caregivers to adequate food and nutritional practices.

**Enabling Factors**

The third typological factors; the reinforcing factor, refers to the influence of the significant others such as the parents, neighbours and friends. The significant others have high potentials for influencing the way PLWHA perceive good food and good nutritional attitude (Green *et. al*., 1991).

The PRECEDE framework is appropriate for this study because it contains all the necessary variables needed to be measured from the respondents. These include the following variables for assessment: knowledge on adequate nutrition, health benefits of adequate nutrition, food safety measure and the relationship of adequate nutrition to the

progression HIV/AIDS; attitude such as attitude of the respondents towards twenty one (21) statements with regards to HIV/AIDS and malnutrition, food intake and adequate nutrition and practices in relating to nutrition such as good nutrition and food safety practices among People Living with HIV and AIDS. Also other variable such as socio-economic variables such as level of education, occupation and income (money), time, and significant others who influence the behaviours of the respondents are inclusive.

PLWHA and significant others, good nutrition knowledge and positive attitude toward and adequate practice nutrition will create a positive behavior that will encourage the desire for eating healthy foods. This will in turn allows for normal nutritional status, development of immunity against HIV and other infections, good health and better quality of life.

The provisions of reliable infrastructures such as potable water, good sanitation, economic empowerment through education and creation of employment are impetus required to check or prevent wasting and quick breaking down due to opportunistic infections. Having good knowledge, positive attitude towards adequate nutrition with adequate nutritional practices, and living in a conducive/clean environment may have a positive influence on PLWHA. All these put together improves the quality of life of PLWHA in terms of living healthy without breaking down easily at all time as showed in the model. This is why the PRECEDE model has been adapted to facilitate the conduct of this study (See figure 2.7).

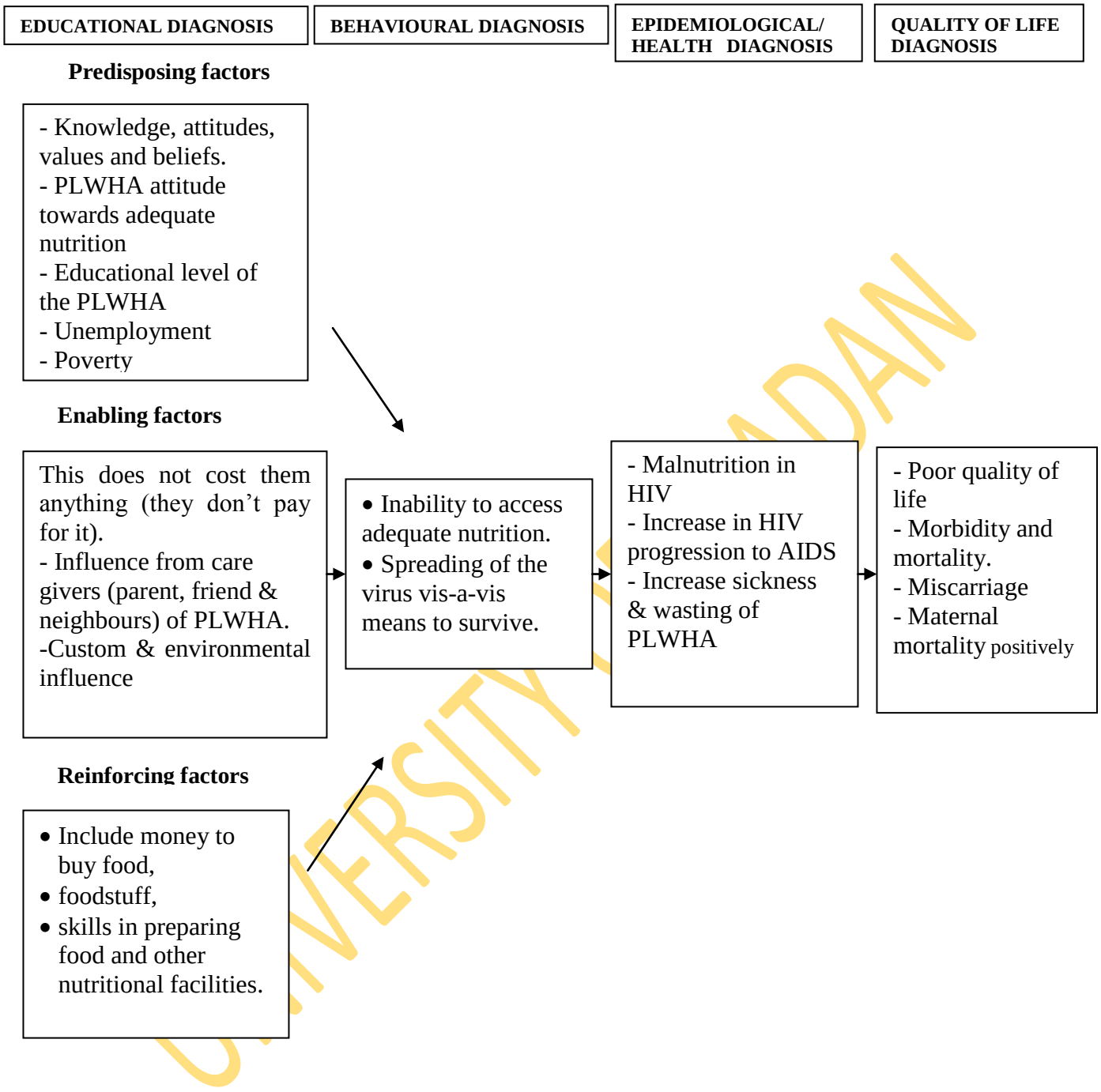



**Figure 2.7: PRECEDE framework adapted to explain Knowledge, Attitude and Practices relating to Nutrition among PLWHAs**

Source: Concept adapted from National Institute of Health, (2005) Theory at a glance: A guide for health promotion practice. National Institute of Health. U.S. Department of Health and Human Services.

## 2.8 Conclusion

Having considered how HIV and AIDS have posed various medical, nutritional, social and economic problems; poor nutritional knowledge and dietary practices common among the most affected households and nutritional status were discovered to significantly contribute to the rapid progression of HIV and opportunistic infections that always accompany it. Very little data exist concerning these aspects of nutrition among People Living with HIV and AIDS in resource-limited settings, such as Nigeria and other sub-Saharan Africa countries. Hence, the justification for this study is contingent upon the importance of adequate nutrition to PLWHA for their nutritional status, wellbeing and longevity.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Study Design and scope

The study was descriptive and cross-sectional, designed to determine the relationship between the knowledge, attitudes and practices in relating to nutrition and the nutritional status of the People Living with HIV/AIDS (PLWHA).

## 3.2 Study Site/Location

The study was conducted at some selected Anti-retroviral (ARV) Therapy Clinic Centres in Ibadan (Oyo State Capital) and Shaki, Oyo State, Nigeria. Oyo State is one of the 36 states in Nigeria with a population of 5,591,589. The male population in year 2006 census was 2,809,840 while the female population was 2,781,749 (NPC, 2006). Oyo State is located in the South West of Nigeria, bounded by Ogun, Osun, and Kwara States as well as the Benin Republic. (See figure 3.1). It is 150km from Lagos and 659km from Abuja. The State is highly urbanized and Yoruba ethnic group dominates the population of the State. However, Oyo State has significant population of non-Yoruba such as Hausa, Ibo, Nupe, Ijaw, Edo, Urhobo as well as non-Nigerians. Oyo state is one of the Border States in Nigeria as it shares international border with the Benin Republic. The state is divided into 33 administrative units (Local Government Areas). The population distribution is about 40% urban and 60% rural.

Ibadan (Oyo State Capital) is the largest city in West Africa with about 2,663,096 population size for the entire Ibadan in 2006 (NPC, Ibadan, 2006). In 2009 population census, a total number of about 2,559,853 were estimated as current population of Ibadan land. Shaki (Headquarter of Shaki West Local Government Area), the second study location is the largest community in the rural area of Oyo State having about thirteen (13) other LGAs around her with population size of about 1.7 million people (NPC, 2006). Shaki in Shaki West LGA, Oyo State, is unique because it attracts a large number of people since she shares international border with the Benin Republic.

The ARV Therapy Clinic Centres selected for this study were Adeoyo Maternity Hospital, Ibadan, in Ibadan North Local Government and the State Hospital, Shaki,

headquarter of Shaki West Local Government. These study areas were selected in order to include an urban as well as some rural areas within Oyo state.

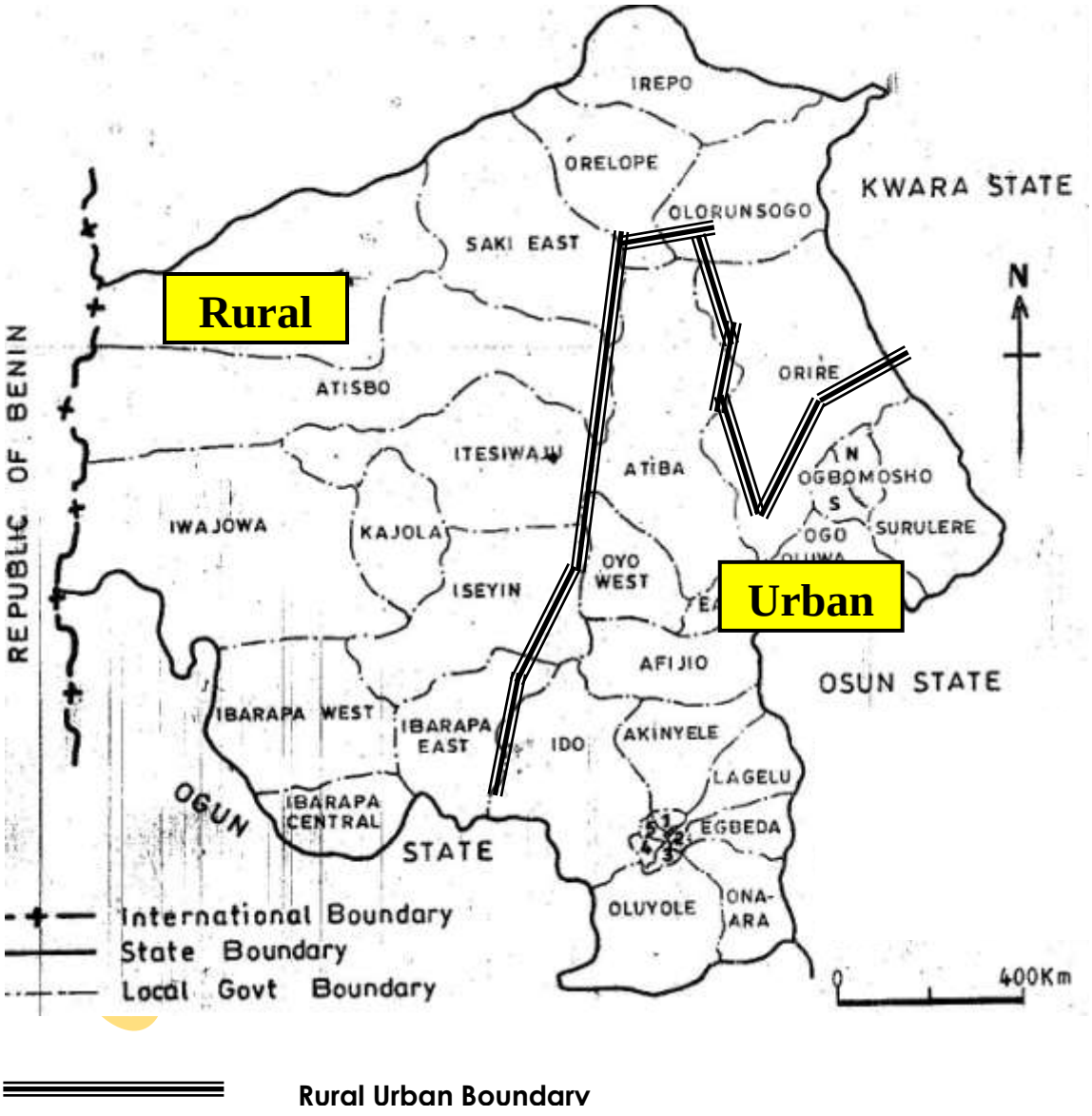



**Figure 3.1: Map of Oyo state showing the study areas (urban and rural areas)**

### 3.3 Study Population

The study population consisted of the adults and the adolescents living with HIV/AIDS who were attending the selected treatment centres as out patients and also satisfied the inclusion criteria.

#### 3.3.1 Inclusion criteria

Only adults (above 19years) and adolescents (10 – 19 years) who were confirmed to be HIV positive and were also attending the ARV Therapy Clinics of Adeoyo Maternity Hospital, Ibadan or the State Hospital in Shaki (headquarter of Shaki West LG) and gave their consent to participate in the study, were included in the study.

#### 3.3.2 Exclusion criteria

People living with HIV/AIDS who were less than 10years, and those who refused to give their consents to participate in the study were excluded.

### 3.4 Sample Size and Sampling Procedure

In order to obtain a representative sample of the population for the study, all the six ARV Therapy Clinics located in Oyo State were stratified into urban and rural clinic centres according to their locations as shown bellow.

The list of ARV clinics in Oyo State based on their locations:

**Urban**

a). State Hospital/PEFAR ARV Therapy Clinic, Ogbomosho

b). State Hospital/GHAIN ARV Therapy Clinic, Oyo

c.) Adeoyo Maternity Hospital/PEFAR ARV Therapy Clinic, Ibadan

d.) UCH/PEFAR ARV Therapy Clinic, Ibadan

**Rural**

a). State Hospital/GHAIN ARV Therapy Clinic, Shaki

b). Baptist Hospital/PEFAR ARV Therapy Clinic, Shaki

One ARV centre was selected by balloting from each of the strata (urban and rural).

**Sample size**

In order to obtain the sample size of the population to be studied, the following procedures were followed:

**Step 1**: A Preliminary survey was conducted to document the various activities at the ARV Therapy Clinics selected.

**Step 2**: Contacts were made with the PLWHA; frame of reference was generated from all the centers where sample size was generated.

**Step 3**: The sample size for the study was calculated using the following formula:

$$n = \frac{z^2 * p\,(1 - p)}{d^2}$$

Where n = sample size

z = confidence level at 95 % (standard value of 1.96)

p = reasonable estimate of key proportions 60% or 0.60

d = margin of error at 5% (standard value of 0.05) (Copied from Adegbite, 2006).

Therefore using this formula, Sample size for the study was calculated as follow:

$$n = \frac{1.96^2 * 0.6\,(1 - 0.6)}{0.05^2} = \mathbf{368.79}$$

The number was rounded up to **405** respondents to make room for attrition or incomplete responses.

## 3.5 Sampling Procedure

In view of the fact that calculated sample size was four hundred and five respondents (405), selection was from selected urban and rural center of the study locations in the proportion of 205 to 150 respectively using Systemic random sampling. Two hundred

respondents (200) from the urban centre (Ibadan) and One hundred and fifty (150) respondents from the rural centre (Shaki) who met the inclusion criteria and also gave their informed consent to participate in the study participated at last and were selected alternatively, as they were waiting to see their physician in each centre.

### 3.6 Instrument for Data Collection

A semi-structured, interviewer-administered and pre-tested questionnaire was developed based on the study specific objectives and used for data collection (See Appendix II). The questionnaire was categorized into five sections (sections A–E).

Section A focused on the Socio-economic and demographic characteristics of the respondents such as age, sex, ethnicity, marital status, educational level, occupation and income.

Section B consists of a 58-point nutritional knowledge scale items for assessing the respondents' knowledge on adequate nutrition, health benefits of adequate nutrition, food safety measure and the relationship of adequate nutrition to the progression HIV/AIDS.
Section C was structured using a 5–point Likert scale ranging from strongly agree, agree, indifferent, disagree to strongly disagree to collect information on the attitude of the respondents towards twenty one (21) statements with regards to HIV/AIDS and malnutrition, food intake and adequate nutrition;

Section D focused on 22–point nutritional practices statements regards good nutrition and food safety practices by the respondents. While the last section, section E was designed for the anthropometric indices record such as height and weight to determine the respondents Body Mass Index, (BMI) and also the waist circumference of the respondents. (See Appendix II and IV for English and the Yoruba versions respectively).

#### 3.6.1 Validity and Reliability of the instruments used for data collection

Several measures were taken to ensure that the instrument used was valid and reliable. Experts in human nutrition, medical sociology, psychology, medical statistics and health promotion and education were consulted to review the instruments used for the study. The instrument which was developed in English version was translated to Yoruba by

experts in both English and Yoruba. The Yoruba version was later translated back to English by another expert in Yoruba and English to ensure that the instrument was well translated for the better understanding of the respondents. This was done to avoid losing the meaning of the items on the questionnaire during the process of translation. (See appendix II and IV for English and the Yoruba version). The investigator also reviewed the Yoruba and English versions for accuracy.

In addition, an in-house pre-testing of the questionnaire was carried out among colleagues and lecturers for useful criticism and suggestions. Another step taken to promote the validity and reliability of the data collected was the training of Research Assistants (RAs) who are Registered nurses and midwives by profession. Four RAs were recruited and trained. The training focused on the following: overview of HIV and AIDS, nutritional requirements of PLWHA, the right attitudes to nutrition, the good or adequate practices to ensure food safety and good nutrition.

The RAs' understanding of the elements of the questionnaire was also enhanced by explaining what each question is seeking to achieve, how it should be asked, as well as how answers should be recorded. Discussions, questions and answers, and role-plays were the training methods adopted. The training lasted for 2 days. The trainees were also involved in the pre-testing of the questionnaire. The training was an experiential learning opportunity created to sharpen the RAs interviewing skills and to get them acquainted with the challenges of conducting interviews.

The two versions of the instrument (the English and Yoruba version) were pre-tested among 40 respondents in the ARV Therapy Clinic in Oyo Township. The clinic in Oyo has similar characteristics with ARV Therapy Clinic in Adeoyo Maternity Hospital, Ibadan and that of Shaki because the clinic is also a GHAIN project/centre.

To confirm the reliability of the instrument, analysis of the pre-test data was performed using Cronbach's Alpha correlation coefficient of the Statistical Package for Social Sciences 15.0 –SPSS 15.0. Alpha (Cronbach's) is a model of internal consistency, based on the average inter-item correlation (http://www.spss.com). This was done to ascertain

the psychometric properties of the instrument. According to this approach, a result showing correlation coefficient equal to or greater than 0.05 is accepted to be reliable. The result of the analysis of the pre-test data was 0.742 which shows that the instrument was very reliable.

### 3.6.2 Ethical Considerations

Ethical approval was obtained from the Ethical Committee of the Oyo State Ministry of Health, Ibadan (See appendix V). The purpose of this was to ensure that the proposal conformed to the generally accepted scientific principles and international ethical guidelines related to human subject researches.

