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Original Article

THE SOCIO-DEMOGRAPHIC CHARACTERISTICS AND NUTRITIONAL STATUS OF PEOPLE LIVING WITH HIV AND AIDS RECEIVING ANTIRETROVIRAL THERAPY IN WAU TEACHING HOSPITAL, SOUTH SUDAN. A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background
Undernutrition in all its forms is the predominant problem for HIV-infected patients and creates a vicious cycle that may catalyze progression from HIV infection to AIDS. Poor nutrition results in weight loss, muscle wasting, weakness, and nutrient deficiencies then leads to an impaired immune system. This study determined the socio-demographic Characteristics and nutritional Status of People living with HIV And AIDs receiving Antiretroviral therapy in Wau Teaching Hospital, South Sudan.

Methodology
A cross-sectional descriptive study was conducted with a quantitative research approach. Using purposive sampling, we recruited key informants to introduce the study to the target population. By simple random sampling, the study assessed 338 respondents. Data on socio-demographics were collected using structured questionnaires while anthropometric data was collected using anthropometric tools and data analysis was done using the SPSS version 25. Descriptive statistics such as the frequencies, means, and standard deviations were expressed.

Results
The majority of the respondents were female (58.6%) and (64.5%) were married, (55.3%) were catholic and 35.8% had attained a primary level of education. (54.1%) of the respondents had a normal nutritional status, Undernutrition was observed among 24.0% of the respondents. There were more undernourished females 50(25.3%) than males 31(22.1%). 24.0% were underweight, 10.4% were overweight and 11.5% were obese.

Conclusion
Overall, the findings of our study showed that malnutrition in its two forms undernutrition and overnutrition is a major challenge among people attending the anti-retroviral treatment at Wau Teaching Hospital. Undernutrition in anti-retroviral therapy hastens HIV progression into AIDS resulting from a compromised immune system.

Recommendation
Community education on nutritional supplementation, and engagement in economic activities, which improve their standards of living, would lead to improved patient outcomes.

Keywords: *Socio-demographic characteristics and nutritional status, People living with HIV And AIDs, Wau Teaching Hospital, South Sudan*
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BACKGROUND

Undernutrition has long been a public health concern in South Sudan among people living with HIV & AIDs given the recurrent conflict and recovery from protracted conflict, the high number of returnees and internally displaced people (IDPs) facing humanitarian crises, and the refugee situation, many clients are vulnerable to get appropriate dietary intake which determines the disease progression and success of Anti-retroviral therapy (ART). There is limited evidence showing the magnitude of undernutrition in this segment of the community, particularly in the rural residents. A sample from two facilities providing ART in South Sudan estimated that 25-30% of adult patients starting ART were moderately

to severely undernourished with a body mass index (BMI) less than 18.5kg/m², with the highest rates in rural areas (30%) compared to town with 25% (Adebisi et al., 2019). Undernutrition in all its forms is the predominant problem for HIV-infected patients and creates a vicious cycle that may catalyze progression from HIV infection to AIDS. Poor nutrition results in weight loss, muscle wasting, weakness, and nutrient deficiencies which leads to an impaired immune system (Gebru TH, 2020). This will probably increase HIV replication, hastened disease progression, and increased morbidity that results in increased nutritional needs, and increased loss of nutrients. Likewise, adequate dietary intake enhances the therapeutic effect of medicines and boosts the immune system hence helping to fight against the disease and to maintain body weight, promoting healthy living, and overall improving quality of life. The association between HIV and undernutrition is in two ways as both are capable of causing progressive damage to the immune system. HIV weakens the immune system of individuals and poor nutrition further causes more damage. (Gebru TH, 2020)

Despite efforts by the Ministry of Health alongside implementing partners through implementation of a test and treat policy to increase ART coverage in South Sudan using the 90-90-90 target by 2020 was not achieved as by the end of 2020, 29% of the estimated people living with HIV knew their status, 79% of those who knew their status were on antiretroviral therapy, and 80% of those on ART had achieved viral load suppression., increase in nutrition assessment and management of those who are undernourished(Namukose et al., 2023).

