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Under Nutrition Status and Its Determinants among Adult HIV and AIDS Clients Enrolled on Antiretroviral Therapy at Nigest Elleni Mohammed Memorial Hospital, Southern 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 spite of the number of People Living with HIV ever enrolled on ART increases significantly in Ethiopia. Nutritional care and other supports which help for the success of treatment received insufficient attention. The aim of this study was to assess the prevalence of undernutrition status and its determinants among adult HIV/AIDS Clients enrolled on ART at Nigest Elleni Mohammed Memorial Hospital in Hosanna Town, Southern Ethiopia.

Method: Institution based cross-sectional quantitative study was conducted using systematic random sampling technique with sample size of 234. From each sampled patient, interview and anthropometric data were collected. Bivariate and multivariate logistic regression analysis was used and the variables which had significant association were identified on the basis of p-value ≤ 0.05 and AOR, with 95% CI.

Results: Among adult HIV/AIDS Clients in rolled in ART, 32.5% of them were under nourished (BMI<18.5 Kg/m^2). ART patients had no nutritional supports (AOR=2.22), patients who feed less than 3times in a day (AOR=3.29) and had smoking habit (AOR=6.06) were more likely to be under nourished and those patients in WHO Clinical stage 3 (AOR=0.12) were less likely to be under nourished.

Conclusion: This study revealed that under nutrition among adult HIV/AIDS Clients in rolled in ART was high prevalent problem in the study area. WHO clinical stage, daily food intake, nutritional support, smoking status was identified as the determinants of under nutrition. Current study identified that there is a need to design and implement nutritional interventions including nutritional support in items or financially together with healthy habit counselling as part of integrated ART service for effective patient treatment outcome.

Keywords: HIV/AIDS; ART; Under nutrition; BMI; Southern Ethiopia

Abbreviations: AIDS: Acquired Immune Deficiency Syndrome; AOR: Adjusted Odd Ratio; ART: Anti-Retroviral Therapy; BMI: Body Mass Index;CD4:Cluster of Differentiation 4;CEM: Chronic Energy Malnutrition; COR: Crude Odd Ratio; EDHS: Ethiopian Demographic and Health Survey; FMOH: Federal Ministry of Health; FANTA: Food and Nutrition technical Assistance; FAO: Food and Agriculture Organization; HIV: Human Immunodeficiency Virus; KG: Kilogram; HT: Height; NEMMH: Nigest Eleni Mohammed Memorial hospital; OI: Opportunistic Infection; PLWHA: People Living With HIV/AIDS; RUTF: Ready to Use Therapeutic Food; SNNPR: South Nation Nationality Peoples Region; WHO: World Health Organization

Introduction

The Human Immunodeficiency Virus pandemic remains to have a prominent global impact, particularly among the world's resource-limited settings. According to Global AIDS Progress Report of 2014, approximately 36.9 million people were living with HIV and AIDS. In sub-Saharan Africa, there were 24.7 million people living with HIV and 1.1 million people died of AIDS-related causes in 2013 [1,2]. The prevalence of HIV was 1.5 percent among adults age 15-49 in Ethiopia based on Demographic and Health Survey of 2011 [3].

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 increases by 10% and 30% respectively to maintain body weight and physical activity [4,5].

The latest available estimates indicate that about 795 million people in the world were undernourished. In Sub Saharan Africa including Ethiopia about 23.2%individuals were undernourished [6]. In Ethiopia the number of People Living with HIV (PLHIV) ever enrolled on ART increases significantly, currently, 871,334 PLHIV enrolled on ART [7].

Malnutrition and HIV/AIDS compound one another. People Living with HIV and AIDS (PLWHA) are more likely to become malnourished due to reduced food intake resulting from appetite loss and difficulty eating, possibly as a result of infections, side effects of

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medication, or depression. Poor absorption of nutrients that may be the result recurrent/chronic diarrhea and HIV-caused intestinal cell damage. And then the will develop malnutrition again it contributes to immune impairment, making the body vulnerable to frequent illnesses [8-10].

Antiretroviral therapy is critical to suppression of viral replication, reduced destruction of CD4 cells, prevention of viral resistance, promotion of immune reconstitution, and slowed disease progressions [11-13]. Nutrient intake can improve antiretroviral absorption and tolerance. Poor nutritional status in PLHIV speeds the disease progression increases morbidity, and reduces survival time. Good nutrition for PLHIV has been proven to increase resistance to infection, help PLHIV maintain weight, improve drug compliance and drug efficacy [14-16].

