Under Nutrition and Associated Factors among Adult HIV/AIDS Patients Enrolled on ART at Public Health Facilities of Western Ethiopia

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ABSTRACT

Background: HIV/AIDS and malnutrition effects are interrelated and exacerbate one another in a vicious cycle. HIV specifically affects nutritional status by increasing energy requirements, reducing food intake, and adversely affecting nutrient absorption and metabolism. In Ethiopia, the number of People Living with HIV ever enrolled in ART increases significantly.

Objective: The main aim of the study was to assess the magnitude of under nutrition and associated factors among adult HIV/AIDS patients enrolled on ART at public Health facilities of western Ethiopia.

Methods: Institution-based quantitative cross-sectional study was conducted among 278 adult HIV/AIDS patients enrolled on AR in public health facilities of western Ethiopia from January 1-10/2018 by using a systematic random sampling technique. Data was collected by using structured Interviewer administered questionnaire. After collection, checked data was entered into Epi data Version 3.1 and analyzed using Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics were performed and presented as frequencies and percentages. Binary logistic regression was conducted to select the candidate variables for the final model. Then variables with a p-value <0.3 at binary logistic regression were interred into multivariable logistic regression. Finally, variables with p-value <0.05 in the final model were considered as statistically significant predictors of the outcome variable. The result was presented by using tables and charts.

Results: Among 278(100%) study participants, 97(34.9%) were undernourished. Multivariate analysis indicated that; patients with dietary counseling were 46% (AOR [95% CI]=0.54[0.324, 0.901]) less likely to be malnourished compared to those who are not counseled. Also, patients with a CD4 count of <200 cell/μl were more than three and half times (AOR [95%CI=3.643(1.533, 8.654]) more likely to become malnourished compared to those with a CD4 count of >500 cell/μl.

Conclusion: The prevalence of under-nutrition among adult HIV/AIDS patients enrolled on ART was high. Therefore, a nutritional intervention plan in collaboration with different stakeholders to effectively address the nutritional conditions of HIV/AIDS patients enrolled on ART is needed.

Keywords: HIV/AIDS; Malnutrition; Nutritional status; Anti-retroviral therapy

Abbreviations : AIDS: Acquired Immune Deficiency Syndrome; AOR: Adjusted Odds Ratio; ART: Anti-Retroviral Infection; BMI: Body Mass Index; CI: Confidence Interval; HIV: Human Immune Virus; PLHIV: People Living with Human Immune Virus; SD: Standard Deviation; SPSS: Statistical Package for Social Sciences

INTRODUCTION

HIV/AIDS and malnutrition effects are interrelated and exacerbate one another in a vicious cycle. HIV specifically affects nutritional status by increasing energy requirements, reducing food intake, and adversely affecting nutrient absorption and metabolism. Asymptomatic and symptomatic adults have energy requirements that increase by 10% and 30% respectively to maintain body weight and physical activity [1].

HIV, Food insecurity, and malnutrition are intricately linked and exacerbate the harmful impacts of each other. Millions of HIV-infected people live in countries with high levels of poverty and food insecurity. Food insecurity has a negative impact on the overall nutritional and health status of those infected and affected by HIV and AIDS, and Peoples Living with HIV (PLHIV) often express

that food is the greatest need for themselves and their families [2].

Ethiopia has one of the world's highest incidences of undernourished individual's in which approximately 49% of the population is without adequate nutrition. The country is prone to acute food insecurity, primarily from drought, environmental degradation, and insufficient access to and availability of food [3]. In Ethiopia, the number of PLHIV ever enrolled on ART increases significantly, with a current enrollment of 871,334 [4].

Malnutrition contributes to immune impairment, making the body vulnerable to frequent illnesses and increasing demand for energy and nutrients, thereby accelerating disease progression [5]. Poor nutrition may also affect a patient's adherence to antiretroviral therapy (ART) by depriving him or her of the energy to travel to the pharmacy to collect antiretroviral drugs or by potentiating drug toxicity [6]. Failing to meet nutritional needs may lead to decreased immunity and increased susceptibility to opportunistic infections (OIs), which can lead to further malnutrition. Adequate nutrient intake can improve antiretroviral absorption and tolerance. On the other hand, PLHIV speeds the disease progression, increases morbidity, and reduces survival time [7]. Despite there is a growing number of ART users in Ethiopia, nutritional care and support get insufficient attention for the success of treatment. Therefore this study aimed to assess the nutritional status and associated factors among adult HIV/AIDS patients enrolled in ART care.

