NUTRITIONAL STATUS OF HIV/AIDS PATIENTS RECEIVING FOOD SUPPLEMENTATION AND ANTIRETROVIRAL THERAPY IN FOOD INSECURE ENVIROMENTS IN CHISAMBA AND KAPIRI MPOSHI DISTRICTS, ZAMBIA

BY

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DECLARATION

I, Estella Mwanza do hereby declare that this dissertation represents my own original work and has never been presented for any degree or other qualification in this university or any other institution of higher learning.

Signed…….. Date…….

SUPERVISOR'S DECLARATION

I hereby certify that the candidate has fulfilled the conditions of the Resolution and Regulations appropriate for the Master's degree of Human Nutrition at the University of Zambia and that the candidate is qualified to submit this thesis in application for that degree.

Date ……..... Signature of supervisor …….....

DISSERTATION APPROVAL FORM

Name Examiner 1..... Signature..... Date.....

Name Examiner 2.....Signature.....Date.....

Name Examiner 3.....Signature.....Date.....

ABSTRACT

The HIV/AIDS pandemic is a challenge to many nations with estimates indicating that by 2022, there were 39 million people in the world living with HIV and in Zambia, the HIV prevalence among adults, 15 years and above, is approximately 11 percent. ART has been known to slow progression of HIV in to AIDS, however food insecurity can negatively affect treatment adherence and nutrition status in people living with HIV/AIDS, hence the need to incorporate food supplements in treatment of HIV patients from food insecure households or communities. However, there is scarcity of empirical evidence on the nutrition status of HIV/AIDS patients receiving food supplements and ART. Therefore, this cross-sectional study investigated the association between nutritional status and food supplementation in HIV-positive individuals receiving ART. Purposive sampling was used to identify two districts with food supplementation programs to HIV/AIDS patients and simple random sampling was employed to select 296 particepants; 140 from Kapiri Mposhi and 156 from Chisamba district. A semi structured questionnaire which included, FFQ was used to collect data from the participants. Weight and height were collected after food supplementation and compared to baseline data from the medical records. Additionally, household demographics, and frequency of physical activity were assessed. Furthermore, any serious illnesses experienced by the participants during the course of taking food supplements that could have affected their weight during data collection were noted. Results showed that most of the participants, 82.5 percent, were not in formal employment and the majority, 60.9 percent, were females. It was also observed that the prevalence of severely undernourished participants reduced from 31.5 percent before supplementation to 8 percent after supplementation, moderate undernutrion reduced from 61.5 percent before supplementation to 44 percent after supplementation and for participants with normal BMI, the prevalence increased from 7 percent before supplementation to 48 percent after supplementation. The improvement in BMI of participants was statistically significant ($t = -14.703$; $p < 0.001$). The most consumed foods were cereals (100 percent), vegetables (82.1 percent) and meat products (56 percent). Cooking oil had the least prevalence of consumption (7 percent). It was also learnt that 71.5 percent of the participants were enganged in physical exercises.This study has shown that food supplements impacted positively on the BMI scores of the participants and therefore recommends incorporation of food supplements into HIV care to ensure better treatment outcomes.

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DEFINITIONS OF TERMS

AIDS	A group of illnesses caused by Human Immunodeficiency Virus (HIV) that weakens the immune system leaving the body vulnerable to life-threatening conditions, such as infections and cancers.
Antioxidant	A substance (e.g., vitamin E, vitamin C, zinc, selenium) that prevents cell damage and also repairs cells damaged by free radicals formed from cell respiration (by-products of the body's use of oxygen).
Antiretroviral	A drug used for HIV prophylaxis or treatment but not cure
Antiretroviral therapy	Treatment with a combination of ARV medications that reduces the amount of HIV in the body (viral load), leading to improved health and survival in a person living with HIV.
Body mass index	A figure that expresses adult weight in relation to height. It is calculated by dividing Weight in kilograms (kg) by height in meters squared (m^2), or (kg/m^2)
CD4+ T Cells	CD4+ T-cells (CD4) are white blood cells that are an essential part of the human immune system. These cells are often referred to as T-helper cells. HIV attacks and kills CD4 cells, leaving the body vulnerable to a wide range of infections. The CD4 count is used to determine the degree of weakness of the immune system from HIV infection
Enzyme	A biological catalyst which enhances or inhibits a chemical reaction
HIV	The virus that weakens the immune system and causes AIDS
Malabsorption	Failure of the digestive tract to absorb nutrients into the body
Malnutrition	A condition caused by inadequate or excess intake of nutrients
Metabolism	The continuous physical and chemical processes taking place in living cells, including the release of energy from food.

Nutrient	A substance that can be metabolised to provide energy and build tissue. The nutrients in food include carbohydrates, proteins (amino acids), fats (lipids), vitamins, and minerals
Nutrition	The process of assimilating food and using it for growth and replacement of tissues
Nutritional status	A measurement of the extent to which a person's physiological needs for nutrients are met.
Odynophagia	Pain on the throat when swallowing food. This can be caused by sores on the throat.
Opportunistic infections	An infection which takes advantage of weakness in the immune system; people living with HIV are vulnerable to such opportunistic infections as tuberculosis, bacterial pneumonia, candidiasis, herpes simplex and Kaposi's sarcoma
Physical Exercise	Physical works such as, Gardening, sweeping, Slashing the grass, Jogging, walking, Cutting fire wood and Bicycle riding
Thrive	'Transforming household resilience in vulnerable environments' was a USAID funded project that was giving out complimentary foodstuffs to people living with HIV/AIDS. The role of the Project was to improve the nutrition status of People Living with HIV and AIDS including adults, orphans and vulnerable children by promoting good nutrition and preventing malnutrition. The operational focus of the Project is to integrate nutrition services into the HIV and AIDS prevention, care and treatment. Emphasis is on establishing Nutrition Assessment, Counselling and Support (NACS) routine services in 50 targeted health facilities across four provinces by 2017

ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AND	Academy of Nutrition and Dietetics
ART	Anti-Retroviral Therapy. Sometimes written as ARVs
BMI	Body Mass index
CI	Confidence Interval
CSB	Corn-Soya Blend
FAO	Food and Agricultural Organisation
HAART	Highly Active ART
HEPS	High energy supplements
HIV	Human Immunodeficiency Virus
MSM	Men having sex with Men
MTCT	Mother to Child Transmission
MUAC	Mid-Upper Arm Circumference
NFNC	National Food and Nutrition Commission
NSG	Nutrition support group
NZP+	Network of Zambian People Living with HIV/AIDS
PEM	Protein Energy Malnutrition
PLHIV	People Living with HIV
PLWHA	People Living with HIV AND AIDS

PrEP	Pre-Exposure Prophylaxis
PUFA	Poly unsaturated fatty Acids
RDA	Required daily allowance
RNI	Recommended Nutrient Intake
RUTF	Ready-to-Use Therapeutic Food
THRIVE	Transforming Household Resilience in Vulnerable Environment.
UNAIDS	Joint United Nations Program on HIV/AIDS
VA	Veterans Affairs
WHO	World Health Organisation

CHAPTER 1: INTRODUCTION

1.1 Background

The Human immunodeficiency virus (HIV) pandemic remains a major public health challenge affecting the global community with estimates indicating that 39.0 million people were living with HIV at the end of 2022. During this same year 630, 000 people died from AIDS related causes and 1.3 million new infections were recorded (WHO, 2023). This problem disproportionately affects the WHO African region where two thirds of the global HIV cases have been reported (ibid).

In Zambia, the HIV prevalence among adults, 15 years and above, is currently estimated at 11 percent (MoH, 2023). This unacceptably high prevalence can be attributed to a number of risk factors including early sexual debut, and engagement in multiple sexual partnership (ibid). HIV eventually progresses in to Acquired immune Deficiency syndrome (AIDS) and the progression is faster in people who are not on treatment (Labban, 2016).

Worldwide, antiretroviral therapy (ART) is known to slow the progression of HIV and assist with AIDS recovery (Geldsetzer *et al.*, 2015). However, good nutrition plays a vital role in treatment efficacy (Labban, 2016). Optimum nutrition helps to strengthen the immune system, manage opportunistic infections, optimize response to medical treatment and may contribute to slowing the progression of the disease (Castleman, Seumo-fosso and Cogill, 2003). Maintaining a healthy lifestyle for people living with HIV/AIDS through optimum nutrition alongside ART may improve their quality of life and enable them care for themselves, their children and their dependants.

