

UNDERSTANDING KEY DRIVERS OF UNDER NUTRITION AMONG ADULTS LIVING WITH HIV AND AIDS ATTENDING ART CLINIC AT KYENJOJO GENERAL HOSPITAL, WESTERN UGANDA. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background:

The study aimed to assess the nutritional status along with the clinical and socio-economic factors associated with under nutrition among those attending the anti-retroviral clinic at Kyenjojo General Hospital.

Methodology:

A cross-sectional and descriptive study was conducted with both qualitative and quantitative research approaches. Using purposive sampling, we recruited key informants to introduce the study to the target population. By simple random sampling, the study assessed respondents 334 subjects considering a 5 % degree of precision at a 95 % confidence interval. Data on treatment patterns and socio-demographics were collected using structured questionnaires while anthropometric data was collected using anthropometric tools. Anthropometric data was used to compute the BMI. All data was entered in MS Excel and transferred to SPSS version 23. Descriptive statistics such as the frequencies, means, and standard deviations were expressed. The degree of relationship among variables was statistically evaluated using chi-square analyses. Statistical significance was reported at the $p > 0.05$ level.

Results:

The nutritional status of 51.1% of the respondents was normal, 16.2% were underweight, 18.3% were overweight and 14.4% were obese. Under nutrition was more prevalent in males (19.1%) than in females (14.0%). In addition, under nutrition was significantly associated with age ($P=0.009$), marital status ($P<0.001$), the highest level of education ($P=0.008$), estimated monthly income ($P=0.002$), alcohol use ($P=0.031$), treatment regimen ($P=0.002$), opportunistic infections ($P=0.014$), and clinical staging of disease ($P=0.022$).

Conclusion:

Under nutrition is a major challenge among people attending the anti-retroviral treatment at Kyenjojo General Hospital. Major changes in extension service provision, by including adults in affected Kyenjojo would help alleviate the problem at hand.

Recommendation

Health care providers including nutritionists and dieticians should create awareness on the role of nutrition in HIV/AIDS and anti-retroviral treatment.

Keywords: Under Nutrition, HIV, Art Clinic, Kyenjojo General Hospital

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Background of the study

Under nutrition is described as insufficient intake of energy and nutrients to meet an individual's needs to maintain good health (Maleta, 2006) According to (Koethe & Heimbürger, 2010) nutrition can manifest in many forms, wasting, underweight, stunting, and micronutrient deficiency. Globally nutrition is the most important risk factor for illness and death, contributing to more than half

of deaths worldwide (Derks et al., 2017) More than 800 million peoples worldwide are chronically undernourished (FAO, 2014) of which 200 million are living in Sub Saharan Africa (SSA), and greater than 33 million are living with HIV infection (WORLD FOOD PROGRAMME(WFP), world health organization(WHO), 2006).

According to the Food and Agriculture Organization of the United Nations (FAO), 1 in 12 persons worldwide are Undernourished and this includes 10 persons living with HIV. Furthermore, in over half of AIDS-related deaths, malnutrition is involved (McGuire, 2015).

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Globally, under nutrition is more intense in developing countries and least-developed countries than in developed countries such as Japan, the United Kingdom, and Canada (Koethe & Heimbürger, 2010). Furthermore, under nutrition is more common in Africa than in any other part of the world; and it is estimated that one in every three undernourished persons in the world lives in Africa. Under nutrition is by far the biggest contributor to AIDS-related mortality, present in half of all cases of AIDS-related deaths among PLHIVs (Benzekri et al., 2015).

In East Africa nutrition among people living with HIV and AIDS remains a major public health problem as the malnutrition rate in East African countries such as Kenya and Tanzania ranges from 18 to 23% in some regions (Dedha, Demena, et al., 2017) (Mahgoub et al., 2005)

UDHS 2014 estimated that 34% of adults above 15 years are undernourished and nutrition among HIV-infected persons was rated at 38%. The majority of the HIV-infected persons in Uganda are underfed.

In Uganda, under nutrition remains a major health burden. (Mukanga & Kiguli, 2006) And about 157,000 AIDS-related deaths were estimated to have occurred from 2016 to 2020 were associated with Vitamin A Deficiency (VAD) alone (Nakagawa et al., 2020).