The finding of this research will serve program managers and decision-makers to design appropriate nutritional intervention

MATERIALS AND METHODS

Study design, area and period

An institution-based quantitative cross-sectional study was conducted among ART users at Nekemte town, western Ethiopia from January 1-10/2018. Nekemte town, the capital city of East Wollega zone is located at 331 km from Addis Ababa to the West. The total population of the town is estimated to be 122,262 of which 62,353 (51%) were females and 59,909 (49%) were males. In the town, there are a total of 1,512 HIV/AIDS patients on ART. In the town there were 2 public hospitals, 3 health centers, and 5 private health institutions. Of the health institutions in the town, two hospitals, two health centers, and one specialty clinic give ART services.

All HIV/AIDS patients aged 18 years and above who were enrolled in ART care clinic in Nekemte town Health facilities were the source population and, all HIV/AIDS patients aged 18 years and above who are actively taking ARV drugs at the selected Health facilities of Nekemte town were the study population. Patients who have no physical deformity (that can impair anthropometric measurement) and non-pregnant were included in the study. Patients who were seriously ill at the time of data collection were excluded.

Sample size determination

The required Sample size was determined by using a single population proportion formula, considering the following assumptions: p=27% (proportion of malnourished people living with HIV/AIDS [8],

Z=1.96 and d=5%, the initial sample size was

N=(1.96)2 (0.27) (0.73)/(0.05)=303

Since, the total population is less than 10,000; correction formula was used as follows.

Nf=[n/(1+(n/N))]=[303/(1+(303/1512))]=253. By adding 10% non-

response rate, the total sample size was 278.

Sampling procedure

Nekemte town has a total of 5 public health facilities (two hospitals and 3 health centers) that provides ART services. From the five public health facilities, three public health facilities (two hospitals and one health center) were selected by using simple random sampling method. Then, the calculated sample size was distributed across the three health facilities, proportionally to the size of clients in each health facility. From each health facility, respondents were selected by using a systematic random sampling technique.

Measurements

In this study, under-nutrition is defined as those HIV/AIDS patients on ART with BMI below 18.5 kg/m². Body Mass Index (BMI) is the weight of a person in kilograms divided by their height in meters squared. Normal nutrition is defined as those HIV/AIDS patients on ART with BMI from 18.5 kg/m² to 24.9 kg/m². Over-nutrition is defined as those HIV/AIDS patients on ART with BMI above 24.9 kg/m².

Data collection procedures and quality control

Data was collected by using a structured interviewer-administered questionnaire and anthropometric measurements by four BSc nurse data collectors and one MSc holder supervisor. The weight of participants was taken using standard balance and the scale will be checked at zero before and after each measurement. Participants' weight was measured after removing heavy clothes and recorded to the nearest 0.1 Kg. Height measurements of participants were taken using the standard measuring scale. Participants' take off their shoes, stand erect, and look straight in a horizontal plane. The occiput, shoulder, buttocks, and heels touched measuring board, and height was recorded to the nearest 0.01 cm. To determine nutritional status, BMI was calculated. The standard cut-offs point used were: <18.5 kg/m² for under nutrition, 18.5-24.9 kg/m² for normal, and greater than or equals to 25.0 kg/m² for overweight.

To ensure the quality of data, the questionnaire was prepared in English, translated into regional language (Afan Oromo), and retranslated to English to check its consistency. Also, training was given for data collectors and supervisors and then, pre-testing of the questionnaire was done on 5% of HIV/AIDS patients on ART at Gimbi hospital (out of the study area) before the actual survey. Close supervision was undertaken by the supervisor.

