



Dietary Practices Among Adults Living with HIV and AIDS Attending Clinics at Narok County Referral Hospital, Kenya

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Abstract

A combination of malnutrition, Human immune deficiency virus (HIV) and Acquired immune Deficiency Syndrome (AIDS) leads to a vicious cycle of immune malfunction, malnutrition and infectious diseases. Despite more funds being accessible for PLHIV treatment, and many of such programs having positive outcomes, HIV remains a greater basis of morbidity and mortality. The aim of this study was to determine the effect of dietary intake and demographic and social economic status among adult patients living with HIV and AIDS attending Narok County Referral Hospital. The study adopted cross-sectional analytical design. Purposive sampling was used to select Narok county referral hospital, the PLHIV attending the comprehensive care clinic at the hospital and key informants. Simple random sampling was applied to select the 121 respondents from the PLHIV visiting the clinic. A structured questionnaire and anthropometric form were used to collect the data. Besides, 24-hour dietary recalls and a 7-day food frequency questionnaire were used to collect dietary data and were analyzed both descriptively and inferentially; the test of significance was done at a significant level of 0.05. The results were used to establish the nutritional status of PLHIV clients. Secondary data of the patients was collected from their files.

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The study established that most of the respondents were not consuming the required level of nutrients such as fiber, fat, cholesterol, vitamins E, B1 and 2, Folic Acid, zinc and iron. This was reflected in the 7-day food frequency questionnaire which showed that most patients were not getting the required foods from all the categories considered. It was also noted that most patients had financial challenges and this influenced their dietary intake and hence nutritional status was not statistically significant among PLHIV attending Narok County referral hospital. The study concluded that the three measures of nutritional status used in this study (BMI, MUAC and WHIR) may not be adequate predictors among adult PLHIV. The results are expected to be beneficial to health facilities at the County and National levels, health partners, beneficiaries, health care workers and researchers.

Key words: Human Immuno Deficiency Virus (HIV); Acquired Immune Deficiency Syndrome (AIDS); Dietary Practices; PLHIV and Nutritional Status.

1.1 Background to the Study

The link between malnutrition, Human immune deficiency virus (HIV) and Acquired immune Deficiency Syndrome (AIDS) is a good example of the chain reaction of immune malfunction, malnutrition and infectious diseases. HIV oppresses the nutritional status by damaging immunity and weakening absorption and utilization of nutrients [1]. This relationship, is a typical vicious cycle of immune dysfunction coupled with infectious diseases and malnutrition. Malnutrition can exacerbate the effects of HIV and hasten AIDS-related illnesses in people living with HIV [2]. “Malnutrition is the world’s worst single danger to better public health” defines The World Health Organization. Food and nutrition insecurity status may hasten progression to AIDS-related illnesses [3].

In Sub Saharan Africa, malnutrition is highly widespread. Among the general population, about 40% of the total [4] HIV- positive individuals are liable to malnutrition due to decreased dietary intake, nutritional losses, altered metabolic reactions, and greater requirements for both macro- and micro-nutrients [5]. In HIV disease, the existence of malnutrition strongly indicates patients’ survival independent of CD4 (Cluster of Differentiation) T-lymphocyte counts. Clinical insufficiency of some nutrients occurs rapidly in response to dietary deficiencies, malabsorption, or changed metabolism, while those having a storage form in the body may take longer. Malnutrition alters the immune function with increase in exposure to infections, faster disease progression, reduced functional status, quality of life, and increased morbidity and mortality [6]. UNICEF's nutrition interventions for PLHIV in Kenya suggest that prevalence of malnutrition (BMI <18.5) among adults varies between 15 percent and 65 percent [7].

In Narok county Human immunodeficiency virus (HIV) is still a huge epidemiological issue even with the access to antiretroviral medications. In this county, people do not have access to adequate food thereby compounding the effects of the disease on the immune system [8]. Lack of sufficient nutrition among people living with HIV and AIDS has a negative impact on the access to medication and care services especially in pastoralist communities like the Maasai who are the majority in Narok County [8]. Food availability and good nutrition are thus essential for keeping people living with HIV healthy for longer [9]. A stronger, healthful body

can better resist the opportunistic infections that affect people living with HIV, especially in economically depressed settings where promotive, preventive health care is usually unavailable [10]. Dietary management of PLHIV is essential to maintaining the capacity to take part in the workforce and to aid socioeconomic progress [11]. Consuming a variety of foods is a globally recognized appreciation for a healthy diet, and is related to positive health results like reduced deaths [12]. Dietary diversity is a qualitative measure of food consumption that mirror household access to a wide variety of foods and is also a representation of the nutrient adequacy of an individual's diet. Dietary diversity scores have been positively correlated with increased mean micronutrient density adequacy of complementary foods and micronutrient adequacy of the diet in adults [11]. The initiation of antiretroviral therapy affects lipid metabolism, and protease inhibitors appear to further worsen the patient's atherogenic profile [13] (Cunha, 2015). Highly Active Antiretroviral Therapy (HAART) leads to lipid changes with increases in both total cholesterol and triglycerides [14].