Furthermore, undernourished HIV-infected persons are more likely to suffer episodes of infectious disease, as well as episodes of longer duration and greater severity, than other HIV-negative persons, and in particular, chronic diarrhea has been linked with undernutrition among PLHIV. In Western Barh el Gazal state the prevalence of Undernutrition among adult HIV-infected patients was estimated at 39% for 2022 higher than that 3 years back which was estimated at 30% in 2019(Alebel et al., 2021). Malnutrition remains a challenge among PLHIV and the situation is the same at Wau Teaching Hospital. Therefore, this study examined the socio-demographic Characteristics and nutritional Status of People living with HIV And AIDs receiving Antiretroviral therapy in Wau Teaching Hospital, South Sudan.

METHODOLOGY

Study Area

The study was conducted in the Wau Teaching Hospital ART clinic. The Hospital is located in Western Bahr el Ghazal State South Sudan; it is about 626.01km away from the capital of South Sudan Juba and serves a population of about 1 million people. The main catchment areas of this hospital include three counties of Western Bahr el Ghazal State i.e. Jur River, Raja, and Wau County and the Hospital is supported by the Dutch base organization CORDAID & other partners in partnership with the Ministry of Health Government of South-Sudan run the Hospital.

Study Type

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; the 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 on the participants hence taking a short time. Data was collected from respondents on the key drivers for undernutrition among adults living with HIV-infected patients at the ART clinic in Wau Teaching Hospital.

Study Population

The study population was People Living with HIV and AIDs who are above 18 years old and are attending ART Clinic for treatment. Specifically, the study targeted HIV-positive adults attending the anti-retroviral clinic at the hospital in Wau Teaching Hospital in South Sudan.

Inclusion Criteria

All adults attending the ART clinic at Wau Teaching Hospital who accepted to participate in the research activity based on consent form were interviewed.

Exclusion Criteria

- People living with HIV and AIDS on Antiretroviral treatment but were critically ill or mentally unstable.
- People living with HIV and AIDS and who are on Antiretroviral treatment but below the age of 18 years.
- Pregnant women attending the antiretroviral Clinic will not be included in the study lactating women in their first six months postpartum, Adults with edema, and the elderly, 60 years and above.

Sample size

Considering a 39.0% prevalence of undernutrition among PLHIV reported in the Western Barh el Gazal state (DHIS2 annual report 2020), 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; 39% (~0.39)
d=margin of error as 5% (standard value of 0.05)
n= (1.96x1.96) (0.39) (1-0.39) / (0.05x0.05)
n= 366 respondents will be targeted

Sampling techniques

Purposive sampling of key informants

This is a sampling technique that involves the identification and selection of individuals, or groups of individuals that are proficient with a particular community or society considering investigating a condition associated with stigma, the study first purposively identified core contacts; nurses and physicians working at the clinic in who introduced the analysis to the target population (Palinkas LA, 2019). Wau Teaching Hospital was chosen because it is the main ART site in the whole region hence researcher intended to collect data at a single point in time from a dynamic population and no need to follow up with the participants hence taking a short time

Convenient sampling methodology

From the identified population, study participants were selected and interviewed one after the other as they visited the facility. To get the 366 participants, the researcher has been collecting data following the work schedule from Monday to Saturday six working days from 8th Jan 2024 to 8th of Feb 2024

Data Collection Procedures

Structured interviews

In the study, there was face-to-face interaction with participants being asked 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 compared to reference standards. Anthropometry involved the following measurements: Mid-Upper-Arm Circumference in centimeters, body weight in kilograms, and height in centimeters which was used to compute the BMI of the study participants.
Height; this involved the following assessment procedure
The study participants were asked to stand barefoot on the footpiece without any head gears on the height board or heavy clothes.
To ensure accuracy, the following were carried out 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.

Data collection tools

Structured questionnaires

The study used structured questionnaires with mostly closed-ended questions, the questionnaires had sections on socio-demographic, socio-economic, and clinical factors data including age, occupation, education level, marital status, and factors such as duration of therapy, political factors, cultural factors, and drug combinations.