Data processing and analysis

The checked data were entered into Epi data Version 3.1 and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive statistics such as means, medians, and standard deviations were calculated to describe the independent variables and the result was presented by using tables and charts. Logistic regression was used to identify independent predictors of under-nutrition. Binary logistic regression was conducted to select the candidate variables for multivariable logistic regression, at p-value <0.3. A multivariable logistic regression, variables with p-value < 0.05 were considered as statistically significant predictors of under-nutrition. Assumptions of logistic regression like normality (by using histogram), presence of Multi collinearity (by using variance inflation factor), and model fitness (by using Hosmer Lemeshow goodness of fit) were checked for the model.

RESULTS

Socio-demographic characteristics

A total of 278 adult patients on ART were involved in the study with a response rate of 100%. About 177(63.7%) of the participants were females and 101(36.3%) were males. Sixty-four (23.0%) of the participants were aged between 30-34 years with a mean Age of 33.47 (SD 9.416). More than 2/3, 231 (83.1%) of the respondents were Urban residents while the rest 47(16.9%) were Rural. About one third (38.5%) of the study participants were Orthodox religion followers, and the least was 6(2.2%) Wakefata religion follower in Table 1.

Nutrition and lifestyle-related characteristics

Among all, 278 participants of the study, two-third (70.9%) of respondents did not develop a change of feeding style after knowing of HIV status, and more than half (153(55%) of the participants were counseled for diet. Regarding organizational support other than medication, the majority, 248 (89.2%) did not get any support from organizations other than medication. Concerning regular physical exercise, one third 210(75.5%) of the study participants do not do physical exercise in Table 2.

Clinical profile and ART status of the respondents

More than two-third, 202 (72.7%) of the participants had no eating difficulty and more than half 164(59%) of the respondents were stage

one of WHO stages. Majority, 189(68%) of the participants did not develop current/past opportunistic infections in the past six months in Table 3.

Under nutrition among study participants

Regarding the prevalence of under-nutrition, among 278 study participants, 97(34.9%), were undernourished in Figure 1.

Factors associated with nutritional status among adult HIV/AIDS patients enrolled in ART

In multivariate analysis, dietary counseling and a CD4 count are associated with under nutrition at p-value <0.05. ART patients who had dietary counseling were 46% less likely to become under nourished compared to those who didn't counseled (AOR [95% CI]=0.54[0.324, 0.901]). Also, patients having a CD4 count of <200 cell/μl were 3.6 times (AOR [95%CI=3.643(1.533, 8.654]) more likely to become malnourished compared to those with a CD4 count of >500 cell/μl. Similarly, patients with a CD4 count of 200-2500 cells/μl were 2.6 times (AOR [95%CI=2.596[1.276, 5.284]) more likely to become malnourished compared to those with a CD4 count of >500 cells. Furthermore, patients with a CD4 count of 351-500 cells were 2.5 times (AOR [95%CI=2.511[1.272, 4.958]) more likely to become undernourished compared to those with a CD4 count of >500 cells in Table 4.

Table 1: Socio-demographic characteristics of the study participants at ART clinic of Nekemte town public Health facilities, western, Ethiopia, 2018.
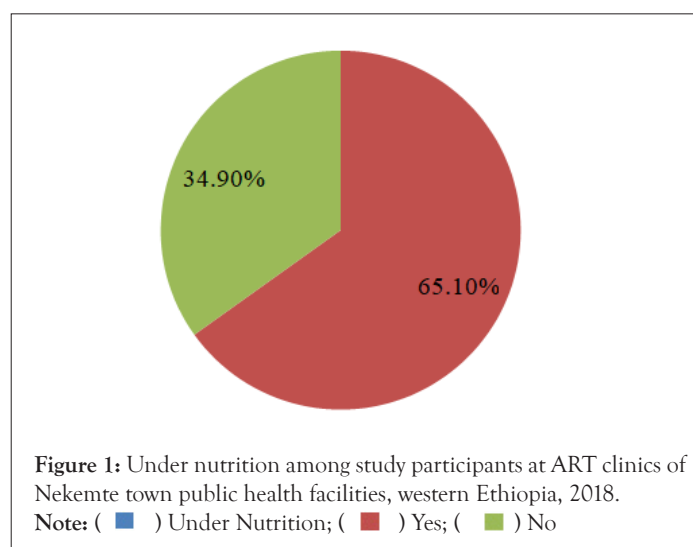
Variables	Categories	Frequencies	Percent (%)
Age in year	18-24	40	14.4
	25-34	120	43.2
	35-44	86	30.9
	>45	32	11.5
Sex	Male	101	36.3
	Female	177	63.7
Marital status	Single	48	17.3
	Married	164	59
	Divorced	43	15.5
	Widowed	23	8.3
Ethnicity	Oromo	193	69.4
	Amhara	70	25.2
	Others	15	5.4
Religion	Orthodox	107	38.5
	Muslim	52	18.7
	Protestant	104	37.4
	Others	15	5.4
Family size	<3 members	109	39.2
	4-5 members	146	52.5
	<6	23	8.3
Educational status	Unable to read and write	45	16.2
	Primary education	151	54.3
	Secondary education	59	21.2
	Tertiary education and above	23	8.3
Occupation	Unemployed	141	50.7
	Employed	137	49.3
Family monthly income	<500birr	35	12.6
	501-1000 birr	109	39.2
	1001-1500 birr	33	11.9
	1501-2000 birr	52	18.7
	>2001birr	49	17.6