Besides the dietary intake among these patients, a growing body of evidence suggests that socio-economic determinants may also adversely affect survival among people living with HIV/AIDS [15]. The consequences of HIV infection for societies, health and economies are devastating everywhere, but most especially so in poor, vulnerable and disadvantaged populations such as those already infected with HIV Virus. Research evaluating the role of nutrition in HIV infection focused initially on loss of weight or Lean Body Mass (LBM) and wasting [16]. The lean body mass and wasting was found to be associated with increased risk of opportunistic infections and death [17]. Even in the era of Highly Active Antiretroviral Therapy (HAART), unintentional weight loss is associated with increased risk of mortality [17]. Other factors which have been identified as affecting the development of metabolic complications include age of patient and economic status [18]. This paper focused on the relationship between dietary intake and nutritional status of people living with HIV/AIDS. It also considered how social demographic factors influence the dietary intake and hence the nutritional status of these patients with a focus in Narok county.

1.2 Problem Statement

Despite more funds being accessible for PLHIV treatment, and many of such programs having positive outcomes [19]. HIV remains a greater basis of morbidity and mortality [20]. Insufficient dietary consumption to meet the elevated metabolic needs due to HIV infection affected nutritional status of PLHIV, lowering immunity and increasing disease advancement leading to increased morbidity and mortality [2]. Yearly in Narok County, approximately 1,341 adults die of AIDS related conditions [21] while the region has also been facing challenges in food and nutrition security [22]. Little information exists about the link between dietary practices and nutrition status among adult patients living with HIV and AIDS attending Narok County Referral Hospital.

1.3 Purpose of the Study

The purpose of the study was to assess the effect of dietary intake and the Nutrition Status of adult patients living with HIV and AIDS attending Narok County Referral Hospital.

1.4 Objectives of the Study

To achieve the purpose of the study, the specific objectives were;

- i. Assess the demographic and socio- economic characteristics of PLHIV attending Narok County Referral Hospital
- ii. Determine the dietary practices of PLHIV attending Narok County Referral Hospital.

1.5 Hypothesis of the Study

H₀₁: There is no relationship between nutritional status and dietary practices of PLHIV attending Narok County Referral Hospital.

1.6 Conceptual Framework

Multiple micronutrient deficiencies develop in the beginning of the HIV infection leading to elevated requirement among PLHIV [23] Sub-Saharan African diets are likely to be insufficient in energy and other nutrients [24] Figure 1.1 shows the relationship between demographic and socio-economic factors, dietary intake, morbidity status and nutritional status among HIV and AIDS patient.

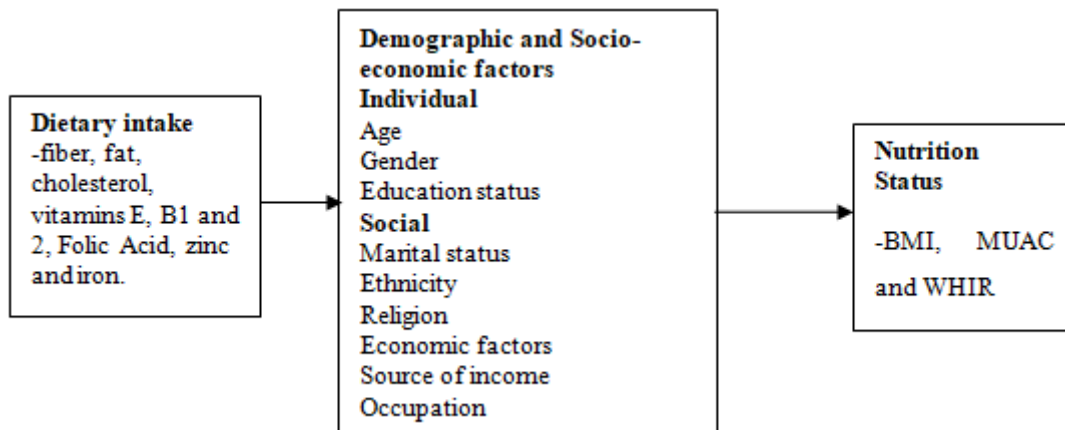


Figure 1: Conceptual framework of the relationship between dietary intake and nutritional status

The demographic factors were age, gender and education level of the patients; social factors were marital status, ethnicity, religion, family type and sum of people in household while economic factors were source of income and occupation. These factors affect the dietary intake among the patients and this influences their nutritional status. From the figure, the study searched to establish the relationship between demographic factors, social and economic factors and nutritional status of the patients in Narok County.