A number of studies have revealed that the provision of ART to food insecure patients may lead to further complications related to under-nutrition. This is because Antiretroviral drugs may cause an increase in appetite and demand for food, which if unavailable may result in poor adherence among food insecure patients (Ntalasha *et al.*, 2015; Audain *et al.*, 2014). This underscores the importance of improving household food security and integration of food security in HIV/AIDS programs (Mwai *et al.*, 2013).

Unfortunately, close to one third of the Zambian population is reportedly food insecure; this suggests that HIV patients may be as affected by food insecurity as the wider population and that poor diet quality may be one of the key factors leading to compromised adherence to drugs among

many patients and also immune malfunction in people living with HIV, which leads to viral load increase, increased opportunistic infections and mortality.

HIV care and treatment services have been available in Lusaka, Zambia since May, 2004. Home-based care and treatment adherence support programs were also initiated, which included food donations from World Food Programme. In Chisamba and Kapiri Mposhi districts in the Central Province of Zambia, a total of 2,232 (25 percent) HIV infected patients received food supplementation in addition to ART between 2014 and 2016. It is against this background that this study endeavoured to investigate the effect of food supplementation on HIV/AIDS patients who were receiving ART in Chisamba and Kapiri Mposhi districts.

1.2 Statement of the problem

The Zambian Government acknowledges that nutritional care and support, through food supplementation, can quickly help strengthen immune system and delay disease progression, making it possible for person living with HIV/AIDS to thrive (MoH, NFNC and FANTA, 2017) . As such, total public expenditure on nutritional care increased from 12.6 percent in 2012 to 17.5 percent in 2017 (Harris *et al.*, 2019) , this is without additional donor funding from UNAIDS, Right to Care, and World Relief. Also the budget expenditure on health in Zambia increased from 5.3 Billion kwacha in 2015 to 6.8 Billion in 2017 (GRZ, 2021).

Despite these efforts, the HIV prevalence in central province increased from 11.2 percent in 2015 to 12.4 percent by the end of 2017 and the number of AIDS related deaths remained unchanged at 93,000 from 2015 to 2019 (UNAIDS, 2020). This shows that nutritional care and other interventions still need to be scaled up to ensure adequate access to such services by more patients. Zulu *et al.*, 2011 noted that 64 percent of PLWHA had insufficient access to nutritional care and roughly two-thirds of them were women.

Additionally, there is limited information to show the effect of these food supplements alone in the Zambian context to build and amend supportive policy implementation (Ntalasha *et al.*, 2015). This study aimed to assess the association between food supplementation and nutritional status of HIV/AIDS patients receiving ART in the two districts. Through the findings of this study, recommendations were given on how to improve the nutritional status of patients on ART.

1.3 Rationale of the study

HIV patients frequently experience weight loss due to nutrient malabsorption, altered metabolism and reduced dietary intake caused by appetite loss, mouth ulcers, and food insecurity (De Pee and Semba, 2010) . As infection advances, it becomes increasingly difficult to restore nutritional status.

More information is still needed on how best, nutrition and treatment programs can be tailored to restore nutritional status of HIV/AIDS patients. Such information may be useful to the government for crafting well-structured policies that will see more resources allocated towards improving the nutritional status of HIV/AIDS patients.

Therefore, this study assessed the impact of food supplementation on the nutritional status of HIV/AIDS patients in Chisamba and Kapiri Mposhi districts of Zambia that were enrolled on a food supplementation program while receiving ART.

The findings of this study provided some of the evidence needed by the Government and other stakeholders to input in to programs tailored towards improving the nutritional condition of HIV/AIDS patients.

1.4 Main objective

To determine the association between food supplementation and nutritional status of HIV/AIDS patients receiving ART in Kapiri Mposhi and Chisamba districts of Zambia between 2014 and 2016 and assess their dietary intake.

1.4.1 Specific objectives

- To assess the nutritional status of HIV patients before and after food supplementation in Kapiri Mposhi and Chisamba districts between 2014 and 2016.
- To assess dietary intake of the HIV patients in Kapiri Mposhi and Chisamba districts.
- To determine the prevalence of HIV patients on ART and food supplements who are engaged in physical exercises.
- To establish the association between food supplementation and nutritional status of HIV/AIDS patients receiving ART.

1.4.2 Research questions

- Did the nutritional status of HIV patients on ART in Chisamba and Kapiri Mposhi districts improve following food supplementation between 2014 and 2016?
- Was there a link between the nutritional status of HIV patients before and after food supplementation in Kapiri Mposhi and Chisamba Districts?
- What is the prevalence of HIV patients on ART and Food supplements engaged in physical exercises?
- What is the association between food supplementation and nutritional status of HIV/AIDS patients receiving ART?

1.5 Assumptions

It was assumed that all respondents answered the questions in the questionnaire correctly and honestly.

1.6 Limitations

It was difficult to confirm whether all the food supplements were consumed by the participants and also, there was no control group for comparison. Additionally, treatment adherence was difficult to measure. Moreover, the presence of opportunistic infections may have affected weight gain as 21 percent of respondents reported at least an illness during the period. Therefore, inferences on the association between nutritional status and food supplementation in HIV/AIDS patients were made within the context of these limitations.

CHAPTER 2: LITERATURE REVIEW

2.1 What is HIV /AIDS

Human immunodeficiency virus (HIV) is an infection that attacks the body's immune system and Acquired immunodeficiecy syndrome (AIDS) is the most advanced stage of the disease. HIV targets the body's white blood cells, weakening the immune system. This makes it easier for those infected to get sick with diseases like tuberculosis and some cancers.

HIV is spread from the body fluids of an infected person, including blood, breast milk, semen and vaginal fluids. HIV can be treated and prevented with antiretroviral therapy (ART). Untreated HIV can progress in to AIDS, often after many years (WHO, 2023).

Most transmissions in Zambia are through heterosexual contact by high-risk sexual practices (such as multiple concurrent partnerships), low and inconsistent use of condoms, low rates of voluntary medical male circumcision and population mobility (Anabwani and Navario, 2004). Additionally, Mother to Child Transmissions (MCT) account for 15 to 30 percent, during gestation or labour, with a further risk of 10 to 20 percent associated with breast feeding (Teasdale, Marais and Abrams, 2011). Moreover, limited available data suggest that less than 1 percent of the new infections, are due to men having sex with men (MSM). If an infected individual delays or does not seek and receive treatment for HIV, the infection is likely to develop into AIDS.

2.2 Effect of HIV/AIDS on nutrition status of patients

HIV/AIDS may lead to Oxidative stress which may result in to the degradation of intestinal cells as reactive species oxidize the poly-unsaturated fatty acids (PUFA) component of membranes, disrupting cellular structure and function in the process. This causes nutrient malabsorption, which is linked to wasting in HIV patients (Van Oosterhout *et al.*, 2010).

Similarly, HIV/AIDS patients can suffer from undernutrition due to inadequate food intake caused by anorexia, dysgeusia, dysphagia, depression, or lack of access to adequate foods (Alo, Ogbonnaya and Azuogu, 2014). Consequently HIV/AIDS can lead to nutritional deficiencies in infected individuals. The foregoing coupled with the fact that HIV/AIDS patients require more energy, 10 percent more when asymptomatic and 20 – 30 percent more when symptomatic underscores the importance of providing adequate amounts of the right foods to the HIV/AIDS patients.

Failure to meet nutritional needs increases susceptibility to infections and patients may take longer to recover from minor illnesses. This might lead to a cycle of more weight loss, more vulnerability and worsening illness (Raiten *et al.*, 2011).

2.3 Effect of malnutrition on the immune system

Protein energy malnutrition and micronutrient deficiencies affect the immune system by damaging the lymphoid tissues which are most vulnerable leading to lymphoid atrophy. The immune system is also reduced through alteration of T cell subsets, decrease of T cell counts and cytokine response (Sicotte *et al.*, 2014). In protein energy malnutrition severe malnutrition impairs the immune system and decreases one's resistance to infection. In the case of protein energy malnutrition (PEM), cell-mediated and innate immunity are particularly lessened, thereby increasing the risk of viral infection (including HIV) and disease progression (Sicotte *et al.*, 2014).

According to Anabwani and Navario, 2004, nutrition is crucial in strengthening the immune system because most immune cells and their products depend on metabolic pathways that are nutrient dependant as co factors for their actions and activities. Antioxidant minerals and vitamins such as selenium, Zinc and Vitamins A, C and E are key in ensuring an active immune response.