Informed consent was obtained from the respondents. Respondents had the choice of participating or withdrawing their consent freely at any time. Confidentiality of each participant's responses was maintained during and after the collection of data; only registration numbers was assigned to each questionnaire and no name was required on the questionnaire (See Appendix II). The registration numbers were used to facilitate data entry and analysis and no one could link the identity of the participants with the registration numbers.

## 3.7 Data Collection

The data collection process involved the following steps:

1. Identification / visits to each of the clinic
2. Paying a courtesy call on the head of each clinic to intimate him with the commencement of the study and to seek for permission to conduct interviews
3. Administration of the questionnaires to the respondent
4. The retrieving of the questionnaires from the participants, immediately after completion and reviewing for completeness.
5. Anthropometric assessment of weight, height and waist circumference of each respondent and recording on their questionnaires

Visits were made to each of the two centres used for the study which include Adeoyo Maternity Hospital /PEFAR Clinic, Ibadan and the State Hospital/GHAIN Clinic in Shaki in the company of the research assistants who were Registered nurses and midwives. This

was done to obtain permission and to establish rapport with the managements of the centres as well as the association of PLWHA, and also to intimate them with the study objectives prior to the interview. The researcher with the assistance of the trained RAs did the administration of the questionnaires. The questionnaires were interviewer administered or self-administered, depending on the respondents' choice of mode of interview. The researcher in collaboration with the RAs assisted the respondents as necessary while filling the questionnaires. Data collection was carried out within a period of two months. The respondents were interviewed at the clinics at a time considered convenient for them and in a place within the premises that ensured confidentiality, while some collected the questionnaire, filled them at a time considered convenient and returned them later. However, some of these respondents withdrew their informed consent to participate along the line due to fatigue and time taking to interview them which they complained was too long. Also because there was no insentive attached to their participation some withdrew their already given informed consent; and this was the main reason why the maximum sample size of 405 could not be met. The questionnaires were checked immediately after completion to ensure that they were properly filled and all the questions were answered.

### 3.7.1 Anthropometric Assessment

A bathroom scale with accuracy of 0.5kg was used to measure the body weight of each respondent. Heights were measured using a wooden Stadiometer marked in centimetre – (0.01m) and a non-stretchable steel measuring tape was used to determine the respondents' waist circumference.

## 3.8 Data Management and Analysis

A serial number was assigned to each of the questionnaires for easy identification. The quality of Information collected was checked at the field. This involved reviewing the responses of each participant as recorded in the questionnaire. Problems discovered during data collection were solved immediately on the field.

Using coding guide, the edited questionnaires were coded and the data in each questionnaire was analyzed using descriptive and inferential statistics such as frequency,

mean with their standard deviations, ranges and percentages using SPSS version 15.0. The associations of the variables assessed (Socio-economic variables– education, occupation and monthly income, nutritional knowledge and nutritional practice) with the nutritional status of the respondents were evaluated using Chi-square test.

For evaluating the level of nutrition knowledge, the respondents were asked fifty eight (58) questions; one and zero scores were awarded for correct and wrong answers for each question respectively. The maximum score was 58. Respondents who scored < 29 points were categorized or described as having "poor" knowledge, those who scored between 29–34 points were categorized as having "fair" knowledge and those with 35–40 points were listed as having "good" knowledge while those with 41 and above points were categorized as having "very good" knowledge.

The attitude of the respondents was summarized into three categories as follows: Strongly agreed and agreed = Agreed (positive attitude), strongly disagreed and disagreed = disagreed (negative attitude) and Indifference as the third category. Similar to nutritional knowledge, one and zero scores were awarded to correct and wrong answers for each question relating to nutritional practices of the respondents respectively. The maximum score for the questions on nutritional practices was 22 (100%). Respondents who scored < 11 points or 50.0% were classified as having inadequate nutritional practices; while score of 11 points or 50.0% and above was classified as having adequate nutritional practices.

The analyzed questionnaires were stored in a safe place from destruction by water or fire and where unauthorized persons would not have access to them; and will be destroyed after the defence of the dissertation. The findings of the study were summarized and presented in tables and chats.

### 3.9 Limitations of this study

Research is the most effective and scientific way of solving problem but it has its short coming. In this study, limitations observed cannot be overlooked. Some of these include:

i.) **Human complexity**: Human behaviour is complex; and this may cause some limitation in research dealing with human behaviour such as this. Human beings

are a product of psychological, physical and physiological; factors which act together to influence one's behaviour. For instance, one can measure physical aspect like height, weight, etc; likewise physiological aspect to some extent e.g. breathing or respiratory rate, blood pressure, etc. But the difficulty is with adequate measurement of the psychological aspect like attitude and emotions.

ii.) **Unavailability of literature on chosen topic**: One needs literature review as a link between the present and the past. At times there may be a shortage of literature in certain area of study as experienced in this study. And so without literature review one cannot do much on the study. It is therefore suggested that the little discrepancies that may be observed in the findings of this study was largely due to the shortage of literature review.

iii.) **Inadequate fund as well as time factor** suggested the unnecessary reduction in the size of the sample used for the study. So because the study focused on very sensitive and personal issues, it is possible that some of the responses to be volunteered by the respondents may not be true reflections of reality of their nutritional knowledge, attitude and practice in relation to their in relation to their nutritional status. This therefore makes it difficult to draw much inference from the finding or to generalize such result to a bigger population.

iv.) The anthropometric indices considered are limited to BMI and circumference of the waist only due to the sensitivity of the study.

### 3.10 Dissemination of the Study finding

The findings from this study would form part of the requirements for the award of the Master of Public Health degree –M.P.H. (Population and Reproduction Health Nutrition) in the Department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan. It will also be published in a peer reviewed of reputable journal. In addition, a day seminar on Health education focusing on the right and adequate practices of nutrition and the importance of taking an adequate diet will be organized for the PLWHA through their supportive groups and in a news bulletin.

# CHAPTER FOUR

## RESULTS

### 4.1 Socio-demographic Characteristics of the Respondents

The socio-demographic characteristics of the respondents are presented in figure 4.1 – 4.7. The mean age of the respondents was 35.7 ±11.4 years with age range of 11.0 – 80.0years. Majority (68.3%) of the respondents were females while 31.7% were males. More than a half (58.0%) of the respondents were married, 20.9% were single and 12.3% were widows or widowers. A high percentage (70.9%) of the respondents was Yoruba. Others were either Igbo (14.0%) or Hausa (11.1%). About 17.4% of respondents had no formal education while 19.4%, 27.1% and 36.1% had primary, secondary or tertiary education respectively. About half (50.9%) of the respondents were Muslims, 48.0% were Christians; while a few (1.2%) were practicing traditional religion. A large percentage (76.0%) of the respondents was earning less than N10,000:00 per month.


