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Addis Ababa University

Addis Ababa University College of health science
School of Public Health

Assessment of nutritional status of adolescents living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia

APPROVED BY THE EXAMINING BOARD

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ACRNOMYS

AIDS- Acquired Immune Deficiency Syndrome

ART –Anti- Retroviral Therapy.

ALHIV- Adolescents Living With HIV.

EDHS- Ethiopian Demographic Heal Survey

ECSA-Ethiopian Central Statistical Agency

HAART- Highly Activate Anti-Retroviral Therapy.

HIV- Human Immune deficiency Virus.

LMIC- Low and Middle Income Countries

OIs-Opportunistic Infections.

PMTCT -Prevention of Mother To Child Transmission

PLWHA-People Living With HIV /AIDS

SUN+ - Scaling Up Nutrition Movement Program.

SSA –Sub Saharan Africa.

UNECA - United Nations Economic Commission for Africa

UNICEF-United Nation’s International Emergency Fund

UNAIDS- Joint United Nations Program on Aids.

WHO- World Health Organization.

ABSTRACT

Malnutrition is a major threat to the health of HIV infected individuals and is associated with increased risks of morbidity and mortality.

Objective; the objective of the study was to assess the nutritional status and associated factors among adolescents living with HIV enrolled at public hospitals in Addis Ababa, Ethiopia.

Methods: Facility based across-sectional study was conducted between February and April 2016.Data were collected on 340 adolescents aged 10-19 years attending government public hospitals in Addis Ababa.

Nutritional status was assessed using BMI-for-Age (BAZ) and Height-for-age (HAZ) as measures of thinness and stunting respectively. Standard deviation (SD) scores (Z scores) were applied to determine the nutritional status. Adolescents whose BAZ and HAZ was less than -3SD were considered severely malnourished; those adolescent with BAZ and HAZ between -2SD and -3SD were considered malnourished while those with BAZ and HAZ >= - 2SD were well-nourished. Statistical analysis was done using WHO anthro plus and STATA 12. Statistical software package.

Result: The prevalence of stunting was 37.4% [0.3218-0.425, 95% CI, with 8.2% [0.052-0.11, 95% CI] of adolescents being severely stunted.

The risk factors for stunting included skipping of meal [(AOR: 1.74.; 95% CI:1.07- 2.83) and primary care (AOR: 1.23.; 95% CI, 1.03.-1.47). The prevalence of thinness was 15.6 % [0.117-0.194, 95%CI] with 2.9% [0.0113 - 0 .047, 95% CI] severely thin. The risk factors for thinness include treatment interruption [AOR 2.78, 95% CI, 1.20- 6.43] nutrition counseling[AOR 2.05 ,95 %CI,1.13- 3.72] and moderately household food insecurity (AORAOR1.67,95CI % 1.21-3.21) amongadolescentsliving with the HIV enrolled at public hospitals in Addis Ababa, Ethiopia.

Conclusion: The prevalence of stunting and thinness was high among the HIV infected adolescents. Skipping meal, getting primary care from relatives, nutritional counseling, and moderately household food insecurity were significantly associated with malnutrition (stunting and thinness).

Recommendation; Greater recognition of the substantial burden of malnutrition among adolescents living with HIV is needed, and there is a need for more services aimed at nutrition counseling, retention in care , nutrition interventions beyond clinical settings and economic empowerments of adolescents living with HIV.

Key words; HIV, thinness, stunting, adolescents

1. INTRODUCTION

1.1BACKGROUND

Globally, an estimated 2.1 million adolescents (10-19 years) were living with HIV at the end of 2012. The widespread of the infections are in sub-Saharan Africa, where more than 80% of all adolescents living with HIV were found. (1).Even if Ethiopia has one of the lowest HIV prevalence rates in East Africa, however, there are still more than one million people estimated to be living with HIV, among which about 140,000 were estimated to be adolescents (10-19) years old (1, 2).

Worldwide, an increase in HIV related mortality among adolescents (aged 10-19 years) was reported between 2001 and 2012 (3). Yet, as the overall number of HIV-related deaths reduced by 30%, but that of adolescents increased by 50% between 2005 and 2012 (4).

According to the World Health Organization, the increase in HIV-related deaths among adolescents has been endorsed primarily to several factors including, poor prioritizing of adolescents in national HIV plans, inadequate endowment of accessible and adequate HIV testing and counseling and treatment services and lack of social support for adolescents to remain in care and adherence to antiretroviral therapy (ART) (5).

Malnutrition and HIV work in tandem; while HIV can lead to malnutrition, malnutrition will worsen the impact of HIV. People living with HIV (PLHIV) need to consume up to 30% more calories than their uninfected counterparts, making nutritional support a key component of care for those living with HIV, including adolescents (6)

Several studies have shown high levels of malnutrition among adolescents in the general population in Sub-Saharan Africa, with prevalence rates ranging from 5% to 60% among countries in this region (7-11)

In Ethiopia, study conducted in, Ambo and Mekele,on school adolescentsindicated the overall prevalence of thinness and underweight to be 27.5% and 38.7% respectively (12, 13). Regarding adolescents infected with HIV, Study conducted in Uganda indicated the prevalence of stunting and thinness to be 36% and 18% respectively (14). Although, several studies indicated the higher prevalence of malnutrition (12.3%- 28%) in adults attending ART services in Ethiopia (16 -19), little is known about adolescent living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia.

1.2. STATEMENT OF THE PROBLEM

Adolescents are a neglected group in terms of nutrition. In developing countries, as many as half of all adolescents are stunted (20), which means their physical and cognitive development has been restricted because of inadequate nutrition. Yet optimal nutrition during adolescence, a period of rapid physical growth is crucial.

Adolescence is one of the four critical phases of human growth and development when negative effects of food insecurity and malnutrition are pronounced.However, most nutrition policies and programs and research agendas in many low and middle income countries give very little attention to the impact of food insecurity on health and wellbeing of adolescents. As a result, global evidence on adolescent nutrition and health is sparse.

Adolescents in sub-Saharan Africa (SSA) who were infected at birth with HIV are surviving into young adulthood and face a multitude of malnutrition, treatment, reproductive health and psychosocial challenges. Among these challenges malnutrition is a major problem which can lead to substantial problems with medication adherence and efficacy (21, 25).

Although, Ethiopia is one of the countries hit hardest by HIV epidemic alongside of malnutrition and it occurs in severe forms and affects many people either before or within the era of ART(22-24), and despite the internationally accepted recommendation that eating a variety of foods leads to a healthy diet, and is associated with positive health outcomes such as reduced mortality, there is inadequate information on the nutritional status of Adolescents Living with HIV (ALHIV) receiving care and support at public hospitals in Addis Ababa, Ethiopia.Therefore the rational of this study is to over view the nutritional status of adolescents living with HIV to indicate the gap of adolescents nutrition issue to the fore and encouraging all actors to adopt the sort of holistic approach required to tackle them.

1.3. SIGNIFICANCE OF THE STUDY.

Good nutrition during adolescenceis critical to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, provide adequate stores of energy for illnesses and prevent adult onset of nutrition related diseases (25).

Adolescents are rarely considered a significance target group for nutrition interventions; nevertheless, adolescence is a time of rapid change and growth that raise the need for energy and micronutrients. Adolescence is considered a nutritionally susceptible period of life for a number of causes. The body demands more nutrients and calories as a result of the rise in physical growth and maturation and changes in body composition

The HIV-infected adolescent is at high nutritional risk. HIV infection causes surplus nutrient loss and mal-absorption, more increasing nutritional requirements over those needed for the rapid growth and development that occurs during puberty (6, 33).

While several studies have been conducted to elucidate the nutritional status of adults and children living with HIV, no known studies have specifically targeted nutritional status of adolescents living with HIV in general in Ethiopia and in particular in Addis Ababa

Therefore, this study will provides important information on the nutritional status of adolescents living with HIV(ALHIV) for health professionals, program implementers, policy makers and other stakeholders working in the area of HIV/AIDS control and prevention to plan and implement effective strategies for improving quality of life for this marginalized age group.

2. LITERATURE REVIEW.

2.1. MALNUTRITION AND HIV/AIDS

Low and medium income countries face a double burden of malnutrition and lifestyle related chronic diseases like HIV/AIDS and, several of which have their roots in childhood and adolescence (27). Their effects are interconnected and aggravate one another in a vicious cycle.

Both HIV and malnutrition can self-sufficiently cause progressive damage to the immune system and amplified susceptibility to infection, morbidity and mortality through opportunistic infections, fever, and diarrhea, loss of appetite, nutrient malabsorption, and weight loss (28, 29).

HIV definitely affects nutritional status by rising energy requirements, decreasing food intake, and poorly affecting nutrient absorption and metabolism (30). The WHO recommendations for the nutrient needs of people living with HIV/AIDS call for increases in energy over the intake levels endorsed for healthy non-HIV-infected adolescents of the same age, sex, and level of physical activity (31). Although ART decreases many of the contributing factors that cause HIV-related weight loss, wasting continues to be a factor in determining the success of ART (32).

2.2. NUTRITIONAL STATUS OF ADOLESCENTS.

Adolescents are rarely considered a significance target group for nutrition interventions; nevertheless, adolescence is a time of rapid change and growth that raise the need for energy and micronutrients. Adolescence is considered a nutritionally susceptible period of life for a number of causes. The body demands more nutrients and calories as a result of the rise in physical growth and maturation and changes in body composition.

The HIV-infected adolescent is at high nutritional risk. HIV infection causes surplus nutrient loss and mal-absorption, more increasing nutritional requirements over those needed for the rapid growth and development that occurs during puberty. The requirements may even be higher if the HIV-infected adolescent suffers from secondary infections or is pregnant or lactating (6, 33).High levels of stunted growth among HIV infected children and adolescents have been reported in developing countries. A Cross-sectional study conducted in Uganda on Nutritional Status of HIV-infected adolescents enrolled into an HIV-care Program in Urban and Rural Uganda revealed that 36.2% and 18% of adolescent living with HIV (10-19) are stunted and thin respectively, and among these11.1% and 8 % is severely stunted and thin (14). According to this study being male and living in rural area is considered to be predictor of malnutrition.