Key informant guides

The tool was designed with guiding questions to probe patterns of Anti-retroviral treatment. 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 height of the study participants which were read and recorded to the nearest 0.1 cm.

Weighing scale

The study used the digital weighing scale to determine the weights of the study participants which were read and recorded to the nearest 0.01 kgs. The weighing scales were 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 to zero.

Data Analysis Method

Nutritional status analysis

The height and weight data collected were used to calculate BMI using the BMI calculation formula,
(kgm2)

BMI was categorized according to the WHO standards with cut-offs indicated in Table 1;

Table 1: showing the WHO Body Mass Index classification

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 were coded, entered, and analyzed using IBM SPSS statistics version 25 for Windows. Descriptive statistics were carried out 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, and mean were done.

Validity and reliability

Validity and reliability were debated and approved by the research supervisor and the research committee to ensure that the design was well-framed. The researcher employs and trains research 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.

Ethical Consideration

An introductory and approval letter was obtained from the Mildmay Institute of Health Sciences and was presented to the relevant authorities in Wau Teaching 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 was sought before the collection of information from eligible respondents.

RESULTS

Characteristics of the Study Participants

Table 2a: Showing socio-demographic characteristics of respondents

Characteristic	Frequency	Percentage (%)
Age group		
<25	81	23.9
26-35	98	28.9
36-45	107	31.6
>45	52	15.4
Sex		
Male	140	41.4
Female	198	58.6
Religion		
Catholic	187	55.3
Protestant	32	9.5
Muslim	78	23.1
Traditional	34	10.1
Others	7	2.1
Marital Status		
Single	31	9.2

Married	218	64.5
Separate/Divorce	89	26.3

Table 2b: Showing socio-demographic characteristics of respondents.

Level of Education		
No education	90	26.6
Primary	121	35.8
Secondary	47	13.9
Tertiary	80	23.7

The nutritional status of adults attending the ART clinic at Wau Teaching Hospital

Table 3: Anthropometric parameters of respondents

	Weight(kg)	Height(cm)	MUAC (cm)	BMI (kg/m^2)
MEAN	62.7	162.8	22.9	22.8
SD	12.8	12.3	2.6	5.2
MIN	29	129	18.0	15.3
MAX	100	190	29.0	39.7

Table 3: showed that the mean (SD) BMI was 22.8 (5.2) kgm^2 with the maximum and minimum of 15.3 kgm^2 and 39.7 kgm^2. In addition, the mean (SD) MUAC was 22.9 cm (2.6) cm with a maximum and minimum of 29.0 cm and 18.0 cm respectively. Meanwhile the mean SD for Height 162.8 (12.3) maximum and minimum 190 & 129 cm respectively. For mean SD weight 62.7 (12.8) with maximum and minimum of 100 and 29 kg as shown in (Table 4).

Table 4: The nutritional status of adults attending the ART clinic at Wau Teaching Hospital

	Underweight (24.0%)	Normal (54.1%)	Overweight (10.4%)	Obese (11.5%)
Sex of respondents				
Female	50 (25.3%)	107 (54.1%)	21 (10.6%)	20(10.1%)
Male	31(22.1%)	76 (54.3%)	14 (10.0%)	19(13.6%)

Table 4: shows that the majority (54.1%) of the respondents had a normal nutritional status while 10.4% and 11.5% were overweight and obese respectively. Undernutrition was observed among 24.0% of the respondents. There were more undernourished females 50/198 (25.3%) than males 31/140 (22.1%). The majority of the females were of normal nutrition than their counterpart males, underweight was also observed in females than males as well and overweight and obese among females compared to their fellow males in Wau Teaching Hospital.