Vitamin A in particular is not only an antioxidant but also maintains mucosal immune system making it an important dietary component. Vitamin A also enhances T helper type 2 cytokine production and secretory IgA response to viral infections especially at high doses. In addition, carotenoids and other vitamin A compounds have potential to inhibit reverse transcriptase in HIV-1 and -2 whereas vitamin C has been shown to inhibit the HIV virus in vitro (Audain *et al.*, 2014).

2.4 Role of food security and nutrition in treatment of HIV/AIDS infected people

Food security is both an outcome of and a contributor to the HIV/AIDS pandemic. A food insecure individual may engage in risky behaviour such as sex vending which may lead to contracting HIV or increasing of the viral load for those who are already infected. On the other hand, food insecure individuals may struggle to adhere to ART because the antiretroviral drugs (ARVs) stimulate appetite in HIV patients (Ntalasha *et al.*, 2015; De Pee and Semba, 2010;Weiser *et al.*, 2010)

Increased appetite in HIV patients may lead to more food intake which helps body mass recovery and improve immune function (potential for delaying onset of AIDS) but this is difficult to attain in households or environments where there is lack of access to sufficient quality foods to satisfy

the stimulated appetite. Inadequate access to food by some HIV patients in food insecure environment in Kenya was cited as one of the reasons as to why some patients declined treatment, citing fears of potential side effects as a result of taking drugs on empty stomachs. Unfortunately, lack of treatment leads to rapid progression of HIV in to AIDS causing a decrease in productivity and ultimately, death (Audain *et al.*, 2014).

Similarly , studies conducted in Uganda showed that food insecurity was associated with non-adherence to ART, incomplete viral suppression and having a CD4 count <350 cells/mm^3 presenting the need for nutrition interventions in palliative care (Audain *et al.*, 2014).

According to Raiten *et al.*, 2011, food insecurity is associated with worse virologic and immunologic outcomes, worse physical and mental health status and increased risk of mortality. Furthermore, a strong relationship exists between food insecurity and multiple high-risk sexual behaviours and vulnerability to sexual violence and abuse which are risk factors for contracting HIV (Masanjala, 2006)

Poor nutrition affects the efficacy of drug metabolism. Certain ARVs affect the way nutrients are utilized by influencing nutrient absorption, metabolism, distribution, or excretion. Particular examples of such ARV's include protease inhibitors (PI), such as ritonavir and nelfinavir which can cause changes in the metabolism of lipids (fats), resulting in an elevation in blood cholesterol and triglyceride levels (Hadgu, 2013). Most of the nutritional concerns in AIDS care in countries where Highly Active Antiretroviral Therapy (HAART) is widely available are now related to metabolic alterations associated with HAART, which predispose patients to cardiovascular and other chronic complications (Andrade *et al.*, 2012).

2.5 Antiretroviral therapy and food supplementation

Studies have documented widespread micronutrient deficiencies among HIV-infected people mostly in the Southern Africa region. However few studies have assessed the impact of food supplementation in the region. Among these few, supplement composition, patient characteristics, and treatments vary widely.

Evidence has shown a strong association between HIV progression and food insecurity (Ntalasha *et al.*, 2015). This partly explains the increased mortality risk of patients with low BMI receiving ART especially among the vulnerable populations such as the elderly, pregnant women and young

children. HIV infection may also lead to reduced agricultural production and loss of income, which results in food insecurity. Consequently, impoverished families struggle to cope with HIV related morbidity and mortality and hence many reportedly resort to 'distress' coping strategies, such as selling of key assets, which amongst other things can threaten family cohesion (Masanjala, 2006).

Antiretrovirals are widely available in most Sub-Saharan African countries. For instance, in Zambia, public health services provide antiretroviral at no cost, however, good nutrition is vital for the enhanced efficacy of these drugs. People on ART who receive food supplementation experience a faster recovery from HIV/AIDS related infections (Labban, 2016) Supplementary foods such as Ready-to-Use-Fortified Spreads (RUFS) and Corn-Soya-Blends (CSB) have been shown to remarkably increase the weight, BMI and treatment adherence (Audain *et al.*, 2014).

Thus, the role of nutrition in AIDS recovery is widely acknowledged and further research in to the relationship between nutrition and nutritional status of patients on ART has mainly focused on the role and impact of micronutrients, protein, special nutrients such as specific amino acid mixtures, and food supplements, especially in the case of wasting (Houtzager, 2009).

2.6 Nutrition for people living with HIV/AIDS

Evidence has shown that ARVs are essential in prolonging the lives of people living with HIV/AIDS, and food and sound nutrition are vital to human health. Efforts to scale up interventions on care and treatment programs need to address the challenge of how to apply principles of clinical care in a safe and efficacious implementation of ARV's that will ensure long term care of HIV patients and enhance the quality of their lives (Raiten *et al.*, 2011). In addition, food security programs should include nutrition education and integrate activities that will mitigate the impact of HIV on the infected. Labban, 2016, suggests that care interventions for the HIV pandemic cannot operate in isolation but must be embedded into the spheres of health facilities, the community, the workplace and the household. Furthermore, challenges of weak health system and attrition of health workers can be addressed through use of community health workers (Mwai *et al.*, 2013).

2.7 ART and food supplementation in Zambia

Zambia is among the countries in Sub-Saharan Africa severely hit by the HIV/AIDS pandemic. By 2018 Zambia had approximately 1.2 million people living with HIV and about 63 percent of these are on ART (MoH, 2017).

In Zambia, several studies have identified at-risk groups for HIV based on baseline indicators of malnutrition (MoH, 2017; MoH, 2023) However, few have determined the impact of improved nutrition on clinical outcomes of an HIV patient while on ART. This is a notable gap in the medical literature, since in resource constrained communities early weight gain serves as the theoretical foundation for food-by-prescription and food supplementation programs (John *et al.*, 2010)

Cantrell *et al.*, 2008 investigated the effects of food supplementation and ART adherence in HIV positive adults in Zambia. The food supplement consisted of micronutrient fortified Corn-Soya Blend (CSB), which had 6.2 kg of protein per 10kg bag; and 620ml of vegetable oil per month for each individual ration from May 2004 to March 2005. It was learnt that those who received the supplement had a 95 percent adherence compared to 48 percent for those who did not.

Findings of that study also showed that the participants on supplementary foods had a weight gain of 5.4 kg while those who were not had an increase in their weight by 5.1 Kgs after six months. The weight gain after 12 months for the participants on supplementary foods and those who were not were 6.3 and 5.4 kg respectively. The weight gain was not statistically significant; however, the researcher described the results as a "trend towards modest".

2.8 Food supplementation: high energy protein supplement (HEPS). Yummy soya

In Chisamba and Kapiri Mposhi Districts of Central Province, patients on ART were given food supplements sourced from Community Markets for Conservation (COMACO) and Java foods and distributed by THRIVE. Every patient was given 2 boxes, each with a one-month supply of 60 x 100g sachets.

To ensure all food supplements were consumed by the right people within the family, random monitoring at the time of feeding was conducted by care givers while the health staff requested all beneficiaries to bring empty sachets as they came to collect the next consignment. Care givers were given nutrition education on the need to make sure the food supplements was given to the intended beneficiaries.

The prescription was that the recipients of the supplements (HEPS) take it three to four times in a day in addition to the usual food. The main ingredients in the HEPS were maize flour, soya beans flour and sugar.

Table 2.1: Nutritional Information for yammy soya

Nutrients	Typical value/100g
Energy	400kcal
Protein	15g
Fat	6g
Vitamin A	3460UI
Thiamine	0.128mg
Riboflavin	0.48mg
Vitamin C	48mg
Vitamin B12	2cmg
Vitamin B1	1.4mg
Vitamin E	8.3mg
Vitamin D	441.6UI
Vitamin K	30mg
Iodine	4mg
Potassium	140mg
Zinc	5mg
Phosphorus	280mg
Potassium	4mg
Calcium	362mg
Fibre	5g
Iron	4mg

CHAPTER 3: MATERIALS AND METHODS

3.1 Research design

This study used a cross sectional study design and data was collected both retrospectively from the participant's medical files and also through administering a semi structured questionnaire without following the participants over time. The study was done in January 2017.

3.2 Study site profile

The study was conducted in Chisamba and Kapiri Mposhi districts of Central Province in Zambia. Chisamba is 97 kilometres from Lusaka the capital city of Zambia, and has a population of 250,000 (CSO, 2012). Kapiri Mposhi is 209 kilometres from Lusaka and it has a population of 295,000 (ibid). These sites were chosen because they are in one of the two provinces where food supplementation to HIV patients was still running in Zambia.