**Figure 4.1: Sex distributions of the respondents**

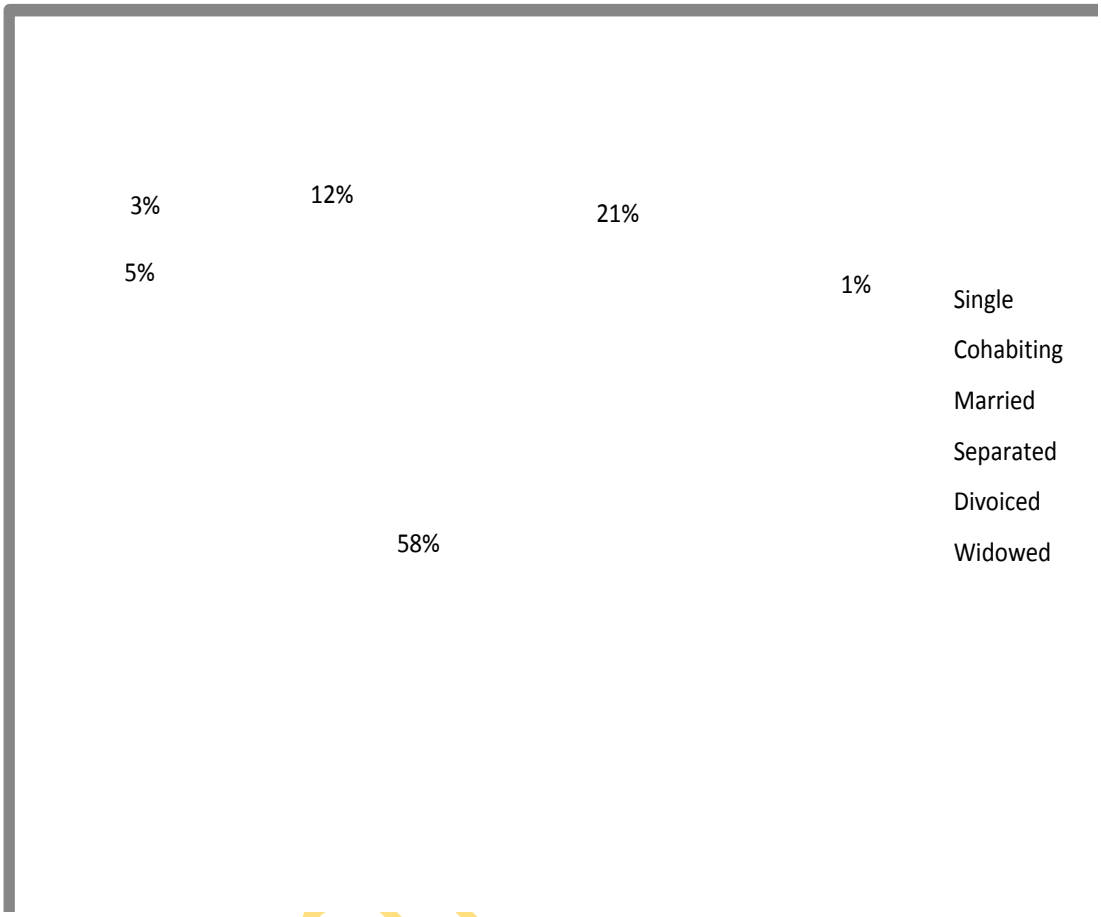



**Figure 4.2: Marital status distributions of the respondents**

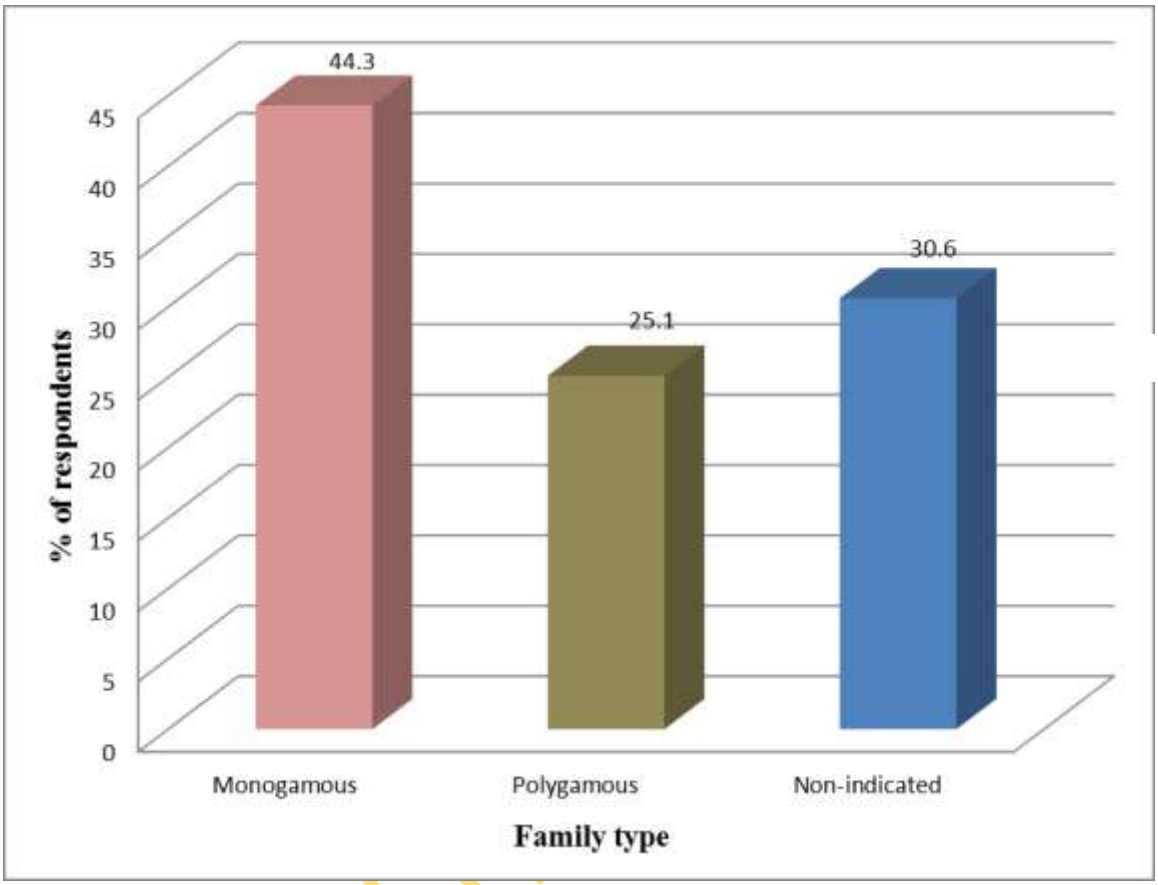



**Figure 4.3: Types of family of the respondents**

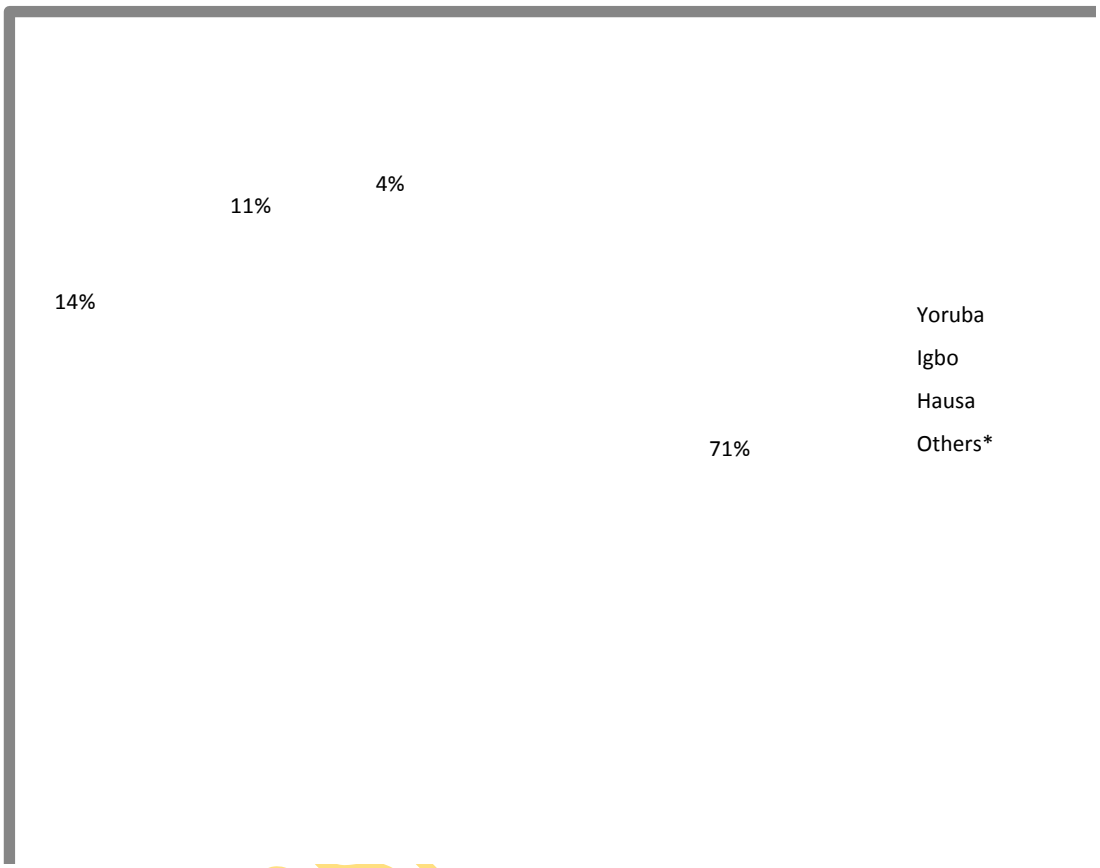



**Figure 4.4: Ethnic group distributions of the respondents**

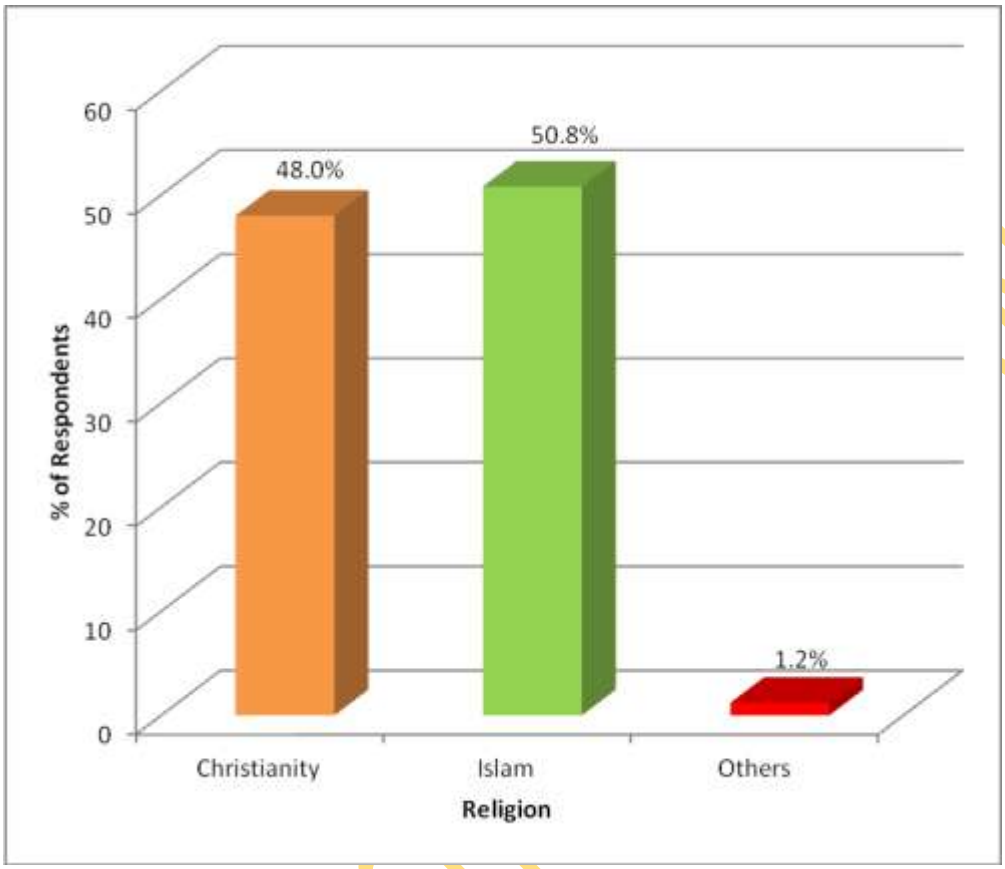



**Figure 4.5 Religion of the respondents**

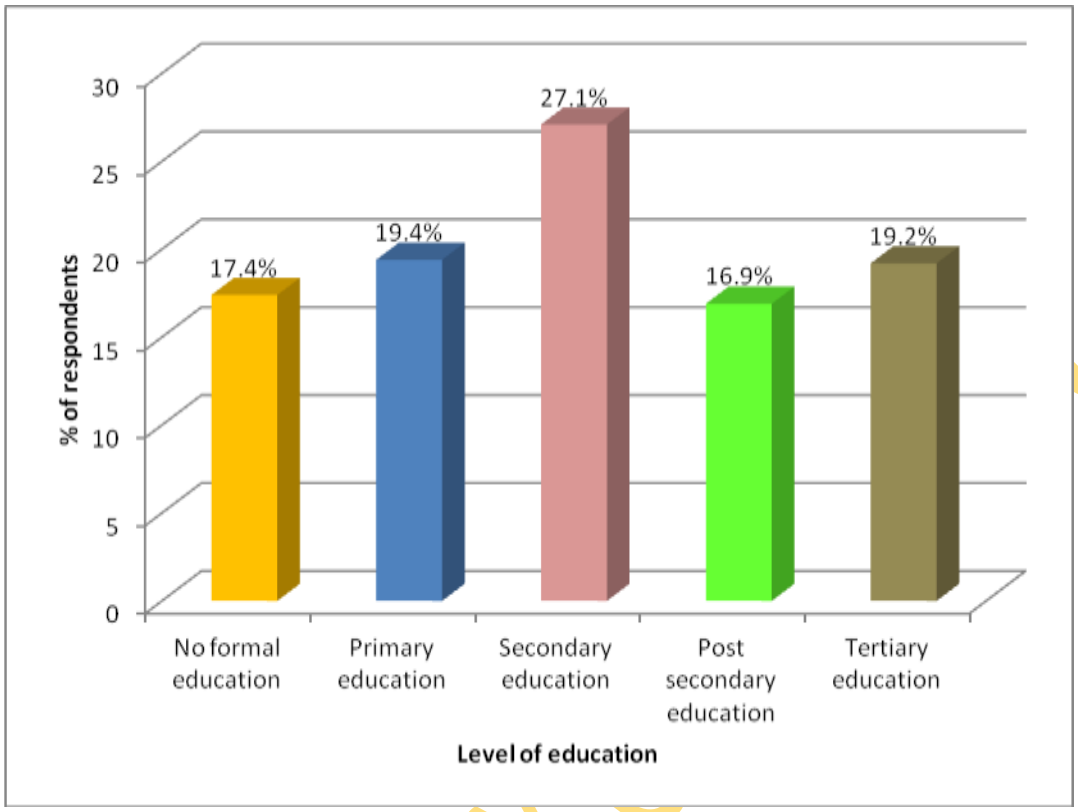



**Figure 4.6: Respondents' levels of education**

## 4.2 Occupation distributions of the respondents

Table 4.1 data presents Occupation distributions of the respondents. Majority (67.9%) of the respondents were unemployed (23.7%), farmers (2.9%), petty traders (24.0%), or artisans (17.1%). Only 32.1% of the respondents were either civil servants (16.6%) or business men or women (15.7%).

**Table 4.1: Occupation distributions of the respondents**

**n = 350**

| S/N | Occupation | n | % |
|---|---|---|---|
| 1. | Farmer | 11 | 3 |
| 2. | Petty Trader | 84 | 24 |
| 3. | Artisans | 59 | 17 |
| 4. | Civil Service | 56 | 16 |
| 5. | Business man/woman | 56 | 16 |
| 6. | Not employeed | 84 | 24 |
| | **Total** | **350** | **100** |

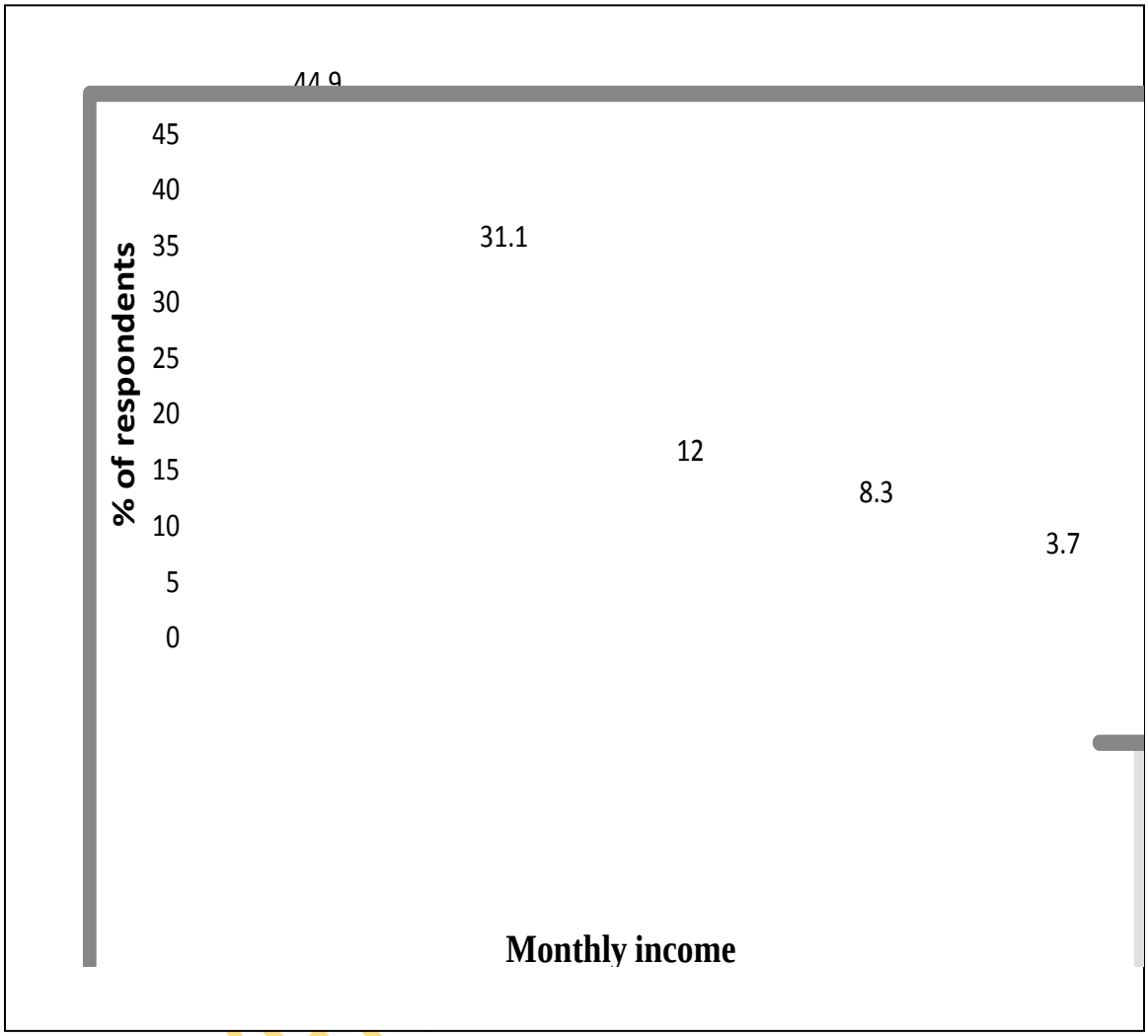



**Figure 4.7: Monthly income distribution of the respondents**

## 4.3 Medical History of the respondents

Table 4.2 shows the medical history of the respondents. Less than half (45.5%) of the respondents had been attending the clinics for treatment for less than 2years while 54.5% had been attending the clinic for more than 2years. Only 14.2% of the respondents reported frequent illnesses. The Anti-retroviral drugs generally prescribed for all the respondents was d4T (STAVUDINE) capsule. Other drugs include haematinics and drugs to treat infections such as Co-trimazole and Metronidazole tablets.

**Table 4.2 Medical History of the respondents**

| | Medical History | n | % |
|---|---|---|---|
| 1. | **Duration of clinic attendance** | | |
| | >1year | 87 | 24.9 |
| | 1 – < 2years | 72 | 20.6 |
| | 2 – 3years | 106 | 30.3 |
| | >3years | 85 | 24.2 |
| **2.** | **Frequency of falling ill** | | |
| | Often (daily – monthly) | 50 | 14.2 |
| | Not often (every 2 – 6 months) | 300 | 85.8 |
| **3** | **Common illnesses experienced by the respondents**: | | |
| | (General weakness, cough, Diarrhoea and Skin rashes) | 350 | 100.0 |
| **4.** | **ARV drugs generally prescribed:** | | |
| | d4T (STAVUDINE) capsule | 350 | 100.0 |
| **5.** | **Other drugs:** (Haematinics, Co-trim tablet & Metronidazole tablet) | 350 | 100.0 |

## 4.4 Sources of nutrition information to the respondents

The various sources of nutrition information to the respondents are indicated in table 4.3. Major sources of information to the respondents regarding nutrition in HIV/AIDS were clinics (94.3%) and friends (58.9%). However other sources include: radio/television (51.1%), magazines (40.6%), new-papers (36.6%), scientific journals and books (24.6%) and seminars (8.3%)

**Table 4.3 Sources of nutrition information on HIV and AIDS for the respondents (multiple responses)**

| S/N | Sources | n | % |
|---|---|---|---|
| 1. | Scientific Journal and Books | 86 | 24.6 |
| 2. | News paper | 128 | 36.6 |
| 3. | Radio/Television | 179 | 51.1 |
| 4. | Magazines | 142 | 40.6 |
| 5. | Friends | 206 | 58.9 |
| 6. | Clinics (Nurses & Doctors) | 330 | 94.3 |
| 7. | Seminar | 29 | 8.3 |

## 4.5 Knowledge of the respondents on the type of nutritient needed in the management of HIV/AIDS

Table 4.4a: data presents the level of knowledge of the respondents on the importance of adequate nutrition in the management of HIV/AIDS. About 86.9% – 97.1% knew that all the nutrients are needed and must be adequately included in their diet. A high percentage of the respondents (95.1%) were aware of all the nutrients that should be combined in their diet in order to maintain good nutritional status.

**Table 4.4a: Knowledge of the respondents on the types of nutrients needed in the management of HIV/AIDS**

**(n = 350)**

| S/N | Knowledge Statement | YES | | NO | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| The types of nutrients needed to maintain good nutritional status include: | | | | | |
| 1 | Carbohydrate foods * | 323 | 92.3 | 27 | 7.7 |
| 2. | Proteinus foods * | 340 | 97.1 | 10 | 2.9 |
| 3. | Fats and oil * | 304 | 86.9 | 46 | 13.1 |
| 4. | Vitamins * | 337 | 96.3 | 13 | 3.7 |
| 5. | Minerals * | 318 | 90.9 | 32 | 9.1 |
| 6. | Water * | 335 | 95.7 | 15 | 4.3 |
| 7. | These nutrients should be combined and eaten to obtain an adequate diet: Carbohydrates, Proteins, Fat and Oil, Vitamins and Water * | 333 | 95.1 | 17 | 4.9 |

* Correct answers
** Incorrect answers

## 4.6 Knowledge of the respondents on the importance of adequate nutrition in the management of HIV/AIDS

Respondents' knowledge on the importance of adequate nutrition in the management of HIV/AIDS data is presented in table 4.4b: Almost all the respondents (93.7%) were aware that taking an adequate diet helps to build immunity. Majority of the respondents (92.0% and 95.1%) were aware that taking adequate diet helps to reduce the rate of opportunistic infections and HIV/AIDS exposes infected individuals to more infections respectively. Also as many as 64.0% – 78.3% knew that loss of appetite, diarrhoea, nausea and frequent vomiting can contribute to development of malnutrition. Only 37.7% of the respondents indicated that the medication prescribed for treating AIDS related symptoms can also contribute to malnutrition. And about 66.6% of them felt that People Living with HIV should always take adequate diet.

**Table 4.4b: Knowledge of the respondents on the importance of adequate nutrition in the management of HIV/AIDS**

**n =350**

| | Knowledge Statement | YES n | % | NO n | % |
|---|---|---|---|---|---|
| 1. | Feeding adequately helps to build immunity * | 328 | 93.7 | 22 | 6.3 |
| The following conditions can cause malnutrition: | | | | | |
| 2. | Loss of appetite * | 274 | 78.2 | 76 | 21.8 |
| 3. | Diarrhea * | 248 | 70.9 | 102 | 29.1 |
| 4. | Nausea * | 224 | 64.0 | 126 | 36.0 |
| 5. | Frequent vomiting * | 25 | 74.0 | 91 | 26.0 |
| 6. | Medicine used for treating AIDS-related symptoms * | 132 | 37.7 | 218 | 62.3 |
| 7. | HIV/AIDS can depress good nutritional status * | 265 | 75.7 | 85 | 24.3 |
| 8. | Good nutritional status reduces the rate of opportunistic infections in PLWHA * | 322 | 92.0 | 28 | 8.0 |
| 9. | HIV/AIDS exposes one to more infections * | 333 | 95.2 | 17 | 4.8 |
| 10. | PLWHA should always take an adequate diet * | 233 | 66.6 | 117 | 33.4 |

***** Correct answers

** Incorrect answers

## 4.7 Knowledge of the respondents on the effects of gastro-intestinal dysfunctions and inadequate nutrition on general health of PLWHA

Table 4.4c: data shows knowledge of the respondents on the effects of gastro-intestinal dysfunctions and inadequate nutrition on general health of PLWHA. Less than a half (40.3%) of the respondents felt that People Living with HIV should eat more nutritious foods than the other members of their families who were not infected. High percentage of them (89.7%) was aware that fruits and vegetables should be eaten daily. With regards to the effects of inadequate diet on HIV/AIDS, 92.6%, 91.1% and 90.6% realized that inadequate diet would lower their resistance to infection, make HIV/AIDS more serious and reduce their life span respectively.

**Table 4.4c: Knowledge of the respondents on the effects of gastro-intestinal dysfunctions and inadequate nutrition on general health of PLWHA**

| Knowledge Statement | YES | | NO | |
|---|---|---|---|---|
| | n | % | n | % |
| 1. PLWHA should eat more nutritious food than the one's normally eaten by his/her family. * | 141 | 40.3 | 209 | 59.7 |
| The diet recommended for PLWHA should include: | | | | |
| 2. All the nutrients mentioned in (1–6a) above. * | 339 | 96.9 | 11 | 3.1 |
| 3. Varieties of fruits and vegetable should be eaten daily to fight infections. * | 314 | 89.7 | 36 | 10.3 |
| Inadequate diet: | | | | |
| 4. Has no effect on HIV/AIDS infection, ** | 105 | 30.0 | 245 | 70.0 |
| 5. Lowers the resistance to infection, * | 324 | 92.6 | 26 | 7.4 |
| 6. Makes HIV/AIDS more serious* | 319 | 91.1 | 31 | 8.9 |
| 7. Reduces the life span of people living positive with HIV/AIDS. * | 317 | 90.6 | 33 | 9.4 |

***** Correct answers

****** Incorrect answers

## 4.8 Knowledge of the respondents on the effect of adequate nutrition on the weight of PLWHA:

Data presented in table 4.4d: shows respondents' knowledge on the effect of adequate nutrition on the weight of PLWHA. Many of the respondents (89.7%) knew that PLWHA generally lose weight, 95.1% and 97.7% of them were also aware that good nutrition would help PLWHA to prevent weight loss and strengthen their immunity respectively. Majority of the respondents (88.3% and 84.3%) knew that the weight of the PLWHA can be improved by taking the prescribed drugs and eating regularly varieties of food which provide an adequate diet (both in calorie and nutrients). Also as many as 81.7% - 82.0% of them were aware that PLWHIV needs more nutritious foods than healthy individuals. Almost all the respondents (90.9%) reported that eating enough quantities of varieties of foods is important to strengthen their immune system because not all foods have the same health benefits (49.4%).

**Table 4.4d: Knowledge of the respondents on the effect of adequate nutrition on the weight of PLWHA**

**(n =350)**

| S/N | Knowledge Statement | YES | | NO | |
|---|---|---|---|---|---|
| | | N | % | N | % |
| 1. | People living positive with HIV/AIDS generally lose weight. * | 314 | 89.7 | 36 | (10.3) |
| Good nutrition helps people living positive with HIV/AIDS to: | | | | | |
| 2. | Prevent weight loss, * | 333 | (95.1) | 17 | (4.9) |
| 3. | Strengthen their immune system. * | 342 | (97.7) | 8 | (2.3) |
| The weight of PLWHA can be improved by: | | | | | |
| 4. | Taking the prescribed drugs regularly, ** | 309 | (88.3) | 41 | (11.7) |
| 5. | Eating adequate diet regularly, * | 295 | (84.2) | 55 | (15.8) |
| 6. | Taking more frequently meals (e.g. snacks), * | 261 | (74.6) | 89 | (25.4) |
| 7. | Eating varieties of foods, * | 264 | (75.4) | 86 | (24.6) |
| 8. | All of the above, * | 306 | (87.4) | 44 | (12.6) |
| Who need more adequate foods? | | | | | |
| 9. | People living positive with HIV, * | 286 | (81.7) | 64 | (18.3) |
| 10. | People living with AIDS, ** | 287 | (82.0) | 63 | (18.0) |
| 11. | People living positive with HIV should eat enough quantities of varieties of foods to strengthen their immune system * | 318 | 90.9 | 32 | 9.1 |
| 12. | Not all foods have the same health benefits * | 173 | 49.4 | 177 | 50.6 |

***** Correct answers

****** Incorrect answers

## 4.9 Knowledge of the respondents on drugs and HIV/AIDS and the use of spicy foods, alcohol and cigarette/tobacco use

Table 4.4e: data represents knowledge of the respondents on drugs and HIV/AIDS and the use of spicy foods, alcohol and cigarette/tobacco. Almost all the respondents (96.3%) indicated that PLWHA should take vitamins and mineral supplements only when they are prescribed for them. However, only 39.4% were aware that good nutrition enhances the efficacy of their medication.

With regards to avoidance of some food items that could constitute some harmful effects, 66.3% reported that they needed to avoid very spicy and acidic foods, while 92.3% and 95.4% indicated that they must avoid alcohol/alcoholic beverages and cigarette/tobacco smoking respectively. Only a few (44.0%) reported that PLWHA would need to avoid carbonated drinks.