2. Literature Review

2.1 Demographic, Social and Economic Factors and HIV and AIDS

HIV and AIDS cripple the lives of those infected and their families. It extends to physical health, psychological, economic and social life [25]. Globally approximately 38.6 million people are infected with Human Immune deficiency virus (HIV) and an estimated 25 million have already died [26]. Africa has the highest HIV prevalence rates in the world ranging from <0.1%-28.0%. Sub-Saharan Africa (SSA) remains the worst hit region with AIDS as the leading cause of death in the region. Up to 90% of all HIV positive adults live in the Sub-Saharan Africa region. Kenya is one of the six HIV 'high burdens' countries in Africa – about 2.3 million people are living with HIV infection [27]. Overall HIV prevalence in Kenya is 5.6% and the high burden of HIV and AIDS in Kenya accounts for an estimated 29 per cent of annual adult deaths, 20 per cent of maternal mortality [24]. Family members, especially a spouse, have been identified as critical sources of social support, and responsible for a large part of the link between social support and health. Support from sources not related to the family do not satisfy for what is missing in the family as shown by available evidence [28].

Studies have shown that there is a positive relationship between social economic status (SES) among countries with high and low income, and health where individuals in high SES are healthier compared to those in low SES [29]. A number of cross-sectional studies assessing determinants of dietary diversity in adult populations have found that dietary diversity is associated with socioeconomic status Household income as a proxy indicator for socio-economic status has been found to be strongly associated with access to adequate food intake and or/food security . Food access that household members have is strongly associated with the control they have over household resources or income, particularly for women [30]. A study by [31] on socioeconomic patterning of food purchasing showed that persons from disadvantaged socioeconomic backgrounds were less likely to purchase grocery foods that were comparatively high in fibre and low in fat, salt and sugar. Those employed in blue-collar (manual) occupations and residents of low-income households purchased fewer types of fruit and vegetables, and less regularly, than their higher status counterparts. Groups socio-economically deprived among them women are negatively affected by HIV and AIDS research shows. They are disproportionately affected by HIV and AIDS suggesting that poverty is a risk factor for infection . There are other social factors associated to dietary intake that have been established. Married individuals have been found to consume more servings of snacks/desserts, but fewer servings of alcoholic beverages than those who were unmarried. There is also evidence of an obvious difference in the dietary scores between the ethnic groups and religion. Muslim women have been found to have the lowest scores whereas Christian women had the highest [32].

A study in Boston and Rhode Island revealed that 25% -35% of the women had dietary intakes of less than 75% of the daily recommended intakes for vitamins A, C, E and B-6, and iron and zinc and male-headed households showed greater food security. According to [11]. The current study borrows a lot from this study since dietary and nutritional status of an individual is influenced by the quality of life which is influenced by both social and economic wellbeing of the patient.

A study conducted from among Sub-Sahara African countries by [34] indicated that HIV and AIDS is predominant among the 15-24-year old. In 2005 a study by Sebastian established that higher education is strongly associated with household food security. A cross- sectional study in a semi-rural setting in Louisiana found that intake of cereals/breads, dairy products, fruits/100% fruit juices and vegetables was higher in subjects with more than 12 years of education [35]. Reference [36] showed that PLHIV were predominantly young

married farmers and females with low level of income and formal education and was concerned about those who have lost a partner in one way or the other or who never had one, getting married leading to increased number of individuals getting HIV and AIDS. He further raised concerns about the fact that separated, divorced, widowed or never married PLHIV still marry, remarry or plan to marry unsuspecting people, without the necessary precautionary measures. Although so much has been written about the epidemiology of HIV and AIDS and the factors fueling the epidemic in Kenya, little is known of the socio-demographic and economic characteristics of people diagnosed with HIV and AIDS, their dietary intake and how they affect their nutritional status [37]. Based on this review, this study examined the relationship that exists between demographic, social & economic status, dietary intake and nutritional status among adult people living with HIV and AIDS is influenced by their.

2.2 Dietary Practices, Nutrient Requirements and HIV and AIDS

The immune system is undermined by HIV and malnutrition which join together to elevate co-infections and accelerate HIV-related diseases. Food insecurity and lack of education reduces choices for work leading to high mobility in search of work [38]. Dietary intake plays a vital role in sustaining optimum nutrition status and PLHIV may be unable to choose and eat a varied diet if they do not possess adequate nutrition knowledge [39]. Enough dietary intake and absorption are necessary if one is to achieve the optimum potential of the treatment [40]. Some studies on micronutrient show that supplementation can decrease disease progression, reduces mortality, diminish viral loads and decrease gastrointestinal effects [41]. Decreased amounts of B12 is associated with advancement to AIDS, depressed cognitive function, and drug toxicity [42]. Better survival among PLHIV has been linked to high levels of some B vitamins [43]. Reference [44] showed that death occurred of a person regardless of the cause when the weight reduces to 60% of optimum body weight. Wasting severity can be checked by use of mid-upper arm circumference, body weight, triceps skin fold thickness, body mass index and functional power [44]. Adults living with HIV have 10–30% higher energy requirements than a healthy adult without HIV [45]. PLHIV adults without symptoms need an additional 10% energy to maintain body weight and physical activity, energy requirements increase by up to between 20% to 30% for adult's body weight during AIDS. Food availability and good nutrition are thus essential for keeping people living with HIV healthy for long [9]. A stronger, healthier body can better resist the opportunistic infections that affect people living with HIV, especially in resource-poor settings where preventive health care is not often available [10]. Reference [11] noted that a higher food variety score has been found associated with urban residents, other studies have established that urban residents have higher consumption frequencies for all food categories than rural residents [46] and that urbanization is accompanied by an improvement in micronutrient intakes [47]. Also, a cross sectional study in a rural area of North-East Burkina Faso (West Africa) revealed an overall poor dietary quality with a mean DDS = 5.1 (1.7) food groups [31]. Poor nutritional status may hasten progression to AIDS-related illnesses, undermine adherence and response to antiretroviral therapy, and exacerbate socioeconomic impacts of the virus [9].