Additionally, Central Province is bordered by eight (8) provinces in Zambia that gives it a more cosmopolitan demographic distribution. That meant, the findings would be more representative of a large part of ethnic grouping in Zambia than would be with other provinces.

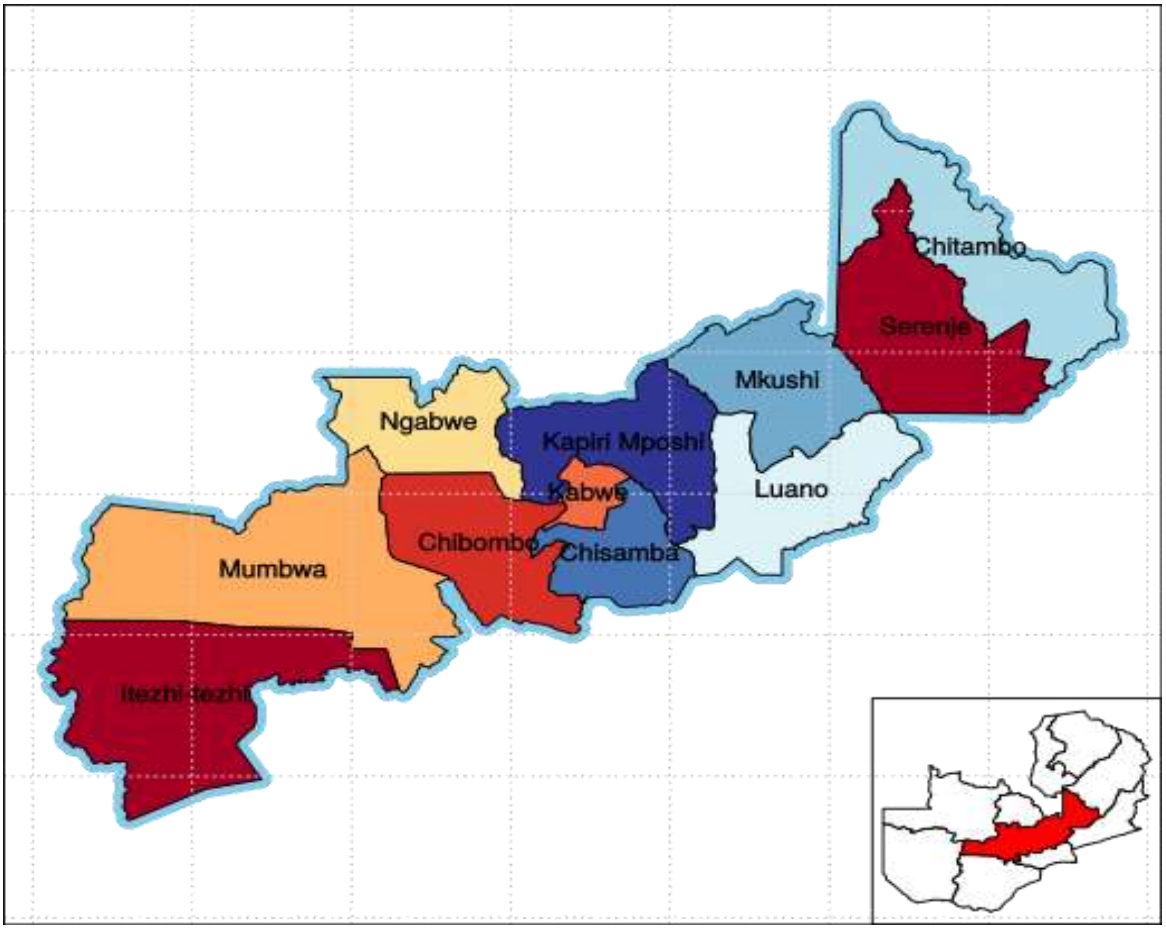

Figure 3.1 Map of Central Province, Zambia

Source: Lighton Phiri, 2016

3.3 Study population

The sampling frames for each of the two districts, Chisamba and Kapiri Mposhi, consisted of residents living with HIV/AIDS; at least 15 years old at the time of data collection and had been receiving food supplements from January 2014 up to December 2016.

3.4 Inclusion criteria

Participants were eligible to participate in this study if they were residents of Kapiri Mposhi or Chisamba districts; HIV positive; were on ART; received food supplements from January 2014 to December 2016; at least 15 years of age and accompanied by parent or guardian to give consent if 15 to 17 years of age, not mentally challenged and agreed to participate in this study.

3.5 Exclusion criteria

The exclusion criteria required that participants should neither be critically ill nor showing symptoms of the disease. Also, pregnant, lactating mothers and participants under the age of 14 years were ineligible to participate in this study.

3.6 Sample size and sampling techniques

The sample size for the study was calculated using Cochrane et al (1963)

$n = Z^2p\ (1- p)/d^2$

Where: n – sample size

Z-confidence level set at 95% (1.96 z score value)

P-proportion of HIV = 25%

d- Margin of error

The sample size was adjusted upwards by 5 percent to factor in attrition and questionnaires that may not have complete information. The final sample size was 305 respondents.

3.7 Sampling

Chisamba and Kapiri Mposhi districts were purposefully selected because of the on-going food supplementation program for HIV patients who were also on ART. This was followed by generating a list of eligible participants in each district. A predetermined number of eligible participants (305) was picked from the list using simple random sampling.

3.8 Pre-testing of the research tools

Pretesting of the questionnaire was done among 10 eligible participants in Makululu compound in Kabwe. Makululu has similar demographic features as Kapiri Mposhi and Chisamba and is also in Central Province. This was done to improve clarity, appropriateness and understanding of the questions in the questionnaire.

3.9 Data collection procedure and tools

Data for this study was collected in January 2017. A semi-structured questionnaire with pre-coded response choices (closed-ended questions with a few open-ended questions) was used to elicit

responses from participants. The questionnaire comprised sections with questions on socio-economic and demographic characteristics, dietary intake, frequency of consumption of food supplements, quantities of food supplements consumed and physical activities the study participants engaged in.

3.9.1 Anthropometric measurements

Baseline data on Anthropometry (weight and height) of the participants was taken from the hospital records. These baseline figures which the hospital collected in the year 2014 were compared to anthropometric measurements compiled by the researcher.

To measure weight, the participant had to stand on an electronic Seca scale model 8741021659, with arms relaxed at the side; feet positioned close together so that weight was evenly distributed on the feet before taking the reading. The height board was used to measure height. Prior to taking the height measurement, the participant had to stand with heels placed together; back of the heels, buttocks and shoulder blades touching the back plate and the head positioned in the Frankfurt horizontal position.

Body mass index (BMI) was calculated by dividing the participants' weight in kilograms by the participants' height in meters squared

3.9.2 Dietary intake

A monthly FFQ was used to elicit releveant information from the participants on their dietary intake. The questionnaire included a list of locally available foods and drinks and participants were required to report which food items on the list were consumed and how often over the last one month.

3.10 Ethical consideration

The study design and the survey instruments were submitted for Ethics review and were approved by ERES Converge Institution Review Board. Furthermore permission to conduct the study in Kapiri Mposhi and Chisamba districs was obtained from the Provincial and District Health Offices. Participants in this study did so on a voluntary basis. Prior to commencement of the interviews, the purpose and importance of the study was explained to the selected participants and consent forms signed. Those who could not sign offered their thumb prints. For participants who were 15 - 17 years old, consent was obtained from them and also from their parents or guardians.

All the information collected from the participants were kept under the custody of the researcher as confidential and study participants were anonymous. Questionnaires were identified by coded numbers and Participants were assured of utmost confidentiality and that their participation in the interview would not affect services that they were currently receiving. It was also emphasized that data published in local or international journals would not be linked to participants.

3.11 Data analysis

Data was analysed using the Statistical Package for Social Scientists (SPSS) version 21. The analysis produced both inferential and descriptive statistics. Prior to conducting the analysis, the BMI data, which were continuous in nature, were categorised based on WHO guidelines as follows :< 18.5 kg/m^2 is underweight; 8.5 - 24.9 kg/m^2 is normal, >= 25 kg/m^2 is overweight and >= 30kg/m^2 is considered obese. The paired sample t-test was used to establish the difference in the mean body mass index of HIV/AIDS patients before food supplementation and after food supplementation. Chi-square analysis was used to establish the relationship between food supplementation and nutritional status of the participants.