**Table 4.4e: Knowledge of the respondents on drugs and HIV/AIDS and the use of spicy foods, alcohol and cigarette / tobacco use:**

| S/N | Knowledge Statement | YES n | % | NO n | % |
|---|---|---|---|---|---|
| . | | | | | |
| 1. | PLWHA should take supplements such as multivitamins and minerals only when they are prescribed * | 337 | 96.3 | 13 | 3.7 |
| 2. | Good nutrition improves medication regimens * | 138 | 39.4 | 212 | 60.6 |
| Which of these should people living with HIV/AIDS avoid? | | | | | |
| 3. | Very spicy and acidic foods, * | 232 | 66.3 | 118 | 33.7 |
| 4. | Alcohol and alcoholic beverages, * | 323 | 92.3 | 27 | 7.7 |
| 5. | Cigarette/tobacco smoking, * | 334 | 95.4 | 16 | 4.6 |
| 6. | Carbonated drink. * | 154 | 44.0 | 196 | 56.0 |

***** Correct answers

****** Incorrect answers

## 4.10 Knowledge of the respondents on food safety

Knowledge of the respondents on food safety is represented in table 4.4f. Majority of the respondents (90.6%) knew that food could be contaminated with harmful organisms and 74.9% indicated that food contamination could be avoided by selecting fresh local foods, 99.1% reported that all raw food must be washed properly before eating, while 98.6% indicated that cooking raw foods thoroughly before eating helps to destroy harmful bacteria. Also 73.7%, 74.3% and 76.0% of the respondents reported that eating foods immediately after cooking, refrigerating all uneaten foods and keeping cooked foods in covered containers before eating will help to prevent food contamination respectively. As many as 96.6%, 98.3% and 98.9% were aware that cooked and raw foods must be kept separately, foods must be eaten from a clean plate and hands must be washed thoroughly before preparing, serving or eating of foods respectifully.

**Table 4.4f: Knowledge of the respondents on food safety**

**n = 350**

| S/N | Knowledge Statement | YES | | NO | |
|---|---|---|---|---|---|
| | | n | % | n | % |
| 1. | Food can be contaminated with harmful organisms. * | 317 | 90.6 | 33 | 9.4 |
| Contamination can be avoided by: | | | | | |
| 2. | Selecting fresh local foods * | 262 | 74.9 | 88 | 25.1 |
| 3. | Selecting imported foods ** | 179 | 51.2 | 171 | 48.8 |
| 4. | Selecting manufactured foods ** | 191 | 54.6 | 159 | 45.4 |
| 5. | Washing all raw foods well before eating * | 347 | 99.1 | 3 | 0.9 |
| 6. | Cooking foods thoroughly to destroy harmful organisms * | 345 | 98.6 | 5 | 1.4 |
| 7. | Eating foods immediately after cooking * | 258 | 73.7 | 92 | 26.3 |
| 8. | Refrigerate immediately all uneaten portions * | 260 | 74.3 | 90 | 25.8 |
| 9. | Keeping foods in covered containers all the time * | 266 | 76.0 | 84 | 24.0 |
| 10. | Keeping cooked and raw foods separately in separate containers * | 338 | 96.6 | 12 | 3.4 |
| 11. | Storing, preparing and eating foods in clean places * | 344 | 98.3 | 6 | 1.7 |
| 12. | Washing hands before preparing, serving or eating foods * | 346 | 98.9 | 4 | 1.1 |

***** Correct answers

****** Incorrect answers

### 4.11 Knowledge of the respondents on PLWHA and Breast feeding practice

Table 4.4g: data presents the level of knowledge of the respondents on PLWHA and breast feeding practice. Majority (88.9%) of the respondents knew that mothers with HIV can transfer HIV virus to their infants through breastfeeding, but only 16.3% indicated that it is more beneficial for a baby to be breastfed by mothers living positive with HIV/AIDS. A high percentage (90.6%) of them reported that it is better to use alternative (artificial) methods of infant feeding than breastfeeding and 72.0% indicated that mothers living positive with HIV/AIDS could give water, fruit juices and other foods to their baby in the first six months of the baby's life.

**Table 4.4g: Knowledge of the respondents on PLWHA and Breast feeding Practice**

**n = 350**

| | Knowledge Statement | YES n | YES % | NO n | NO % |
|---|---|---|---|---|---|
| 1. | Mother with HIV can transmit the virus to her baby through breastfeeding * | 311 | 88.9 | 39 | 11.1 |
| 2. | It is more beneficial for the baby to be breastfed by a mother living positive with HIV/AIDS ** | 57 | 16.3 | 293 | 83.7 |
| 3. | Use alternative (artificial) methods of infant feeding * | 317 | 90.6 | 33 | 9.4 |
| 4. | Mother living with HIV/AIDS can give water, juices or other foods to the baby in the first six months of the baby's life ** | 252 | 72.0 | 98 | 28.0 |

***** Correct answers

****** Incorrect answers

### 4.12 Mean of all nutritional knowledge scores of the respondents

The mean of all nutritional knowledge scores of the male and female respondents was represented in table 4.5. Within a total of 58.0 points nutritional knowledge score, the mean nutritional scores of all the respondents was 43.0(4.6) while the scores according to the male and female respondents was 43.2(4.5) and 42.4(4.5) respectively.

The mean nutritional knowledge score of the male (43.2 ±4.5) was significantly higher when compared with their female counterparts (42.4 ±4.7) ($p<0.05$)

**Table 4.5 Mean nutritional knowledge scores of the respondents (n=350)**

| | 58-point Nutritional knowledge |
|---|---|
| **SEX** | **Mean Nutritional knowledge score** |
| | Mean (±) |
| Male | 43.2 (4.5) |
| Female | 42.4 (4.5) |
| **Total** | **43.0 (4.6)** |

## 4.13 Nutritional knowledge classification of the respondents

The nutritional knowledge categories of the respondents are indicated in table 4.6. It is shown that 13.7%, 51.1%, 34.9% and 0.3% of the respondents had poor, fair, good and very good nutritional knowledge respectively. On the average, the nutritional knowledge of 86.3% the respondents was not poor.

**Table 4.6 Nutritional knowledge classification of the respondents**

**n = 350**

| | Classification | Point awarded (%) | n | % |
|---|---|---|---|---|
| 1. | Poor | < 29 (<50.0 ) | 48 | 13.7 |
| 2. | Fair | 29–34 (50.0–59.0) | 179 | 51.1 |
| 3. | Good | 35–40 (60.1–69.0) | 122 | 34.9 |
| 4. | Very good | ≥ 41 (70.0) | 1 | 0.3 |
| | **Total** | | **350** | **100** |

### 4.14 Association between selected socio-economic characteristics and nutritional knowledge of the respondents

Table 4.7 presents the association between the socio-economic status and the nutritional knowledge of the respondents. No significant association was observed between level of education, occupation and the monthly income of the respondents with their nutritional knowledge ($p>0.05$).

**Table 4.7: Association between selected socio-economic characteristics and nutritional knowledge of the respondents**

| Association between: | Knowledge score | | | | Statistics |
|---|---|---|---|---|---|
| | Good {n (%)} | Fair {n (%)} | Poor {n (%)} | Total {n (%)} | |
| **Level of education** | | | | | |
| No formal education | 18 (29.5) | 31 (50.8) | 12 (19.7) | 61 (100.0) | $X^2 = 12.040$ |
| Primary education | 32 (47.1) | 26 (38.2) | 10 (14.7) | 68 (100.0) | DF = 6 |
| Secondary education | 40 (42.1) | 43 (45.3) | 12 (12.6) | 95 (100.0) | p = 0.061 |
| Post secondary | 32 (26.4) | 63 (52.1) | 26 (21.5) | 121 (100.0) | |
| **Occupation** | | | | | |
| Not employeed | 23 (27.7) | 43 (51.8) | 17 (20.5) | 83 (100.0) | |
| Farmer | 4 (40.0) | 4 (40.0) | 2 (20.0) | 10 (100.0) | $X^2 = 9.772$ |
| Artisan | 29 (48.3) | 24 (40.0) | 7 (11.7) | 60 (100.0) | DF = 8 |
| Businessmen/women | 42 (30.2) | 69 (49.6) | 28 (20.1) | 139 (100.0) | p = 0.281 |
| Civil service | 21 (41.2) | 23 (45.1) | 7 (13.7) | 51 (100.0) | |
| **Monthly income** | | | | | $X^2 = 2.285$ |
| < N5000.00 | 54 (41.2) | 57 (43.5) | 20 (15.3) | 131 (100.0) | DF = 2 |
| ≥ N5000.00 | 64 (33.2) | 98 (50.8) | 31 (16.1) | 193 (100.0) | p = 0.319 |

### 4.15: The Attitude of the respondents towards their needs to maintain adequate nutrition and food safety

The attitude of the respondents with regards to their needs to maintain adequate nutrition and food safety is presented in table 4.8. A large percentage (63.0% – 96.5%) agreed that eating adequate diet promote immune system and reduces the rate of opportunistic infections. Many (69.4%) and (63.7%) agreed that PLWHA should be on varieties of foods and need more nutritious foods than people who are not living positive respectively**.** Also 86.6% agreed that expired, acidic foods, foods with preservatives, oily foods aggravate loss of appetite, nausea and vomiting or diarrhoea and thus should be avoided. A large majority (90.5% and 92.5%) agreed that nutrition is critical to their survival and longevity, and to the better outcome of their treatment respectively. Also 86.5% and 97.4% agreed that malnutrition accelerates HIV to AIDS and consumption of adequate diet is important for maintaining good quality of life by PLWHA respectively.

Majority of the respondents (56.3% and 54.3%) disagreed or were indifferent in their opinion that only inadequate diet can lead to weight loss, or Jung foods could likely promote the growth of fungi in the mouth respectively. A high percentage (89.4%) of the respondents agreed that special diets such as fluid and soft diets are important for PLWHA who have sore in the mouth. Also majority (96.3%) agreed that supplements such as multivitamins and minerals are important for PLWHA. A large number agreed that taking of alcohol or smoking cigarette is harmful to their health. As many as 69.1% also agreed that alcohol decrease appetite and is harmful to health of PLWHAs. Also, 78.3% agreed that raw eggs, unpasturized milk, and dairy products may contain bacteria that are harmful to their immune system. A large majority (90.3% – 99.2%) also agreed that eating undercooked meats and chicken may contain bacteria that could be harmful to their immune system and cooking all raw foods very well, before eating is good and promotes good health. Similarly, majority (98.6%) agreed that, washing foods and hands thoroughly before preparing, serving or eating of foods is important. A large majority (84.3%) of the respondents disagreed that culture/tradition or taboos prevent them from taking certain foods. In summary, majority (53.4%) of the respondents had positive attitude towards the necessity to maintain adequate nutrition and food safety.

**Table 4.8: The Attitude of the respondents towards their needs to maintain adequate nutrition and food safety**

**(n = 350)**

| | Statements | Agreed n (%) | Disagreed n (%) | Indifference n (%) |
|---|---|---|---|---|
| | **Importance of adequate nutrition** | | | |
| 1. | Consumption of adequate diet is important * | 341 (97.4) | 5 (1.4) | 4 (1.2) |
| 2. | Adequate diet promotes strong immune system and reduces rate of opportunistic infections * | 338 (96.5) | 7 (2.0) | 5 (1.4) |
| 3. | PLWHA should be on varieties of foods. * | 243 (69.4) | 83 (23.7) | 24 (6.9) |
| 4. | PLWHA need more nutritious foods than normal individual * | 223 (63.7) | 95 (27.2) | 32 (9.2) |
| 5. | Inadequate diet can lead to weight loss. * | 153 (43.7) | 118 (33.8) | 79 (22.6) |
| | **Foods and gastrointestinal malfunction** | | | |
| 6. | Special diets (soft or fluid diets) are important with sore in the mouth or throat. * | 313 (89.4) | 15 (4.3) | 22 (6.3) |
| 7. | Expired foods/acidic foods/foods with preservatives /oily foods aggravate loss of appetite, nausea and vomiting or diarrhea. * | 303 (86.6) | 21 (6.0) | 26 (7.4) |
| | **Adequate nutrition, health and longevity** | | | |
| | For PLPWH, nutrition is crucial to: | | | |
| 8. | Their survival and longevity, * | 317 (90.5) | 4 (1.1) | 29 (8.4) |
| 9. | The better outcome of their treatment with ARVs. * | 324 (92.5) | 5 (1.5) | 21 (6.0) |
| 10. | Malnutrition accelerates HIV to AIDS. * | 303 (86.5) | 20 (5.7) | 27 (7.7) |
| | **Need for supplements** | | | |
| 11. | Supplements such as multivitamins and minerals are essential * | 337 (96.3) | 7 (2.0) | 6 (1.7) |

**Table 4.8 cont'd: The Attitude of the respondents towards their needs to maintain adequate nutrition and food safety**

| | Statements | Agreed n (%) | Disagreed n (%) | Indifference n (%) |
|---|---|---|---|---|
| | **Use of alcohol and tobacco/cigarette** | | | |
| 12. | Smoking does no harm to the body ** | 11 (3.2) | 336 (96.0) | 3 (0.9) |
| 13. | Alcohol is harmful to the health of PLWHA * | 242 (69.1) | 45 (12.9) | 63 (18.0) |
| 14. | Taking alcohol or cigarette interferes with some medications * | 18 (5.2) | 328 (93.7) | 4 (1.1) |
| | **Food safety** | | | |
| 15 | Raw eggs, unpasturized milk, and dairy products may contain bacteria, * | 274 (78.3) | 32 (9.1) | 44 (12.6) |
| 16. | Eating undercooked meats and chicken may contain bacteria * | 316 (90.3) | 26 (7.4) | 8 (2.3) |
| 17. | Cooking all raw foods well before eating promotes good health * | 347 (99.2) | 1 (0.3) | 2 (0.6) |
| 18. | Washing all foods well before eating promotes good health * | 345 (98.6) | 2 (0.6) | 3 (0.9) |
| 19. | Sweets and sugar may promote the growth of fungi (thrush) * | 160 (45.7) | 76 (21.7) | 114 (32.6) |
| | **Family Taboos** | | | |
| 20. | My culture and tradition allow me to take all food items. ** | 51 (14.6) | 265 (75.7) | 34 (9.7) |
| 21. | It is a taboo in my family to eat some foods. * | 42 (12.0) | 295 (84.3) | 13 (3.7) |

* Correct answers

** Incorrect answers

### 4.16 Nutritional practices of the respondents

The nutritional practices of the respondents are presented in table 4.9. More than half (56.9%) of the respondents claimed to be food secured (have enough food available to them always), 47.7% reported that they could not sufficiently obtain the quality food they needed always, 53.7% claimed to be eating varieties of foods regularly; while 59.7% claimed to be eating adequate amounts of energy, protein, fat, vitamins and mineral foods and taking enough water daily. More than a half (54.3%) of the respondents reported that they were not eating extra foods than what their family normally ate and only 37.4% were on special diet such as fluid or soft high protein diet since they knew their HIV status. High percentages (92.3%) of the respondents were taking multivitamins supplements. With regards to food safety control, 96.9% claimed to ensure that they cooked their foods and 54.6% stored their foods well. Also, most of the respondents (97.7%) ensured that they kept their food well protected from contamination by insects, rodents and domestic animals. However, 60.9% of the respondents could not afford to boil their water before drinking. Majority of the respondents (61.7%) and 86.9% claimed that they could not eat raw eggs and did not allow raw foods to get in contact with their cooked foods respectively and 72.3% always ensured that all foods were eaten immediately they were prepared. A high percentage (82.9%) also considered it very important to wash fruits properly before eating and clean vegetables well before they are prepared for food. Also majority (83.3%) normally wash their utensils and dishes before they were used for food. A large percentage (96.6%) regularly washed their hands before meals. Only a few (14.9%) were taking alcohol while 82.9% were taking carbonated drinks occasionally. As many as 43.1% of the lactating women were not breastfeeding but feeding their infants with breast milk substitute and 38.3% used feeding bottle for their infants. In summary, only about a half (52.0%) of the respondents claimed to be putting the information they have acquired on nutrition into practice.

**Table 4.9: Nutritional practices of the respondents**

**(n = 350)**

| | Statements | YES n (%) | NO n (%) | Not Sure n (%) |
|---|---|---|---|---|
| | **Food security** | | | |
| 1. | I ensure I have enough food available to me always. * | 199 (56.9) | 150 (42.9) | 1 (0.3) |
| 2. | I cannot sufficiently obtain the quality foods i need daily ** | 167 (47.7) | 182 (52.0) | 1 (0.3) |
| | **Adequate diet (food quality)** | | | |
| 3. | I eat adequate varieties of foods daily * | 188 (53.7) | 161 (46.0) | 1 (0.3) |
| 4. | I eat all the following foods: Energy giving foods, protein, fats and oils, vitamins, minerals and enough water daily. * | 209 (59.7) | 141 (40.3) | – |
| 5. | As PLWHA, I don't eat additional foods than the foods normally eaten by my family members. ** | 190 (54.3) | 156 (44.6) | 4 (1.1) |
| 6. | I am on better diet since the time I know my HIV status * | 131 (37.4) | 214 (61.1) | 5 (1.4) |
| | **Food safety** | | | |
| 7. | I take supplements such as multivitamins and minerals daily. ** | 323 (92.3) | 24 (6.9) | 3 (0.9) |
| 8. | I ensure that all food is cooked thoroughly, especially meats and chicken before eating them. * | 339 (96.9) | 7 (2.0) | 4 (1.1) |
| 9. | I ensure cooked foods are stored properly even when I have no access to a refrigerator. * | 191 (54.6) | 157 (44.9) | 2 (0.6) |
| 10. | I always keep my food covered and stored away from insects, flies, rodents, and domestic animals. * | 342 (97.7) | 8 (2.3) | – |
| 11. | I cannot afford to always boil water before drinking. ** | 213 (60.9) | 135 (38.6) | 2 (0.6) |
| 12. | I do heat or steam mouldy, fairly spoiled, food before eating. ** | 112 (32.0) | 236 (67.4) | 2 (0.6) |

***** Correct answers

****** Incorrect answers

**Table 4.9 cont'd: Nutritional practices of the respondents**

| | Statements | YES n (%) | NO n (%) | Not Sure n (%) |
|---|---|---|---|---|
| 13. | I cannot eat raw eggs or foods that contain raw eggs. * | 216 (61.7) | 132 (37.7) | 2 (0.6) |
| 14. | I ensure that all food is served and eaten immediately after preparation. * | 253 (72.3) | 96 (27.4) | 1 (0.3) |
| 15. | I do not allow raw foods to get in contact with my cooked food. * | 304 (86.9) | 45 (12.9) | 1 (0.3) |
| 16. | I do not consider it important to wash vegetables before cooking, since they will go through heating again. ** | 59 (16.9) | 290 (82.9) | 1 (0.3) |
| 17. | I do not always wash utensils and dishes clean before they are used for food. ** | 40 (11.4) | 309 (88.3) | 1 (0.3) |
| 18. | I wash my hands thoroughly before preparing, handling, and eating food and after using the toilet or changing diapers or nappies. * | 338 (96.6) | 11 (3.1) | 1 (0.3) |
| | **Alcohol intake** | | | |
| 19. | I take alcohol and alcoholic beverages occasionally. ** | 52 (14.9) | 297 (84.9) | 1 (0.3) |
| 20 | I do not take alcohol, but I take sweet and carbonated drinks * | 290 (82.9) | 59 (16.9) | 1 (0.3) |
| | **Child feeding practices** | | | |
| 21. | As an HIV positive mother, I do not breastfeed my baby. * | 151 (43.1) | 67 (19.1) | 132 (37.7) |
| 22. | I use feeding bottles to feed my infants instead of using a cup. * | 134 (38.3) | 109 (31.1) | 107 (30.6) |

***** Correct answers

****** Incorrect answers

### 4.17 Nutritional practices scores of the respondents

As shown in table 4.10, about a half (52.0%) of the respondents practiced adequate nutrition while 48.0% of them did not.