Human Immunodeficiency Virus (HIV) and AIDS remain a significant health burden particularly in developing countries (FANTA-2, 2010). By the end of 2016, about 34.5 million adults were living with HIV and an estimated 1 million patients died due to Acquired Immunodeficiency Syndrome (AIDS) related conditions (Dedha, Damena, et al., 2017) Under nutrition is the predominant problem for HIV-infected patients because it creates a vicious cycle which may catalyze progression from HIV infection to AIDS (Dedha, Damena, et al., 2017). HIV affects nutrition status by increasing energy requirements, reducing food intake, and affecting nutrient absorption and metabolism insufficiencies due to cytokine activity and diarrhoea, (Hailemariam et al., 2013) also studies have shown that the progression of the disease can be increased by poor diet. On the other hand, under nutrition itself can induce immunosuppression and modulate the immunological response to HIV infection affecting the overall clinical outcome and worsening HIV related immune depression.

Different studies in different parts of the world revealed the factors associated with under nutrition among people living With HIV and AIDS were age, poor medication adherence, anemia, duration of the disease, opportunistic infection, advanced WHO stage, low CD4+ count, not taking co-trimoxazole, current substance use, marital status, residence, and active tuberculosis. Besides remarkable efforts made in increasing the treatment coverage of HIV/AIDS in the past decades, the high burden of HIV/AIDS and under nutrition have remained the major problems of health care systems in SSA (Dedha, Damena, et al., 2017). HIV-related debilitating infections have severe nutritional consequences that commonly precipitate weight loss and finally lead to a wasting syndrome. The prevalence of under nutrition among HIV-infected individuals was 19% in Tanzania and 10% in Zimbabwe. Uganda is also one of the countries hit hardest by the HIV epidemic alongside malnutrition (Uganda AIDS Commission, 2017) the prevalence of under nutrition among HIV/AIDS patients receiving ART in Uganda ranges from 10.1 to 43.8% (Eismann, 2017).

In Kyenjojo district, the prevalence of Under nutrition among adult HIV-infected patients was estimated at 32% for 2022 higher than 4 years back which was estimated at 29% in 2017 (Kyenjojo district HMIS annual report 2016). So it is upon this background that the researcher intends to investigate the factors contributing to under nutrition among adults living with HIV/ AIDS attending the ART clinic at Kyenjojo general hospital, western Uganda.

General Objective

The general objective of the study was to assess the key drivers of under nutrition among adults living with HIV and AIDS attending the ART clinic at Kyenjojo General Hospital, western Uganda.

Specific Objectives

1. To establish the nutrition status of adults living with HIV and AIDS attending the ART clinic at Kyenjojo General Hospital,
2. To assess the socio-economic factors contributing to under nutrition among adults living with HIV and AIDS attending the ART clinic at Kyenjojo General Hospital
3. To determine the clinical factors associated with under nutrition among adults living with HIV and AIDS attending the ART clinic at Kyenjojo General Hospital.

METHODOLOGY

Research design

The study design was cross-sectional with a descriptive approach. The descriptive approach involves observing, describing, and documenting aspects of a situation as it naturally occurs in a given population; cross-sectional examines what currently exists. This design was chosen because the researcher intended to collect data at a single point in time from a dynamic population and no need to follow up the participants hence taking a short time. Data was collected from respondents on the key drivers for under nutrition among adults living with HIV-infected patients at the ART clinic in Kyenjojo General Hospital.

Study population

The study population comprised people living with HIV aged 18 years and above attending the ART clinic. Specifically, the study targeted HIV-positive adults attending the anti-retroviral clinic at Kyenjojo General Hospital.

Inclusion Criteria

(i) All adults attending the ART clinic at Kyenjojo General Hospital who accepted to participate in the research activity based on the consent form (Annex 1).

Exclusion Criteria

(i) People living with HIV/AIDS and were on Antiretroviral treatment but were critically ill or mentally unstable.

(ii) People living with HIV/AIDS who were on Antiretroviral treatment but were below the age of 18 years were denied participation in the study.

(iii) Pregnant women attending the anti-retroviral clinic were not included in the study.