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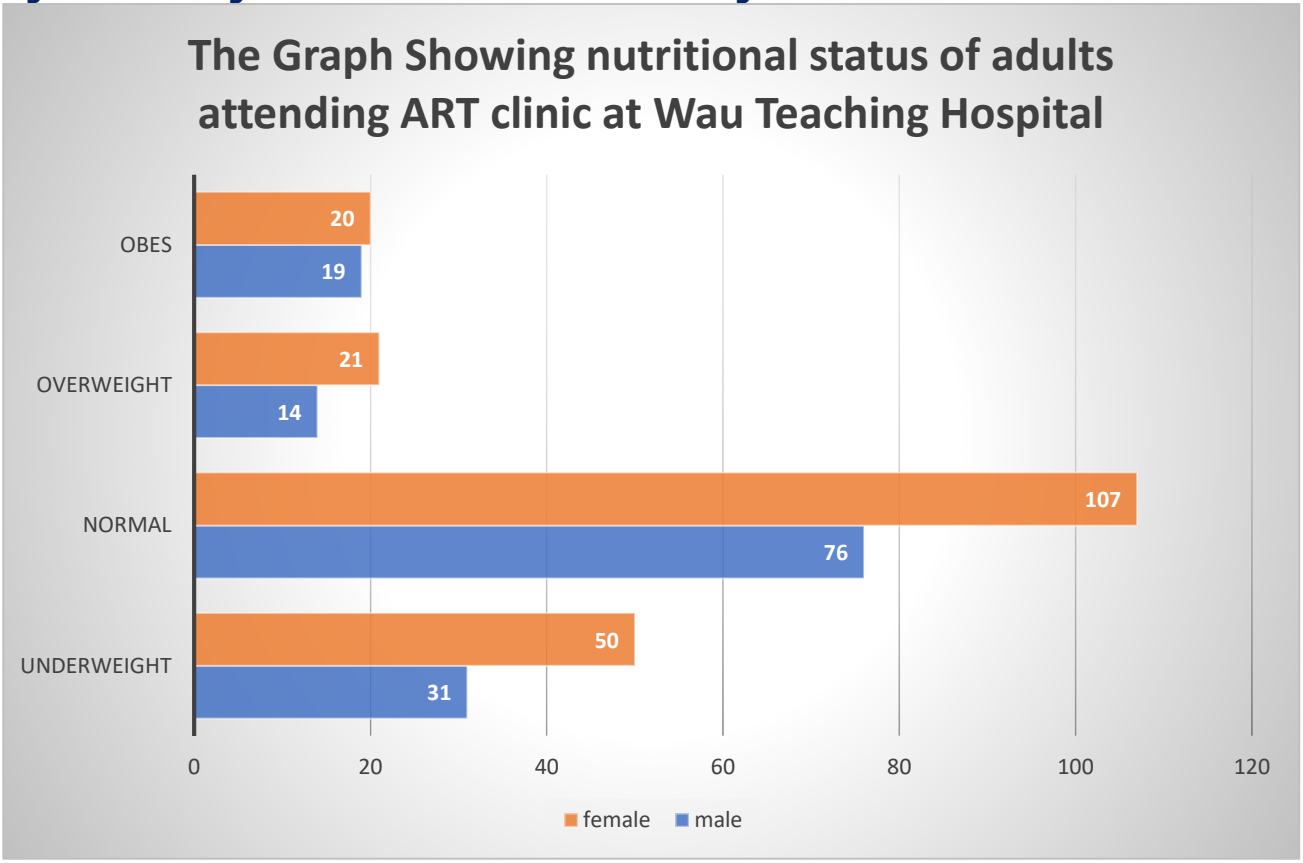
Figure 2: Showing nutritional status of Adults Attending ART Clinic at WTH



DISCUSSION OF FINDINGS

The socio-demographic characteristics of the study participants

The mean (SD) age of the respondents was 38.3 (±11.3) years. This indicated that we assessed majorly an adult population of patients attending the anti-retroviral treatment at Wau Teaching Hospital.

The findings showed that there were more females (58.6%) compared to males among the patients that attended the ART clinic at Wau Teaching Hospital indicating a higher prevalence of HIV/AIDS in females compared to males. This finding is similar to results from previous studies on people living with HIV/AIDS in Uganda which reported more females than males living with HIV/AIDS(Owachi et al., 2024). The higher proportion of females with HIV/AIDS than males in previous studies has been associated with the higher rate of female sexual exposure to infected men's early sexual activity and the engagement in transactional sex in the form of sex-for-money and other gifts(Owachi et al., 2024).