**Table 4.10: Nutritional practices score of the respondents (n = 350)**

Total nutritional practices score = 22 points.

| | Score (points) | n | % |
|---|---|---|---|
| Adequate nutritional practices | ≥11 | 182 | 52.0 |
| Inadequate nutritional practices | <11 | 168 | 48.0 |
| **Total** | | **350** | **100** |

### 4.18 Association between the selected socio-economic characteristics and nutritional practices of the respondents

Table 4.11 shows the association between the selected socio-economic variables (leve of education, occupation and monthly income) and the nutritional practices of the respondents. There was no significant association between the level of education, monthly income and occupation of the respondents with their nutritional practices ($p>0.05$).

**Table 4.11: Association between the selected socio-economic variables (education, occupation and monthly income) and nutritional practices of the respondents**

| S/N | Association between | Nutritional practices | | | |
|---|---|---|---|---|---|
| | | Adequate {n (%)} | Inadequate {n (%)} | Total {n (%)} | Statistics |
| 1. | **Level of education** | | | | |
| | No formal education | 59 (96.7) | 2 (3.3) | 61 (100.0) | $X^2 = 1.086$ |
| | Primary education | 63 (95.5) | 3 (4.5) | 66 (100.0) | |
| | Secondary education | 85 (94.4) | 5 (5.6) | 90 (100.0) | DF = 3 |
| | Post secondary | 97 (94.2) | 6 (5.8) | 103 (100.0) | p = 0.781 |
| 2. | **Occupation** | | | | |
| | Not employeed | 60 (96.8) | 2 (3.2) | 62 (100.0) | $X^2 = 3.712$ |
| | Farmer | 10 (100.0) | 0 (0.0) | 10 (100.0) | |
| | Artisan | 57 (95.0) | 3 (5.0) | 60 (100.0) | DF = 4 |
| | Businessmen/women | 132 (95.7) | 6 (4.3) | 138 (100.0) | p = 0.446 |
| | Civil service | 44 (89.8) | 5 (10.2) | 49 (100.0) | |
| 3. | **Monthly income** | | | | $X^2 = 0.855$ |
| | < N5000.00 | 127 (96.9) | 4 (3.1) | 131 (100.0) | DF = 1 |
| | ≥ N5000.00 | 181 (93.8) | 12 (6.2) | 193 (100.0) | p = 0.355 |

### 4.19 Anthropometric indices and Body Mass Index of the respondents

Table 4.12 shows the anthropometric indices and body mass index of the respondents. The mean body mass index (BMI) for male and female respondents was 23.8 ±3.3 ($kg/m^2$) and 23.1 ±4.4 ($kg/m^2$) respectively, and their waist circumference also was 90.0 ±14.4cm. and 87.7 ±14.0cm. respectively with **Standard Reference**: Male = 102cm. and Female = 88cm. There was no significant difference in the BMI of the male and female respondents ($p>0.05$).

**Table 4.12: Anthropometric indices and Body Mass Index of the respondents**

**n = 350**

| **Anthropometric indeces** | **Male (Mean ±SD)** | **Female (Mean ±SD)** | **Total (Mean ±SD)** |
|---|---|---|---|
| Height (m) | 1.6 ±0.1 | 1.6 ±0.1 | 1.6 ±0.1 |
| Weight (kgs.) | 63.2 ±9.7 | 56.7 ±10.5 | 58.8 ±10.5 |
| Body Mass Index (BMI) ($kg/m^2$) | 23.8 ±3.3 | 23.1 ±4.4 | 23.3 ±3.7 |
| Waist Circumference cm.) | 90.0 ±14.4 | 87.7 ±14.0 | 88.5 ±14.2 |

### 4.20 The nutritional status of the male and female respondents

The nutritional status of the respondents is presented in table 4.13. More females (9.6%) compared to males (5.4%) were underweight; while more males (35.1%) compared to females (27.1%) were either overweight or obese. However, a low percentage (8.3%) of the respondents was underweight. Majority (64.0%) of them had normal weight, while 23.1% and 4.6% were overweight and obese respectively. Female respondents' nutritional status was significantly higher than that of their male counterpart ($p<0.05$).

**Table 4.13: The body mass index of the male and female respondents**

| | Nutritional status | | | | |
|---|---|---|---|---|---|
| **Association between** | **Underweight** | **Normal** | **Overweight** | **Obese** | **Statistics** |
| | BMI ≤ 18.5**(kg/m$^2$)** | BMI = 19.0 – 24.9 | BMI = 25.0 – 29.9 | BMI ≥ 30.0 | |
| **MALE** | | | | | $X^2 = 12.502$ |
| **{ n (%)}** | 6 (5.4) | 66 (59.5) | 34 (30.6) | 5 (4.5) | |
| | | | | | DF = 3 |
| **FEMALE** | | | | | |
| **{ n (%)}** | 23 (9.6) | 158 (66.1) | 47 (19.7) | 11 (4.6) | P = 0.006 |
| **Total** | | | | | |
| **{ n (%)}** | 29 (8.3) | 224 (64.0) | 81 (23.1) | 16 (4.6) | |

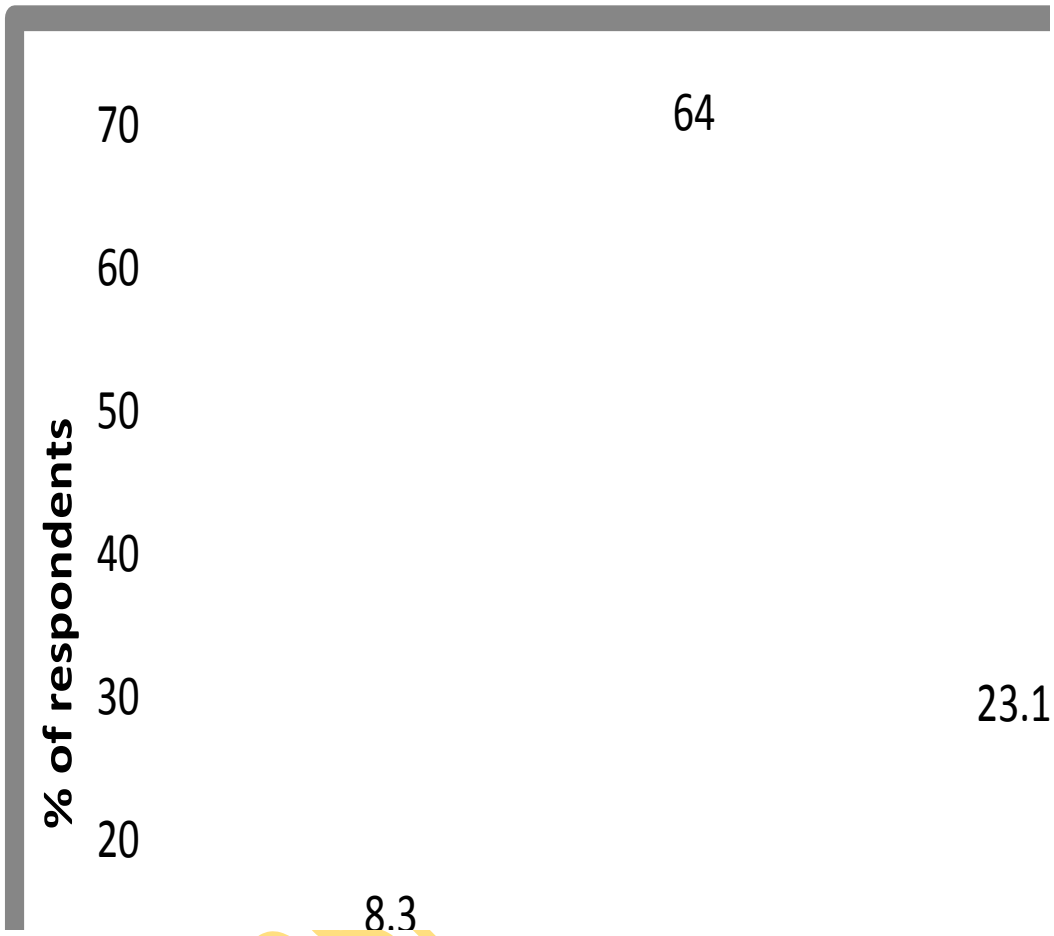



**Figure 4.8 Nutritional status of all the respondents**

## 4.21 Association between the selected variables assessed (education, occupation, monthly income, nutritional knowledge and nutritional practices) and the nutritional status of the respondents

Association between some selected variables assessed (level of education, occupation, monthly income, nutritional knowledge and nutritional practices) and the nutritional status of the respondents is presented in table 4.14. There was a significant association between the selected socio-economic characteristics (level of education, occupation, and monthly income) and the nutritional status of the respondents ($p<0.05$). However, no significant association was observed between the nutritional knowledge or nutritional practices of the respondents and their nutritional status ($p>0.05$).

**Table 4.14: Association between the selected variables assessed (education, occupation, monthly income, nutritional knowledge and nutritional practices) and the nutritional status of the respondents**

| S/N | Association between | Nutritional status | | | | |
|---|---|---|---|---|---|---|
| | | **Underweight** | **Normal** | **Overweight** | **Obese** | **Statistic** |
| 1. | **Education** | | | | | |
| | No formal education | 21 (34..4) | 40 (65.6) | 0 (0.0) | 0 (0.0) | |
| | Primary education | 0 (0.0) | 66 (100.0) | 0 (0.0) | 0 (0.0) | $X^2$ =243.322 |
| | Secondary education | 0 (0.0) | 81 (90.0) | 9 (10.0) | 0 (0.0) | DF = 10 |
| | Post secondary | 0 (0.0) | 33 (32.0) | 70 (68.0) | 0 (0.0) | p = 0.000 |
| 2. | **Occupation** | | | | | |
| | Not employeed | 5 (8.1) | 50 (80.6) | 7 (11.3) | 0 (0.0) | $X^2$ = 102.046 |
| | Farmer | 0 (0.0) | 6 (60.0) | 4 (40.0) | 0 (0.0) | DF = 12 |
| | Artisan | 0 (0.0) | 53 (88.3) | 7 (11.7) | 0 (0.0) | |
| | Business men/women | 16 (11.6) | 98 (71.0) | 24 (17.4) | 0 (0.0) | p = 0.000 |
| | Civil servant | 0 (0.0) | 11 (22.4) | 38 (77.6) | 0 (0.0) | |
| 3. | **Monthly income** | | | | | $X^2$ = 93.581 |
| | ≤ N5000.00 | 21 (16.0) | 110 (84.0) | 0 (0.0) | 0 (0.0) | DF = 2 |
| | > N5000.00 | 0 (0.0) | 112 (58.0) | 81 (42.0) | 0 (0.0) | p = 0.000 |
| 4. | **Nutritional knowledge** | | | | | |
| | Poor knowledge | 14 (6.8) | 139 (67.5) | 53 (25.7) | 0 (0.0) | $X^2$ = 0.296 |
| | Good knowledge | 7 (5.9) | 83 (70.3) | 28 (23.7) | 0 0.0) | DF = 2 |
| | | | | | | p = 0.862 |
| 5. | **Nutritional practices** | | | | | |
| | Adequate | 1 (6.3) | 10 (62.5) | 5 (31.3) | 0 (0.0) | $X^2$ = 0.880 |
| | Inadequate | 20 (6.0) | 212 (63.5) | 87 (26.0) | 15 (4.5) | DF = 3 |
| | | | | | | p = 0.830 |

# CHAPTER FIVE

## DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS:

### 5.1 DISCUSSION

Human immuno-deficiency virus (HIV) and acquired immuno-deficiency syndrome (AIDS) remain the greatest health challenges to human race of our age (UNAIDS, 2002). The heavy toil on human lives, large scale devastation and emasculation on human spirit by the scourge of HIV and AIDS adversely affects man's social and economic development. The devastating effects on lives of individuals, families and communities and all levels of the society including the young, attest to HIV and AIDS phenomenon as nothing short of war on humanity (Ogundipe, 2007; and Akwa Ibom State SACA, 2005); thus, the need to identify the existing problems and also develop the appropriate strategies to overcome the problems.

It has long been established that malnutrition impacts negatively on optimal immune function, thus increasing susceptibility to morbidity and mortality among HIV positive individuals. It is therefore important to include nutritional care and support in the provision of quality care support for people living with HIV/AIDS (PLWHA).

Nutrition is known to play a major role in the transmission of HIV and the prognosis of a person infected with the virus. Adequate nutrition enhances the immune system and helps reduce the incidence of infections, prevent weight lost and loss of lean body mass. A well nourished person has stronger immune system to fight infection and to cope with HIV/AIDS while malnutrition makes body more susceptible to infections and diseases due to weakening immune system. Persons living with HIV are more susceptible to malnutrition because of the HIV infection itself and inadequate knowledge about relevant diets and wrong attitude to nutrition as well as inappropriate nutritional care practices. The Federal Ministry of Health of Nigeria had developed guidelines on nutritional care and support for people living with HIV in Nigeria hence the need to ascertain the knowledge attitude and the practices of the People Living with HIV in each locality.

### 5.1.1 Socio-demographic of the respondents

A large majority of the respondents in this study were females; and the majority of them were widows who could have lost their spouses due to HIV/AIDS. This indicates that female adults constituted a larger sub-group of the population affected by the HIV virus than male counterparts within Oyo State. This observation is in tandem with the report of UNAIDS, (2008) which states that in 2007, an estimated 1.7 million new HIV infections occurred in the sub-Saharan region of Africa, with prevalence rates exceeding 30.0% among adult population and most of the people living with HIV and AIDS were women. However, reason for this is that women are biologically, socio-economically and socio-culturally more at risk of HIV infection than men (Gupta, 2000 and Topouzis, 2000). Biologically, the risk of becoming infected with HIV during unprotected vaginal intercourse is between two and four times higher for women than for men (World Bank, 1997). HIV/AIDS also exacerbates social, economic, and cultural inequalities that define women's status in society. The predominant culture of silence and passivity regarding sex stigmatizes women who try to access STD treatment services. The norm of virginity restricts adolescent girls' access to information about sex and increases risk of sexual coercion. Economic vulnerability increases the chance of exchange of sex for food and money. Male power often manifested in sexual violence. Susceptibility to HIV infection is increased through sexual practices, including genital cutting, dry sex and ritual cleansing (www.nlm.nih.gov/medlineplus) are also some of the reasons why females are disproportionally affected with HIV/AIDS. As well females are found to have easier access to health services facilities than their males' counterpart (www/unsystem.org./scn).

The mean age of the respondents in this study was 35.7 ± 11.4 years. This age is the peak of reproductive stage of life most especially for women; meaning that the respondents were at the stage when they were sexually active and probably with deliberate multiple partners due to cultural norms or religious belief. The age of the respondents is also in agreement with the report of Petrie, (2004) among the South Africans which states that HIV/AIDS exist among the married than the single group of reproductive age.

The people residing in the study location were predominantly Yoruba, thus majority of the respondents were Yoruba. More than 50% were Muslim, about a third had either no formal or primary education and two third of the respondent were earning less than N10,000 per month which confirms report of Castetbon, Kadio, Bondurand, Boka Yao, Barouan, Coulibaly, Anglaret, Msellati, Malvy, & Dabis (1997) and Steyn and Walker, (2000) that the low social economic condition and educational capacity of the HIV infected patients might limit their ability to cope with the nutritional demand of their illness. According to Alder et al., (1994), education, occupation and monthly income played prominent role in the nutritional practice of an individual. Earlier study confirmed that poverty and household food insecurity and ignorance are known to be associated with malnutrition and these scenarios are reported to be radically compounded by the emergency of HIV/AIDS (Rutengue, 2004). In a survey conducted by Thai Business Coalition on AIDS, it was also reported that almost a half of the surveyed PLWHA were unemployed or without a regular income (UNAIDS, 1997). This information indicates the low socioeconomic status of a large percentage of PLWHA and the need to support them to live a better quality of life.

### 5.1.2 Knowledge of Nutrition and HIV/AIDS

A healthy diet that is adequate in term of energy, protein, fat and essential micronutrients may help prolong the time it will take for HIV to progress to AIDS. This is because there is a strong relationship between nutritional status and immune system function (FMOH, 2011). Many people live with the virus fourteen years or more if they maintain good nutrition. Thus PLWHA need adequate nutrition information and knowledge for their self care.

Nutritional status of an individual or population is strongly predictive of the survival and functional status of the individual or the population and this are also true for people with infections such as HIV/AIDS. Poor nutritional status impairs immune response, accelerates diseases progression, increases the frequency and severity of opportunistic infection and impedes the effectiveness of medication (HRSA Care Action, 2004). Thus HIV/AIDS have direct impact on the nutrition of people living with HIV/AIDS.

Malnutrition in turn further produced serious consequence of accelerating the onset and further accelerates the rate of damage of the immune system and the progression of the disease (Haddad & Gillespie, 2001 and Piwoz & Preble, 2000). Thus poor nutrition and HIV/AIDS form part of a typical vicious cycle malnutrition-related immuno-suppression and oxidative stress leading to faster disease progression and earlier death (Babameto, 1997). According to James (2000), nutrition is often the main form of therapy available in the developing world and it is crucial in the holistic approach to maintain health in person with HIV/AIDS. Thus people living with HIV/AIDS must be adequate in the knowledge of nutrition, have the positive attitude and also apply the good nutrition information they have, into their day to day life in order to achieve good health and long life (Serena Rajabium, 2001). However, earlier report indicates that many HIV infected individuals fail to consume the required intake for at least one or more nutrients most especially micro nutrients (Dworken et al, 1990; Luder et al, 1995).