Sample size calculation

Considering a 32% prevalence of under nutrition reported in the Kyenjojo district HMIS annual report of 2016, the sample size was calculated using the Leslie and Kish formula, as shown below

n =required sample size

z =standard error of mean which corresponds to a 95% confidence level (standard value of 1.96)

p =known prevalence; 32% (~0.32)

d =margin of error as 5% (standard value of 0.05)

$n = (1.96 \times 1.96) (0.32) (1 - 0.32) / (0.05 \times 0.05)$

$n = 334$ respondents were targeted.

Sampling techniques

Purposive sampling of key informants

This is a sampling technique that involves identification and selection of individuals, or groups of individuals that are proficient with a particular community or society (Etikan, et al., 2016). Given that our study investigated a condition associated with stigma, the study first purposively identified core contacts; nurses and physicians working at the clinic who introduced the study to the target population.

Simple Random sampling

This is a sampling technique where every item or individual in a population has an even chance or likelihood of being selected in the sample (Sharma, 2017). From the identified population, study participants were simply randomly selected by balloting.

Data collection methods and tools

Data collection methods

Structured interviews

In the study, these were face-to-face with participants being asked close-ended questions in a structured format. In addition, key informant interviews with probing and guiding questions regarding the study were applied to purposively selected persons such as clinic in-charges including nurses and doctors.

Anthropometry

This refers to the physical measurement of body parts in comparison to reference standards. Anthropometry involved the following measurements: Mid-Upper-Arm Circumference in centimeters, body weight in kilograms, and height in centimeters which were used for computing the BMI of the study participants.

Height; this involved the following assessment procedure

- The study participants were asked to stand barefeet on the foot piece without any head gears on the height board.
- To ensure accuracy, the following was done with the help of an assessment assistant who was recruited to help in the assessment; shoulder blades, buttocks, and heels touched the surface of the height board; knees fully straight, arms stretched on the sides; and the neck straight with the eyes looking straight ahead with the headpiece firmly extended in position.
- The measurement was taken and recorded to the nearest 0.1 cm.
- The procedure was repeated to ensure accuracy and the average height recorded.

Weight; this involved the following assessment procedure;

- Before each weight measurement was taken, the weighing scale was calibrated to zero.
- The study participants were asked to step on the weighing scale with minimal clothing.
- Weight was recorded to the nearest 0.01 kg.

MUAC; involved the following procedure;

- The MUAC of the less flexed arm was used. The mid-point is located by flexing the study participant's elbow to 90 degrees. The tape is placed at the midpoint.
- Without tightening or loosening the tape, the measurement is read from the window of the tape.
- The procedure was repeated to ensure accuracy and the average measurement was recorded to the nearest 0.1 cm.

Data collection tools

Structured questionnaires

The study used structured questionnaires with mostly closed-ended questions (Annex 2). The questionnaires had sections on socio-demographic data including age, occupation, household size, education level, and marital status, and factors such as duration of therapy, drug combinations, and lifestyle factors.

Key informant guides

The tool was designed with guiding questions to probe patterns of Anti-retroviral treatment (Annex 3). The questionnaires were pre-tested on a few individuals to determine suitability before the actual field exercise of data collection.

Anthropometric tools

Height board

This is an anthropometric tool that was used to measure the standing height of individuals, in the study, the height board was used to determine the weight of the study participants which was read and recorded to the nearest 0.1 cm.

Weighing scale

The study specifically used the digital weighing scale to determine the weights of the study participants which was read and recorded to the nearest 0.01 kgs. The weighing scale was standardized periodically using objects of known weight. In addition, the batteries were tested for functionality before the actual assessments of the individuals and the reading was tarred to zero.

MUAC tape

The tape was used to determine the circumference of the mid-point of the rarely used arm that is between the tip of the shoulder (acromion) and the elbow (olecranon) of the study participants. Before the use of the MUAC in data collection, the tape was checked for calibration.

Data analysis methods and tools

Nutritional status analysis

The height and weight data collected was used to calculate BMI using the BMI calculation formula,

(Kgm²)

The WHO Body Mass Index classification

BMI was categorized according to the WHO standards with cut-offs indicated in the table below;

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BMI cut-offs	Nutritional status
<18.5	Underweight
18.5 to less than 25.0	Normal
25.0 to less than 30	Overweight
>30.0	Obese

Statistical analysis methods

Data was coded, entered, and analyzed using IBM SPSS statistics version 23 for Windows. Descriptive statistics were conducted using frequencies and proportions. Statistical tests were carried out to examine relationships between the outcome variables and selected determinant factors of ART. Data analysis for frequency distribution, mean, chi-square, and cross-tabulation were used as follows:

1. Chi-square tests

The test uses categorical variables which are analyzed using cross-tabulations to establish whether significant associations exist between variables. The study analyzed categorical variables such as marital status, BMI categories, and occupation type.