A prospective study conducted in Brazil on Nutritional assessment and lipid profile in HIV-infected adolescents treated with highly active antiretroviral therapy indicated compromised

nutritional parameters compared to a paired healthy control group (34). Another cross sectional Studies conducted in the same area on Dietary intake and nutritional status of HIV-1-infected adolescents, found a high prevalence of adequate weight and Height for age, as well as high intakes of energy and protein (35).

Study in Thailand on orphans aged 6 to 12 years found that HIV-infected children had significantly higher proportions of stunting and underweight as compared to other orphans who are not HIV positive (36). Another study conducted in Zimbabwe revealed that 62% of HIV infected children and adolescents aged years were stunted (37). A cross-sectional study conducted in Klang Valley, Malaysia on Nutritional Status of Children (1-18 years) Living with HIV and Receiving Antiretroviral (ARV) Medication show that 20.8% and 14.6% were stunted and severely stunted respectively. According to the study almost all the children did not achieve the recommended energy intake for their age groups and almost half of the children did not achieve the RNI for selenium and vitamin (38). Similar study, in Sao Paulo, Brazil conducted on quality of diet indicated a similar eating pattern as adolescents in the general population (39).

In Ethiopia study conducted on assessments of adult nutritional status and associated factors among ART Users in Dilla, Nekemte, Gonder and Bahirdar referral Hospitals indicated that 12.3 %, 27%, 27.8% and 21.1% of malnutrition respectively (16-19). According to these studies WHO clinical stage four, ART interruption and presence of opportunistic infection (tuberculosis), Income, nutritional support, HIV related symptoms, feeding difficulties and duration on ART were the predictors for malnutrition.Another study Conducted in Jimma university referral hospital on adult attending highly antiretroviral therapy (HAART) indicated the high prevalence of food insecurity in adults attending ART services (40). According to this study lower food diversity was significantly and independently associated with food insecurity. Studies conducted on school going adolescent in the general population in Addis Ababa,Mekele City and Ambo elementary and secondary school adolescents in Ethiopia indicated the overall prevalence of wasting(thinness) and underweight to be 37.8%, and 27.5% respectively(12,13).

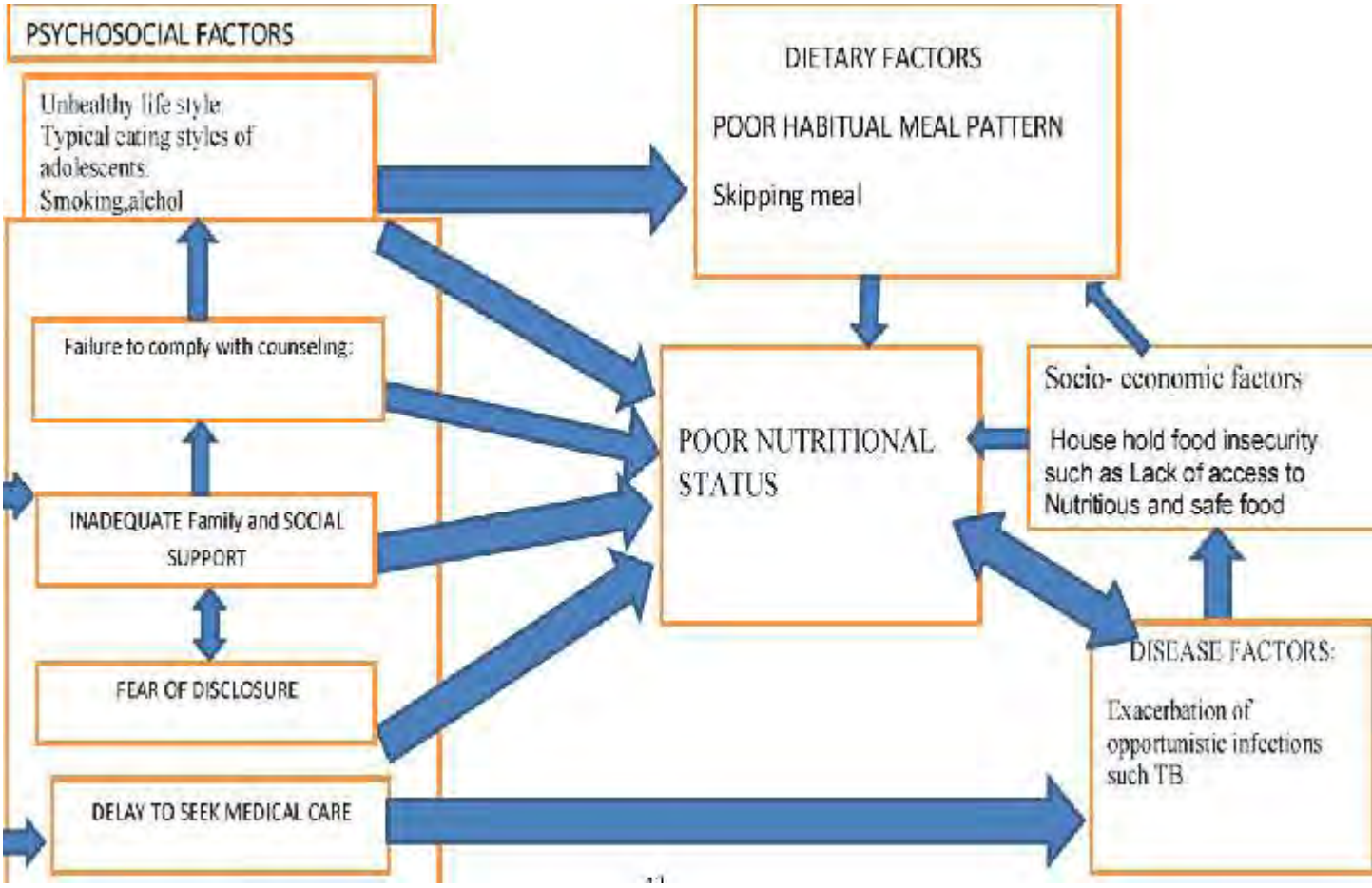
2.3. FACTORS INFLUENCING UNDER NUTRITION IN ADOLESCENTS.

In addition to the effect of HIV/AIDs, under nutrition is associated with multiple risk factors operating at different levels, from the individual level to household and community levels. At the individual level, under nutrition is caused independently or jointly by inadequate dietary intake and illnesses (41). Factors influencing potential nutrition problems in adolescents includeinappropriate food intake which include irregular meal patterns (skipping of meal,), poverty(inadequate income, inadequate food resource and lack of access to food) ,nutrition related condition like, chronic diseases, Psychological factors like significant emotional stress or depression and life style factors like heavy use of alcohol or drug ,living alone or living in unstable family or environment(42,45).

Sufficient evidence suggests that PLHIV including adolescents face significant barriers to taking up and adhering to treatment. These barriers include stronger side effects when taking antiretroviral therapy on an empty stomach, the insight that treatment rises appetite, and inability to bear the costs of looking for treatment; these costs include transport costs, costs of medicine to treat opportunistic infections and the opportunity cost of not working (43).

In Ethiopia, factors that influence roots of malnutrition include insufficient food intake, sub-optimal feeding practices, household food insecurity, and insufficient access to health care and poor water and sanitation services (44). In high-prevalence settings, PLHIV including adolescents face similar socioeconomic challenges to the rest of the population; however, the disease often leads to a further worsening in socioeconomic status.

While several studies have been conducted to elucidate the nutritional status of adult and children living with HIV, no known studies have specifically targeted nutritional status of adolescent living with HIV in general in Ethiopia and in particular in Addis Ababa. Therefore, this study focuses on adolescents, a group that has typically been considered less vulnerable to poor health, and has received less attention in research, in spite of the fact that many health problems which occur later in life can be mitigated by adopting healthy lifestyle during adolescence.


PSYCHOSOCIAL FACTORS
Unhealthy life style
Typical eating styles of adolescents.
Smoking,alchol
Failure to comply with counseling:
INADEQUATE Family and SOCIAL SUPPORT
FEAR OF DISCLOSURE
DELAY TO SEEK MEDICAL CARE
DIETARY FACTORS
POOR HABITUAL MEAL PATTERN
Skipping meal
POOR NUTRITIONAL STATUS
Socio- economic factors
House hold food insecurity such as Lack of access to Nutritious and safe food
DISEASE FACTORS:
Exacerbation of opportunistic infections such TB

3. OBJECTIVE OF THE STUDY

3.1 GENERAL OBJECTIVE

To assess nutritional status and its associated factors among adolescents (10-19 years)living with HIV enrolled at publichospitalsin Addis Ababa, Ethiopia.

3.2 SPECIFIC OBJECTIVES

1. To determine the prevalenceof stunting and thinness of adolescents living with HIVenrolled at public hospitals, in Addis Ababa, Ethiopia.

2. To determine factors associated with stunting and thinness among adolescents living with HIV enrolled at public hospitals, in Addis Ababa, Ethiopia.

4. METHODOLOGY.

4.1. STUDY DESIGN.

For this particular research, A facility based quantitative cross-sectional study was implemented.

4.2. STUDY AREA.

This research was conducted in Addis Ababa, Ethiopia, at government public hospitals which provide ART services from February 2016 to April 2016.

In Addis Ababa there are a total 45 hospitals, among these 11 are governmental, 3 military hospitals and the rest are owned by private sectors, in addition there are 88 health centers that provide health services for the community. Among these health facilities all government hospitals and Health centers provide ART services, regarding private sectors only few of them involve in rendering the services. The Government of Ethiopia launched fee-based antiretroviral treatment in 2003 and free- HAART in 2005. As August 2015, about 20,000 adolescents are accessing HAART services in the country and among these about 3000 were receiving the services in Addis Ababa.