Information from the FFQ was used to determine the prevalence of food consumption. To calculate the prevalence of consumption of different food items , the participant was asked to state the foods that he or she consumed in the past one month based on a predefined list of food items. The number of particepants who consumed a specificified food item were aggregated and divided by the total number of participants. This gave the prevalence of consumption of a specified food item.

CHAPTER 4: RESULTS

4.1 Socio-demographic information about the participants

From the selected 305 eligible participants, 296 took part in this study; out of whom 140 were from Chisamba and 156 were from Kapiri Mposhi district. Nine (9) declined to be interviewed. Disaggregated according to sex, 60.1 percent of the participants were females while 39.9 percent were males (Table 4.1).

The results also showed that only 14.9 percent of the participants were in formal employment while 82.5 percent were involved in activities other than formal employment for their living. The highest proportion of participants (73.6 percent) earned less than ZMW 1,000 per month, followed by those who earned between ZMW 1,000 and ZMW 3,000 (18.9 percent) and only 7.5 percent of participants earned more than ZMW3,000.00 per month.

The results also show that 39 percent of the households sourced water from bore-holes, 34 percent from shallow wells, 20 percent from taps, and 5 percent from streams. The main source of cooking fuel was charcoal (47 percent), followed by fire wood which was used by 45 percent of the participants. The energy used by the least number of participants was hydroelectricity with only 8 percent using it. Of the participants that used firewood or charcoal as a source of fuel, 60.87 percent said that they had challenges in finding these fuels while 39.13 percent easily found these energy sources.

Table 4.1 Socio-demographic and economic information about participants

Variable	Description	Frequency	Percent (%)
Gender	Male	118	39.9
	Female	178	60.9
Level of education	Non	41	13.6
	Primary	190	62.9
	Secondary	66	21.9

Employment status	Formal	45	14.9
	Non-Formal	249	82.5
Monthly income (ZMW)	< 1,000	39	73.6
	1,000 – 3,000	10	18.9
	>3,000	4	7.5
Source of water	Boreholes	78	39
	Shallow wells	68	34
	Streams	10	5
	Taps	40	20
Major source of cooking fuel	Charcoal	94	47
	Fire wood	90	45
	Electricity	12	8

4.2 Illness of participants during the course of taking supplements

As stated in the exclusion criteria, only participants that were not critically ill participated in this study, however, previous illness during the course of taking food supplements which could have had an effect on the weight of participants at the time of data collection was investigated. The research results in Table 4.3 show that 15.5 percent of the participants reported falling ill whilst receiving food supplementation. The common illnesses cited were malaria, diarhoea and sore throat.

Table 4.2 Patients that experienced serious illness during the course of taking this food supplement that would have affected weight

Response	Frequency	Percent
Yes	31	15.5
No	164	82.0

4.3 Nutrition status of participants

The results show that the prevalence of severely undernourished participants reduced from 31.5 percent before supplementation to 8 percent after supplementation. Additionally, the prevalence of moderate undernutrition reduced from 61.5 percent before supplementation to 44 percent after supplementation and for participants with normal BMI, the prevalence increased from 7 percent before supplementation to 48 percent after supplementation.

A comparison of the nutrition status of the participants before and after supplementation is shown in figure 4.1.

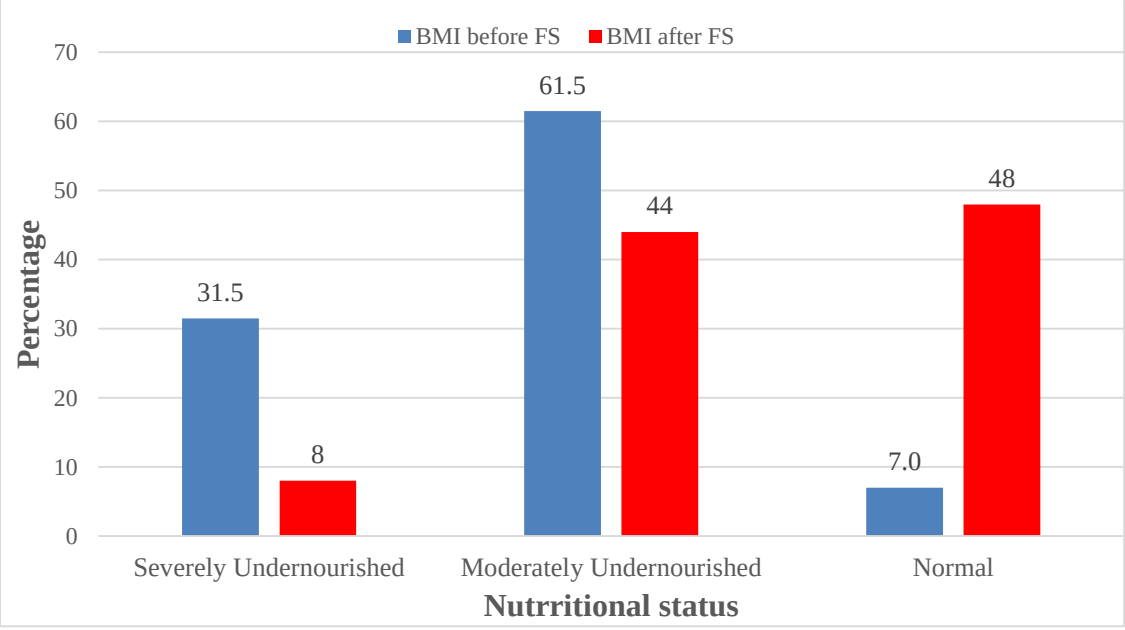

Figure 4.1 Nutritional status before and after supplementation

Furthermore, the t–test analysis in Table 4.3 showed a significant difference between BMI before and BMI after food supplementation ($p < 0.001$).

Table 4.3 Paired sample T Test of BMI before and BMI after supplementation

Pair	Mean	Std Deviation	Std error mean	t	Significancy 2 tailed
BMI before - BMI after	-1.9740	1.8987	0.1343	14.703	0.000

4.4 Association between quantity of food supplements and nutrition status

A chi-square analysis was carried out to determine the relationship between quantity of food supplements and nutritional status of the participants (Table 4.4). The results show that there was no significant relationship between quantity of food supplements and nutritional status of the participants.

Table 4.4 Association between quantity of food supplementation and nutrition status

	Nutrition status of participants		
	X^2 Value	Df	p-value
Quantity of food supplemented	438.162a	3	0.241

4.5 Dietary intake

The research results show that cereals were the most consumed food stuffs (100 percent), followed by vegetables (82.1 percent). Meat and meat products were consumed by 56 percent while cooking oil had the least prevalence of consumption at 6 percent (Table 4.5). It was also revealed that birds were consumed by 48 percent of participants while 45 percent of the participants reported that they had consumed fish. Fruits, milk and beans were consumed by 43, 28 and 26.5 percent of the participants respectively.

Table 4.5 Frequency of consumption of food by study participants

Item		Frequency	Percent (%)
Cereals	Never /<1/ month	0	0
	1 - 3 / month	296	100
Milk and milk products	Never /<1/ month	85	42.5
	1 - 3 / months	56	28.0
Fish	Never /<1/ month	17	8.5
	1 - 3 / months	90	45.0
Cooking oil	Never /<1/ month	54	27.0
	1 - 3 / months	14	7.0
Meat and meat products	Never /<1/ month	37	18.5
	1 - 3 / months	112	56.0
Beans	Never /<1/ month	12	6.0
	1 - 3 / months	53	26.5
Birds	Never /<1/ month	52	26.0
	1 - 3 / month	96	48.0
Fruits	Never /<1/ month	71	35.5
	1 - 3 / month	86	43.0
Vegetables	Never /<1/ month	53	17.9
	1 - 3 / month	243	82.1

4.6 Involvement in Physical activities

Over seventy one percent (71.5 percent) of the participants were engaged in at least one of the following physical exercises; sweeping, slashing, running, firewood cutting, gardening or walking while 28.5 percent lived a sedentary life.