Data is inadequate to back provision of more protein due to HIV infection, [48]. Vitamins and minerals role in health is incontrovertible. Although information is still inadequate for specific macronutrient interventions in PLHIV treatment, a regular support is needed, governed by available data, rationale and experience [49]. This

study notes that a lot of literature on dietary intake has focused on children and not adults. The study was to find out how nutritional status and dietary intake can revamp the health status among adult PLHIV. The nutrients to be investigated are; energy, carbohydrates, protein and fat.

2.2 Nutritional Status of PLHIV

Receiving desired nutrition helps to improve health and quality of life of the PLHIV [50]. There is an increase of literature showing that nutritional support is a crucial part of a comprehensive response to HIV/AIDS. Support nutritionally is an essential component of an overall counter to HIV and AIDS, assisting to sustain immunity and maintaining a healthy physical activity [51]. Reference [52] in their study found that individuals who receive antiretroviral therapy (ART) with appropriate nutrition are more likely to regain weight and adhere to medications, thus helping them rejoin the work force and improve food security for themselves and their families.

3. Methodology

A cross sectional analytical study design was adopted in the study to analyze the quantitative data. The design was the most appropriate for this study since the variables under test cannot be manipulated by the study; they were used as they are in their natural state [53]. This constituted the 498 adult PLHIV aged 18 years and above attending the Comprehensive Care Clinic (CCC) at Narok County Referral Hospital. Adults above 18 years of age both male and female gender, confirmed HIV positive, attending the Narok County Referral Hospital and who gave informed consent to participate in this study. Adult patients attending the clinic for the first time, bed ridden or mentally disturbed were excluded from the study. The desired sample size Calculation was done using the Fisher formula [54] whereby $n = [z^2pq/d^2]$, Therefore, the total sample for the study was $110 + 11 = 121$ respondents.

Purposive sampling was used to select Narok county referral hospital and the PLHIV attending the comprehensive care clinic at the hospital. Simple random sampling was applied to select the 121 respondents from the PLHIV visiting the clinic. The respondents were assumed to have similar characteristics as PLHIV. Every 4th person was selected for the study in order to have an equal representation of both male and female in the sample (that is $498/121 = 4$).

Primary data was key in this study as the researcher sought to find out first-hand information direct from the target population. The study used a researcher administered structured questionnaire. A 24-hour recall questionnaire was used to determine the foods that the patient had taken within the last 24 hours. Food Frequency Questionnaire (FFQ) was used to assess the frequency, source and adequacy of the foods the patient had taken within 7 days. A Focus Group Discussion, with about 8 to 10 individuals through an open discussion by a skilled moderator was done using an FGD guide to ensure consistency by the various FGD groups captured. A key informant guide qualitative in-depth interviews with the health workers at the CCC were held. Among those who participated were clinicians, nurse, lab technologist, nutritionist and a HIV testing counselor. An observation checklist was also used to capture more data about the state of the patient. The anthropometric

form was used to record the height and the weight of the patients. This helped to record the physical status of the patients and patient's records. In terms of Height using the height meter, weight using adult weight scale, MUAC using adult MUAC tape and a measuring tape for Waist – Hip Ratio.

Data collected from open-ended questions was edited, coded and entered into a computer spreadsheet in a standard format to enable the analysis of descriptive statistics and inferential statistics using SPSS 22.0 version computer package. Nutrisurvey computer package was also used to analyze dietary intake data while WHO cut-off points were used to analyze respondent's nutritional status. A body mass index of < 18.5, 18.6 – 24.9, 25 – 29 and > 30 computed as underweight, normal, overweight and obese nutritional status respectfully and controlled for sex and age of the patients. A MUAC of 0 – 21 cm indicated by a Red colour on the measuring tape denotes severe malnutrition, 21- 23 cm indicated by the Yellow colour on the measuring tape denotes moderate malnutrition and above 23 cm shown by Green colour on tape denotes absence of under nutrition for adults [55].

The measures of central tendency and dispersion; mean median, mode and standard deviations were used to analyze descriptive statistics i.e. demographic and socioeconomics data. Anthropometric data analysis was done using mean and standard deviation for BMI, MUAC and WHR which were correlated with dietary intake, morbidity and social demographic variable in order to establish the relationship between the variables at a P value of $P < 0.05$. The relationship was considered statistically significant if the $p < 0.05$.