The study was carried out in selected antiretroviral therapy units of four tertiary level general hospitals in Addis Ababa, Ethiopia(Black Lion, , Yekatit 12, Zewditu, and ALERT) whichserve as the major referral and reference hospitals in Ethiopia.According to the report obtained from registration records, at thetime of the study, about 2,011adolescents were currently onHAART in the selected hospitals.Of 2,011 adolescents on HAART, 340 (100%) scheduled to presentfor care or pharmacy pick-ups between February and April , 2016 .

4.3. SOURCE POPULATION

The source population was all adolescents (10-19) year old living with HIVenrolledat public hospitals in Addis Ababa, Ethiopia.

4.4. STUDY POPULATION

The study population wereadolescents (10-19 years) living with HIV, enrolled in the selected public hospitals.

4.4.1. ELIGIBILITY CRITERIA

4.4.1.1. INCLUSION CRITERIA

Adolescents (10-19) living with HIV who visited the health institution during the study period for ART service.

4.4.1.2. EXCLUSION CRITERIA.

- Adolescents (10-19 years) who visited the health facility for the first time and who have no medical record in the facility, as somedata were required from medical record.
- Adolescents with physical deformity with respect to height measurements
- Adolescents who are severely ill and unable to respond to the Questionnaires

4.5 SAMPLE SIZE AND SAMPLING PROCEDURES

4.5.1. SAMPLE SIZE DETERMINATION.

The sample size was calculated using Epi-info version 7.statcalc taking the proportion of respondent considered as malnourished(stunted) to be 50%, a precision of 5% and with 95% confidence level and as the study population was less than 10,000; finite population, correction was further employed .

: The sample size of the study was calculated using the formula for the estimation of single proportion as;

$$n=\frac{[Z\alpha_2]XP(1-P)}{d^2}$$

n = sample size

p = proportion of HIV infected adolescents with stunting (taken as 50%).

d = maximum allowable error (margin of error) =0.05

Z = value of standard normal distribution (Z-statistic) at 95% confidence level (z=1.96).

n = 384 subjects

The source population was less than 10,000; finite population, correction was employed to decrease thesample size as follows

$$n=\left[\frac{1.96^2 * 0.5*0.5}{0.05^2}\right]=384$$

- $n_f=ni/1+(ni/N)$

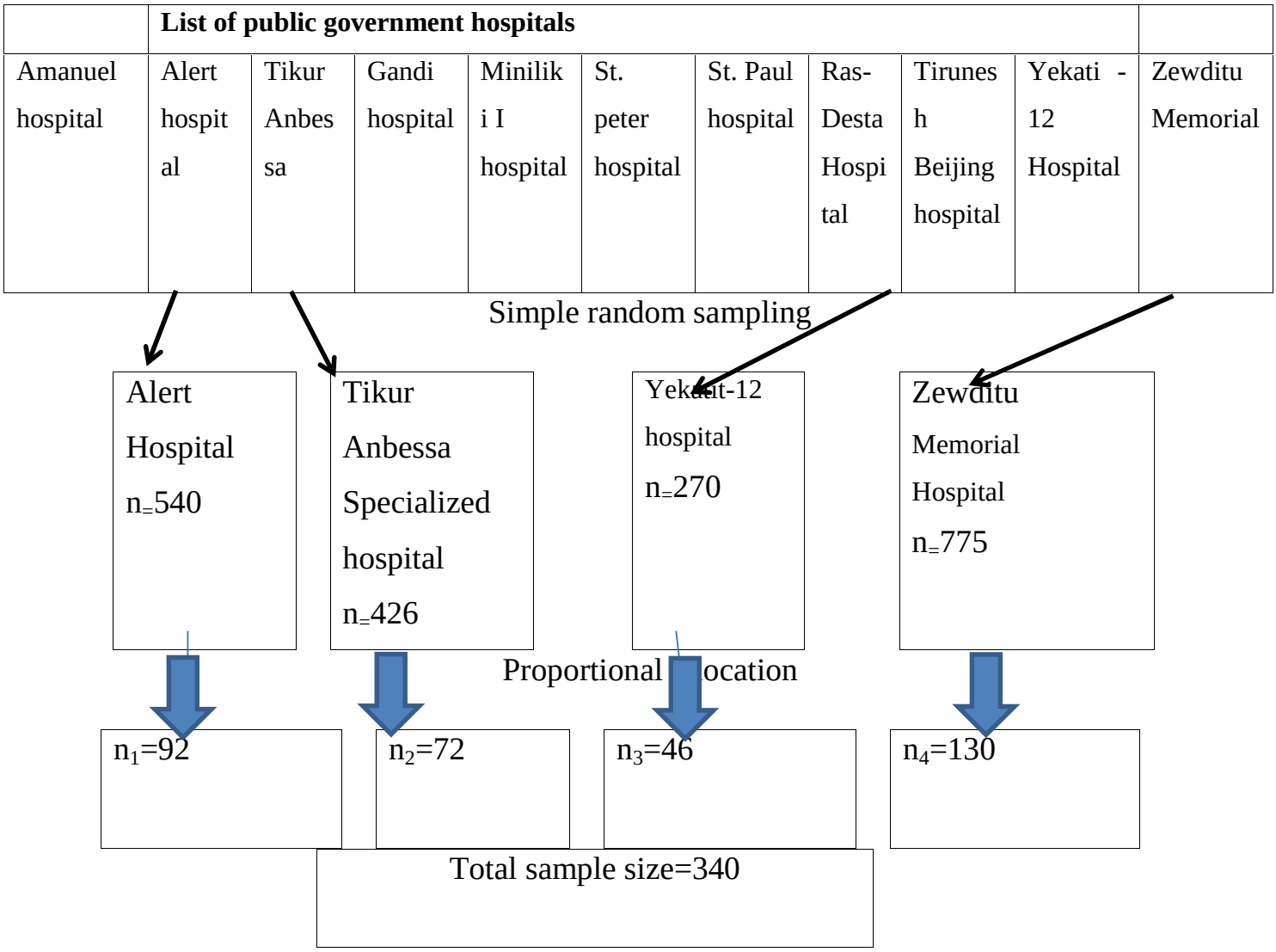
$$n_f = \frac{384}{1+384/3000}$$

n_f =340 was the final sample size .

4.5.2. SAMPLING PROCEDURE.

The study areas were selected using simple random sampling techniques; among publicgovernment hospitals in Addis Ababa. Therefore based on the above criterion four Hospitals (ALERT,Tikur-Anbessa, Yekatit-12 and Zewditu Memorial) were selected using probability sampling technique. The study participants were obtained from eachfacility by using proportional allocation proportions. For selecting individual respondent from each health facility, the study participants were selected randomly using a computer generated simple random based on patient ART unique identification number. Random selection of participants was done prior to patients presenting to clinic.

Fig 1. Schematic representation of study area.



4.6. STUDY VARIABLES

4.6.1. DEPENDENT VARIABLES

- Malnutrition (stunting and thinness)

4.6.2. INDEPENDENT VARIABLE

Socio-demographic characteristics such as:

- Age, Sex, religion, ethnicity and educational status,primary care givers (only mother, only father, both, other relatives), number of people in the house hold, educational status of parents and socio economic status

Life style factors like skipping meal, use of alcohol and cigarette.

- Clinical condition like cd4-count, disclosurestatus, duration on ART, treatment interruption and on Opportunistic infections treatment.
- Household dietary diversity and household food insecurity

Operational definition

Malnutrition –refers to under nutrition (stunting and thinness) for this particular study

stunting; height below two standard deviationsfrom median height-for-age of a reference population (height-for-age < -2 SD Z-score)

Thinness: weight below two standard deviation from median weigh-for-aget of a reference population(weight –for-age < -2SD Z-score.)

Foodsecurity:is defined as the 'limited availability of nutritionally adequate and safefoods, or limited ability to acquire acceptable foods in socially acceptable ways'

Dietary diversity : is defined as the number of different foods or food groups that are consumed in the previous 24-hour .

4.7. DATA COLLECTION PROCEDURE.

Data collection was carried out using pre tested and structuredquestionnaires. Thequestionnaires were prepared in English and translated in to Amharic and translated back into English by third person to check the consistency of the language.Socio-demographic variableswhich include sex, age, educational level, number of household members, primary care givers (father, mother or relatives),social support, life style factors such as skipping meal ,use of alcohols and cigarettes and clinical condition, food insecurity, dietary diversityand anthropometric measurements of height and weight which was implemented following WHO 2007 growth reference (5-19years) (45).

Height measurement: Height was measured with the Study participant standing with his or her back against the measuring board, heels, buttocks, shoulders and head touching a flat upright sliding head piece.

The participants' legs were placed together making the knees and ankles touching each other. The study participants were asked to take in a deep breath. Height measurement was taken at maximum inspiration and the height was recorded to the nearest 0.1 cm.

Weight measurement: The study participants were weighed using Seca scales. The scales were validated with standard weights before actual weighing of the adolescents. The scales were placed on a hard flat surface and adolescents were weighed wearing only lightweight clothing (excluding jackets, shoes, and belts).

Each study participant was measured twice and the average of the two measurements was recorded. In cases where the difference between the two measurements exceeded the tolerance limitthe degree to which the two measurements are close), the participants repositioned and weighed a third time.

4.8. DATA ANALYSIS PROCEDURE.

Socio-demographic and economic data were entered,sorted, cleaned, and edited using stata 12.version statistical package, whereas, Anthropometric data wereentered and analyzed using WHO Anthro-plus software.Descriptive summary (Frequency distribution, proportion,mean & standard deviation) was used to summarize thevariable. Bivariate & multivariate logistic regression wasdone to assess the association of factors with adolescent stunting and thinness, by calculating odds ratios, their 95% confidencelimits and P-value less than 5% was taken as statistically significant.