Despite there are a growing number of ART users in Ethiopia, nutritional care and support get insufficient attention to the success of treatment and also there is little evidence against to the nutritional condition of peoples' living HIV and AIDS those who are enrolled in ART care in the study area. The results of this study will also serve as baseline data onto program managers and decision makers to design nutritional intervention. Therefore this study aimed to assess the undernutrition status and its determinants among adult HIV/AIDS Clients enrolled on ART at Nigest Elleni Mohammed Memorial Hospital in Hosanna Town, Southern Ethiopia.

Materials and Methods

Study area and period

The study was carried out in Nigest Elleni Mohammed Memorial Hospital in Hosanna town the capital city of Hadiya Zone SNNPR State situated 196 Km from Hawassa and 232 Km from Addis Ababa. The Hospital was built in 1984 GC and it is serving 3.5 million people from different zones with 110 beds. A total of 882 adult HIV/AIDS patients have been enrolled at Nigest Elleni Mohammed Memorial Hospital ART care. We have completed the study from November 01 to June 14, 2016.

Study design and population

Institutional based cross-sectional quantitative study was conducted to assess adult undernutrition status and its determinants of ART users at Nigest Elleni Mohammed Memorial Hospital. The source populations were all adult HIV and AIDS patients that are enrolled in ART care clinic in Nigest Elleni Mohammed Memorial Hospital. The study population was the sampled adult HIV/AIDS patients who are actively taking ARV drugs at Nigest-Elleni Mohammed Memorial Hospital. Patients who were actively following ART care clinic in Nigest Elleni Mohammed Memorial Hospital and aged 18years and older, not have physical deformity and non-pregnant women were included in the study. Patients who seriously ill at the time of data collection were excluded.

Sampling size determination

The sample size was determined using single population proportion formula taking 25.5% [17] the prevalence of malnourished people living HIV and AIDS at Felege-Hiwot Referral Hospital in Bahirdar with 5% marginal error and 95% confidence interval (CI) of certainty (alpha=0.05). Since the source populations (882) which were <10000, an adjustment formula was used. By taking 5% non-response rate, the total sample size was 234. Systematic random sampling was used and we have taken every three (k^{th} interval=3) of the daily attended clients consecutively and to start the first case a lottery method was used.

Data collection procedure

Data was collected using structured questionnaire and anthropometric measurements. Three collection team members participated. The weight of participants was taken using standard beam 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 measurement of participants was taken using the standard measuring scale and height was recorded to the nearest 0.1 cm. To determine undernutrition status, BMI was calculated. The standard cut-offs that we used: <18.5 kg/m^2 was under nourished (Chronic Energy deficiency or CED), 18.5-24.9 kg/m^2 was normal.

Data quality management, processing and analysis

Questionnaire prepared in English was translated into the Amharic language to make data collection easier and back to English for checking language consistency. Pre-testing of the questionnaire was done on 15 ART care clients in the Hossana Health Center a week prior to the actual survey. The collected data was checked out for the completeness and clarity by the students. This quality checking is done daily after data collection and amendments were made before the next data collection measure. The data was collected by 3 B.Sc. Nurses for 15 days. After data collection, each questionnaire was checked for competence and code was given before data entry. Data entry and analysis was done by SPSS version 16.0. To identify the determinants of undernutrition status among Adult HIV and AIDS clients enrolled on ART in this study logistic regression analysis was done. A variable with P-value<0.25 was transferred to multivariate analysis which helps all associated variables in bivariate analysis to compete with dependent variable together in order to control confounding factors. Lastly, variables with a p-value<0.05 and AOR, with 95% CI were identified to measure the strength of the associations.

Ethical consideration

Ethical clearance was obtained from an ethical review committee of Wachemo University, College of Medicine and health science. Official permission letter was sent to Nigest Elleni Mohammed Memorial Hospital in which the actual data collection was performed. The purposes and importance of the study were explained and informed consent was secured from each participant. Confidentiality was maintained at all levels of the study.

Results

Socio-demography characteristics of the respondents

A total of 234 adult patients enrolled on ART were involved in the study with response rates of 100%. From them, 135 (57.7%) of the participants was females and 126 (53.8%) were between age group 30-45 years. The majority 147 (63.6) was protestants and 167 (71.4%) from Hadiya ethnic group. Most were urban dwellers 148 (63.2%), 144 (61.5%) respondents had an occupation and more than half of the respondents 137(57.7%) had monthly income below 1000 ETB (Table 1).