4. Results

4.1 Demographic and Socio-Economic Characteristics of Study Respondents

Demographic factors were considered for this study because they helped to describe the social characteristics of the respondents. This section considered the relationship of the respondents to the head of the family, the age, gender, education level, marital status, religion and level of income. The study sought to establish the age of the respondents and the results show that majority of the respondents 42 (35%) were aged between 38-47 years, 41 (34%) were between 28-37 years and above 48 years were 33 (28%). The results show that majority 105(87.5%) of the respondents were the heads of families. On gender of the respondents the results show that there were 52% male and 48% female. The results in showed that most of the respondents 51 (42.5%) were married, separated were 24 (20%), singles were 21 (17.5%), while only 19 (16%) were widowed. The study sought to establish whether religion has an influence on the nutritional status of the PLHIV. The results indicate that most of the respondents 66 (55%) were Protestants, followed by 50 (42%) who are Catholics.

The study also sought to establish the education level of the respondents. Most of the respondents 55.8% had basic primary education level and only 2.5% had attained tertiary education. Regarding the respondent's occupation the results show that majority of the respondents 49.2% were casual laborers with only 3.3% either unemployed or doing no formal work. The study also sought to establish the influence of income on the nutritional uptake by PLHIV. Most of the households 37.5% had very little income level of between shs 1,000 to shs 5,000. While 6.7% were earning over shs 20,000. *'Our ability to seek medical assistance when we are*

sick is also affected by the lack of finances' a respondent said 'many of our colleagues suffer a lot at home because they come from very poor families and they are not able to get the required care in terms of food, medication and even movement'.

4.2 Dietary Practices of PLHIV attending Narok County Referral Hospital

The study also sought to establish the dietary intake of PLHIV, the researcher examined the dietary intake using the 24 hr. recall and 7-day food frequency questionnaire.

4.2.1 Dietary Practices based on 24-hour Dietary Recall

The data were analyzed based on the WHO (2003) recommendations to evaluate whether the clients were getting adequate nutrients. The study established the water intake, protein, fat, carbohydrates, dietary fiber and cholesterol. The mean value was compared to the recommended nutritional value and the percentage computed to establish how many PLHIV were taking the recommended nutrients. The findings of the study stipulate that majority of the respondents 80% were taking enough energy and overall met the recommended quantity of 3355 kcal and 2848 kcal for male and female respectively. The results revealed that males consumed a mean of 2755 kcal while females took 2453 kcal. Specifically, 82.1% of the male and 86.1% of the female met the required energy consumption. In regard to protein it was noted that all of the respondents 138.6% of the male and 135.4% of the female met the recommended requirement. The male consumed 79g against the recommended 57g while female consumed 65g against the recommended 48g indicating that the respondents consumed more than enough protein in their diet. In regard to fat, the findings indicate that most of the respondents 60% male and 65% female were consuming on average 12g and 13g respectively compared to the required daily amount of 20 and 35g respectively. This shows that most respondents were not getting enough of the fats in their diet. The results also indicated that on average most of the respondents were consuming above the recommended amounts of carbohydrates. For both male and female, the recommended amounts range from 45-65 carbohydrates per/day.

Regarding dietary fiber intake, the results show that on average the respondents consumed 80.6% for male and 92% of female meaning that the majority met the recommended intake per day. The results show that on average male consumed 25g compared to the recommended amount of 31g while female consumed 23g compared to the recommended 25g. For cholesterol the recommended amount should be less than 300mg for both male and female. The results show that only 16.3% of the male met the recommended allowance while for female only 15% met the recommended amounts.

The study tested whether the intake of vitamin by the patients met the recommended quantities. The results revealed that consumption of some types of vitamins was high compared to recommended amounts for both male and female. They included; Vitamin A (μg) at 130% male and 160% female, Vitamin C (mg) at 148.5% male and 134.8%, Vitamin B1 (mg) at 180.8% male and 170% female. Consumption for Vitamin B2 (mg) was fair at 73.8% for male and 95.5% female, but low Vitamin E (mg) levels at 42.7% for male and almost at recommended level at 96.0% for female. However, consumption for vitamin B6 (mg) at 50% male and at 46.9%

for female and folic acid (μg) at 22.6% for male and 24.4% for female were low.

The findings on whether the respondents were taking enough minerals measured in milligrams per day in their diet indicated that the clients met requirements for sodium at 32.2% of male and 57.6% of female respectively indicating that majority were within the range of the required threshold of below 2300mg. The minerals that were consumed above requirements included; Magnesium at 330% male and 244% female and phosphorous at 200.7% male and 173.1% female. The rest of the minerals like potassium at 32.4% male and 24.1% female, calcium at 41.7% male and 49.1% female, iron at 72.22% male and 34% female and zinc at 44.79% male and 50.16% female were consumed at below the recommended requirements. One respondent answered when asked what a balanced diet is “*a balanced diet consists of the three foods, carbohydrates, protein and vitamin.*” Clearly minerals were not mentioned or considered.