Bivariate & multivariate logistic regression was done to assess the association of factors with adolescent stunting and thinness Standard deviation (SD) scores (Z scores) were used to determine the nutritional status. Adolescent with BMI-for age (BAZ) and height for age (HAZ) below -2SD scores were considered malnourished. Both descriptive,Bivariate and multivariate regression analysis were applied to determine the predictors of malnutrition(stunting and thinness) accounting for potential confounders.

4.9. DATA QUALITY MANAGEMENT

Data was collected by four ART trained clinical nurses and supervised by one ART trained Public health officer. The data collectors and supervisor had two days of data collection training on how to conduct interview and anthropometric measurements. The weight scale was validated by using standardized weight before actual weighing of the study participant. The quality of data was assured through careful design, translation and pretesting of questionnaire, and proper handling of data. The data was monitored frequently during data collection and collected questionnaires were examined for completeness and consistency during interview and at the end of each day.

4.10. ETHICAL CLEARANCE

Ethical clearance was obtained from Ethical Review Committee (ERC) of Addis Ababa University, College of Health Science, School of Public Health and Research Ethics Committee of Addis Ababa Health Bureau. Official letters of co-operation from the above organization and Federal Ministry of Health (FMOH) were obtained and given to theofficials selected for the study.

Prior to the interview written consent was obtained from study participant who are eighteen years while for study participants who are less than eighteen years assent were obtained from study participant and consent was obtained from their parents/guardians or care givers. There were information for participants about the voluntary basis of Participation and that they can stop the interview at any time if they are not comfortable. In order to ensure participants' confidentiality, data collectors and supervisor were recruited based on ART services experience and no names or personal identifiers were included in the written questionnaires. Identification of an informant was possible through numerical codes for the purpose of data analysis.

4.11. DISSEMINATION PLAN

The finding of this research will be disseminated in print form and submitted to Addis Ababa University; College of health Science, School of Public Health, Research and publication office and effortwill be made to publish the results in relevant peer reviewed journals.

5. Results

5.1. Socio-Demographic Characteristics of Adolescentsliving with HIV enrolled in ART services at public hospitals in, Addis Ababa, Ethiopia, 2016.

A total of 340 adolescents living with HIV responded to the questionnaire making the response rate 100%. Of the total study subjects 177(52.02 %) were males and the rest 163(47.95%) were females.

Regarding the age of respondents, majority 213 (62.7%) were 15-19 years old and the mean± (SD) age and height was15.1(±2.2.) and 150.8(±10.3) respectively.

The mean height-for-age and BMI-for-age Z-score of the study population were -1.6(±1SD) and -0.9(±1) respectively.

More than three-fourth, 281 (82.7%) and 170(50.0%) of respondents were Orthodox Christian in religion and Amahara in ethnicity. As to the family of the respondents 77(23.1%) were from large family, greater than five members. Concerning educational status of respondents more than half 211 (62.1 %) were attending primary school and few of them 10 (2.9%) attend tertiary level (Table 1). With respect to types of primary care more than one third of study of study participant 123(36.2%) live with both parents and more than one quarter 106 (31.2%) live with their relatives. The rest76 (22.4%)and 25(7.4%) live onlywith their mother and father respectively.

Table 1 Socio- demographic characteristics of adolescents living with HIV receiving care at public hospitals in, Addis Ababa, Ethiopia. 2016

Characteristics		frequency	Percent
	10-14	127	37.3
	15-19	213	62.7
age	Total	340	100.0
	Male	177	52.1
	Female	163	47.9
Sex	Total	340	100.0
	Orthodox	281	82.7
	protestant	41	12.1
	Muslim	15	4.4
	Catholic	2	0.6
	Others	1	0.3
Religion	Total	340	100.0
	Oromo	104	28.1
	Amara	170	50.0
	Tigre	29	8.5
	Gurage	28	8.2
	Others	9	2.7
Ethnicity	Total	340	100.0
	primary	211	62.1
	secondary	95	27.9
	Pre -college	24	7.1
Educational level of	Tertiary	10	2.9
respondents	Total	340	100.0
	No formal education	87	27.1
	primary	105	30.9
	Secondary	102	30.6
Educational level of	Tertiary	39	11.7
mother	Total	333	97.9
	No formal education	65	19.8
	primary	74	22.5
	Secondary	99	30.1
Educational level of	Tertiary	91	27.7
father	Total	329	96.8
	Both parents	123	36.2
	Only mother	76	22.4
	Only father	25	7.4
	Relatives	106	31.2
Type of primary care giver	NGO	10	2.9
	Total	340	100
	< 5	256	76.9
Household members	>= 5	77	23.1

5.2. Behavioral Factors of AdolescentsLiving With HIV Receiving Care at Public Hospitals In Addis Ababa, Ethiopia, 2016.

Concerning behavioral factors of adolescents living with HIV receiving care at government public hospitals in Addis Ababa, more than two-third 228 (67.1%) counseled on nutrition during their follow up prior to the survey, but only few of them 71 (20.9 %) got nutrition and other social support. For the purposes of this survey, we defined social support to include a range of informal to formal social support including materials, food and economic support from a range of public, private and community-based entities, In addition, assessment of dietary habit of respondents show that more than one- third of study participants 135 (39.7 %), reported to skipping their meal before the survey. Among these 46(13.5%),15(4.4%), 40(11.8%), 34(10%) of the study participants skip breakfast, lunch, snack and supper respectively. Concerning smoking and alcohol,all of the study participants were responded that they were not involved in the consumption of both alcohol and cigarette.(Table 2).

Table 2. Social and behavioral factors of adolescent living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia, 2016

characteristics		Frequency	proportion
Get nutritional and social support	Yes	71	20.9
	No	267	78.5
	Total	338	99.4
Skip meal	Yes	135	33.3
	No	205	66.7
	Total	340	100.0
Which one do you skip	breakfast	46	13.5
	lunch	15	4.4
	snack	40	11.8
	supper	34	10
	Total	135	39.7
Get nutrition counseling	Yes	228	67.9
	No	112	32.1
	Total	340	100

5.3 Clinicalcharacteristics of adolescents living with HIV receiving care at public hospitals in, Addis Ababa, Ethiopia, 2016.

As regards to the clinical characteristics of study participants; more than three-fourth 291 (85.59 %) were disclosed and more than half 205(60.3%) has CD4 count greater than 500 cells/µL in the previous six month before the survey.Concerning duration on ART majority of them 269 (85.3%) was on ART for greater than or equal to five years. relating to treatment interruption about 36 (10.6 %) of the study subjects responded that they interrupt their follow up and restarted.regarding opportunistic infections few study participants 3 (0.9 %) was on TB treatment during the survey.WHO-t stage of the respondents shows 157 (46.2%), 140 (41.2%), 31(9.1%) 8 (2.4%) are in the first, second, third and fourth stages respectively.trends of visiting health facility of respondents were assessed and majority 279(82.1%) of the respondents did not visit the health facility for acute illness in the previous two weeks before the survey ( ).

Table 3.Clinical characteristics of adolescents living with HIV receiving care at public hospitals Addis Ababa, Ethiopia, 2016.

HIV related symptom n=340		Frequency	Percentage
Visit health facility for acute illness	Yes	57	13.8
	No	279	82.1
	Total	336	95.9
Who t- stage	t-stage I	157	46.2
	t-stage II	140	41.2
	t-stage III	31	9.1
	t-stage IV	8	2.4
	Total	336	98.2
Interrupt treatment	Yes	36	10.6
	No	304	89.4
	Total	340	100.0
Disclosure	yes	291	85.6
	No	48	14.1
	Total	339	99 .7
Cd4-count	<=500	134	39.4
	>500	205	60.3
	Total	339	99.7
On TB. Treatment	Yes	3	0.9
	No	337	99.1
	Total	340	100.0
Duration on ART(years)	<=5 years	71	20.9
	>5 years	269	79.1
	Total	340	100.0

5.4 dietary factors of adolescents living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia 2016.

Household dietary diversity of respondents was assessed using the questions specifically covered food consumption during the past 24 hours period containing Cereals, Vegetables,Fruits, Meat, Milk/Milk products, Eggs, Fish, Legumes, Root/Tubers ,Oils/Fats, Honey/Sugar and condiments such as coffee and tea. Participants were asked to report the frequency of consumption of each food using the past 24 hours. Participants received 1 point if they consumed at least once during the last 24 hours of the foods within each subgroup and 0 points if they never consumed the food.Three study participants were excluded from the analysis, as they report getting food support from NGO on the regular basis. The dietary diversity score ranged from one to twelve. The mean (±SD) dietary diversity score in the study group was 6.2 (± 1.9). the analysis was carried out by categorizing the food group into twelve and those study participants who consume less than four food category classified as having least diversified food, those having four to six classified as less diversified and those having above seven food category classified as having well diversified diet .Then tertiles of the dietary diversity score were computed with the highest tertile defined as well diversified diet, while the lowest two tertiles were labeled as less and least diversified diet respectively

The analysis of household dietary diversity of respondents show that 300(88.2%) of the respondents consume food containing cereals, 181 (53.2%) consume food containing root or tubers, 161 (47.4%) consume vegetables, 147(43.2%) consume fruits ,65 (19.1%) consume meat,58 (17.1%) consume eggs, 11(3.2%) consume fish,226 (66.5%)consume lentils/bean,/pea,85(25.0%) consume cheese, yoghurt and other milk products 316 (92.9%) consume food made from oil ,267(78.5) consume food made from honey or sugar and 294 (86.5%) consume condiments such as coffee/tea in the previous twenty-four hours before the survey. Regarding household food insecurity measurement, the study participants were asked to report the frequency of worrying about what to eat to the range of remaining hunger day and night in the previous four weeks before the survey.