Validity and reliability

Validity was debated and approved by the research supervisor and the research committee to ensure that the design was well-framed.

The researcher employed and trained assistants with medical backgrounds so that interpretation and use of tools become easy for reliability. In addition, the assessment tools were pre-tested before the actual data collection.

Study limitations and presentation

The respondents may conceal some data that may be needed on personal-related aspects for privacy reasons. This was solved by guaranteeing confidentiality to the respondents and that the study was solely for academic purposes.

Diet plays a vital role in an individual's nutritional status. However, our study did not assess the dietary determinants of the nutritional status of an individual in terms of total calories, proteins, and other nutrients.

Ethical considerations

An introductory and approval letter from the Department of Agricultural Sciences was obtained from the University and presented to the relevant authorities in Kyenjojo General Hospital. Study participants were informed that participation in the study is voluntary and that information collected during the study was purposely for research. In addition, written or verbal consent using a consent form (Annex 1) was sought before the collection of information from eligible respondents.

RESULTS

Characteristics of study participants

The socio-demographic characteristics of the respondents are presented in Table 1. The majority of the respondents were married (68.6%) while the rest (31.4%) were not married. Household size was three to five, two or fewer, and six or more 54.5%, 31.4%, and 14.1% of the respondents respectively.

Table 1: Socio-demographic characteristics of respondents

Characteristic	Frequency	Percentage
Sex		
Female	193	57.8
Male	141	42.2
Religion		
Christian	193	57.8
Moslem	102	30.5
Others	39	11.7
Age category		
>24	46	13.8
25 to 34	93	27.8
35 and above	195	58.4
Marital status		
Married	229	68.6
Not married	78	23.4
Others	27	8.0
Highest education		
Primary or lower	57	17.1
Secondary	205	61.4
Tertiary	72	21.6
Household size category		
Two or less	105	31.4
Three to five	182	54.5
Six or more	47	14.1

Socio-economic factors of adults attending the ART clinic at KGH

Majority of the respondents were wage earners (57.8%), 31.1% were salary earners and 11.1% were unemployed. The estimated monthly expenditure was between less than 200,000, 200,000 to 400, 000 and above 500,000 USHS among 13.8%, 57.5% and 28.7% of the assessed individuals.

Physical exercises were reported in 43.1% of the respondents while 56.9% did not engage in any planned physical exercises. In addition, the majority of the respondents did not own land (62.3%) while only 37.7% owned land.

Substances such as alcohol was used by 36.5% of the respondents while 63.5% of the did not drink alcohol. In addition, cigarette smoking was reported in 17.7% of the respondents while 82.3% did not smoke cigarettes.

Table 2: Socio-economic factors of adults of respondents

Characteristic	Frequency	Percentage
Occupation		
Salary earner	104	31.1
Wage earner	193	57.8
Unemployed	37	11.1
Estimated monthly income (UGSHS)		
<200,000	46	13.8
200 to 400,000	192	57.5
>500,000	96	28.7
Land ownership		
Yes	126	37.7
No	208	62.3
Alcohol use		
Yes	122	36.5
No	212	63.5
Cigarette use		
Yes	59	17.7
No	275	82.3
Physical exercise		
Yes	144	43.1
No	190	56.9

Clinical factors of adults attending ART clinic at KGH

As shown in table 3, clinical staging of HIV was stages one (30.5%), two (53.3%) and three (16.2%) among respondents who were on first line 46.1%, second line 34.7% and third line 19.2 treatment regimens respectively. Duration on Anti-

retroviral treatment was less than 12 months, 12 to 24 months and above 24 months in 15.9%, 32.9% and 51.2% of the people attending the ART clinic at the hospital. The commonly reported opportunistic infections in the people assessed included diarrhea (47.6%) and tuberculosis (38.0%). Other conditions (14.4%) such as headaches, stomachaches, evening chills, vomiting and nausea were also reported.