4.2.2 Food Consumption Based on the Seven-Day Food Frequency

The respondents were required to indicate frequency of cereals intake within the seven days. The results show that at least 19.3% of the respondents said that they consumed the cereals once per week and 16.9 % said they consumed daily. The results also show that 61.6% of the patients purchased the food and most of them indicated that the food was not adequate. This shows that the major limiting factor for the patients was the income level which limited their ability to purchase and use cereals on a daily basis.

Majority of the clients took the root crops once a week (23.3%). This indicates that the patients were not getting enough of the nutritional value they are expected to derive from the roots (i.e. Irish potatoes, sweet potatoes and cassava). The main source was purchasing which again is limited because it depends on the income level of the patients. Only 10.5% said the amount they consume was adequate. This again shows that irrespective of the high nutritional value in the roots, the patients were not getting enough of them because the cost was prohibitive since the roots and tubers have to be purchased.

For the cereals they were consumed also mostly once a week by 13.18% of the patients. Majority of the respondents were not taking the cereals at all (specifically maize and wheat flours and rice). The results also show that the main source of the legumes was also from purchasing. Among the cereals only the beans were being produced by 22.5% of the respondents followed by cowpeas. The results also show that only 10.42% of the respondents indicated that they were having adequate levels of cereals. This also confirms the inadequacy of the nutrients especially the vitamins among the patients.

The results also show that most of the respondents 22.2% were only taking animal protein once a week. Milk was the only animal protein that was being taken on daily basis by 42.5% of the respondents. The results also show that most of the animal protein that the respondents took was produced by 19.2% of the respondents while 18% purchased the animal protein. It was also noted that the 27.3% of the respondents indicated that whatever they were taking was adequate only 18.9% said they were not having adequate animal protein. The results indicate that since most respondents were producing the animal protein mainly (milk and eggs) in their homes they were able to have an adequate amount and also used it frequently.

Vegetables are very good in providing vitamins, minerals and roughage. The results show that only 20.3% of the respondents were consuming the selected vegetables on daily basis. The results also revealed that 38.5% of the vegetable products were purchased by the respondents who used them with only 1.3% and 1.8% indicating that they produced or received donations respectively. It was also noted that of the respondents who used the vegetables products 15.18% said they had adequate supply. This shows that very few of the PLHIV among the respondents consumed the vegetables.

On average only 11.8% of the respondents took a variety of fruits but only once a week, 4.8% took them twice, 4.3% three times and only 3.4% took fruits daily. The most common fruits taken by the patients were avocados, bananas, oranges and watermelon. Among those who took the fruits 21.5% had to purchase. Only bananas and avocados were being produced by the respondents. It was further noted that 10.5% of the respondents indicated that they were taking enough of the fruits which implies that the fruits were inadequate.

The results show that 14.1% of the respondents were consuming vegetables on a daily basis, 11.2% said they consumed them three times a week, 10.0% said once a week and 7.4% consumed them twice a week. This indicates that of all the food types that the respondents were asked to indicate their recall within 7 days vegetables were the most highly consumed. However, 41.2% of the respondents purchased them while only 4.2% produced. On adequacy 23.3% said the vegetables were adequate while 23.8% said they were not adequate. Among the vegetables most respondents indicated that they were able to take Sukuma wiki, spinach, tomatoes, manage and cabbage.

4.3 Nutritional status of PLHIV attending Narok County Referral Hospital

In order to assess the nutritional status of PLHIV, BMI, MUAC, and Waist Hip Ratio (WHR) were used. These are the three main methods used to assess patients' nutritional status for recommendation of admission and discharge from HIV related nutritional interventions such as Food by Prescription (FBP) and Integrated Management of Malnutrition (IMAM).

4.3.1 Nutritional Status by Mid Upper Arm Circumference (MUAC)

This measures the level of malnutrition among the patients. The study adopted the thresholds measurement recommended by (UNICEF, 2009) for adults MUAC of ≤ 21 cm which denotes severe malnutrition, 21- 23 cm denotes moderate malnutrition and ≥ 23 cm denotes normal nutrition for adults. The results show that 89.2% of the respondents met the expected threshold of > 23 cm and above indicating that they had a normal level of muscle and fats which means they were not malnourished. Only 5.8 % had moderate MUAC level of 21 – 23 cm while the rest 5 % were suffering from severe malnutrition as shown by the low MUAC level of <21 cm.

4.4.2 Nutritional Status by Body Mass Index (BMI)

The respondents BMI was measured and the results presented in Table 4.9. This were used to recommend that the PLHIV are given proper nutrition interventions such as ready to use therapeutic food, ready to use supplementary food or flour-based food based on BMI classification. The expected threshold for one to be

considered to have a normal body mass index is when he/she is between 18.5 – 24.9 (refer to appendix I) adopted from [45]. The results show that most of the respondents 60.0 % had normal weight since their BMI ranged between 18.5 – 24.9. This was followed by 29.5% who were underweight with a BMI of < 18.5 while 10.5% were overweight with a BMI of 25-29.99. None of the respondents were therefore obese.