Table 4 Household dietary diversity measurements of respondents using 24-hour recall methods

Variables	level	sex		Total
n=340		n(%)Male	n (%)Female	N (%)
Any bread/cereals	Yes	157(46.2)	143 (42.O)	300 (88.2)
	No	20 (5.9)	20 (5.9)	40 (11.8)
Potato/tubers/root	Yes	97(28.5)	84 (24.7)	181 (53.2)
	No	80 (23.5)	79 (23.3)	159 (46.8)
Any Vegetables	Yes	78 (22.9)	83 (24.5)	161 (47.4)
	No	99 (29.1)	80 (23.5)	179 (52.6)
Any fruits	Yes	73 (21.5)	74(21.7)	147 (43.2)
	No	104 (30.6)	89(26.2)	193(56.8)
Any Beef ,pork	Yes	37 (10.9)	28(8.2)	65 (19.1)
	No	140 (41.2)	135 (39.7)	275 (80.9)
Any eggs?	Yes	35 (10.3)	23 (6.8)	58 (17.1)
	No	142 (41.8)	140 (41.2)	282(82.9)
Fresh or dried fish	Yes	8 (2.4)	3 (0.8)	11 (3.2)
	No	169 (49.7)	160 (47.1)	329 (96.8)
Any foods made from beans, peas,	Yes	122 (35.9)	104 (30.6)	226 (66.5)
lentils, or nuts?	No	55 (16.2)	59 (17.3)	114 (33.5)
Any foods made with oil, fat, or butter	Yes	161(47.3)	155 (45.6)	316 (92.9)
	No	16 (4.7)	8 (2.4)	24 (7.1)
Any cheese, yogurt, milk or other milk	Yes	51(15.0)	34 (10.0)	85 (25)
products	No	126 (37.1)	129 (37.9)	255 (75)
Any sugar or honey	Yes	134 (39.4)	133 (39.1)	267 (78.5)
	No	43 (12.6)	30 (8.9)	73 (21.5)
Any other food, such as condiments,	Yes	151 (44.4)	143 (42.1)	294 (86.5)
coffee, tea?	No	26(7.6)	20 (5.9)	46 (13.5)

characteristics		frequency	proportion
Household dietary score	Well diversified household = >7	152	44.7
	Less diversified household 4-6	154	45.3
	Least diversified household <4	34	10.00
	Total	340	100
Household food insecurity	Food secured	226	67.1
	Mild food insecure	42	12.5
	Moderate food insecure	47	14
	Severely food insecure	22	6.3
	Total	337	100.0

5.5. Prevalence and Factors Associated with malnutrition (Stunting)among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia 2016.

This study revealedthat 37.4%study subjects were stunted with 8.3% being severely stunted. The prevalence of stunting is higher among males compared to females. The majority 213 (62.6%) of adolescents were in the age group 15-19 and also they are more stunted than the early adolescent group (10-14).

More than one quarter of adolescents 106 (31.18)get primary care from their relatives and they are more likely stunted than those who get primary care from both parents (p=0.005).Regarding educational status of respondents those study participants whose educational status is at primary level are more stunted than those at secondary level and above. Concerning educational status of parents' seven study participants was excluded from the analysis of maternal education status and eleven study participants excluded from the analysis of paternal educational status. Concerning family size more than three fourth of respondents reported that they live with in small family size.

Table 5. Nutritional status of as measured by height-for-age (Stunting) among adolescents living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia ,2016 .

characteristics	Nutritional status			
	Severely stunted <-3 Z-scores n(%)	Moderately stunted >-3 <-2 Z- scores n(%)	Normal height ≥-2 Z-scores n(%)	Total n(%)
sex				
Male	19(5.6)	52 (15.3)	106 (31.2)	177 (52.1)
female	9(2.6)	47 (13.8)	107 (31.5)	163 (47.9)
Age				
10-14	12 (3.5)	32(9.4)	83(24.4)	127(37.3)
15-19	16 (4.7)	67(19.7)	130(38.2)	213(62.6)
Religion				
Orthodox	26 (7.6)	84 (24.7)	171 (50.3)	281 (82.6)
Protestant	1 (0.3)	11 (3.2)	29 (8.5)	41(12.1)
Muslim	1 (0.3)	4 (1.2)	13 (3.8)	18 (5.3)
Ethnicity				
Oromo	12 (3.5)	30 (8.8)	62 (18.2)	104 (30.6)
Amara	12 (3.5)	52 (15.3)	106(49.8)	170 (50.0)
Tigre	1 (0.3)	11(3.2)	17(7.9)	29 (8.5)
Gurage	2 (0.6)	5(1.5)	21(9.9)	28 (8.2)
Others	1 (0.3)	1(0.3)	7(2.0)	9 (2.6)
Educational status of respondents				
primary	21 (6.2)	53 (15.6)	137 (40.3)	211 (62.1)
secondary	3 (0.9)	34 (10.0)	58 (17.0)	95 (27.9)
Pre -college	4 (1.2)	9 (2.6)	11(3.2)	24 (7.0)
Tertiary	-----	3 (0.9)	7 (2.0)	10 (2.9)

Educational level of mother				
No formal education	9 (2.7)	20 (6.0)	58 (17.4)	87(27.1)
primary	14 (4.2)	30 (9.0)	61(18.3)	105 (30.9)
secondary	14 (4.2)	26 (7.8)	62 (18.6)	102 (30.6)
Tertiary	5 (1.5)	8 (2.4)	26(7.8)	39 (11.7)
Educational level of father				
No formal education	8 (2.4)	15(4.6)	42(12.8)	65 (19.8)
primary	12(3.6)	18(5.5)	44(13.4)	74 (22.5)
secondary	9 (2.7)	22(6.7)	66(20.)	99 (30.0)
Tertiary	10(3.0)	29(8.8)	52(15.8)	91 (27.7)
Type of Primary care giver				
Both parents	10 (2.9)	30 (8.8)	83 (24.4)	123 (36.18)
Only mother	6 (1.8)	16 (4.7)	54 (15.9)	76 (22.3)
Only father	1 (0.3)	9 (2.6)	15 (4.4)	25 (7.3)
relatives	11 (3.2)	43 (12.6)	52 (15.29)	106 (31.2)
NGO	----------	1 (0.3)	9 (2.6)	10(2.9)
Household members				
< 5	22 (6.5)	73 (21.5)	161 (47.3)	256 (76.9)
>= 5	6 (1.8)	25 (7.3)	46 (13.5)	77 (23.1)

5.5. Bivariate analysis for predictors of stunting among adolescent living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia, 2016.

Bivariate logistic regression was used to identify the characteristics that differentiated malnourished (stunted) study subjects from those well-nourished. Coefficients were expressed as crude OR relative to the referent category. However, no statistically significant relationships were observed between sex ,age, religion , ethnicity ,educational level of respondents , educational level of mother and father , number of house hold members, household dietary diversity, house hold food insecurity ,nutrition counseling , meal pattern and clinical conditions like cd4 –count ,WHO t-stage, , treatment interruption ,presence or absence of opportunistic infections such as TB ,and nutritional status (stunting) (P>0.05). However, only two variables skipping of meal (p=0.03)and type of primary care(p= 0.005) wassignificantly associated with stunting on binary logistic regression (table 6).

On multiple logistic regression Variables with p-value less than 0.25such as ,age-group , religion ,ethnicity , educational status of respondents ,educational status of mother and father , primary care, skipping of meal and duration on ART was fitted in to multiple logistic model and skipping meal (p=0.013), and getting primary care from relatives (p=0.003) were statistically significantly associated with stunting of adolescents (table7).

Table 6.Bivariate analysis for predictors of stunting among adolescent living with HIV Enrolled at public hospitals in Addis Ababa, Ethiopia, 2016.

characteristics		Nutritional status			p-value	COR[95% CI]
		Stunted (<-2Z-score)	Normal (≥Z-score)	Total		
Sex	**male**	71 (20.9)	106 (31.2)	177 (52.1)		
	Female	56 (16.5)	107(31.5)	163 (47.9)	0.27	0.781[0.50-1.21]
Age	10-14	44 (12.9)	83 (24.4)	127 (37.4)		
	15-19	83 (24.4)	130 (38.3)	213 (62.6)	0.43	1.2[0.76-1.90]
	Total	127(37.3)	213 (62.7)	340 (100.0)		
Religion	Orthodox	110 (32.3)	171 (50.3)	281(82.65)		
	Protestant	12 (3.5)	29 (8.5)	41(12.0)	0.23**	0.64 [0.31- 1.3]
	Muslim	5 (1.5)	10 (4.7)	15(4.4)		
	Catholic	-------	2 (0.6)	20(5.9)		
	Others	--------	1(0.3)	1(0.29)		
	Total	127(37.3)	213 (62.7)	340 (100.0)		
ethnicity	Oromo	42 (12.3)	62 (18.2)	104 (30.6)		
	Amhara	64 (18.8)	106 (31.2)	170 (50.0)		
	Tigre	12 (3.5)	17 (5.0)	29 (8.5)		
	Gurage	7 (2.0)	21 (6.2)	28 (8.2)	0.14**	0.49[0.19--1.26]
	Others	2 (0.6)	7 (2.0)	9 (2.6)		
	Total	127(37.3)	213(62.7)	340 (100.0)		
Educational status of respondent	primary	74 (21.8)	137 (40.3)	211 (62.1)		
	secondary	37 (10.9)	58 (17.1)	95 (27.9)		
	Pre-college	13 (3.8)	11 (3.2)	24 (7.06)	0.07**	2.18[0.93 - 5.12]
	Tertiary	3 (0.9)	7 (2.)	10 (2.9)		
	Total	127 (37.3)	213 (62.7)	340 (100.0)		