Good nutritional knowledge is fundamental to maintaining an optimal immune response and accelerates the progress of the problem of HIV/AIDS (Gramlich & Mascidli, 1995; Gay & Meydani, 2001 and Woods, Spiegelman, Knox, Forrester, Connors, Skinner, Silva, Kim, Sherwood, & Gorbach, 2002). According to this survey, although majority of the respondents obtained their nutrition information from the clinics and other sources, the nutrition information were not given by the nutritionists who are experts in the goals of helping individuals or group of individuals achieving good nutritional status and good health. This reflects the low level of employment of qualified nutritionists who are specially trained to educate people on nutrition. It is likely that the respondents could have been given inadequate nutrition information which could negatively influence the level of the attitude and practice of the respondents with regards to nutrition. Nutritionists have been trained to have the skills of educating people to improve their nutritional status in a cost-effective and reasonably simple way, applying this principle to different conditions (Piwoz and Preble, 2000).

It is revealed in this study that a high percentage of the respondents were aware that adequate nutrition is an essential mediator in optimising their immune function and that nutrient deficiencies are associated with immune impairment in both HIV-uninfected and

HIV-infected subjects. This finding is in tandem with Bukusiba, Kikafunda and Whitehead, (2010) report in a study conducted in Uganda on nutritional knowledge, attitude and practices, and the relationship with socio-demographic characteristics in urban population of women living positive with HIV/AIDS. According to the report, a large percentage of women infected with HIV/AIDS, who were trained on the importance of nutrition for PLWHA believed that it is very important to consume an adequate diet. Majority of the respondents in this study (64.0 – 97.7%) knew that HIV/AIDS contribute to malnutrition in various ways such as loss of appetite, development of diarrhea, nausea and vomiting, depression of immune system, increase in the rate of opportunistic infections, general loss of weight and reduce the quality of life and life span of the infected person. They were aware that they need to take varieties of foods including fruits and vegetables and also need to observe various food safety measures. Based on their level of awareness of the importance of the nutritional care in their treatment, the nutritional knowledge score of the respondents was good. The variation in the knowledge scores of the male and female respondents was not significant ($p>0.05$). Surprisingly, no significant association was observed between level of education, occupation and the monthly income of the respondents with their nutritional knowledge ($p>0.05$). Strong reason for this can be linked to the fact that the respondents in this study were collected from health facilities, which means that they have been supported at least with ART which has positive effects on their nutritional knowledge inrespective of their level of their education, occupation or monthly income.

### 5.1.3 Nutritional attitude of the respondents

According to Green et. al., (1991), the presence or absence of knowledge of adequate nutrition and the prevailing beliefs relating to food and nutrition can influence attitude (that is, the way an individual perceives food or good nutrition). In this survey majority of the respondents had positive attitude towards adequate nutrition. For instance, majority of them agreed that eating adequate diet promote immune system and reduces the rate of opportunistic infections; and that nutrition is critical to their survival and longevity, and to the better outcome of their treatment. Also a large majority agreed that malnutrition accelerates HIV to AIDS and consumption of adequate diet is important for maintaining

good quality of life by PLWHA. The good nutritional knowledge of the respondents is likely to have accounted for this.

### 5.1.4 Nutritional practices of the respondents

Quality nutritional care and support are crucial for PLWHA to improve their nutritional status and to prevent and treat opportunistic infections, and also to enhance their quality of life and prolong their survival (FMOH, 2011). With correct nutrition, and holistic approach to HIV and other infections, PLWHA can maintain a healthy life (James, 2000).

There is evidence that food insecurity increases the incidence and the gravity of malnutrition and malnutrition impairs the body's natural defence against the opportunistic infections, resulting in anorexia, mal-absorption, altered metabolism, weight loss and gradual weakness of the body (FAO, 2002). All these indicate that malnutrition is a serious danger for PLWHA and they need to maintain good nutritional practices in order to maintain good nutritional status and delay the progression of the disease.

In this study, more than half of the respondents claimed to have enough food available to them always; however, more than a third could not sufficiently obtain the quantity and quality as well as the varieties of food they needed daily. This group of people were prone to the serious danger of malnutrition, poor health and poor quality of life as well as short life. Due to changes in metabolic alterations and release of pro-oxidant cytokines and other reactive oxygen species, AIDS is known for causing increased utilization of anti-oxidants (vitamin A, E, C and beta-carotene) as well as several minerals such as zinc and selenium. The increased utilization increases the risk of damage to cells, proteins and enzymes. This leads to severe weight loss (wasting) which strongly predicts illness and death among PLWHA (Piwoz and Pebble, 2000). With regards to the quality of food eaten by the respondents, most of the respondents were not eating extra food than what they normally eat. However, some who could not eat the normal texture of food were taking either soft or fluid diets which were prescribed by a dietitan. Also majority of the PLWHA were taking vitamins and mineral supplements along with fruits and vegetables which they took occasionally. Nutritional well being is also determined by consuming

safe foods that are free from pathogenic organisms and appropriate or adequate in nutrients and calorie (Friis, 2002).

With regards to food safety control, majority of the PLWHA ensured they stored their foods well and protected them from contamination by insects, rodents and domestic animals. Majority also ensured raw foods were kept separately from cooked foods and also ensured they cooked their raw foods very well before eating. Almost all PLWHA claimed to keep their food utensils clean and ate their foods as soon as they were prepared. Many also claimed to maintain general personal hygiene.

Nutritional status is easily compromised during any type of infection and generalized infections such as HIV/AIDS often result in reduced food intake, poor absorption and utilization of nutrients and loss of nutrients. All these physiological stress of disease along with ignorance and poverty contribute to poor nutritional status.

The healthy lifestyle of an individual influences the extent to which food contribute to good physical, mental and social wellbeing (FAO/WHO, 1992). It is well known that smoking suppresses appetite and leads to reduced food intake and alcohol consumption can be harmful to the body especially the liver, increases vulnerability to infection and reduces food intake (FMOH, 2011). In this study, only a few of PLWHA were still taking alcohol occasionally however majority were taking carbonated drinks. Among the lactating mother, with regards to breastfeeding practices less than half were not breast feeding their infants. The general assessment of the PLWHA in this study indicates that about a half of them were practising adequate nutrition.

Assessing the nutritional status of PLWHA is an essential part of monitoring their nutrition in relation to their health and wellbeing (WHO, 1996). Assessing their nutritional status will also serve as appropriate process to develop an accurate planning and implementation of interventions to reduce morbidity and mortality associated with malnutrition, as good nutrition is known to improve the quality of life and health of PLWHA (WHO, 1996). With the use of BMI, majority (64.0%) of the PLWHA in this study had normal weight only a few (8.3%) were underweight and about a quarter were

overweight or obese. More females compared to males were underweight while more males compared to females were either overweight or obese. About a third of the PLWHA were malnourished.

## 5.2 Conclusion

People Living with HIV/AIDS in Ibadan and Shaki, Oyo State, Nigeria had low socioeconomic status, good nutritional knowledge, their attitudes were found to be positive; however, their overall practices of nutrition was only sub-optimal (fairly adequate).

## 5.3 Recommendations

i.) The report from this study necessitates the continuous nutritional intervention to help the People Living with HIV/AIDS. There is need for continuous information that will develop a better attitude toward nutrition and also put into practice the healthy eating plan in the management of their diseases. This will help to achieve better self care, good nutritional status, optimal health and survival most especially for those patients not qualifying for the antiretroviral programmes.

ii.) Malnutrition has direct negative impact on HIV/AIDS thus food fortification of cereals with micro nutrients and proteineous foods given free as food supplement will likely assist in addressing the nutritional problem of the people living with HIV/AIDS.

iii.) Nutrition education is known to be important public health tools to improve the nutritional status of people especially when it is well planned and executed. Thus, the government should employ the nutritionist (specially trained nutrition educators with adequate nutrition education skills) in every hospitals and clinics to train PLWHA how to maintain good nutritional status in a cost effective way.

iv.) Most of the PLWHA were unemployed or without irregular income, thus they need to be well supported by their relations, philantrophist and Government to help them obtain sufficient quantity and quality as well as varieties of foods they need daily.

v.) PLWHA should not be neglect practice of adequate nutrition as it is an important self care which they must not neglect.

### 5.4. Contribution to the Body of Knowledge

This dissertation has the followings contributions to the body of knowledge:

1. Female adults constituted a larger sub group of the population affected by the HIV virus in Ibadan and Saki, Oyo State, Nigeria.
2. Socio – economic status of high percentage of the PLWHA was low
3. A high percentage of the PLWHA were aware of the importance of adequate nutrition and intake varieties of food in the management of their diseases.
4. Majority of the PLWHA had positive attitude towards adequate nutrition
5. Only half of the respondent were putting the nutrition information's they have acquired into practice due to inability to purchase the food items they required
6. Majority of the PLWHA had normal weight, however a quarter of them were malnourished.

### 5.5. Suggestion for Further Studies

1. Practice of adequate nutrition intake by the People Living with HIV/AIDS.
2. This study – "knowledge, attitude and practice relating to nutrition among people living with HIV/AIDS" in a larger population or more States.
3. Knowledge and practice relating to nutrition by HIV/AIDS care givers.

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## APPENDIX I

### CONSENT FORM

Name of Principal Investigator: Timothy Adeyemi Adeniji

Name of Organization: University of Ibadan

Greetings. My name is **Timothy Adeyemi Adeniji,** a student of the Department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan. I am part of a team conducting a research study on the "Knowledge, attitudes and practices of nutrition among people living with HIV/AIDS (PLWHA), in Ibadan and Shaki, Oyo State".

**1. Purpose of the research:**

The purpose of this study is to investigate the knowledge, attitudes and practices of nutrition in relation to nutritional status of people living with HIV/AIDS in Ibadan and Shaki, Oyo State. The findings of this study will help in planning programmes that would improve the nutritional and health status of PLWHA.

**2. Duration of the research:**

The duration of the study, which you are being requested to participate in, is 1-3 months.

**3. Procedures**:

We invite you to participate in filling the questionnaire. If you accept to take part, it is important you give answers to all the questions. If you do not wish to answer any of the questions posed in the questionnaire, you may move on to the next question. You don't need to write your name. The information recorded is considered confidential, and no one else except the investigators will have access to the information documented during the research. The investigators will also assess your weight and height to know the state of your nutrition.

4. **Risks and Discomforts:**

You may refuse to answer any question or not take part in a portion of the interview if you feel the question(s) makes you feel uncomfortable.

5. **Benefits:**

There will not be direct benefit such as incentives to take part in the research. However, there will be indirect benefits in that the information obtained from this study will help the researchers to develop appropriate nutrition programme for the Association of People Living with HIV/AIDS in Oyo State, Nigeria.

6. **Confidentiality:**

We have taken the following steps to ensure that you are safe and that the information you provide is confidential.

1. Filling of questionnaire will take place in a private place
2. The information that we collect from this study will be kept confidential.
3. Information collected from you will be recorded in a file that will not have your name on it, but a number assigned to it instead.
4. You are free to discuss with the leader of the research team should in case you have any concern or question.

7. **Alternative to participation:**

You do not have to take part in this research if you do not wish to do so. You may stop participating in the interview at any time that you wish.

8. **Who to contact:**

If you have any question you may contact any of the following:

Mr. Timothy Adeyemi Adeniji,

Address: Department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan.

0807 672 9431, 0703 434 5481

E-mail: pharmacyaddat@yahoo.com.

Or

Dr. Grace. T. Fadupin
Address: Department of Human Nutrition,
Faculty of Public Health, College of Medicine,
University of Ibadan, Ibadan.
0806 878 8692
E-mail: fagtan2000@yahoo.com.

The proposal for this project has been reviewed and approved by the Oyo State Ministry of Health, Ibadan Ethics Committee which is the committee which its task is to make sure that the research participants are protected from harm. If you wish to find more about this, contact

Address: Oyo State Ministry of Health, Secretarial Complex, Ibadan.

**9. <u>Certificate of Consent for Qualitative Study.</u>**

I have been invited to take part in the research on the knowledge, attitudes and practices of nutrition in relation to nutritional status of people living positive with HIV in Oyo State. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions and the questions had been answered to my satisfaction. I consent voluntarily to be a participant in this study and understand that I have the right to withdraw from the interview at any time, which in any way will not affect my medical care.

| | |
|---|---|
| Print name of Participant | Date and Signature of Participant |
| …….. | …….. |
| | ------/ -----/ ---------- (dd/mm/yy) |
| Print name of Researcher/Moderator | Date & Signature of Researcher/Moderator |
| ---------- | ---------- |
| | ------/ -----/ ---------- (dd/mm/yy) |

# APPENDIX II

## QUESTIONNAIRE

## KNOWLEDGE, ATTITUDE AND PRACTICE RELATING TO NUTRITION AMONG PEOPLE LIVING WITH HIV/AIDS (PLWHA) IN IBADAN AND SHAKI, OYO STATE, NIGERIA

Dear respondent,
I am **Timothy Adeyemi Adeniji,** a student of the Department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan. The purpose of this study is to learn from you about knowledge and attitudes towards nutritional requirement of people living positive with HIV (PLPWHIV). The findings from this study will help in the formulation of nutritional programmes that would improve the nutritional management and the healthcare of PLPWHIV.

Please, be informed that your participation is voluntary. Your identity, responses and opinions will be kept confidential and no name is required in filling the questionnaire. Please give honest responses to the questions as much as possible. You are free to ask questions as the interview progresses.

Thank you for cooperation.

## Section A – Socio-economic status and Demographic characteristics of the subjects

**Instruction:** *The sign (>>) means go to next question.*

1. Age (as at last birthday):

……

2. Sex (tick☑): 1. Male ☐ 2. Female ☐

3. Ethnic group/Tribe (tick☑): 1. Yoruba ☐ 2. Ibo ☐ 3. Hausa ☐ 4. Others specify……

4. Religion (tick☑): 1. Christianity ☐ 2. Islam ☐ 3. Traditional religion ☐
   4. Others specify)……

5. Marital status (tick☑): 1. Single ☐ 2. Cohabiting ☐ 3. Married ☐ 4. Separated ☐
   5. Divorced ☐ 6. Widowed ☐

6. Type of marriage 1. Monogamy ☐ 2. Polygamy ☐

7. Highest level of education (tick☑): 1. No formal Education ☐ 2. Primary education ☐

3. Secondary education ☐ 4. Post-secondary education ☐ 5. Tertiary ☐

6. Others (specify) ……..

8. Profession/Occupation (tick☑): 1. Not employed ☐ 2. Farming ☐ 3. Petty trading ☐

4. Artisan ☐ 5. Civil- service ☐ 6. Businessman/women ☐ 7. Others……..

9. Income (monthly): 1.) Less than 5,000:00 ☐ 2.) 5,000:00 – 10,000:00 ☐

3.) 15,000:00 – 25,000:00 ☐ 4.) 25,000:00 – 50,000:00 ☐ 5.) Above 50,000:00 ☐

10. Housing facility 1. Self owned ☐ 2. Rented ☐ 3. Family/free ☐

11. When did you discover that you are living with the virus? ……. (In years)

12. How long have you been attending this clinic? …….. …. (In years)

13. Do you fall sick often? 1. Yes ☐ 2. No ☐

14. If yes, how often do you fall sick?

1. Almost everyday ☐ 2. Weekly ☐ 3. Every two weeks ☐ 4. Monthly ☐

5. Every two or three months ☐ 6. Every 6 months ☐ 7. >6 months ☐

## Section B – Knowledge of Nutritional needs

15. Do you believe there is any relationship between adequate nutrition and HIV/ AIDS?

1. Yes ☐ 2. No ☐

16. What is the relationship between adequate nutrition and HIV/AIDS?

……

……

17. Why does a person Living Positive suffer malnutrition?

……

……

18. Can the following conditions cause malnutrition?

a.) Diarrhoea 1. Yes ☐ 2. No ☐

b.) Loss of appetite 1. Yes ☐ 2. No ☐

c.) Nausea 1. Yes ☐ 2. No ☐

d.) Frequent vomiting 1. Yes ☐ 2. No ☐

e.) Medicine used for treating AIDS related symptoms 1.Yes ☐ 2. No ☐

19. What type of foods is needed to maintain good nutritional status?

a.) Energy giving foods (e.g. Yam, rice, gaari, etc.)1. Yes ☐ 2. No ☐

b.) Body building foods (e.g. Meat, fish, milk, eggs, beans, etc.) 1. Yes ☐ 2. No ☐

c.) Fats and Oils (e.g. Palm oil, groundnut oil, etc.) 1. Yes ☐ 2. No ☐

d.) Protective foods (e.g. Vitamins in fruits and vegetables) 1. Yes ☐ 2. No ☐

e.) Minerals (such as Calcium, Iron, Zinc, Selenium in milk, meats and nuts)

1.Yes ☐ 2. No ☐

f.) Water (such as enough clean water, fruit juices, beverage drinks).

1. Yes ☐ 2. No ☐

20. What foods should be combined and eaten in order to maintain an adequate diet?

1.) a, b, and c in 19 above. 1. Yes ☐ 2. No ☐

2.) a, b, c, d, and e in 19 above. 1. Yes ☐ 2. No ☐

3.) All the above foods mentioned in 19. 1. Yes ☐ 2. No ☐

21. Does feeding well help to build Immunity? 1. Yes ☐ 2. No ☐

22. Does feeding well help to prevent infections? 1. Yes ☐ 2. No ☐

23. Does HIV/AIDS expose one to more infections (opportunistic infections)?

1. Yes ☐ 2. No ☐

24. Does good nutrition reduce the rate of those opportunistic infections?

1. Yes ☐ 2. No ☐

25. Should the Person Living Positive be on special diet? 1. Yes ☐ 2. No ☐

26. Should the Person Living Positive to HIV eat more food than the ones normally eaten by his/her family? 1. Yes ☐ 2. No ☐

27. What kind of diet is recommended for a Person Living Positive?

1.) a, b, and d in 19 above. 1. Yes ☐ 2. No ☐

2.) a, b, c, and d in 19 above. 1. Yes ☐ 2. No ☐

3.) all the foods/diet mentioned in 19 above. 1. Yes ☐ 2. No ☐

28. Should fruits and vegetables be eaten everyday? 1. Yes ☐ 2. No ☐

29. Poor diet will:

a.) weaken the resistance to infection 1. Yes ☐ 2. No ☐

b.) make HIV/AIDS more serious 1. Yes ☐ 2. No ☐

c.) have no effect on HIV/AIDS infection 1.Yes ☐ 2. No ☐

d.) reduce the life span of People Living with HIV/AIDS 1. Yes ☐ 2. No ☐

30. Do people living positive with HIV loss weight? 1. Yes` ☐ 2. No ☐

31. Can good nutrition help people living positive to

a.) prevent weight loss 1. Yes ☐ 2. No ☐

b.) strengthen their immune system. 1. Yes ☐ 2. No ☐

32. What can be done to improve the weight of People living positive?

a.) take the prescribed drugs regularly. 1. Yes ☐ 2. No ☐

b.) eat adequate diet regularly. 1. Yes ☐ 2. No ☐

c.) take more meals frequently. 1. Yes ☐ 2. No ☐

d.) select and eat combination of foods he/she prefers and can obtain easily.