Clinical profiles and ART status of the study participants

The HIV status of patients showed that 95 (40.6) were at WHO clinical stage II. Diarrhea of 58(24.8%) respondents was the most common GI manifestation. 83 patients (35.5%) were with a CD4 count of 351-500 cells/μl. 91 (38.9) patients had a current or past history of opportunistic infections, 109 patients (46.6%) were on ART treatment

Variables	Number	Percent
Sex of respondents		
Male	99	42.3
Female	135	57.7
Age respondent		
18-29	50	21.4
30-45	126	53.8
≥ 45	58	24.8
Marital status		
Married	111	47.4
Divorced	19	8.1
Widowed	61	26.1
Unmarried	43	18.4
Family size		
< 3	79	33.8
3-6	112	47.9
≥ 7	43	18.4
Residency		
Urban	148	63.2
Rural	86	36.8
Ethnicity		
Hadiya	167	71.4
Kembata	29	12.4
Silte	16	6.8
Gurage	12	5.1
Others	10	4.3
Religion		
Protestant	147	63.6
Muslim	22	9.5
Orthodox	43	18.6
Catholic	13	5.6
Others	6	2.6
Occupation		
No occupation	90	38.5
Had occupation	144	61.5
Educational status		
Illiterate	29	12.6
Primary	20	8.7
Secondary	58	25.1
Higher secondary and above	46	19.9
Monthly income		
<1,000 ETB*	135	57.7
≥ 1,000 ETB	99	42.3

*ETB: Ethiopian Birr

Table 1: Socio-demographic characteristics of respondents at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016 (n=234).

regimen 1e (TDF+3TC+NVP), most of the patients have taken ART for more than three years (Table 2).

Food and lifestyle-related characteristics

The study showed that 170 (72.6%) adult patients were changed their feeding style after knowing their HIV status. About 60 (25.6%) patients were consumed High fat containing foods. Tap water was the most common type of water used by 191 (81.6%) respondents. From the total study participants, 124(53.0%) of them has received feeding counseling (Table 3).

Variables	Number	Percent
Eating fat		
No	153	65.4
Yes	81	34.6
Gastrointestinal symptoms		
No	136	58.1
Yes	98	41.9
Diarrhea	58	24.8
Indigestion	21	9
Constipation	19	8.1
WHO clinical stage		
Stage 1	80	34.2
Stage 2	95	40.6
Stage 3	47	20.1
Stage 4	12	5.1
CD4+ T cell count		
<200 cells/μl	33	14.1
200–350 cells/μl	49	20.9
351–500 cell	83	35.5
≥ 500	69	29.5
Current/past OI in the past 6 months		
No	143	61.1
Yes	91	38.9
ART regimen		
1e	109	46.6
1c	51	21.8
1d	35	15
1a	9	3.8
1f	8	3.4
2b		
Duration of ART		
<6 months	45	19.2
6 months-3 years	80	34.2
≥ 3 years	109	46.6

Table 2: Clinical profiles and ART status of the study participants at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016

Support and dietary characteristics

From patients who had no nutritional support, 54 (71%) became undernourished. In the study patients that fed their meals less than 3 times per day and became undernourished were 20 (26%) however, 137 (87%) of patients that enrolled on ART were Fed 3 and more times per day and their nutritional status became normal (Figure 1).

Undernutrition status of adult HIV/AIDS clients

In the analysis, the prevalence of undernutrition (Chronic Energy deficiency) among adult HIV/AIDS Clients in rolled in ART was 32.5%. From the ART users, 158 (67.5%) was Normal (BMI 18.5-24.9 Kg/m^2). The prevalence of undernutrition and normal nutritional status among females were 46 (19.7%) and 89 (38%), respectively (Figure 2).