Educational status of mother	No formal education	29 (8.71)	58 (17.42)	87 (26.13)		
	primary	44 (13.21)	61(18.32)	105 (31.53)		
	Secondary	40 (12.01)	62 (18.62)	102 (30.63)	0.17**	1.6[0.82- 3.15]
	Tertiary	13 (3.90)	26(7.81)	39 (11.71)		
	Total	**126 (37.0)**	**207 (60.9)**	**333 (97.9)**		
Educational status of father	No formal education	23 (6.99)	42(12.77)	65 (19.76)		
	primary	30 (9.12)	44(13.37)	74 (22.49)		
	Secondary	33 (10.0)	66(20.1)	99 (30.1)		
	Tertiary	39 (11.8)	52(15.8)	91(27.7)	0.20**	1.71[0.74- 3.95]
	Total	125 (36.8)	204 (60.0)	329 (96.8)		
Primary care giver	Both parents	40 (11.76)	83 (24.4)	123(36.2)		
	Only mother	22 (6.5)	54 (15.9)	76 (22.3)		
	Only Father	10 (2.9)	15 (4.4)	25 (7.3)		
	relatives	54 (15.8)	52 (15.3)	106 (31.2)	0.005*	0.23[0.02- 0.88]
	NGO	1 (0.3)	9 (2.6)	10 (2.9)		
	Total	127 (37.3)	213(62.7)	340 (100.0)		
Household members	<5	95 (7.94)	161 (47.35)	256 (75.29)		
	>=5	31(9.12)	46 (13.53)	77 (22.65)	0.62	1.14[0.67- 1.9]
	Total	126(37)	207(60.9)	333 (97.9)		
Duration on ART	< 5	33 (9.70)	38 (11.18)	71 (20.88)		
	>=5	94 (27.65)	175 (51.47)	269 (79.12)	0.07**	0.6[0.36- 1.05]
	Total	127 (37.3)	213 (62.7)	340 (100.0)		
Skip meal	Yes =135	41 (12.1)	94 (27.6)	135 (39.7)	0.03*	0.6 [0.38-0.95]
	No =205	119 (35.0)	86 (25.3)	205 (60.3)		
	Total	160 (47)	180(53.0)	340 (100.)		

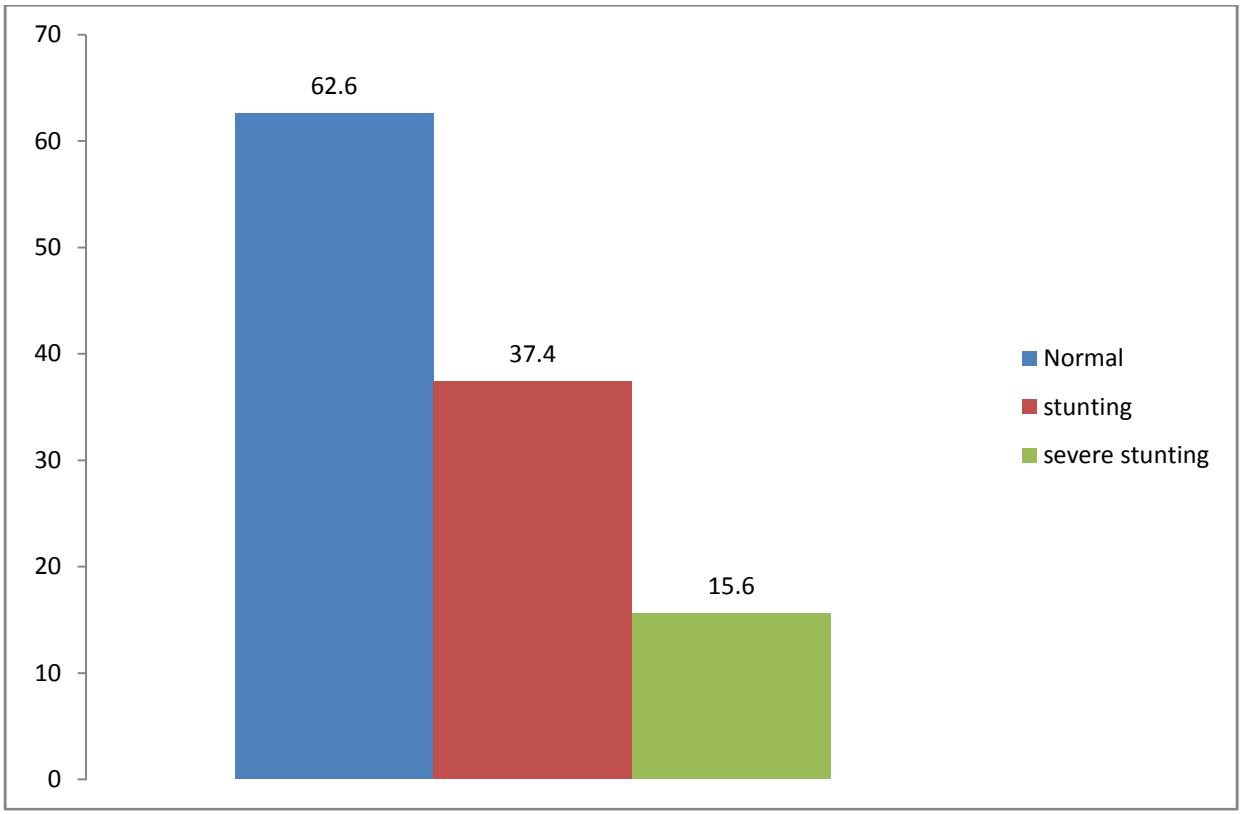
.*variables with p-value <0.05, **variables with p-value less than 0.25

5.6. Multivariate analysis for predictors of stunting among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia, 2016.

Variables with p-value less than 0.25such as ,age-group , religion ,ethnicity , educational status of respondents ,educational status of mother and father , primary care, skipping of meal and duration on ART was fitted in to multiple logistic model and skipping meal (AOR1.7,95 %CI 1.07-2.8), and getting primary care from relatives (AOR1.2;95 %CI,1.2-1.5)were statistically significantly associated with stunting of adolescents (table 7).

Table 7. **Multivariate analysis for predictors of stunting among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia, 2016.**

Characteristics		n (%)	COR	95% CI	AOR	95 %CI
Skip meal	Yes	135(39.7)	0.6	[0.381-0.956	1.7	[1.07- 2.8]
	No	205(60.3)				
Primary care	Both parents	123(36.2)				
	Relatives	106(31.2)	2.2	[1.26-3.68]	1.2	[1.2-1.5]


70
60
50
40
30
20
10
0
62.6
37.4
15.6
Normal
stunting
severe stunting

5.6. Prevalence and Factors Associated with thinness among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia, 2016.

Table 8 revealed that 53 (15.6 %) of adolescents were thin with 10 (2.9%) severely thin. The Percentage of adolescents who were thin was higher (62.8%) among males compared to females. Majority (93.0%) of the thin adolescents had achieved an education level of secondary level and below.Concerning age categorymajority (69.8%) of the thin adolescents isbetween 15-19 years. More than two- third (72.1 %) of thin adolescents had house hold dietary score below the mean score. Regarding house hold food insecurity scale measurement more than half (61.9) of thin adolescents are mildly to severely food insecure (Table 8).

Table 8. Nutritional status as measured by BMI-for-age (thinness) among adolescents living with HIVenrolled at public hospitals in Addis Ababa, Ethiopia, 2016.

characteristics		Nutritional status			
		Severe thin (<-3Z-scores)n(%)	thin (≥-3Z&<-2Z-score)n (%)	normal (≥-2Z-scores)n (%)	total
sex	Male	8 (2.4)	27 (7.9)	142 (41.8)	177 (47.9)
	Female	2 (0.6	16 (4.7)	145 (42.7)	163 (52.1)
	Total	10 (3)	43 (12.6)	287 (84.5)	340 (100.0)
Age	10-14	2 (0.6)	13 (3.8)	112 (32.9)	127 (37.4)
	15-19	8 (2.4)	30 (8.8)	175 (51.47)	213 (62.7)
	Total	10(3)	43(12.6)	287(84.5)	340 (100.0)
Religion	Orthodox	8(2.4)	33 (9.7)	240(70.59)	281 (82.7)
	Protestant	1 (0.3)	8 (2.4)	32 (9.41)	41 (12.06)
	Muslim	1 (0.3)	2 (0.4)	13 (4.4)	18 (5.3)
	Total	10 (3)	43(12.6)	287 (84.5)	340 (100.0)
Ethnicity	Oromo	3 (0.88)	16 (4.7)	85 (24.1)	104 (30.6)
	Amahara	3 (0.88)	19 (5.6)	148 (43.5)	170 (50.0)
	Tigre	3 (0.88)	2 (0.6)	24 (7.06)	29 (8.5)
	Gurage		5 (1.5)	23 (6.76)	28(8.2)
	Others	1 (0.29)	1 (0.3)	7 (2.06)	9(2.7)
	Total	10 (3)	43(12.6)	287(84.5)	340 (100.0)
Educational status	primary	1 (0.3)	29 (8.5)	178 (52.3)	211 (62.1)
	secondary	4 (2.1)	11 (3.3)	79 (23.3)	95 (27.9)
	Pre -college	5 (1.5)	-	23 (6.8)	24 (7.0)
	Tertiary	-	3 (0.9)	7(2.1)	10 (3)
	Total	10 (3)	43(12.6)	287(84.5)	340 (100.0)

Educational level of mother	No formal education	4 (1.2	14(4.2)	69 (20.7)	87(27.13)
	primary	3(0.9)	10 (3.0)	92 (27.6)	105(30.9)
	secondary	2 (0.6)	8 (2.4)	92 (27.6)	102(30.6)
	Tertiary	1(0.03)	5 (1.5)	33(9.9)	39(11.7)
	Total	10(3)	37(10.9)	286 (84.1)	333 (97.9)
educational level of father	No formal education	3 (0.9)	15 (4.6)	47 (14.3)	65(19.8)
	primary	2(0.6)	11(3.3)	61 (18.5)	74 (22.5)
	secondary	4(1.2)	6(1.8)	89 (27.05)	99 (30.09)
	Tertiary	---	6(1.8)	85 (25.8)	91 (27.7)
	Total	9(2.6)	38(11.2)	282(82.9)	329 (96.8)
Primary care giver	Both parents	5 (1.5)	21(6.2)	97(58.5)	123(36.2)
	Only mother	1(0.3)	9 (2.7)	66 (19.4)	76 (22.3)
	Only father	----	2 (0.6)	23 (6.8)	25 (7.35)
	Relatives	4 (1.2)	9(2.7)	93(27.3)	106 (31.2)
	NGO	------	2(0.6)	8 (2.3)	10 (2.94)
	Total	10 (3)	43 (12.6)	287(84.4)	340 (100.0)
Household members	One -four	7 (2.10)	35 (10.5)	214 (62.9)	256 (76.9)
	Five & above	3 (0.90)	6 (1.8)	68 (20.4)	77 (23.1)
	Total	10 (3)	41(12.1)	282 (82.9)	333 (97.9)

5.7. Bivariate analysis for predictors of thinness among adolescent living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia, 2016.