Further analysis showed that 23 percent of the participants used walking as a physical exercise, 15.5 percent preferred running, 22 percent were involved in sports and 12 percent did other forms of physical exercises. More than twenty five percent (25.5 percent) performed physical exercise thrice in a week, while 20.5 percent performed it twice, and 12.5 percent performed physical exercise only once

Table 4.6: Paticipants involved in Physical activities

Variable	Description	Frequency	Percent (%)
Enganged in Physical Exercise	Yes	211	71.5
	No	85	28.5
Number of times Physical exercises are performed	Once	25	12.5
	Twice	41	20.5
	Thrice	51	25.5

CHAPTER 5: DISCUSSION

The study assessed the effect of food supplements on the nutritional status of HIV/AIDS patients receiving ART in Kapiri Mposhi and Chisamba districts of Zambia between 2014 and 2016. Most participants in the study were females. This could be attributed to a higher prevalence of women (13.9 percent) than Men (8 percent) living with HIV (MoH, 2023) , a phenomenon similar to what is obtaining in most communities in sub-Saharan Africa where a big proportion of the population living with HIV/AIDS are women (UNAIDS, 2020).

Most of the participants only attained primary education, probably an indication that people of lower education may be more vulnerable to acquiring HIV compared to people who have attained higher education. HIV/AIDS awareness could be higher among the educated people and are thus more likely to avoid risky behaviours such as having unprotected sex with partners of unknown HIV status. They may also be more knowledgeable on how to access Post Exposure Prophylaxis (PEP). These results resonate with findings from a study titled; *The adult prevalence of HIV in Zambia: results from a population based mobile testing survey conducted in 2013–2014* which estimated the adult prevalence of HIV in Zambia and also determined whether being HIV positive was associated demographic characteristics. The results of that particular study showed that educational level was among the factors that had a significant relationship with being HIV positive (Chanda-Kapata *et al.*, 2016).

Most of the participants were in the low-income bracket; they earned less than ZMW 1,000 per month, an indication that the majority of these people could be going through economic hardships, a situation which could have rendered most of them vulnerable to contracting HIV. Evidence has shown that economic hardship can push low-income earners into high-risk activities that eventually expose them to HIV (Low *et al.*, 2019).

Additionally, low income entails less disposable income which may usually result in low meal frequency and low dietary diversity, hence poor nutrition status among household members. The nutrition status of the HIV/AIDS infected household members is likely to be worse than that of the other household members because they require additional nutrients to meet their increased metabolic activities brought about by HIV/AIDS. The foregoing underscores the importance of the food supplements that were given to the participants as a rich source of nutrients.

The nutrition status of most participants improved after being placed on the food supplementation program. This could imply that the food supplements partly satisfied their energy needs deficits. This finding corroborates with the findings of the study by Olsen *et al.*, 2014, in Jima and Oromia region in Ethiopia, which determined the effects of lipid based nutritional supplements in patients with HIV during the first three months of ART and also after three months delay. Results of that study showed an increase in the lean body mass of the participants at 3 months. This shows the importance of providing food supplements to HIV positive patients especially in impoverished communities.

However, other studies have shown contrary results. For instance Cantrell *et al.*, 2008 investigated the effect of food supplementation and ART on HIV/AIDS patients and found no significant difference in the weight gain between those who were on supplements and those who were not. Cantrell's observation was for a period of one year while the participants in this study had been taking supplements for at least two years, this could be one of the reasons that explains the difference in the findings.

This study found no significant relationship between the quantity of food supplements consumed and nutritional status of the participants. This could imply that most participants consumed the minimum amounts of supplements that they needed to positively influence their BMI. It could also mean that the supplements were of high quality and as such one did not require much to get the desired results.

This study did not establish a significant relationship between quantity of food supplements consumed and nutritional status of patients receiving food supplements. It could be that most of the participants received at least the minimum quantity of supplement that was necessary to positively impact their weights. However, compared to baseline data, the nutritional status of the participants significantly improved after participating in the food supplementation program, a finding which agrees with the finding by Labban, 2016 who found a relationship between food supplementation and nutritional status in PLWHA.

The finding that most participants were unable to eat food of their choice and most of them consumed smaller meals resonates corroborates with the evidence that the majority of persons with HIV/AIDS live in sub–Saharan Africa where food shortages and malnutrition are among the major

problems (UNAIDS and WHO, 2004). This shows the need for incorporating food supplements in the treatment programs.

The high prevalence of cereal consumption can be due to the fact that the staple food in Zambia, Maize, is a cereal. Vegetables are also widely consumed because they are relatively cheap and depending on the season, they can be sourced from the wild by rural communities.

This finding could indicate that the major source of energy are cereals and vegetables are a major source of vitamins and minerals. However, very low prevalence of cooking oil consumption could imply that the participants are not benefitting much from the vegetables. Use of cooking oil cooking oil in vegetables would enhance bioavailability of some fat-soluble vitamins such as vitamin A, E and K. This finding provides an opportunity for nutrition educationist to teach the households in these localities on the importance of cooking oil.

A high proportion, (34 percent), of the participants accessing water from shallow wells should be a cause for concern. Food and water safety are very important for PLHIV and consuming water from shallow wells which is in most cases contaminated puts them at a higher risk of contracting water borne diseases (MoH, 2011). Contaminated water and food may be among the factors causing persistent illnesses among the PLHIV resulting in weight loss and even death.

Most of the participants were involved in physical exercises which is good for their health. Studies have shown that adequate levels of exercise are important in weight management and enhances active life (Mwaikambo *et al.*, 2015).

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study established that there was a significant difference in nutritional status before and after food supplementation. There were less patients who were severely malnourished after food supplementation compared to nutritional status before food supplementation. The study also found that quantity of food supplementation was not significantly related to the nutritional status of the participants.

6.2 Recommendations

- Institutions that provide food supplements to PLHIV should enhance their efforts by starting food supplementation early.
- People should be encouraged to have some source of income that can be used to buy food that they are advised to eat. For those unable to work due to illness, they should be identified by Community Based Agents and their names submitted to various organisations for social protection.
- Promotion of less labour-intensive crops such as pigeon peas among PLHWA would not only earn them income but also provide them with the much needed proteins.
- The government can also establish additional social protection programmes to enhance the capacity and opportunities of the poor and vulnerable people to improve and sustain their livelihoods and welfare concerning nutrition for PLWHA in the communities.
- Introducing Policies where every patient is linked to the Ward Nutrition Coordinating Committee (WNCC), which is composed of representatives from different government departments, would help in easily identifying PLHWA that need social protection or any other type of help.
- Community health workers should be trained in managing some illnesses affecting HIV positive people. This will enable PLWHA to get treatments on their opportunistic infections as close to their households as possible. Furthermore, nutrition support groups should be trained in sustainable methods of making HEPS at local level. This is manageable even at household level for people living with HIV because they would use locally available ingredient such as soya beans and maize. Companies in Zambia which

manufacture food supplements should venture into manufacturing fortified foods at a larger scale, which can be prescribed to the patient when BMI is below 18 kg/m^2.

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APPENDICES

Appendix 1: Information Sheet

STUDY TITLE: NUTRITIONAL STATUS OF HIV/AIDS PATIENTS RECEIVING FOOD SUPPLEMENTATION AND ANTIRETROVIRAL THERAPY IN FOOD INSECURE ENVIROMNENTS IN CHISAMBA AND KAPIRI MPOSHI DISTRICTS, ZAMBIA

Principal Investigator: Estella Mwanza

My name is Estella Mwanza, a student studying Human Nutrition at the University of Zambia. I am carrying out a study to find out effects of food supplementation on nutritional status of HIV/AID patients receiving antiretroviral therapy in Chisamba and Kapiri Mposhi districts.

I am asking you to take part in the study because you are HIV/AIDS Positive, taking ART and supplementary food from 2014- 2016. It is not mandatory for you to participate. It is your choice. If you agree, I will have an interview with you for 30 minutes. I will take anthropometry measurements; I will also ask questions on food supplementations and the amount received every time you visit the hospital. To have the clear insight of the study I will also ask you about the food you eat apart from the food supplementation given at the hospital and how often these foods are eaten.

There are no risks that will result from your participation though there is a minimal financial benefit of K10 which will cover transport cost. You do not have to answer all of the questions. You have a right to skip some questions you think are personal, withdraw or seek further clarification where you do not understand.

The information that I will collect from this study will be kept private. Your name will not be used on paper forms and your contact information will not be published at the end of the study.

I will share the knowledge I will get from this study with Chisamba and Kapiri Mposhi district hospitals, Provincial medical offices for Central Province and “THRIVE” The organization which donate food supplements for people living with HIV/AIDS to the Ministry of Health in the study areas. I will also share the information with other organizations interested to know the effect of food supplements on HIV/AIDS patients taking ART.