Table 3: Clinical factors of adults attending ART clinic at KGH

Characteristic	Frequency	Percentage
Treatment line		
First line	156	46.1
Second line	116	34.7
Third line	64	19.2
Duration on ART		
<12 months	53	15.9
12-24 months	110	32.9
>24 months	171	51.2
Common opportunistic infection		
Tuberculosis	127	38.0
Diarrhoea	159	47.6
Others	48	14.4
Clinical staging		
Stage one	102	30.5
Stage two	178	53.3
Stage three	54	16.2
CD4 count		
<200	95	28.4
200 to 500	173	51.8
>500	66	19.8

Table 4: Anthropometric parameters of respondents

	Weight(kg)	Height(cm)	MUAC(cm)	BMI(kg/m ²)
Mean	58.2	161.2	26.8	22.4
SD.	13.3	7.9	5.2	4.9
Minimum	37.0	141.0	20.1	15.5
Maximum	100.5	189.5	36.8	37.1

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The nutritional status of adults attending ART clinic at KGH

The mean (SD) BMI was 22.4 (4.9) kgm² with the maximum and minimum of 15.5 kgm² and 37.1 kgm². In addition, the mean (SD) MUAC was 26.8 cm (5.2) cm with the maximum

and minimum of 20.1 cm and 33.8 cm respectively (Table 4).

As shown in the table 5, the majority (51.1%) of the respondents were of normal nutritional status while 18.3% and 14.4% were overweight and obese respectively. Under nutrition was observed among 16.2% of the respondents. There were more undernourished males 27/141 (19.1%) than females 27/193 (14.0%).

Table 5: The nutritional status of adults attending ART clinic at KGH

	Underweight (16.2%)	Normal (51.1%)	Overweight (18.3%)	Obese (14.4%)
Sex of respondents				
Female	27 (14.0%)	92 (47.7%)	50 (25.9%)	24 (12.4%)
Male	27 (19.1%)	79 (56.0%)	11 (7.8%)	24 (17.0%)

Factors associated with under nutrition among respondents

Socio-economic factors associated with under nutrition

As shown in the table 6, only the age X²(2)9.425, p=0.009, marital status X²(2)29.247, p=0.000 and the highest level of

education X²(2)9.537, p=0.008 were associated with under nutrition among respondents. In addition, only the estimated monthly income X²(2)12.240, p=0.002 and alcohol use X²(2)4.660, p=0.031 were also associated with malnutrition.

Table 6: Socio-economic factors associated with under nutrition

Characteristic	N	Under nutrition		Chi-square value
		Yes	No	
Sex				
Female	193	27	166	X ² (2)1.600, p=0.206
Male	141	27	114	
Age category				
>24	46	4	42	X ² (2)9.425, p=0.009
25 to 34	93	24	69	
35 and above	195	26	169	
Marital status				
Married	229	23	206	X ² (2)29.247, p=0.000
Not married	78	28	50	
Others	27	3	24	
Highest education				
Primary or lower	57	16	41	X ² (2)9.537, p=0.008
Secondary	205	24	181	
Tertiary	72	14	58	
Occupation				
Salary earner	104	18	86	X ² (2)1.996, p=0.369
Wage earner	193	33	160	
Others	37	34	34	
Estimated income (UGSHS)				
<200,000	46	4	42	X ² (2)12.240, p=0.002
200 to 400,000	192	24	168	
>500,000	96	26	70	
Alcohol use				
Yes	122	15	107	X ² (2)4.660, p=0.031
No	212	39	173	
Cigarette				
Yes	59	4	55	X ² (2) 2.127, p=0.145
No	275	50	225	

Table 7: Clinical factors associated with under nutrition

Characteristic	N	Under nutrition		Chi-square
		Yes	No	
Treatment line				
First line	156	16	138	X ² (2) 12.472, p=0.002
Second line	116	30	86	
Third line	64	8	56	
Duration on ART				
<12 months	53	7	46	X ² (2) 2.041, p=0.594
12-24 months	110	16	94	
>24 months	171	31	140	
Common opportunistic infection				
Tuberculosis	127	17	110	X ² (2) 3.214, p=0.014
Diarrhoea	159	29	130	
Others	48	8	40	
Clinical staging				
Stage one	102	8	94	X ² (2) 7.597, p=0.022
Stage two	178	36	142	
Stage three	54	10	44	
CD4 count				
<200	95	19	76	

200 to 500	173	30	143	$X^2(2)$ 4.800, $p=0.091$
>500	66	5	61	

Clinical factors associated with under nutrition

As shown in table 7, under nutrition was significantly associated with the treatment regimen $X^2(2)$ 12.472, $p=0.002$, common opportunistic infections $X^2(2)$ 3.214, $p=0.014$ and the clinical staging of HIV $X^2(2)$ 7.597, $p=0.022$.