Factors affecting nutritional status (thinness) of adolescents were assessed using binary logistic regression. The analysis showed that being male, educational status of mother who, achieved secondary school , skipping of meal , nutritional counseling, treatment interruption , house hold dietary diversity below mean score and moderate house hold food insecurity were significantly associated ($p<0.05$) with thinness of adolescents living with HIV who receive care at public hospitals in Addis Ababa , Ethiopia.

Males are about two times thinner than females with (COR 2.0; 95% CI.1.07 - 3.66). Respondents whose mothers' education of secondary level was less likely thinner than (COR0.37; 95% CI 0.16 - 0.88) those without formal education. Concerning behavioral factors, Skipping meals (COR 2.5; 95% CI 1.36 - 4.5) was significantly associated with (p-value=0.003) thinness.regarding nutrition counseling those study participants who responded that they did not get nutrition counseling at the facility during their follow up before the survey was two times (COR 2.04; 95%CI 1.11- 3.72) more thinner than those who responded that they got counseling (p=0.02)

Regarding clinical conditions those study participants who responded positively (yes) to treatment interruption was about four times thinner (COR3.7; 95%CI 1.7- 7.95) than those who did not interrupt their treatments (p=0.001).concerning dietary factors, household dietary diversity below mean score (COR2.58; 95% CI, 1.34 -4.95) and moderate household food insecurity (COR 8.79; 95 % CI 4.19 - 18.5) were associated with thinness with p-values (0.004) and (p=0.000) respectively (Table 9).

Table 9. Bivariate analysis for predictors of thinness among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia, 2016.

characteristics		Nutritional status				
		thin (<-2Z-scores) n (%)	normal (>-2 Z-scores) n(%)	Total n(%)	p-value	COR[95% CI]
Sex	Male	35 (10.3)	142 (41.8)	177 (47.9)	0.029*	2.0[1.07- 3.66]
	female	18 (5.3)	145 (42.6)	163 (52.1)		
	Total	53 (15.6)	287(84.4)	340(100.0)		
Age – group	10-14	15 (4.41)	112 (32.9)	127 (37.35)		
	15-19	38 (11.2)	175 (51.5)	213 (62.6)	0.14**	1.6[0.85- 3.1]
	Total	53 (15.6)	287 (84.4)	340(100.0)		
Religion	Orthodox	41 (12.1)	240 (70.59)	281(82.65)		
	Protestant	9 (2.6)	32 (9.4)	41 (12.05)	0.22**	1.6[0.73 -3.7]
	Muslim	3 (0.9)	12 (3.5)	15 (4.4)		
	Catholic		2 (0.6)	2 (0.6)		
	Others *		1 (0.3)	1 (0.3)		
	Total	53 (15.6)	287(84.4)	340 (100.0)		
Ethnicity	Oromo	19 (5.6)	85 (25.0)	104 (30.6)		
	Amahara	22 (6.5)	148 (43.5)	170 (50.0)	0.23**	0.66[0.34 -1.29]
	Tigre	5 (1.5)	24 (7.1)	29 (8.5)		
	Gurage	5 (1.5)	23(6.8)	28 (8.2)		
	Others	2(0.6)	7 (2.1)	9 (2.7)		
	Total	53 (15.6)	287(84.4)	340 (100.0)		
Educational status of respondent	primary	33 (9.7)	178 (5.4)	211 (62.1)		
	secondary	16 (4.7)	79 (23.3)	95 (27.9)		
	Pre-college	1 (0.3)	23 (6.8)	24 (7.1)	0.16**	0.23[0.03- 1.79]
	Tertiary	3 (0.9)	7 (2.1)	10 (3)		
	Total	53 (15.6)	287 (84.4)	340 (100.0)		
Education level of mother	No formal education	18 (5.4)	69 (20.7)	87(27.1)		
	primary	13 (3.9)	92 (27.6)	105 (30.9)		
	secondary	10 (3.0)	92 (27.6)	102 (30.6)	0.026*	0.37[0.16-0.88]
	Tertiary	6 (1.8)	33 (9.9)	39 (11.7)		
	Total	47(13.8)	286(84.1)	333 (97.9)		

Educational level of father	No formal education	10 (3.0)	55 (16.7)	65(19.8)		
	Primary	13 (3.9)	61 (18.5)	74 (22.5)		
	Secondary	16 (4.9)	83 (25.2)	99 (30.1)		
	Tertiary	10(3.0)	81 (24.6)	91(27.7)	0.27	0.55[0.18- 1.6]
	Total	49 (14.4)	280 (82.3)	329 (96.7)		
Primary care giver	Both parents	26 (7.6)	97 (28.5)	123 (36.17)		
	Only mother	10 (2.9)	66 (19.4)	76 (22.3)		
	Only father	2 (0.59)	23 (6.76)	25 (7.35)		
	Relatives	13 (3.82)	93 (27.35)	106 (31.17)	0.07**	0.52[0.25 -1.07]
	NGO	2 (0.59)	8 (2.35)	10 (2.94)		
	Total	53 (15.6)	287 (84.4)	340 (100.0)		
Household members	One-four	42 (12.35)	214 (62.94)	256 (55.29)		
	Five and above	9 (2.65)	68 (20)	77 (22.65)	0.31	0.67 [0.31-1.45]
	Total	51(15)	282(82.9)	333 (97.9)		
Get nutritional counseling	Yes =228	28(8.3)	200(59.5)	228(67.8)		
	No =108	24(7.1)	84 (24.7)	108(31.8)	0.02*	2.[1.11- 3.72]
	Total	52 (15.3)	284 (83.5)	336 (98.8)		
Skip meal	Yes =135	31 (9.1)	104 (30.6)	135 (39.7)	0.003*	2.5[1.36- 4.5]
	No =205	22 (6.5)	183 (53.8)	205 (60.3)		
	Total	53 (15.6)	287 (84.4)	340 (100.0)		
Interrupt treatment	Yes =36	13 (3.8)	23 (6.8)	36 (10.6)	0.001*	3.7[1.7- 7.95]
	No =304	40 (11.8)	264 (77.6)	304 (89.4)		
	Total	53(15.6)	287(84.4)	340 (100.0)		
Disclosure status	Yes =291	46 (13.5)	245 (72.3)	291 (85.8)		
	No =48	6 (1.8)	42 (12.4)	48 (14.2)	0.55	0.76[0.3- 1.89]
	total	52 (15.3)	287(84.4)	339 (99.7)		
Cd4-count	Below five hundred =**134**	13 (3.8)	121(35.7)	134 (39.5)	0.017*	0.44[0.22-0.86]
	Above five hundred =**205**	40 (11.8)	165 (48.7)	205 (60.5)		
	Total	53 (15.6)	286 (84.1)	339 (99.7)		
Household dietary diversity score	Below mean score	39 (11.5)	149 (43.8)	188 (55.3)	0.004*	2.58[1.34 -4.95]
	Above mean score	14(4.1)	138 (40.6)	152 (44.7)		
	Total	53 (15.6)	287(84.4)	340 (100.0)		
Household food	Food secure	19 (5.6)	207 (60.9)	226 (66.5)		

security measurements	Mild food insecure	9 (2.6)	33 (9.7)	41 (12.1)		
	Moderate food insecure	21 (6.2)	26 (7.7)	47 (13.9)	0.000*	8.79[4.19 - 18.5]
	Severely food insecure	3 (0.9)	19 (5.6)	22(6.5)		
	Total	52 (15.3)	285 (83.8)	337 (99.1)		
Do you have social support	Yes	15	56	71(20.9)		
	No	38	229	267(78.5)	0.15**	0.61[0.31- 1.20]
	Total	53	285	338 (99.4)		

.*variables with p-value <0.05, **variables with p-value less than 0.25

5.8Multivariate analysis for nutritional status (thinness)among adolescent living with HIV receiving care at government public hospitals in Addis Ababa, Ethiopia, 2016

After controlling the effects of other covariates, variables which were significantly associated on the bivariateanalysis with thinness such as sex, educational status of mother, skipping of meal, nutritional counseling, treatment interruption, house hold dietary diversity and house hold food insecurity) and other variables with p-value less than 0.25 werefitted into multivariable logistic regression model; three variables were found to be predictors of thinness of adolescents living with HIV, nutrition counseling(AOR2; 95%CI 1.1-3.7) ,treatment interruption [(AOR 2.78,95 % CI, 1.2-6.4) and moderately house hold food insecurity were (AOR1.67,95CI %1.21-3.21) were statistically significant (Table 10).

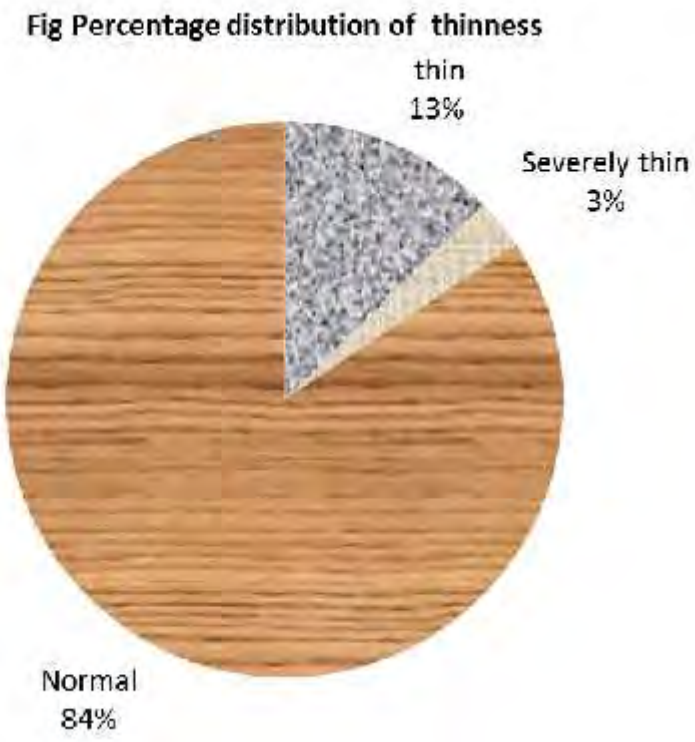


Figure 3.Distribution of nutrition status (thinness) of adolescents living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia, 2016.