The findings, there was a higher number of unemployed people (64.8%) compared to employed which affected their nutritional status. It's similar to the study conducted in Canada says HIV status often hurts socioeconomic status by constraining an individual's ability to work and earn income, effects of HIV on physical and mental functioning can make maintaining regular employment difficult. Patients with HIV infection may also find that their work responsibilities conflict with their health care needs, disease severity, and self-reported HIV-related work discrimination place HIV-positive women and individuals with low education at risk for employment loss (Murden R et al, 2008)

A study in the Deep South of the USA shows that Structural factors including poverty, lack of employment opportunities, limited healthcare access, and limited transportation infrastructure have been highlighted as both independent and interactive contributors to healthcare engagement in HIV-positive women (Walcott M et al, 2019)

The findings, there was a high number of internally displaced persons (84.2%) which is be line with studies from Some studies done in southern Ireland showing homeless

and marginalized housed individuals are considered food insecure and are more likely to have lower CD4 (T-cell) counts, poorer medication adherence, and incomplete suppression of HIV replication(Martins et al., 2011). Food insecurity and residential instability are associated not only with poorer medication adherence but also with inconsistent health care and poorer access to health care, as well as less favorable attitudes toward health care providers(Beyene, 2023). The findings, the majority of the respondents were married (64.5%). 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 (86.4%) of the assessed individuals had primary, secondary, and tertiary 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 WTH

Overall, the findings revealed that slightly more than half (54.1%) of the respondents were of normal nutritional status while 10.4% and 11.5% were overweight and obese respectively. In the findings, there were more malnourished males (18.9%) than females (26.9%) attending the anti-retroviral clinic at Wau teaching hospital. Similarly, studies found that malnutrition was more common in HIV-positive males (14.1%) than in HIV-positive females (8.3%) in Ugandan adults (Ogenrwoth et al., 2022). The findings showed that only 24.0% of the adults attending the ART clinic at Wau Teaching 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 24.0% proportion of underweight adults attending the ART clinic at Wau Teaching 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 24.0% proportion of underweight adults attending the ART clinic at Wau Teaching Hospital is almost similar to the 15.2% proportion of underweight documented in a study that assessed food security, anthropometric status, and body composition of people living with HIV in refugee settlements in Uganda (Turumanya, 2024a)

Contrary to the findings, a lower prevalence of underweight (22.4%) was documented in a study that assessed food access and diet quality as independent predictors of the nutritional status among people living with HIV in Uganda(Turumanya, 2024b).

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(Manyanga et al., 2014).

CONCLUSION

Overall, the findings of our study showed that malnutrition in its two forms undernutrition and overnutrition is a major challenge among people attending the anti-retroviral treatment at Wau Teaching Hospital. Undernutrition in anti-retroviral therapy hastens HIV progression into AIDS resulting from a compromised immune system.

STUDY LIMITATION.

The respondents may conceal some data that may be needed on personal-related aspects for privacy reasons.

RECOMMENDATION

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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The cooperation and support of all the authorities in Wau Teaching Hospital and the persons who participated in the study are greatly appreciated. I hope our findings can contribute something of any magnitude towards the process and efforts to make a difference in the lives of the respondents and their families.

Lastly, I thank my family for their love, patience, and encouragement during these years of my undergraduate studies. I will always cherish, love, and support you to the best of my ability and potential.

LIST OF ABBREVIATION

AIDS: Acquired Immunodeficiency Syndrome
ART: Anti-Retroviral Therapy
BMI: Body Mass Index
CI: Confidence Interval
HIV: Human Immune Deficiency Virus

MOH: Ministry of Health
PMTCT: Prevention of Mother to Child Transmission
SD: Standard Deviation
SPSS: Statistical Package for the Social Sciences
WHO: World Health Organization.
OI: Opportunistic infections
TB: Tuberculosis
USAID: United States Agency for International Development
UCU: Uganda Christian University

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There is no source of funding.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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