If you are interested in participating or have any questions, please ask or contact me on the address; University of Zambia, School of Agriculture, Department of Food Science and Nutrition P.O. Box, 32379, Lusaka, Cell phone No: 0977547120. You can also contact my supervisor on the same address Dr Kerion Audain. ERES Converge IRB, the organization that reviewed my proposal and gave ethical clearance can be contacted on: The Secretary, ERES Converge IRB office, 33 Joseph Mwelwa Road, Rhodes Park, and Lusaka. Cell Numbers 0955 155633, 0955 155634.

I agree to take part

Appendix 2: Information Sheet In Local Language

Information sheet

Umutwe: Ubufwailisho Bwa Fyakulya Fimbi Ifyo Ficita Kumunthu Uwakwata Akashishi/Ubulwele Bwa Ntandabwanga, Muchisamba Na Ku Kapiri Mposhi machilikiti, Zambia

Principal Investigator: Estella Mwanza

Ishina lyandi nine Estella Mwanza umusambi ulesambilila pafyakulya pesukulu ikalamba ilitwa ati University of Zambia Muchisungu. Ndececenta pabukumu wafyakulya fyakufola kubalwele ba HIV/AIDS (Ubwantanda bwangwa). Kumulandu waici ichikalamba ichakufolela fyakulya ifipela ubumi mamaka kubalwala ubulwele ubwa ntahandabwanga.

Ndefwaya abantu abakwata ubulwele bwantandabwanga kabili abanwa umuti iwitwa ati ARVS muchisungu panshita imo ine balefola ifyakulya ukufuma mumwaka wa 2014 ukufika lero. Tamulepatikishiwa ukusendako ulubali, Cilifye kubufwayo wenu.

Ndi nokumiipusha amepusho ayali nokusenda inshita kulingana naba mineti sate.

Ndino kumipima nokumipusha amepusho pafyakulya mufola inshita yonse eyo amuya kuchipatala. Ukukwata icishinkha pamasambililo eyo tulechita nalaiipusha amepusho pafyakulya mufola Kuchipatala.

Tamufwile ukutina nangu ukumfwa ubunang'ani ukusendako ulubali nanga tamuli amalipilo ayaliyonse. Nalamipelafye ka K10 chila muntu eko mungabomfya kumyendele.Tamulingile ukwasuka amepusho yonse. Namu kwata insambu yakuchiluka amepusho yamo eyo mumwene ukuti naya kosa. Mulingile ukuipusha epo tamummfwile bwino. Ifyo mwalalanda ninkama yesu ifwe babili.Ishina lyenu tayakabomfyeshewe pamapepala ayali yonse nokomwikala tatwakaleishibikwa. Ndinokufwailisha iyi imilandu kufipatala fya ku chende shaku Cisamba naku Kapiri Mposhi nakunchende ikalamba iya citungu cha Central Province nakukabungwe kaba THRIVE akapela ifyakulya ifyabupe ifipela umubili (HEPS)

Ngamulefwaya ukuishibilapo ifingi pali ifi, kuti mwamona ba Estella Mwanza pa sukulu ilikalamba lya University of Zambia kuciputulwa cha bulimi , Nechi putulwa chafyakulya no bunoshi P.O. Box, 32379, Lusaka,. Nambala ya kamusange ni: 0977547120. Kuti mwatuma pa Address imoine kuli bakalamba bachito ba Dr Kerion Audain. Kuti mwatumina ne chilonganino chikalamba ichilemona pa pamasambililo aya, The Secretary, ERES Converge IRB office,33

Joseph Mwilwa Road,Rhodes Park,Lusaka. Cell Numbers 0955 155633, 0955 155634. Ninjishiba ati nshifwile ukusendamo ulubali nga nshilefwaya mukufwailisha uku elyo fyonse ifyo nalalanda tafwakaye kucintu bwingi ukwabula ine ukusuminisha.

Ndesumina ukusendamo ulubali

Appendix 3: Informed Consent

STUDY TITLE: NUTRITIONAL STATUS OF HIV/AIDS PATIENTS RECEIVING FOOD SUPPLEMENTATION AND ANTIRETROVIRAL THERAPY IN FOOD INSECURE ENVIROMENTS IN CHISAMBA AND KAPIRI MPOSHI DISTRICTS, ZAMBIA

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There are no risks that will result from your participation though there is a minimal financial benefit of K10 which will cater for transport refund. You do not have to answer all of the questions. You have a right to withdraw or seek further clarification where you don't understand.

The information that I will collect from this study will be kept private. Your name will not be used on paper forms and your contact information will not be published at the end of the study.

I will share the knowledge I will get from this study with Chisamba and Kapiri Mposhi district hospitals, Provincial medical offices for Central Province and "THRIVE" The organization which Donates food Supplements for people living with HIV/AIDS to ministry of health in the study areas. I will also share the information with other organizations interested to know the effect of food supplements on HIV/AIDS patients taking ART.

If you are interested in participating or have any questions, please ask or contact me on the address: University of Zambia, School of Agriculture, Department of food science and nutrition P.O. Box, 32379, Lusaka,. Cell phone No: 0977547120. You can also contact my supervisor on the same address Dr Kerion Audain. ERES Converge can be contacted, the organization reviewing my

proposal on. The Secretary, ERES Converge IRB office,33 Joseph Mwilwa Road, RhodesPark, Lusaka. Cell Numbers 0955 155633, 0955 155634.

Your thumb print or signature on this form means:

You have been informed about this study's purpose, procedures, possible benefits and risks.

You have been given the chance to ask questions before you sign.

You have voluntarily agreed to be in this study.

Name of participant…….

Signature/Thumb print of participant…….

Date……

Signature/Thumb print of Witness……

Date…….

Appendix 4: Informed Consent In Local Language

INKALATA YACISUMINISHO

Umutwe:Ubufwailisho Bwa Fyakulya Fimbi Ifyo Ficita Kumunthu Uwakwata Akashishi/Ubulwele Bwa Ntandabwanga, Muchisamba Na Ku Kapiri Mposhi chilikiti, Zambia

Principal Investigator:Estella Mwanza

Ishina lyandi nine Estella Mwanza umusambi ulesambilila pafyakulya pesukulu ikalamba ilitwa ati University of Zambia Muchisungu. Ndececenta pabukumu wafyakulya fyakufola kubalwele ba HIV/AIDS (Ubwantanda bwangwa). Kumulandu waici ichikalamba ichakufolola fyakulya ifipela ubumi namaka kubalwele ubwa ntahandabwanga. Ndefwaya abantu abakwata ubulwele bwantandabwanga kabili abanywawa umuti iwitwa ati ARVS muchisungu panshita imo ine balefola ifyakulya ukufuma mumwaka wa 2014 ukufika mumwaka wa 2016. Tamulingile ukuintumpamo. Cili kuli imwe ngamwasumina.

Ndemilomba ukuti bonse mwaibimbamo imuli ayamasambililo pantu muli nobulwele bwantandabwanga, mulenwa nomuti nokufola ifyakulya. Cilikulimwe.

Takuli ifyakutinya imwe ukuibibamo nagula ubukumu ubunono K10, iyo ilepilibula ukuti kulimiyendele kuli aya amasambililo. Tamulingile ukwasuka amepusho yonse. Namu kwata insambu yakuchiluka amepusho yamo eyo mumwene ukuti naya kosa. Mulingile ukuipusha epo tamummfwile bwino. Elyo mwalanjeba nalafisunga ine nemwine.Ishina lyenu tayakabomfyeshewe pamapepalaayali yonse nokomwikala tatwakaleishibikwa. Ndinokusankhabanya aya masambililo kufipatala fya ku chende shaku cisamba naku Kapiri Mposhi nakuchende ikalamba iya citungu cha Central Province nakabungwe kaba THRIVE akapela ifyakulya ifyabupe ifipela umubili (HEPS)

Ngamulefwaya ukuishibilapo ifingi pali ici, kuti mwamona ba Estella Mwanza pa sukulu likalamba ya University of Zambia kuciputulwa cha bulimi , Nechi putulwa chafyakulya no bunoshi, P.O. Box, 32379, Lusaka,. Nambala ya kamusange ni: 0977547120. Kuti mwatuma pa Address imoine kuli bakalamba bachito ba Dr Kerion Audain. Kuti mwatumina ne chilonganino chikalamba ichilemona pa pamasambililo aya, The Secretary, ERES Converge IRB office,33 Joseph Mwilwa Road,Rhodes Park,Lusaka. Cell Numbers 0955 155633, 0955 155634. Ninjishiba

ati nshifwile ukusendamo ulubali nga nshilefwaya mukufwailisha uku elyo fyonse ifyo nalalanda tafwakaye kucintu bwingi ukwabula ine ukusuminisha

Mwalindondolela, pama sambililo, umulandu nefyakukonka no bunoshi eylo na mafia.