1. Yes ☐ 2. No ☐

e.) all the above. 1. Yes ☐ 2. No ☐

33. Who need more foods (thick the right answer?)

1.) People with HIV? 1. Yes ☐ 2. No ☐

2.) People with AIDS? Yes ☐ 2. No ☐

34. People Living Positive should eat:

a.) varieties of foods 1. Yes ☐ 2. No ☐

b.) may not eat varieties of foods 1. Yes ☐ 2. No ☐

35. Do you believe that certain foods have health benefits beyond their basic nutrition?

1.) Yes ☐ 2.) No ☐

36. If yes, name some:

a.) ……

b.) ……

c.) ……..

d.) ……

37. People Living Positive should take supplements such as Multivitamins and Minerals

1. Yes ☐ 2. No ☐

38. Does good nutrition affects medication regimens. 1. Yes ☐ 2. No ☐

39. When there is sore in the mouth or throat, what type of food should be eaten?

a.) Hard foods? ☐ b.) Soft food? ☐ c.) Fluids? ☐

d.) Hot foods? ☐ e.) Cool foods. ☐

40. Which of these should People Living with HIV/AIDS avoid?

a.) Very spicy and acidic foods 1. Yes ☐ 2. No ☐

b.) Alcohol and alcoholic beverages 1. Yes ☐ 2. No ☐

c.) Cigarette/tobacco smoking 1. Yes ☐ 2. No ☐

d.) Sweets and carbonated drinks 1. Yes ☐ 2. No ☐

**Knowledge on Food borne-Infection**

41. Can food be contaminated with harmful organisms? 1. Yes ☐ 2. No ☐

42. How can you avoid food contamination:

a.) Select fresh local foods. 1. Yes ☐ 2. No ☐

b.) Select imported foods. 1. Yes ☐ 2. No ☐

c.) Selected manufactured foods 1. Yes ☐ 2. No ☐

d.) Wash all foods especially raw foods well before eating 1. Yes ☐ 2. No ☐

e.) Cook foods thoroughly to destroy harmful organisms 1. Yes ☐ 2. No ☐

f.) Eat all foods immediately after cooking 1. Yes ☐ 2. No ☐

g.) Refrigerate immediately all uneaten portion straightaway 1. Yes ☐ 2. No ☐

h.) Keep foods in covered containers before eaten 1. Yes ☐ 2. No ☐

i.) Keep cooked and raw foods separately in separate containers 1. Yes ☐ 2. No ☐

j.) Store, prepare and eat foods in clean places. 1. Yes ☐ 2. No ☐

k.) Maintain personal hygiene by washing hands before preparing, serving or eating foods. 1. Yes ☐ 2. No ☐

43. Can mother with HIV transmit the virus to her baby through breastfeeding?

1. Yes ☐ 2. No ☐

44. Which one do you think is more beneficial for the baby? A mother living positive should:

a.) breastfeed her baby? 1. Yes ☐ 2. No ☐

b.) use alternative (artificial) methods of infant feeding. 1. Yes ☐ 2. No ☐

45. Should mother living positive give water, juices or other foods to the baby in the first six months of the baby's life? 1.) Yes ☐ 2.) No ☐

46. Should people living positive with HIV engage in regular physical activities?

1.) Yes ☐ 2.) No ☐

47. If yes, why?

……

48. What are your main sources of information/education regarding nutrition and HIV/AIDS? *(Please tick ☑ all that applies to you)*

a. Scientific Journals and book 1. Yes ☐ 2. No ☐

b. News papers 1. Yes ☐ 2. No ☐

c. Television 1. Yes ☐ 2. No ☐

d. Magazines 1. Yes ☐ 2. No ☐

e. Friends 1. Yes ☐ 2. No ☐

f. Clinic 1. Yes ☐ 2. No ☐

g. Others (Specify) ……

49. Have you ever attended a training/seminar/workshop on nutritional requirements of persons living with HIV and AIDS? 1. Yes ☐ 2. No ☐ If No, >> *go to question* 52.

50. What was the focus of the training/seminar/workshop attended above?

a. _____

b. _____

c. _____

d. _____

51. Who gave you the training/education?

1. Doctors ☐

2. Nurses ☐

3. Nutritionists/Dieticians ☐

4. Others (specify)……

## Section C - Positive Living People with HIV's attitude towards HIV/AIDS and adequate Nutrition.

**Instruction:** For each statement, indicate whether you **Strongly Agree [SA], Agree [A], Indifference [I], Disagree [D] or Strongly Disagree [SD].**

| S/№ | Statement | SA | A | I | D | SD |
|---|---|---|---|---|---|---|
| 52. | Having HIV or AIDS is a punishment from God. | | | | | |
| 53. | People living with either HIV or AIDS do not deserve sympathy because they are paying for their sexual promiscuity. | | | | | |
| 54. | People Living Positive with HIV deserves care and supports. | | | | | |
| 55. | Do you think this study is necessary? | | | | | |
| 56. | For PLPWH, nutrition is crucial to:<br>a) their survival, longevity, and | | | | | |
| | b) Better outcome of their treatment with ARVs. | | | | | |
| 57. | Malnutrition is a bad nutritional condition that one must not tolerate at all because it accelerates HIV to AIDS. | | | | | |
| 58. | Consumption of adequate diet is important for good quality life of PLPWHIV. | | | | | |
| 59. | Eating adequate food promotes strong immune system and reduces rate of opportunistic infections in people living positive. | | | | | |
| 60. | Only inadequate diet can lead to weight loss. | | | | | |
| 61. | People living positive with HIV should be on special diet. | | | | | |
| 62. | People living positive with HIV need more foods than an individual who is not living positive. | | | | | |
| 63. | . Supplements such as multivitamins and minerals are essential for people living positive with HIV. | | | | | |
| 64. | Special diets such as Soft or fluid diets are important for people living positive with HIV and have sore in the mouth or throat. | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 65. | Although “junk” foods such as chips, biscuits, sweets and sugar have little nutritional value, and that sweets and sugar may promote the growth of fungi (thrush), yet they are handy and help in reducing hunger. | | | | | |
| 66. | Alcohol and coffee decrease appetite and interfere with metabolism of nutrients. | | | | | |
| 67. | Taking alcohol by PLPWH does not interact with some medications, and does no harm to them. | | | | | |
| 68. | Smoking does no harm to the body hence PLPWH can take it at will. | | | | | |
| 69. | I know that raw eggs, unpasturized milk, and dairy products may contain bacteria, particularly Salmonella that are harmful to the already weakened immune system of the HIV-infected person. | | | | | |
| 70. | I am aware that eating undercooked meats and chicken may contain bacteria that are harmful to the already immune-compromised HIV-infected person. | | | | | |
| 71. | Washing all foods especially raw foods, very well before eating is good and promotes good health. | | | | | |
| 72. | Cooking foods thoroughly to destroy harmful organisms and maintenance of personal hygiene by washing hands before preparing, serving or eating foods are important for voiding opportunistic infections. | | | | | |
| 73. | Expired foods, acidic foods, foods with preservatives, and oily foods aggravate symptoms related to diarrhoea, nausea or vomiting, loss of appetite, and mouth and throat sores. | | | | | |
| 74. | My culture and tradition does not allow me from stopping to take some food items. | | | | | |
| 75. | It is a taboo in my family to eat some foods. | | | | | |

## Section D - Practices of safe food and good nutrition

**Instruction:** . For each statement, indicate (☑) Yes **or No.**

| S/№ | Statement | Yes (1) | No (2) |
|---|---|---|---|
| 76. | I have enough food available to me always. | | |
| 77. | I cannot sufficiently obtain the quality food I need daily | | |
| 78. | I eat adequate varieties of foods from time to time. | | |
| 79. | I eat adequate amounts of the following foods: Energy giving foods e.g. yam, rice, gaari; protein e.g. meat, fish, milk and beans; fats and oils; vitamins e.g. fruits and vegetables and minerals and enough water daily. | | |
| 80. | As PLPWH, I don't eat more than the foods normally eaten by my family members. | | |
| 81. | I am on special diet since the time I know my HIV status | | |
| 82. | I take supplements such as multivitamins and minerals daily. | | |
| 83. | I ensure that all food is cooked thoroughly, especially meats and chicken before eating them. | | |
| 84. | I am used to storing cooked food even when I have no access to a refrigerator. | | |
| 85. | I always keep my food covered and stored away from insects, flies, rodents, and domestic animals. | | |
| 86. | I cannot afford to always boil water before drinking. | | |
| 87. | I can heat or steam mouldy, fairly spoiled, food before eating. | | |
| 88. | I cannot eat raw eggs or foods that contain raw eggs. | | |
| 89. | I ensure that all food is served and eaten immediately after preparation. | | |
| 90. | I do not allow raw foods to get in contact with my cooked food. | | |
| 91. | I do not consider it important to wash all fruit and vegetables with clean water before cooking, since it will go through heat again. | | |
| 92. | I do not always wash utensils and dishes before they are used for food. | | |
| 93. | I wash my hands thoroughly before preparing, handling, and eating food and after using the toilet or changing diapers or nappies. | | |
| 94. | I take alcohol and alcoholic beverages occasionally. | | |

| | | | |
|---|---|---|---|
| 95. | I do not take alcohol, but I take sweet and carbonated drinks e.g. coke, fanter, e.t.c. | | |
| 96. | As an HIV positive mother, I do not breastfeed my baby. | | |
| 97. | I use feeding bottles to feed infants instead of using a cup. | | |
| 98. | I engage in physical exercise regularly even now that I am living positive with HIV. | | |

## Section E - Anthropometric Records

99. Height (meters)

……

100. Weight

(kg.)……

101. Body Mass Index (kg/$m^2$)

…… 102. Waist circumference

(cm.) ……..

**Thank you for your attention and response.**

## APPENDIX III

### IWE MO GBA LATI KO PA

Oruko mi ni Timotyh Adeyemi ADENIJI. Mo je akeko onipele giga keji ni Isori ti nseto ilera fun mutumuwa ni ayika (Ipa ti imo eko mimo Iye eniyan ati bibisii pelu ounje ati ilera fun alaafia ara) – MPH (Population & Reproduction Health Nutrition), ti Ile-Iwe giga Fasiti Ibadan, ni U.C.H., Ibadan.

Mo nse iwadi lenu awon eniyan ti o ba ni kokoro HIV ati arun eedi lara ti won si nlo si ile itoju to wa fun won ni ilu Ibadan ati Saki, Ipinle Oyo Orile ede Nijeria. Ngo o bi yin ni awon ibeere kan ti o lee fe nira die lati dahun. Mo fe ki e mo wipe awon idahun yin yoo je asiri ti yoo wa ni bonkele. A ko ni beere oruko yin rara niwon igba ti a ko ni so oruko yin papo mo idahun ti e ba fun wa. Awon idahun yin yoo ran ijoba lowo lati gbe eto kale ti yoo fa atunse ba awon ewu ti o ma nsuyo nigbati eniyan ba ni kokoro HIV ati arun eedi lara ti ko si ni imon, ihuwasi to dara ati gbigbe igbese to dara to si ounje ati ilera pelu abojuto gidi fun alaafia ara won.

Didahun ibeere yi ni otito yoo ran iwadi yi lowo pupo.

E ni anfaani lati so wipe e ko fe kopa tabi lati fa seyin kuro leyin igba ti e ti bere. Inu mi yoo dun gidigidi ti e ba fi otito dahun awon ibeere wonyi ti e si fi tifetife ko pa.

**Mogba:-** Niwon igba ti e ti salaye yekeyeke fun mi nipa ohun ti iwadi yi dale lori, mo ni oye eko na, mo si setan lati kopa.

---------- ----------

**Ifowosiwe Olukopa ti Ojo** **Ifowosiwe Olubeere ati Ojo**

**APPENDIX IV**

**IBERE-LEKUNRERE**

**IMO NIPA, OJU TI A FI NWOO ATI IHUWASI WA SI OUNJE, ILERA ATI ABOJUTO LAARI AWON TO NGBE PELU KOKORO ATI ARUN EEDI NI IBADAN ATI SAKI, IPILE OYO, ORILE EDE NIJERIA**

Oludahun ibeere mi owon,

Oruko mi ni **Timothy adeyemi Adeniji.** Mo je akeko ni (department of Human Nutrition, Faculty of Public Health, College of Medicine), ti ile eko giga University ilu Ibadan, Ibadan. Idi pataki fun iwaadi yi ni lati mo nipa imo, ihuwasi ati ise…. Laarin awon to ngbe … pelu kokoro arun eedi.Ohun ti o ba kojopo ninu iwadi yi yio je iranlowo fun wa lati se agbekale eto ti yoo da lori pipa ina arun asekupani, eedi, ni orileede wa.

Mo fi eleyi da yin loju pe ko si ida ti o too tabi ti ko too si ibeere ti n o beere lowo yin. E jowo, kikopa ninu iwadi ko je tipatipa, lati okan wa ni. Idanimo, idahun, ati erongba yin yoo je fifi pamo bi asiri ati pe, akoni beere oruko yin ninu didahun awon ibeere. E jowo, e gbiyanju lati dahun awon ibeere ti ngo beere lowo yin pelu ooto inu.gege bi o ti ye. Anfaani wa lati beere irufe ibeere iyowu bi iforowanilenu won a nti tesiwaju.

Mo dupe pupo fun ifowosowopo yin.

## Ipa A: Mimo nipa awon akopa ninu iforowanilenu wo

**Itonisona:** Yoo wumi lati beere awon ibeere die nipa erongba yin ninu okan, e jowo e ma se binu. Idahun si awon ibeere wonyi yio je nki ko eko ati pe yio fun mi imo ti o peye nipa koko iwadi mi. E jowo e gbiyanju lati dahun awon ibeere wonyi gege bi o ti ye lai fa sehin lori okankan awon koko yi.

1. Ojo ori i yin :……

2. Iseda (fala bayi ☑): 1. Okunrin ☐ 2. Obirin ☐

3. Iru eya ti a ti wa (fala bayi ☑): 1. Yoruba ☐ 2. Ibo ☐ 3. Hausa ☐ 4. Eya miran

4. Esin (fala bayi ☑**):** 1. Onigbagbo ☐ 2. Musulumi ☐ 3. Esin ibile ☐ 4. Esin miran to yato si awon woyin (edaruko ni pato)……

5. Ipo igbeyawo (fala bayi ☑): 1. Apon ☐ 2. Alojo gbepo lai fera eni ☐ 3. Mo loko/niyawo ☐ 4. A ndagbe tabi pinya ninu igbeyawo ☐ 5. Ati ko ara wa sile ☐ 6. Opo ☐

6. Irufe iyawo wo ni: 1. Igbeyawo eleyokan ☐ 2. Igbeyawo to ju eyokan lo ☐

7. Oye eko ti ogaju ti a ni (fala bayi ☑): 1. Ko si imo eko kiko tabi kika ☐ 2. Eko alako bere ☐ 3. Iwe mewa ☐ 4. Iwe giga ti fasiti ati ile iwe imo ero ☐ 5. Awon imiran (salaye) …….....

8. Ise ti a yan laayo (fala bayi ☑): 1. Ko sise lowo ☐ 2. Ise Agbe ☐ 3. Ise owo sise peepepe ☐ 4. Onise owo ☐ 5. Onise ijoba ☐ 6. Onisowo lokunrin/lobinrin ☐ 7. Ise miran to yato si awon woyin (edaruko ni pato)……

9. Owo oya (Osoosu): 1. Ko to 5,000:00 ☐ 2. Laarin 5,000:00 – 10,000:00 ☐

3. Laarin 15,000:00 – 25,000:00 ☐ 4. Laarin 25,000:00 – 50,000:00 ☐

5. O ju 50,000:00 ☐

10. Iru ile igbee yin: 1. Ile ara eni ☐ 2. Ile a ya gbe ☐ 3. Ile ebi ti a ngbe lofe ☐

11. Igba wo lo sakiyesi pe o n gbe pelu kokoro arun eedi? …… (ni Odun)

12. O pe to ti o ti n wa sile Oogun yi fun itoju? ……..(ni Odun)

13. Nje e ma ndubule aesan nigba gbogbo? 1. Beeni ☐ 2. Beeko ☐

14. To ba sepe beeni, bi iru igba wo le ma n dubule aesan?

1. Ojoojumo ☐ 2. Oseose ☐ 3. Ose meji-meji ☐ 4. Osoosu ☐

5. Osu meji-meji si meta ☐ 6. Osu mefa-mefa ☐ 7. O ma n ju osu mefa-mefa lo ☐

## Ipa B: Imo nipa iru Ounje ti ara nilo

15. N je o gbagbo pe ibasepo kan wa laarin Ounje to peye ati kokoro tabi arun eedi?

1. Beeni ☐ 2. Beeko ☐

16. Iru ibasepo wo lo wa laarin Ounje to peye ati kokoro tabi arun eedi? ……..

……

17. Kini idi re ti awon ti o ni kokoro HIV tabi arun eedi fi maa ni aese dede ounje lara?

……

18. Nje awon nkan wonyi le fa aese dede ounje lara?

a.) Yiyagbe gbuuru. 1. Beeni ☐ 2. Beeko ☐

b.) Pipadanu okun lati jeun. 1. Beeni ☐ 2. Beeko ☐

d.) Okan rinrin. 1. Beeni ☐ 2. Beeko ☐

e.) Eebi nigba gbogbo. 1. Beeni ☐ 2. Beeko ☐

e.) Awon oogun lilo fun orisirisi aesan to nje jade lara arun eedi. 1. Beeni ☐ 2. Beeko ☐

19. Iru awon eya ounje wo la nilo lati je fun sise toju nini ounje to dara?

a.) Awon ounje to nfun ni lagbara (fun apeere: Isu, iresi, gaari, ati be be lo.)