4.4.3 Nutritional status by Interpretation of the Waist Hip Ratio (WHR)

The waist hip ratio is very important in evaluating the health status of a PLHIV. The provided threshold cut off points for men and women are; < 0.8 as normal for women, > 0.8 – 0.88 as increased weight and > 0.88 as high risk for women while for men cut off points of < 0.9 as normal health, > 0.9-1.02 as increased risk and >1.02 as high risk. The results show that most of the male patients 50.8% had a normal Waist Hip Ratio of < 0.9 cm while only 49.2% had an increased risk WHR of > 0.9-1.02. The study also established that among the women most of them 89.5% had a WHR of 0.8 – 0.88 indicating an increased risk for Waist Hip Ratio, while only 10.5 % had a normal WHR.

4.5 Relationships between Demographic and Social Factors, Dietary Intake and Nutritional Status among PLHIV

Further analysis was done to establish the relationship that exists between Dietary intake, social demographic factors and nutrition status among adult PLHIV in Narok County. Spearman's rank Correlation analysis between the variables was computed. The results were also used to test the study hypothesis that there is no significant relationship between social demographic variables, Dietary intake and nutrition status among PLHIV in Narok County. In regard to social demographic factors the study established that there is a weak insignificant relationship between the social demographic factors and the nutritional status of the adult PLHIV in Narok County. The null hypothesis is therefore accepted at 0.05 level of significance indicating that there is no significant relationship between the selected social demographic factors and the nutritional status (BMI, MUAC and WHR) of adults PLHIV.

The result shows that there is a weak insignificant relationship between the nutritional status and the dietary intake of the adults PLHIV who participated in the study. Therefore, the null hypothesis that there is no relationship between dietary intake and the nutritional status of the adult PLHIV is accepted since the P- value is > 0.05. The study also established that there is a weak and insignificant relationship between morbidity and nutritional status of adult PLHIV. Hence the null hypothesis that there is no relationship between dietary intake and the nutritional status of the adult PLHIV is accepted at $P > 0.05$.

5. Discussions

5.1 Demographic and Socio- Economic characteristics

The results have suggested that the male PLHIV attending the Comprehensive Care Clinic (CCC) at Narok County Referral Hospital were more than the female. This implies that the males were in a better position to follow up their routine checkups compared to female. This agrees with a study by Barnett and [56] who

indicated a similar trend in participant's gender composition among PLHIV. It is also noted that slightly more than half of these respondents had very low basic education (primary or below) compared to only a few who had attained tertiary and college education. Most of the respondents, almost half, were therefore casual labourers with only a very small percent having formal emolument, as indicated by the income level that most respondents earned. A third of the respondents earned less than ksh 5,000 compared to only a minimal percentage that earned more than ksh 20,000. Monthly income can be a strong and significant predictor of diet diversity among HIV patients [6]. With majority of the respondents earning below shs 5000, it shows that the respondents have a challenge financially which affects their welfare and hence nutritional intake. The greatest impact of the epidemic is felt at the household level, where socio-economic factors combine with socio-cultural and epidemiological variables influence prevalence of HIV infection. The study through measures of central tendency for the socio- economic characteristics shows that HIV burden is high among adults on stable relationship such as marriage. The study established that eighty percent of the respondents always take supper compared to any other meal in a day; lunch was sometimes taken by some of the respondents with majority not taking snacks at all. Among the side effects suffered by the respondents, vomiting came first followed by nausea. These results agree with the assertions of [57] who noted that due to the weakened immune system among the PLHIV various opportunistic infections can affect appetite and ability to eat.

5.2 Dietary Practices

The findings established that almost a third of PLHIV use traditional food to control some common sicknesses. Some of the commonly used foods are spinach, pumpkin leaves, black nightshade and amaranths which are said to control common flu, cold, improve hemoglobin levels and control for gastric infections. On the nutritional value and the type of foods taken by the patient the results showed that regarding macronutrients; protein and carbohydrates were consumed in excess of the required amounts while cholesterol, fats and fiber, most of the respondents indicated that they were not getting enough since less than half of them were meeting the expected threshold. PLHIV require highly nutritious food to boost their immune functions and significant improvement in weight gain. Hence, they need a diet that is adequate in energy, protein and micronutrients to enable nutritional recovery. The results indicated that majority of the respondents consumed enough and, in some instances, more than the recommended quantities for protein, carbohydrates and other foods. Fats, dietary fiber and cholesterol were consumed in very low quantities by both male and female respondents. This was highly attributed to the type of foods they consumed. The PLHIV consumed a significant amount of meat, eggs, beans which are very rich in proteins and maize flour porridge and ugali which are rich in carbohydrates while amaranths, spinach, kales and black nightshade are rich in vitamins A and C, minerals and fiber. Other authors such as [58] observed that nutrition quality of the diet does improve with consumption of greater food diversity. PLHIV needs to consume enough micronutrients especially Vitamins A, B6 and B12, iron and zinc because they are very critical for building a strong immune system and fighting infections. The results revealed that consumption of some types of vitamins was high compared to recommended amounts for both male and female they included; Vitamin A, Vitamin C, and Vitamin. B1, while. Vitamin B2 consumption was fair but Vitamin E was low for the male while consumption for vitamin B6 and folic acid were low for both sexes. This indicates that the intake of vitamin by the respondents was not as per the recommendations and this may affect the ability of their bodies to build immunity against various opportunistic diseases. Vitamins are associated with disease progression from