Determinants of undernutrition status among adult HIV/AIDS patients enrolled in ART

In the study educational status, occupational status, monthly income CD4 count, WHO clinical stage, duration on ART, eating fat-containing foods, daily food intake, daily water consumption, nutritional support, smoking status were significantly associated with undernutrition status in bivariate analysis. The study result of multivariate analysis indicated

Variables	Number	Percent
Change of feeding style after knowing HIV status		
No	170	72.6
Yes	64	27.4
Eat High fat containing foods		
No	174	74.4
Yes	60	25.6
Frequency of daily food intake		
<3	41	17.5
≥ 3	193	82.5
Daily water intake (L)		
<1	14	6
1-2	7	3
≥ 3	191	81.6
Type of water		
No selection	7	3
Tap	191	81.6
Boiled	1	0.4
Treated	4	1.7
Others	31	13.2
Food counseling		
No	110	47
Yes	124	53
Nutritional support		
Had no support	188	80.3
RUTF	46	19.7
Regular physical exercise		
No	199	85
Yes	45	15
Alcohol use		
No	193	82.5
Yes	41	17.5
Smoking		
No	218	93.2
Yes	16	6.8

Table 3: Food and life style related characteristics of the study participants at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016 (n=234).

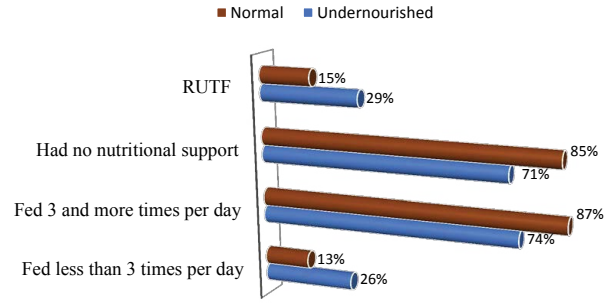

Figure1: Daily feeding frequency, nutritional support and undernutrition status among adult HIV and AIDS patients enrolled in ART at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016.

that WHO clinical stages, daily food intake, nutritional support, smoking status were identified as the determinants of under nutrition in the study area. In the study daily food intake of ART patient was found one of the determinants of undernutrition, patients who feed less than 3 times in a day were 3.29 times more likely to be undernourished than patients who eat 3 or more times. (AOR=3.29; 95%; CI (1.49, 7.28).

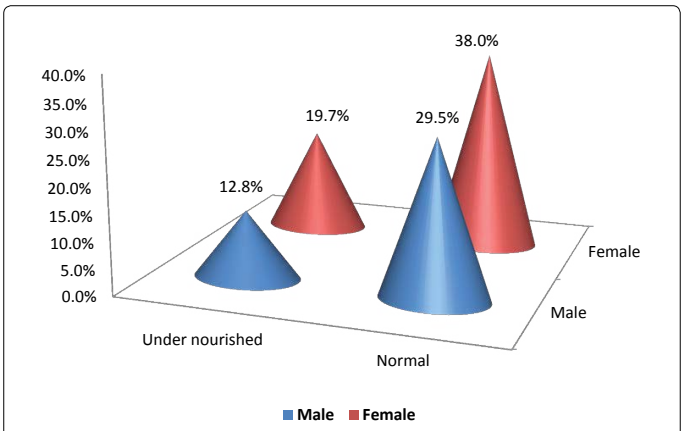

Figure 2: Under nutrition status and sex distribution of adult HIV/AIDS Clients in enrolled in ART at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016.

Illness of patient within WHO Clinical Stage was one of the significant risk factors undernutrition in the study area. Those patients with the illness at WHO Clinical stage 3 were 88% less likely to be undernourished than WHO Clinical stage 1 ART patients (AOR=0.12; 95% CI: 0.03, 0.55). Having nutritional supports became one of the risk factors which significantly associated with undernutrition, those ART patients who had no nutritional support were 2.21 more likely to become Undernourished (chronic energy deficient) than who had no support (AOR=2.28 95: CI: (1.27, 3.85). Comparing from ART patients who did had smoking habit those patients who had smoking habits were 6.06 times more likely to be undernourished (AOR=6.06; 95% CI: 1.12, 32.8) (Table 4).

Discussion

The prevalence of undernutrition among adult HIV/AIDS Clients in rolled in ART was 32.5%. From ART users 158 (67.5%) were Normal (BMI 18.5-24.9 Kg/m^2). The undernutrition in this study was higher than the study conducted in Kathmandu Valley Health center, Nepal 19.9%, Butajira Hospital, 25.2%, FelegeHiwot, Amhara Region of Ethiopia 25.5% and East Wollega Zone (26.47%) [16-19]. On the other hand, the prevalence of undernourished ART clients in the study was lower than studies conducted in Tigray, northern parts of Ethiopia 50.5% [20]. The difference of under nutrition may reflect due to population difference, sample characteristics, the existence of different socio-economic and other factors of the study.