DISCUSSION

The mean (SD) age of the respondents was 39.12 (± 12.6) years. This indicated that we assessed majorly an adult population of patients attending the anti-retroviral treatment at Kyenjojo General Hospital.

The findings showed that there were more females (57.8%) compared to males among the patients that attended the ART clinic at Kyenjojo General Hospital indicating a higher prevalence of HIV/AIDS in females compared to males.

This finding is congruent with results from previous studies on people living with HIV/AIDS in Uganda which reported more females than males living with HIV/AIDS (Nanyonjo, et al., 2020; Small, et al., 2022).

The high proportion of females with HIV/AIDS than males in previous studies has been associated with a higher rate of female sexual exposure to infected men (Baluku, et al., 2019), early sexual activity (Mafigiri, et al., 2017), and the engagement in transactional sex in the form of sex-for-money and other gifts (Nanyonjo, et al., 2020).

The findings, the majority of the respondents were married (68.6%). Wakooko and colleagues reported that more married people were living with HIV/AIDS in a retrospective cohort study conducted among HIV patients on antiretroviral treatment in Bulambuli district, eastern Uganda (Wakooko, et al., 2020).

The findings showed that close to two-thirds (61.4%) of the assessed individuals had secondary education. Contrary to our findings a lower proportion (41.7%) of respondents with secondary school education was reported in a study that assessed gender difference determinants of condom use among HIV clients in Uganda (Walusaga, et al., 2012).

The nutritional status of adults attending the ART clinic at KGH

Overall, the findings revealed that slightly more than half (51.2%) of the respondents were of normal nutritional status while 18.3% and 14.4% were overweight and obese respectively.

In the findings, there were more malnourished males (19.1%) than females (14.0%) attending the anti-retroviral clinic at Kyenjojo general hospital. Similarly, Kazooba et, al., found that under nutrition was more in HIV-positive males (14.1%) than in HIV-positive females (8.3%) Ugandan adults (Kazooba, et al., 2017).

The findings showed that only 16.2% of the adults attending the ART clinic at Kyenjojo General Hospital were undernourished. The proportion of underweight in our study is similar to the 16% prevalence of underweight documented by Kwarisiima et, al., among HIV-positive and general populations in rural Uganda (Kwarisiima, et al., 2016).

The 16.2% proportion of underweight adults attending the ART clinic at Kyenjojo General Hospital is almost similar to the 15.1% proportion of underweight reported in a study that assessed HIV-infected adults initiating highly active antiretroviral therapy in Uganda (Kyeyune, et al., 2014).

Still, the 16.2% proportion of underweight adults attending the ART clinic at Kyenjojo General Hospital is almost similar to the 15.2% proportion of underweight documented by Ntalo in a study that assessed food security, anthropometric status and body composition of people living with HIV in refugee settlements in Uganda (Ntalo, 2019).

The proportion of undernourished people attending the ART clinic at Kyenjojo General Hospital in our study is higher than the 9.7% (Okello, et al., 2017) Association between HIV and blood pressure in adults and role of body weight as a mediator: Cross-sectional study in Uganda.

Contrary to the findings, a higher prevalence of underweight (22.4%) was documented by Kadiyala and Rawat in a study that assessed food access and diet quality as independent predictors of the nutritional status among people living with HIV in Uganda (Kadiyala & Rawat, 2013).

A lower proportion of underweight (6.2%) was documented in a study that assessed the prevalence of overweight and

obesity and associated factors among people living with HIV attending a tertiary care clinic in Uganda (Nalugga, et al., 2022).

In another study that used a different methodology to assess the nutritional status of HIV-infected adults in TASO, Kampala, a lower proportion (12%) of underweight was documented (Mokori, et al., 2011). The differences in methodologies used in the studies might have caused this discrepancy.