HIV to AIDS and in immune regulations. This therefore implies that PLHIV need to take enough of these vitamins to help their body immunity. The results have further revealed that there is low consumption of foods rich in vitamin such as vegetables and fruits as evident from the 7-day foods consumption. Partly, the reason as to why the patients are unable to get enough of these foods is because of lack of money since most of them could only get the foods by buying. This also confirmed the finding by [6] who noted that Monthly income can be a strong and significant predictor of diet diversity among HIV patients. Minerals are also very important in the HIV-nutrition relationship due to their critical roles in cellular differentiation, enzymatic processes, immune system integrity, and other body functions [2]. According to the findings of this study, it is noted that among the minerals that the respondents consumed, only magnesium and phosphorus were consumed in excess of the recommended quantities in milligrams but the rest were below the recommended level. Almost half of the women were found to consume enough potassium. The male consumed enough of phosphorus and iron. This was thought to be so following the food intake on the 7-day food-frequency questionnaires, where it was noted that there was high consumption of meat, beans, ground nuts, eggs, milk and amaranth which are very rich in most of the minerals especially magnesium and phosphorus. The main source of most of these foods was however from purchasing which was a challenge to most patients who did not have enough income to purchase and have adequate quantities of the food. The study established that there is no significant correlation between the dietary practices, morbidity, status and social demographic factors on nutritional status of adult PLHIV. These results agreed with the findings of [59] who noted that PLHIV sometimes are unable to produce the required enzymes to absorb certain micronutrients and hence they need a diet rich in these nutrients to ensure that the body does not use its stored reserves which leads to body mass wastage. Similarly [50], recommendation is that PLHIV should increase energy intake by 10% and 20-30% and protein intake by almost a similar quantity for all people, age and gender. To establish the relationship between socio-economic and demographic variables, dietary intake, the nutritional status the results showed that there is no statistically significant relationship between nutritional status and the socio-economic and demographic factors, dietary practices. This was because the significant P value in all the three relationships was more than 0.05.

6. Conclusion and Recommendations of the Study

6.1 Conclusion

There was an imbalance in the consumption of nutrients where some were in excess, adequate and inadequate. This call for nutrition assessments that can guide the PLHIV to consume only what is recommended not excess or less. Due to the imbalanced nature of nutrient consumption, dietary intake of certain nutrients was either in excess or inadequate. Thus, there was increased morbidity and poor nutrition status among the PLHIV.

6.2 Recommendation

Vitamin A consumption as per the results of the research shows that it's consumed above RDA and considering that it's toxic at above normal levels, vitamin A prescribed routinely for therapy may need to be reduced or stopped all together by the Ministry of Health through revision of nutrition guidelines. Vitamin B₆ consumption was very low (Female - 46.9%; Male -50.0%) and in the guidelines for treatment of TB, Vitamin B₆ is

prescribed to all patients. The Ministry of Health may need to consider the same for PLHIV. Due to the imbalance nature in consumption of nutrients among PLHIV as shown by the results of the research, it's important to equip nutritionists with other ways of assessing consumption of the nutrients to identify nutrients in excess and those that are inadequate to ensure balance in consumption of all nutrients is attained. In the in-patients (wards), several lab requests are usually made and blood is drawn for various lab test, nutrition biochemical test needs to be incorporated by the Ministry of Health and nutritionists to ascertain the levels of vitamin, minerals and lipid profile to correct any imbalance early enough. There is much scope for further investigation, to enrich the breadth and depth of existing work such as when it's better to start supplementary feeding and nutrition counselling to avoid extreme malnutrition and inclusion of more nutrition indicators. Despite the PLHIV surpassing their carbohydrate and protein requirements, they did not meet their energy recommended daily allowance this is therefore an area that requires further research to ascertain why this is so. From the research the consumption of Vitamin A (Female- 160.0%; Male - 130.5%) was above RDA and since excess vitamin A is toxic and it's given routinely to PLHIV as part of treatment, more research may need to be done on this area to establish amounts that a safe. There seems to be many other factors needed in order to appreciate the underlying causes of the poor nutritional status of PLHIV and therefore further research to bridge this knowledge gap is needed.

7. Limitations of the study

Data was collected once using the questionnaire and observation checklist which limited the in-depth of the data collected. There was also scanty literature on nutrition status and dietary intake among adults living with HIV and AIDS in Narok county. This was resolved by using clients' records at the Comprehensive Care Centre, by taking their measurements and also taking them through Focused Group Discussion

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