Illness of patient within WHO Clinical Stage was one of the significant risk factors undernutrition in the study area. Those patients in WHO Clinical stage 3 were 88% times less likely to be under nourished than WHO Clinical stage 1 ART patients, this result were in contrary with the finding in Nepal [16] and also study HIV referral center in Singapore which indicated that Patients are often not diagnosed or do not commence ART until they have advanced disease [11]. The possible explanation for this finding could be patients with WHO clinical stage 3 starts ART treatment without CD4 count and get a chance to start drug early that make drug adaptation easier than stage one. Also, stage one patient mostly is asymptomatic so they might not start drug before their CD4 count decreases and immunity lowers.

Having nutritional supports became one of the risk factors which significantly associated with undernutrition, those ART patients who had no any nutritional support were 2.22 times more likely to become

Explanatory Variables	Undernutrition Status		COR 95% CI	AOR 95% CI	P-Value
	Under nourished	Normal			
WHO clinical stage					
Stage 1	31	49	1	1	
Stage 2	22	73	0.476 (0.247, 0.91)	0.283 (0.063, 1.26)	0.099
Stage 3	16	31	0.816 (0.384, 1.73)	0.123 (0.028, 0.54)	0.006*
Stage 4	7	5	2.213 (0.645, 7.59)	0.221 (0.047, 1.03)	0.055
Daily feeding frequency					
Less 3 times	20	21	2.330 (1.172, 4630	3.29 (1.49, 7.28)	0.003*
3 and more times	56	137	1	1	
Nutritional support					
Had no support	54	134	2.28 (1.18, 4.39)	2.22 (1.27, 3.85)	0.005*
RUTF	22	24	1	1	
Smoking Habit					
Yes	2	14	0.28 (0.06, 1.25)	6.06 (1.12, 32.8)	0.036*
No	74	144	1	1	

*Statistically significant at p-value<0.05; 1 is Odds ratio for reference category

Table 4: Factors associated with under nutrition status among adult HIV and AIDS patients enrolled in ART at Nigest Elleni Mohammed Memorial Hospital, Hosanna, Ethiopia, 2016.

Undernourished (chronic energy deficient) than who had nutritional support. The finding was supported by the studies in Central Haiti [21] and Uganda [22]. However, a study in Butajira hospital contradicts with a report which indicates there individuals who were not taking RUTF were 82% times less likely to be malnourished than those who were taking RUTF [19]. This might be due to patients who were not receiving nutritional support (RUTF) will lose the positive effects of therapeutic foods which help to enhance ART adherence. Moreover, RUTF support may improve the weight of patients.

Comparing from ART patients who did had smoking habit those patients who had smoking habits were 6.06 times more likely to be undernourished. The possible explanation for this finding could be, smoking can lead to body weight loss by increasing the metabolic rate, decreasing metabolic efficiency, decreasing caloric absorption (reduction in appetite) all of which are associated with tobacco use and results decreased immunity so they are susceptible to OIs and leads to economic problem to buy food instead they buy cigarette.

In the study daily food intake of ART patient was fund one of the determinants of undernutrition, patients who fed less than 3 times per day were 3.29 times more likely to be undernourished than patients who fed 3 or more times. The finding was in line with study in Northern Ethiopia in which, inability to get enough and/or quality food was about 2.1 times higher in the non-adherent group [20]. The possible justification for this may be patients who feed frequently gets the adequate energy that might make them productive and increases their immunity against opportunistic infection from food variety and amount they get.

Conclusion

In the study, the prevalence of undernutrition was high among adult HIV/AIDS Clients in rolled on ART in the study area. Nutritional support, daily food frequency, WHO clinical stage and smoking status were found to be the significant determinants of under nutrition at Nigest Elleni Mohammed Memorial Hospital in Hosanna Town, Southern Ethiopia. The Current study recommended that, there is a need to design and implement nutritional interventions including nutritional support in items or financially together with healthy habit counselling as part of integrated ART service to prevent undernutrition and for effective treatment outcome. Then, further studies needed to identify other key determine of under nutrition status among adult patients enrolled in ART using longitudinal methods.

Authors' Contributions

WG, AA wrote the proposal of this research. BM, LL revised the proposal and Incorporate some comments. BM wrote the final manuscript. All authors read and approved the final manuscript.

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