Table 2: Nutrition and lifestyle related characteristic of the study respondents at ART clinics of Nekemte town public health facilities, western Ethiopia, 2018.

Variables	Categories	Frequencies	Percent (%)
Change of feeding style after knowing HIV status	No	197	70.9
	Yes	81	29.1
Dietary counseling	No	125	45
	Yes	153	55
Organizational support other than medication	No	248	89.2
	Yes	30	10.8
Regular physical exercise	No	210	75.5
	Yes	68	24.5

Table 3: Clinical profile and ART status of the study participants at ART clinics of Nekemte town public Health facilities, western Ethiopia, 2018

Variables	Categories	Frequencies	Percent (%)
CD4+T cell count	<200 cell/	33	11.9
	200-350cell/	70	25.2
	351-500cell/	86	30.9
	>500 cell/	89	32
Current/past opportunistic infection in the past 6 month	No	189	68
	Yes	89	32
ART regimens	1c(AZT+3TC+NVP)	38	13.7
	1d(AZT+3TC+EFV)	28	10.1
	1e(TDF+3TC+EFV)	181	65.1
	1f (TDF+3TC+NVP)	31	11.2
Duration of ART	<6 month	23	8.3
	6-12 month	19	6.8
	1-3 year	56	20.1
	>3 year	180	64.7

Figure 1: Under nutrition among study participants at ART clinics of Nekemte town public health facilities, western Ethiopia, 2018.
Note: (■) Under Nutrition; (■) Yes; (■) No

Table 4: Multivariable logistic regression showing factors associated with under nutrition of the study participants at ART clinics of Nekemte town public Health facilities, western Ethiopia, 2018.

Explanatory Variables	Category	Under nutrition		COR 95% CI	AOR (95% CI)
		Yes	No		
Marital status	Single	20	28	1	1
	Married	51	113	0.632(0.326,1.225)	0.552(0.258,1.179)
	Divorced	16	27	0.83(0.357,1.929)	0.832(0.313,2.211)
	widowed	10	13	1.077(0.394,2.940)	1.138(0.351,3.691)

Educational status	Unable to read and write	18	27	3.167(0.924,10.86)	3.739(0.99,13.851)
	Primary	52	99	2.495(0.807,7.718)	2.927(0.889,9.640)
	Secondary	23	36	3.035(0.915,10.06)	4.010(0.141,14.092)
	Tertiary and above	4	19	1	1
Occupational status	Unemployed	42	99	0.633(0.385,1.040)	0.785(0.453,1.362)
	Employed	55	82	1	1
Dietary counseling	No	25	56	1	1
	Yes	54	71	1.946(01.181,3.21)	0.54(0.324,0.901)
Eating difficulty	No	9	21	1	1
	Yes	75	127	1.45(0.818,2.568)	0.602(0.324,1.119)
WHO Stages	Stage 1	50	114	1	
	Stage 2	30	45	1.52(0.860,2.686)	1.201(0.615,2.346)
	Stage 3	15	18	1.9(0.887,4.069)	1.581(0.655,3.819)
	Stage 4	2	4	1.14(0.202,6.428)	1.279(0.182,8.975)