The proportion of underweight in our study is higher than the 10.3% proportion of underweight reported by Kazooba and colleagues among HIV-positive Ugandan adults (Kazooba, et al., 2017) and the 8.2% proportion of underweight among HIV-Infected patients in Kampala, Uganda (Isabirye, et al., 2020).

This discrepancy might be associated with the differences in geographical settings of the study; whereas our study assessed individuals in a remote setting, the other comparative studies assessed individuals in Kampala which is an urban area with seemingly better-off people.

Factors associated with under-nutrition among respondents

The findings showed that under nutrition was significantly associated with the marital status of adults attending the ART clinic at Kyenjojo General Hospital. The marital status of women with HIV/AIDS in Uganda was documented to be driving under nutrition among women in Africa (Djuikom & van de Walle, 2022; Gemede, et al., 2021).

The findings showed that under nutrition was significantly associated with the highest level of education of adults attending the ART clinic at Kyenjojo General Hospital. A study in Ghana revealed that there was an increased likelihood of under nutrition among patients with no formal education (Nanewortor, et al., 2021).

The findings showed that under nutrition was significantly associated with alcohol use in adults attending the ART clinic at Kyenjojo General Hospital. Similarly, studies have documented a significant association between alcohol use and under nutrition in people living with HIV/AIDS (Kalil, et al., 2020; Gebru, et al., 2020; Oumer, et al., 2019).

The findings showed that under nutrition was significantly associated with the treatment line in adults attending the ART clinic at Kyenjojo General Hospital. Previous studies have shown that under nutrition is significantly associated

with the treatment line among HIV/AIDS patients (Oumer, et al., 2019; Dave, et al., 2022; Belete, et al., 2023).

The findings showed that under nutrition was significantly associated with the common opportunistic infections in adults attending the ART clinic at Kyenjojo General Hospital. Opportunistic infections especially tuberculosis have been linked to the difficulty of drug metabolism; it affects productivity at personal, family, and country levels thus aggravating the disease and other under nutrition and its consequences among people living with HIV/AIDS (Tesfaye, et al., 2021).

The findings showed that under-nutrition was significantly associated with the clinical staging of the disease in adults attending the ART clinic at Kyenjojo General Hospital. Previous studies have linked disease progression to loss of muscle mass (Osuna-Padilla, et al., 2022) and increased resistance to treatment (Francis, et al., 2022) thereby causing under nutrition among people living with HIV/AIDS.

Conclusion

Overall, the findings of our study showed that malnutrition in its two forms under nutrition and over nutrition is a major challenge among people attending the anti-retroviral treatment at Kyenjojo General Hospital. Under nutrition was mostly linked to age, marital status, and highest level of education, estimated monthly income, alcohol use, treatment regimen, opportunistic infections, and clinical staging of the disease. Under nutrition in anti-retroviral therapy hastens HIV progression into AIDS resulting from a compromised immune system. This would predispose people living with HIV/AIDS to a double jeopardy of life-threatening opportunistic infections, chronic gastrointestinal complications, and impaired nutrient absorption that would result in death.

Recommendations

Healthcare providers including nutritionists and dietitians should create awareness of the role of nutrition in HIV/AIDS and anti-retroviral treatment for example through routine dietetic nutrition education and nutritional counselling sessions at the ART clinic to empower PLWHIV to make appropriate food choices.

In addition, major changes in extension service provision, by including adults in affected communities would help alleviate the problem at hand. Community education on nutritional supplementation, and engagement in economic activities, which improve their standards of living, would lead to improved patient outcomes.

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Abbreviations

AIDS: Acquired Immune Deficiency Syndrome
BMI: Body Mass Index
FAO: Food and Agricultural Organization
FNC: Food and Nutrition Council
HIV: Human Immune Virus
KGH: Kyenjojo General Hospital
MOH: Ministry of Health
NGOs: Non-government Organizations
SD: Standard Deviation
SSA: Sub-Saharan Africa
SPSS: Statistical Packages for Social Sciences
TASO: The Aids Support Organization
UNAIDS: Joint United Nations Programme on HIV/AIDS
UFANP: Uganda Food and Nutrition Policy
UN: United Nations
UNAP: Uganda Nutrition Action Plan
UNICEF: United Nations International Children's Emergency Fund
VAD: Vitamin A Deficiency
WHA: World Health Assembly
WHO: World Health Organization

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