1. Beeni ☐ 2. Beeko ☐

b.) Awon ounje to ntun ara mo (fun apeere: Eran, eja, omi-wara, eyin, eewa, ati be be lo.) 1. Beeni ☐ 2. Beeko ☐

d.) Ora ati Epo (fun apeere: Epo pupa, Ororo epa, ati be be lo.) 1. Beeni ☐ 2. Beeko ☐

e.) Awon ounje to ndabo bo ara (fun apeere: Fitami lati inu eso ati ewebe.) 1. Beeni ☐ 2. Beeko ☐

e.) Awon ohun asara loore (bii Calcium, Iron, Zinc, Selenium ninu wara, eran ati woro eso) 1. Beeni ☐ 2. Beeko ☐

f.) Omi (fun apeere: Omi to mo daradara, omi eso, awon ohun mimu irengbe miran.) 1. Beeni ☐ Beeko ☐

20. Awon ounje wo lo ye ka papo fun jije to le mu ka je ounje to peye?

1.) a, b, ati d, ninu ibeere 19 loke. 1. . Beeni ☐ 2. Beeko ☐

2.) a, b, d, e, ati e, ninu ibeere 19 loke. 1. Beeni ☐ 2. Beeko ☐

3.) Gbogbo awon eya ounje ti adaruko ninu ibeere 19 loke. 1. Beeni ☐ 2. Beeko ☐

21. Nje jije ounje dada je iranlowo si gbigbe ajesara idena arun ro? 1. Beeni ☐ 2. Beeko ☐

22. Nje jije ounje dada je iranlowo si idena arun? 1. Beeni ☐ 2. Beeko ☐

23. Kokoro arun Eedi/Arun Eedi ma nmu ki awon olokan-o-jokan aesan wole sara eni. 1. Beeni ☐ 2. Beeko ☐

24. Nje ounje asaralore ati ilera ti o dara se adinku si wiwole arun sara eni? 1. Beeni ☐ 2. Beeko ☐

25. Se awon eniyan to gbe pelu kokoro arun Eedi tabi arun re gbodo wa lori awon ounje akanse? 1. Beeni ☐ 2. Beeko ☐

26. Se awon eniyan to gbe pelu kokoro arun Eedi gbodo ma je ounje ju elomiran ninu ebi re lo? 1. Beeni ☐ 2. Beeko ☐

27. Iru awon ounje asara lore wo ni a le gba awon to n gbe pule kokoro arun Eedi niyanju lati ma je?

1.) a, b, ati e labe ipa 19 loke. 1. Beeni ☐ 2. Beeko ☐

2.) a, b, d, ati e labe ipa 19 loke. 1. Beeni ☐ 2. Beeko ☐

3.) gbogbo awon ounje wonyi ti a daruko labe ipa 19 loke. 1. Beeni ☐ 2. Beeko ☐

28. Eso ati ewebe bii efo gbodo maa je lojojumo bi? 1. Beeni ☐ 2. Beeko ☐

29. Awon ounje to nsara lore ti ko dara rara a ma fa:

a.) rire agbara ikojujasi si arun 1. Beeni ☐ 2. Beeko ☐

b.) Mimu ki kokoro arun Eedi tabi Eedi tunbo le si 1. Beeni ☐ 2. Beeko ☐

d.) Ko ni ipa kankan lori kokoro arun Eedi tabi Eedi 1. Beeni ☐ 2. Beeko ☐

e.) din pipelaye awon to ngbe pule kokoro arun Eedi ku 1. Beeni ☐ 2. Beeko ☐

30. Nje awon to n gbe pule kokoro arun Eedi ma npadanu itewon? 1. Beeni ☐ 2. Beeko ☐

31. Nje ounje ati ilera to dara se iranwo fun awon eniyan to gbe pelu kokoro arun Eedi lati:

a.) Dabobo siso igbewon nu 1. Beeni ☐ 2. Beeko ☐

b.) Fifi agbara kun eroja ajesara ara 1. Beeni ☐ 2. Beeko ☐

32. Kinii alese lati mu ki awon eniyan to gbe pelu kokoro arun Eedi gbewon sii?

a.) Lilo ogun ti won ko fun won deedee 1. Beeni ☐ 2. Beeko ☐

b.) je ounje ti o nsara lore deedee 1. Beeni ☐ 2. Beeko ☐

d.) je ounje lemolemo lopo igba 1. Beeni ☐ 2. Beeko ☐

e.) Sa ounje soto ati dida ounje ti o feran po ati ti o wa larowoto re

1. Beeni ☐ 2. Beeko ☐

e.) Gbogbo eyii ti o wa loke yii 1. Beeni ☐ 2. Beeko ☐

33. Talo nilo ounje ju (fala si idahun too yanranti)

1.) Awon eniyan to gbe pelu kokoro arun Eedi 1. Beeni ☐ 2. Beeko ☐

2.) Awon eniyan to ti ni arun Eedi 1. Beeni ☐ 2. Beeko ☐

34. Awon eniyan to gbe pelu kokoro arun Eedi gbodo maje

a.) Orisirisi ounje 1. Beeni ☐ 2. Beeko ☐

b.) Le maaje orisirisi ounje 1. Beeni ☐ 2. Beeko ☐

35. Nje o gbagbo pe awon ounje kan wa too ni anfani ju jije ounje asaralore won lo?

1. Beeni ☐ 2. Beeko ☐

36. To bari bee, daruko won:

a.) ……

b.) ……

d.) ……..

e.) ……

37. Awon too ngbe pelu kokoro arun Eedi gbodo ma loo ogun aropo ounje lago-ara bii Ogun-eje ati eroja asara lore 1. Beeni ☐ 2. Beeko ☐

38. Nje ounje to dara ni ohunkan se pelu ogun lilo bo ti ye? 1. Beeni ☐ 2. Beeko ☐

39. Ti egbo bawa lenu tabi ona-ofun, iru ounje wo ni a gbodo je?

a.) Ounje toole ☐

b.) Ounje tooro ☐

d.) Ounje olomi ☐

e.) Ounje gbigbona ☐

e.) Ounje tutu. ☐

40. Ohun wo ni awon too ngbe pelu kokoro arun Eedi/Eedi gbodo yago fun?

a.) Ounje to mu ati to kan lenu 1. Beeni ☐ 2. Beeko ☐

b.) Oti lile ati ohun mimu elerindodo to le 1. Beeni ☐ 2. Beeko ☐

d.) Siga/Taaba mimu 1. Beeni ☐ 2. Beeko ☐

e.) Suuti ati ohun mimu elerindodo 1. Beeni ☐ 2. Beeko ☐

## Imo lori awon aesan to nwa lati ara ounje

41. Nje ounje le dibaje nipase awon kokoro aefojuri to lewu? 1. Beeni ☐ 2. Beeko ☐

42. Bawo ni ase le yera fun ki ounje ma dibaje?

a.) sa asayan awon ounje to rewa to si jipepe ti ibile 1. Beeni ☐ 2. Beeko ☐

b.) sa asayan awon ounje ile okere 1. Beeni ☐ 2. Beeko ☐

d.) sa asayan awon ounje tati pelo sinu agolo 1. Beeni ☐ 2. Beeko ☐

e.) fo gbogbo ounje papa julo awon ti akoti pese re ka to je 1. Beeni ☐ 2. Beeko ☐

e.) Se ounje dada lati pa gbogbo koko aefojuri to lewu 1. Beeni ☐ 2. Beeko ☐

f.) Je gbogbo ounje loju ese lehin sise 1. Beeni ☐ 2. Beeko ☐

g.) Ko gbogbo ounje to ku sinu ero amu nkan tutu loju ese 1. Beeni ☐ 2. Beeko ☐

gb.) Pa awon ounje mo sinu awon abo to lomori ka to je. 1. Beeni ☐ 2. Beeko ☐

i.) Pa gbogbo ounje sise ati eyi ti a ko ti se mo sinu abo olomori lotooto kato je.

1. Beeni ☐ 2. Beeko ☐

h.) Pamo, pese ki asi je awon ounje wa ninu abo to mo. 1. Beeni ☐ 2. Beeko ☐

j.) pa ofin imototo mo nipa fifo owo ki oto pese, pin tabi je ounje 1. Beeni ☐

2. Beeko ☐

43 Se awon iya-lomo le ko arun kokoro Eedi ran awon omo won nipa fi fomo l'omu?

1. Beeni ☐ 2. Beeko ☐

44. Ewo lo ro pe o je anfani julo fun omo owo? Mama to ngbe pelu kokoro arun Eedi gbodo: a.) f'omo l'omu 1. Beeni ☐ 2. Beeko ☐

b.) f'omo l'ounje lona miran yato si fif'omo lomu mimu 1. Beeni ☐ 2. Beeko ☐

45. Nje mama to ngbe pelu kokoro arun Eedi gbodo fun omo lomi, elerindodo, tabi awon ounje miran ni akoko osu mefa akoko ojo aye omo? 1. Beeni ☐ 2. Beeko ☐

46. Nje awon eniyan too ngbe pelu kokoro arun Eedi gbodo ma se ere idaraya deede?

1. Beeni ☐ 2. Beeko ☐

47. Too bari bee, kinidii? .....

48. Awon ona gbogi wo ni e ti ngbo nipa ounje ati kokoro arun Edi tabi Eedi?

(Jowo fala si awon eyi too ba too si o)

a. Iwe atigbadegba awon Onimo eko sayensi ati iwe kika 1. Beeni ☐ 2. Beeko ☐

b. Iwe Iroyin 1. Beeni ☐ 2. Beeko ☐

d. Ero Amohun-maworan 1. Beeni ☐ 2. Beeko ☐

e. Iwe iroyin elekan lose/losu 1. Beeni ☐ 2. Beeko ☐

e. Awon ore 1. Beeni ☐ 2. Beeko ☐

f. Ile eto ilera1. Beeni ☐ 2. Beeko ☐

g. Awon omiran (So pato) …….

49. Nje o ti lo fun ikeko/semina/ipade ajoro lori ounje too ye lati maje fun awon eniyan too ngbe pelu kokoro arun Eedi ati Eedi rii? 1. Beeni ☐ 2. Beeko ☐

*Bi beko, >> lo si ibeere kejile laadota (52).*

50. Kinii afojusun/akori idanileko/semina/ipade ajoro naa?

a. _____
b. _____
d. _____
e. _____

51. Tani o fun yin ni idanileko?

1. Dokita ☐
2. Noosi ☐
3. Abojuto eto ounje jije ati imototo ☐
4. Awon omiran (So pato) …….

## IPA D - Ihuwasi awon too ngbe pelu kokoro arun Eedi si kokoro arun ati arun Eedi ati ounje toopeye

**Itonii: fun oro kokan, se ami boya Mogba Gan (MG), Mogba (M), Dagunla (D), Mi ogba Rara (MGR), Mi ogba (MOG)**

| S/№ | Statement | (MG) | (M) | (D) | (MGR) | (MOG) |
|---|---|---|---|---|---|---|
| 52. | Nini kokoro arun Eedi tabi Eedi je ijiya lati odo Olorun | | | | | |
| 53. | Awon eniyan too ngbe pelu kokoro arun Eedi tabi arun Eedi ko ye lati kaanu fun nitori pe won jiya fun ise nabi won nii | | | | | |
| 54. | Awon eniyan too ngbe pelu kokoro arun Eedi yee fun itoju ati sisugba/fifowosopo pelu. | | | | | |
| 55. | Nje orowipe eko/iwadi yii yee? | | | | | |
| 56. | Fun Awon eniyan too n gbe pelu kokoro arun Eedi, ounje asaralore se patakii fun :<br>a) Iwalaye won, titojo ati | | | | | |
| | b) abajade itoju to dara pelu ogun tonkoju arun won | | | | | |
| 57. | Aipeye ounje je ipo to buru ninu eto pipeye ounje ni jije ti eniyan gbodo yago fun nigbogbo ona nitori o je asokunfa ki kokoro arun Eedi tete di arun Eedi. | | | | | |
| 58. | Jije ounje topeye se pataki fun igbe aye aladun awon eniyan to n gbe pelu kokoro arun Eedi ait arun Eedi. | | | | | |
| 59. | Jije ounje topeye ngbe awon soja ara nigbowo ati dindin awon olokan-ojokan arun ni ara awon to ngbe pelu arun Eedi. | | | | | |
| 60. | Aeronje topeye je nikan lole yori si siso iwon nu. | | | | | |
| 61. | Awon to ngbe pelu arun Eedi gbodo wa lori akanse ounje kan | | | | | |
| 62. | Awon to ngbe pelu arun Eedi nilo ounje ju eniyan abarapa lo. | | | | | |
| 63. | Ogun aropo ounje lago ara bii Ogun-eje ati eroja asara lore se pataki fun awon too ngbe pelu kokoro arun Eedi. | | | | | |
| 64. | Akanse ounje bii ounje toro tabi olomi se pataki fun awon to ngbe pelu arun | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Eedi too ni egbo lenu tabi lona ofun. | | | | | |
| 65. | Biotilejepe, awon ipapanu bii ipekere, bisikiti, suuti ati suga ni anfani ounje topeye die, sibe, suuti ati suga le sokunfa itankale eefu lenu sibesibe won kunwo ati pe won le seranwo fun titan ebi lona die. | | | | | |
| 66. | Oti lile ati tii onikofi ma ndiwon ounfa ebi os itun nikanse pelu fifo-pale awon ounje. | | | | | |
| 67. | Mimu oti awon to ngbe pelu arun Eedi konikanse pelu ilogun ati pe ko sokunfa ewu kan siwon. | | | | | |
| 68. | Imu siga koni ewu kan si ago ara, fun idi eyi awon to ngbe pelu arun Eedi le mamu bi won batife si. | | | | | |
| 69. | Momo pe awon eyin aese, wara inu agolo kikan, ati iyefun inu agolo le ni kokoro aefojuri (bakiteri) papajulo awon bi Samonila tolewu si soja-ara to tire lago ara eni to ti lugbadi kokoro arun Eedi. | | | | | |
| 70. | Mo loye pe jije eran ti kojina ati adire le ni kokoro aefojuri (bakiteri) to lewu si soja ara toti gbogeje lara eni to ti lugbadi kokoro arun Eedi. | | | | | |
| 71. | Fifo gbogbo ounje papa julo ti atise daradara ki a to je dara, osi tun ngbe wiwa nilera laruge. | | | | | |
| 72. | Sise ounje jina daradara latipa awon kokoro aefojuri tolewu sago-ara ati sise itoju ara eni nipa fifowo kato bere sise, pinpin tabi jije ounje se pataki fun yiyago fun awon kokoro tosopomo arun Eedi. | | | | | |
| 73. | Ounje tojo tilo lori e, toti-kan, ounje tasepamo sinu agolo ati ounje elepo nru ami tomu apere igbe-gburu, esue tabi bibi, siso ife fun ounje nu ati egbo enu ati tona ofun. | | | | | |
| 74. | Ise ati asa mi ko damilowoko lati mama je awon ounje kan. | | | | | |
| 75. | Eewo ni ninu ebi mi latije awon ounje kan. | | | | | |

## Ipa E –Isetoju ounje ati ounje asaralore todara

**Itoni:** Fun oro kokan, safihan (☑) Beeni tabi Beeko

| S/№ | Oro siso | Beeni (1) | Beeko (2) |
|---|---|---|---|
| 76. | Mo ni ounje to to latije fun mi nigbogbo igba. | | |
| 77. | N koni anfani ati ri ounje topeye to to fun mi lojojumo. | | |
| 78. | Mo ma nje orisirisi ounje topeye lore-kore. | | |
| 79. | Moma nje ounje topeye oniwon won yii:<br>Ounje toma nfunni lagbara bii - isu, iresi, gaari; ounje toma nfa eje sara bii - eran, eja, miliki ati ewa; ounje toma nfunni ni ora ati epo; ounje toma nfunni ni fitamini – eso ati ewebe; ounje toma pelo eroja ara ati opolopo omi lojojumo. | | |
| 80. | Gege bi eni to ngbe pelu kokoro arun Eedi, nkije ounje toju bi ti awon ara inu ebi mi lo. | | |
| 81. | Mo ti wa lori akanse ounje lati igba ti mo timo ipo ti mo wa nipa kokoro arun Eedi. | | |
| 82. | Mo ma nlo ogun aropo ounje bii ogun eje ati eroja asara lore lojojumo. | | |
| 83. | Mo ma ngbiyanju lati ripe gbogbo ounje je sise daradara, papajulo eran ati adire ki nto je won. | | |
| 84. | Mo ma ngbe ounje sise pamo koda nigba ti nko ni ero amu-ohuntutu. | | |
| 85. | Mo ma nfi gbogbo-igba de ounje ati pamo kuro lowo awon era, esisin, eku ajeloju onile ati awon eran ile. | | |
| 86. | Mi o lagbara lati gbe omi kanan ki nto mu. | | |
| 87. | Mole gbe ounje totife baje gbona, ki nto jee, | | |
| 88. | Mi o leje eyin aese tabi ounje toni eyin aese ninu. | | |
| 89. | Mo ma ngbiyanju lati pin ounje ati jijee lesekese lehin ti moba ti see tan. | | |
| 90. | Mi o faye sile fun ounje ti a ko tise mi ko papomo eyi ti a tise. | | |
| 91. | Mi o roo wipe ose pataki lati fo awon eso ati ewebe pelu omi tomo kii nto see, niwon igba ti yoo situn laa gbigbe lena koja. | | |
| 92. | Mi o ki fibee fo awon abo ise ounje tabi ijeun ki nto lo won fun ounje. | | |
| 93. | Moma nfoowo mi daradara ki nto bere si pelo ati jije ounje lehin igba ti mo ba lo ilegbonse tabi tu ite tabi paro ite miran fun omo. | | |
| 94. | Mo ma n mu oti lile ati oti elerindodo leekokan | | |
| 95. | Mi o kii mu oti lile , sugbon mo ma nje suuti ati oti elerindodo bii koki, fanta ati beebe lo. | | |
| 96. | Gegebii mama to ni kokoro arun Eedi, mi o ki fun omo mi lomu | | |
| 97. | Mo ma nlo kondo ounje omode (fida) dipo lilo ife. | | |
| 98. | Mo ma nkopa ninu ere idaraya nigbogbo igba koda nisisinyii ti mo ngbe pelu kokoro arun Eedi. | | |

## Ipa E – Iwe-iranti fun Igbelewon

99. Giga (niwon mita) ……

Height (meters) ……

100. Iwuwo (kg.) ……

Weight (kg.) ……

101. Body Mass Index (kg/$m^2$) ……

102. Waist circumference (cm.) ……..

## E see fun ifarabale ati idahun yi

## APPENDIX V

## LETTER OF ETHICAL CLEARANCE

TELEGRAMS.....  TELEPHONE.....

# MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Our Ref. No: AD 13/479/121  Date: 26th May, 2011

The Principal Investigator,
Department of Human Nutrition,
Faculty of Public Health,
College of Medicine,
University of Ibadan,
Ibadan.

**Attention: Adeniji, Timothy Adeyemi.**

*Ethical Approval for the Implementation of Your Research Proposal in Oyo State.*

This acknowledges the receipt of the corrected version of your Research Proposal titled *"Knowledge, Attitude and Practice of Nutrition among People Living with HIV/AIDS (PLWHA) in Ibadan and Shaki, Oyo State, Nigeria"*.

The Committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey, to you, the approval of the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

Please, note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

Wishing you all the best.

OYO STATE RESEARCH ETHICAL REVIEW COMMITTEE
Signature & Date
26/05/11
MINISTRY OF HEALTH, IBADAN

Mr. I. O. Okediran, J.P.
Deputy Director, Planning, Research & Statistics
Coordinator, Oyo State Research Ethical Review Committee.