DISCUSSION

In this study, the prevalence of under nutrition among adult HIV/AIDS Clients enrolled in ART was 34.9% (95 CI: 29.3-37.6). The finding of this study is almost similar with study conducted in Hosana town, southern Ethiopia (31.2%) [9]. The under nutrition in this study was higher than the study conducted in Kathmandu Valley Health center, Nepal (19.9%) ,Butajira town, Ethiopia (25.2%) , Felege Hiwot, Amahra Region of Ethiopia (25.5%) (10-12).This may be due to a difference in socio-demographic characteristics and time differences among studies. On the other hand, under nutrition in this study was lower than studies conducted in Tigray, northern parts of Ethiopia 42.3% [10], a study conducted in India (72%) [11], and a study conducted in Malawi (57%) [12].The difference may be due to, socio-culture of the community, year of study, and awareness creation made regarding HIV and nutrition. Dietary counseling is significantly associated with under nutrition. ART patients who had dietary counseling were 46% less likely to become undernourished compared to those who didn't counseled. This result is supported by a study conducted in Nepal [13], a study conducted in Barirdar [14], a study conducted in Butajira [15] , a study conducted in Tigray [10], and a study conducted in selected public health facilities of Addis Ababa, Ethiopia [16]. The possible justification for this may be due to patients who get counsel on their diet eat appropriate food type that leads to adequate nutritional status than those who didn't counsel for dietary. In this study, the CD4 count is also associated with under nutrition. Respondents with a CD4 count of <200 cell/mm^3 were 3.6 times more likely to become malnourished compared to those with CD4 count of >500 cell/ µl. This finding is in line with study conducted in Hospitals of East Hararghe zone in which respondents with a CD4 count of >500 cells/µl were less likely undernourished as compared to those with a CD4 <200 [17], study conducted in west Showa zone, central Ethiopia, in which, PLHIVs with CD4 counts of less than 350 cells/µl were 2 times more likely to be undernourished than their counterparts [18], a study conducted in Dambia district of northwest Ethiopia [19], and study conducted in Wolayta Sodo teaching and referral hospital, southern Ethiopia [20]. The possible reason might be due to the fact that, the HIV- induced immune impairment and increased subsequent risk of opportunistic infections can worsen nutritional status. Also, it was supported by the fact that, micronutrient supplements significantly increased CD4 count among PLWHA.

CONCLUSION AND RECOMMENDATION

The prevalence of under nutrition among adult HIV/AIDS patients enrolled into ART was high in this study. Nutritional counseling and CD4 count are statistically significant predictors of under nutrition among HIV/AIDS patients enrolled in ART at public health facilities of western Ethiopia. Based on the study findings, the following recommendations were made, Western Ethiopia public health facilities need to plan nutritional interventions in collaboration with other stakeholders to effectively address the nutritional conditions of HIV/AIDS patients enrolled on ART. Health Workers in ART Clinic need to give health education/ nutritional counseling and effectively monitor the CD4 counts of their patients. Researchers need to conduct further studies by using a mixed method to determine the nutritional status of adult patients enrolled on ART.

LIMITATIONS

Cross-sectional study design by its very nature can't establish cause and effect relationship.

DECLARATIONS

Ethical considerations

Ethical clearance was obtained from Wollega University, Institute of Health Science Ethical Review Committee. A formal letter was written to different administrative bodies and organizations to obtain permission to conduct the research in the settings. After informing about the objectives of the study, confidentiality, and right to participate or interrupt participation, written informed consent was obtained from all study participants before the interview.

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CONSENT FOR PUBLICATION

Not applicable

AVAILABILITY OF DATA AND MATERIALS

Data will be available upon request from the corresponding author.

COMPETING INTERESTS

The authors declare that they have no competing interests Not applicable

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AVAILABILITY OF DATA AND MATERIALS

All the relevant data is included in the case report. Reasonable request for any additional data can contact with the corresponding author.

AUTHORS' CONTRIBUTIONS

Both authors contributed in conception, data analysis, drafting, and revised different drafts of the paper. Both authors have reviewed and approved the submission of the manuscript.

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