Mwalipelwa insambu yakwipusha amepusho elyo tamula fwatika.

Kumulandu waicikuipeleshafye ukucita aya masambililo

Ishina…… Ubushiku: ……..

Ukufwatika 

Ishina abaleipusha amepusho..... Ubushiku…….

Ukufwatika 

Appendix 5: Budget

Item	Cost (ZMW)
Food	1,000.00
Stationary, photocopying, printing, binding and binding	2,500.00
Accommodation	1,500.00
Travel expenses	700.00
Transport refunds	2,000.00
Total	7,700.00

Appendix 6: Questionnaire

NUTRITIONAL STATUS OF HIV/AIDS PATIENTS RECEIVING FOOD SUPPLEMENTATION AND ANTIRETROVIRAL THERAPY IN FOOD INSECURE ENVIROMENTS IN CHISAMBA AND KAPIRI MPOSHI DISTRICTS, ZAMBIA

I am, Estella Mwanza a Master's student perusing a programme in Human Nutrition at the UNIVERSITY OF ZAMBIA. In fulfilment of this program, there is a need to undertake a research which is purely for academic purpose. My research topic is NUTRITIONAL STATUS OF HIV/AIDS PATIENTS RECEIVING FOOD SUPPLEMENTATION AND ANTIRETROVIRAL THERAPY IN FOOD INSECURE ENVIROMENTS IN CHISAMBA AND KAPIRI MPOSHI DISTRICTS, ZAMBIA. All the information obtained will remain strictly confidential, your answers and name will never be revealed, and publication of data is for school work only.

Your involvement and contribution as a participant will be greatly appreciated.

Section A

Complete the following by ticking the correct answer in the boxes provided or write your responses in the spaces provided.

Serial No.	Question	Response	Instruction
Q 1.	Are you HIV positive	1) Yes 2) No	If no, do not proceed with the interview
Q 2.	Are you/were you on food supplements in the past 2 years	1) Yes 2) No	If no, do not proceed with the interview
Q 3.	Are you a resident of Kapiri, Chibombo, Liteta or Chisamba?	1) Yes 2) No	If no, do not proceed with the interview

Section B

Personal details

Serial No.	Question	Response Tick [√]	Instruction
Q 4.	How old are you	Under 15 [ ] 15 to 35 [ ] Above 35 [ ]	
Q 5.	Gender	Male [ ] Female [ ]	
Q 6.	What is your highest level of education?	None [ ] Primary [ ] Secondary [ ] Tertiary [ ]	
Q 7.	Were you in formal employment from 2014 to 2016	Yes [ ] No [ ]	If no, skip to Question 8
Q 8.	Which institution were you working for?	Government [ ] Non governmental organisation [ ] Self employed [ ]	
Q 9.	How much did you earn per month?	< ZMW1,000 [ ] ZMW 1,000 to 3,000 [ ] ZMW 3,000 [ ]	

Section C

Anthropometric measurements (To be used with Section D)

Weight before FS ☐	BMI before FS ☐
Weight after FS ☐	BMI after FS ☐

Section D

Access to food supplements

Serial no.	Questions	Response Tick [√]	Instructions
Q 16.	How often were you given weekly food supplements	Weekly [ ] Fortnightly [ ] Monthly [ ] Bi-monthly [ ] Other ……..	
Q 17.	What amount of food supplements were you given per time	1 to 2 kg [ ] Above 2 to 5 kg [ ] Above 5 to 10 kg [ ] Above 10 kg [ ]	
Q 18.	How long would the food given last	1 week & less [ ] 2 weeks & less [ ] 1 month & less [ ] Others …….	
Q 19.	Were the family members joining you in eating this supplementary food?	[ ] [ ] If no, skip to Q 20	
Q 20.	How often did they join you in eating	Always [ ] Very often [ ] Sometimes [ ]	

Q 21.	In addition to supplementary food, was there any food that you always or often ate	Yes [ ] No [ ]	
Q 22.	What type of food do you always eat or often ate apart from supplementary food	Nshima with meat [ ] Nshima with beans [ ] Nshima with vegr=etables [ ]	
Q 23.	With the exception of food supplements, how many meals did you eat per day?	1 meal [ ] 2 meals [ ] 3 meal [ ]	
Q 24.	How often do you eat fresh fruits	Always [ ] Very often [ ] Sometimes [ ]	
Q 25.	How often do you eat fresh vegetables	Always [ ] Very often [ ] Sometimres [ ]	
Q 26.	For how long have you been taking food supplements?	1 to 6 months [ ] 7 to 12 months [ ] 13 to 24 months [ ]	
Q 27.	Have you experienced any serious illness during the course of taking this food supplement that would have affected your weight?	Yes [ ] No [ ]	If no, skip to Q 28
Q 28.	What was the type of serious illness that affected you	Diarrhoea [ ] Malaria [ ] Sore throats [ ] Others [ ]	
Q 29.	How often were you getting sick	Very often [ ] Not often [ ] Rarely [ ]	

Food Frequency

Instructions

Look at the food item list (column 1)

Think back carefully over the past month and determine how often you ate each item

If you eat/drink a specific item less than once a month, mark the Never/<1/ month column.

If you do eat/drink it more regularly, decide how often you eat it per month, OR per week, OR per day and make a cross (X) in the column which best applies to each item in the food list.

Only make one cross (X) for each item in the list e.g., for each row in the table.

	Never/ <1/ month (1)	1-3/ month (2)	1/ week (3)	2-4/ week (4)	5-6/ week (5)	1/ Day (6)	2-3/ day (7)	4-5/ day (8)	6+/ day (9)
STARCHES									
Nsima/ maize /sorghum/millet/cassava									
Roasted/fresh/cooked cassava									
Sweet potatoes with ground nut powder/Peanut butter/Milk									
Rice with milk/ Peanut butter/ groundnut powder									
Boiled Sweet potatoes									
White or brown bread and/or buns/ rolls									
Potato: cooked, baked, mashed with fat									
Pumpkins +samp+ Groundnuts (chidobo)									
Milk and milk products									
Vegetables									
Cooked vegetables: any type. oil/ groundnut sauce added (visashi)									

	Never/ <1/ month (1)	1-3/ month (2)	1/ week (3)	2-4/ week (4)	5-6/ week (5)	1/ Day (6)	2-3/ day (7)	4-5/ day (8)	6+/ day (9)
Vegetables: any type prepared without / oil/ groundnut sauces									
Mixed salad: lettuce, cucumber, tomato, peppers, onions, mushrooms, carrots in any combination or alone. (Apart from fruits any food eaten raw)									
FRUIT									
Fresh fruit / wild (any type)									
Dried fruit (any type)									
Fruit juice									
Fruit salad: fresh or tinned									
PROTEIN									
Meat and meat products									
Fish									
Birds (chicken, quails, ducks etc)									
Eggs									
Beans									
Anything to G/nuts was added									
Milk and milk products									

	Never/ <1/ month (1)	1-3/ month (2)	1/ week (3)	2-4/ week (4)	5-6/ week (5)	1/ Day (6)	2-3/ day (7)	4-5/ day (8)	6+/ day (9)
Soya and soybeans products									
FATS									
Soft margarine									
Cooking oil e.g., sunflower oil									
Salad dressing, mayonnaise: lite/ low fat									
FAST FOODS AND TAKE AWAYS									
Pizza									
Pies & Sausage rolls									
Potato chips (French fries)									
Fried Chicken									
Egg roll									
Cream doughnut									
Fried fish									
Drinks									
Opaque beer (chibuku)									
Beer, cider, coolers e.g., castle, black label, hunters dry, Savanna, Smirnoff etc.									

	Never/ <1/ month (1)	1-3/ month (2)	1/ week (3)	2-4/ week (4)	5-6/ week (5)	1/ Day (6)	2-3/ day (7)	4-5/ day (8)	6+/ day (9)
Beer- 7 days (Gankhata)									
Spirits: e.g., brandy, whisky, rum, vodka, gin. (kachasu)									
Fizzy soft drinks: e.g., Coke, Fanta									
Fizzy diet soft drinks: e.g., Coke lite etc									
Germinated fermented cereal flour drink (tobwa)									
. Fermented cereal drink (Munkhoyo)									
Fermented cereal drink (mutate)									
Fermented sweet beer made from maize grits (Chibwantu)									
Sour milk									

THANKYOU FOR YOUR TIME