Table 10.Multivariate analysis for thinness among adolescent living with HIV receiving care at public hospitals in Addis Ababa, Ethiopia, 2016.

Characteristics		n(%)	COR	95%CI	AOR	95%CI
Household food insecurity	food secured	226(66.5)				
	Moderately food insecure	47 (13.8)	8.8	4.18- 18.49	1.67	1.2- 3.2
Interrupt treatment	Yes	36 (10.5)	3.7	1.74 -7.95	2.78	1.2 - 6.4
	No	304 (89.5)				
Nutrition counseling	Yes	228 (67.06)				
	No	112 (32.94)	0.5	0.23-0.880	2.05	1.1- 3.7

6.Discussions

This study focused on determining the nutritional status of adolescents living with HIV getting ART service at public hospitals in Addis Ababa, Ethiopia.

In this study the prevalence of malnutrition (stunting and thinness) in adolescents living with HIV(ADLHIV) who attendchronic care was 37.4%and 15.6% respectively.

Among stunted adolescent more than half (55.9%) were males compared to females. In most studies allowing comparisons of boys and girls, there was twice as much under nutrition(stunting) in boys as in girls.

About one third of stunted adolescents are mild to severely food insecure. Concerning house hold dietary diversity more than half of the stunted adolescents had dietary diversity score below mean 6.2 (± 1.9).Despite the fact that, both household food insecurity measurement and house hold dietary diversity scores are not statistically significant with stunting of adolescents.

In this study the prevalence of stunting was much higher than that of thinness,suggesting chronic undernourishment.Children who acquired HIV infection in early life has a unique development profile that may include stunting or delayed puberty as a result of inadequate virologic suppression, malnutrition, and other factors[11].

Although there may be a number of research questions thatmay be addressed about potential differences between these two groups (perinatally infected compared with those infected later in life (15), for the purpose of this study whether the study participants infected at birth or infected later in life was not assessed.

This study revealed that those study participants whoskip their meals (AOR1.7, 95 %CI1.07-2.8) was about two times more stunted than those who did not skip, implying that counselors should take action in educating adolescents to follow their regular meal patterns in line with National Guideline for HIV/AIDS and Nutrition. Among study participants more than one third 40.6% skip their meal and among this 33.3% and 29.7% skip breakfast and snack respectively. These food habits may also apply in varying degrees to adolescents in other parts of the world.Getting primary care from relatives (AOR 1.2; 95 %CI1.2-1.5) were statistically significant*with stunting of adolescents.

More than one quarter of study participants get primary care from their relatives and they are more likely stunted than those who get primary care from both parents ,the challenge posed by HIV which resulted in loss of parents .

The prevalence of thinness was lower than the studiesconducted few years back on school adolescentsin, Ambo and Mekele [12, 13] this may be attributed to the fact that as a patient gets ART, there increases immunity against opportunistic and other infections as a result of which the patient will have less risk of loss of appetite because of the absence of eating problems, thus enjoying a better nutritionalstatus from increased intake and utilization.

Treatment interruption, nutritional counseling and moderate household food insecurity were significantly associated with thinness on multivariate analysis [p-<0.05].

This study revealed that those study participants who interrupt their follow up (AOR2.78, 95 %CI 1.2- 6.4.) once they start treatment was about three times thinner than those who remain in care.This finding is consistent with other studies done in Ethiopia, on people living with HIV at Government Hospitals[17]. Nutrition counseling (AOR 2; 95%CI 1.1-3.7) and moderate household food insecurity (AOR1.67, 95 CI %1.21-3.21) were significantly associated with thinness of adolescents.

According to this finding those study participants who did not get counseling onnutrition prior to the survey was two times thinner than those who get counseling, indicating a need for nutrition education and counseling as adolescents in general have less concern for what they usually eat. In addition those study participants who were moderate household food insecure are about two times thinner than those who were household food secured, indicating food insecurity as a significant problem among adolescentsliving with HIV (ALWHA) on highly anti-retroviral therapy(HAART).

The prevalence malnutrition (stunting and thinness) of this study was nearly consistent with a cross-sectional study conducted in Uganda on nutritional Status of HIV-infected adolescents enrolled into an HIV-care Program(14).This is not surprising, given the fact that malnutrition and HIV are the challenges of developing countries. Another cross-sectional study conducted in Klang Valley, Malaysia on nutritional Status of Children (1-18 years) Living with HIV and Receiving Antiretroviral (ARV) medication show that 20.8% and 14.6% were stunted and severely stunted respectively (38).which was lessthan the overall prevalence of this finding.

6.1. Conclusion

The prevalence of stunting and thinness was high among the HIV infected adolescents. Skipping meal, getting primary care from relatives, nutritional counseling, and moderately household food insecurity were associated with malnutrition (stunting and thinness) among adolescents living with HIV receiving care and support at publichospitals, indicating a need for intense nutrition education and economic empowerment for adolescents living with HIV.

6.2.**Recommendation** I.

- **To HIV/AIDS Program Managers:**

As nutritional problems are very commonamong adolescents living with HIV, there is a need for including specific adolescents' nutrition intervention in the national nutrition program.

- **To clinicians and other health professionals workingon HIV/AIDS prevention and control**

Greater recognition of the substantial burden of malnutrition among adolescents living with HIV is needed, and there is a need for more services aimed at the special needs of this unusually vulnerable age group to provide accessible and sympathetic nutrition counseling.

- **For further researchers**

Further research is needed to better define the burden of malnutrition and unique clinical and social problems that face adolescentsliving with HIV.

6.3 Limitation of the study

The limitation of this study was, it did not assess adherence to treatment of the study participants which might potentially affect nutritional status of people living with HIV including adolescents.

As the study was conducted at hospital level, the findings may not be generalizable to dissimilar clinical settings and a result of cross-sectional study design nature, the temporal sequence of events cannot be determined.

Recall bias and social desirability bias are also potential limitations that may have been encountered in this study, while assessing the household food insecurity and household dietary diversity that affect the nutritional status of people living with HIV including adolescents.

6.4. Strengths

The major strengths of this study include the highest response rate (100%) of the participants.

Its focus on adolescents, a group that is lackingattention within studies of nutritional health in developing countries.

It will serve as a base line for further studies on nutritional status of adolescent living with HIV in Ethiopia.

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Appendices

Information sheet, consent form and questionnaires for Adolescents (10-19) Years Old (English ver.)

Section I. Information sheet.

01. Name of the study area (Addis Ababa)

02. Questionnaire identification no. _____

INTRODUCTION: Good morning/afternoon? My name is _____. This Study is undertaken by a graduate student of Addis Ababa University, College of health science, school of public Health. You and I would have a short discussion of about 30 minutes. Before we go to our discussion, I will request you to listen carefully to, what I am going to read for you about the purpose of the study, and you will tell me whether you agree or disagree to participate in this study at the end. The purpose of this study is to assess the nutritional status of Adolescents who are getting care and support at government health facility in Addis Ababa, Ethiopia.

The study will be conducted through structured questionnaire and by taking Anthropometric measurements. You are going to fill a questionnaire about yourself and the food type you frequently eat, per day and per week, and I am going to take some anthropometric measures. You are not obliged to answer any question that you don't want to answer. If you decide not to participate or to withdraw from the study it will have no effect on any services or treatment you are currently receiving, that means, your participation in this study does not involve any direct risk or benefit for you, but it is very useful since your answer will provide information for further nutrition intervention program .Your name will not be required for this study and all the information you provide us will be strictly confidential.

Are you willing to participate in this study?

1. [ ] Yes. 2. [ ] No

Thank you!!

NB: 1. if the study subjects agree to participate in the study, go to consent form

*. No need of enforcing the clients to be included in the study

Section II. Consent form for Adolescents (10-19) years old (English Version)

I the undersigned have been informed about the purpose of this particular research project. I have been informed that I am going to respond to this question by answering what I know concerning the issue. I have been informed that the information I give will be used only for the purpose of this study and my identity as well as the information I give will be treated confidentially. I have also been informed that I can refuse to participate in the study or not to respond to questions if I am not interested. Furthermore I have been informed that I can stop responding to the questions at any time in the process. Based on the above information, I agree to participate in this research voluntarily.

Signature: _____

Date: _____

NB:

1. If the study subject is voluntary to participate in the study, start the interview.
2. Interviewer signature certifying that informed consent has been given verbally by the respondent.

Name _____

Signature _____

Date _____

3. If there are things that require clarification please don't hesitate to ask the interviewer or the principal investigator for clarification.

Address of the principal investigator

birraabdulkarim@gmail.com

Addis Ababa University

College Of Health Science, School Of Public Health.

Mobile: 0911-548809

Addis Ababa

Section III. Questionnaires. Information sheet, consent form and questionnaires for Adolescents (10-19) Years Old (English ver.)

Section I. Information sheet

01. Name of the study area (Addis Ababa)

02. Questionnaire identification no. _____

INTRODUCTION: Good morning/afternoon? My name is _____. This Study is undertaken by a graduate student of Addis Ababa University, College of health science, school of public Health. You and I would have a short discussion of about 30 minutes. Before we go to our discussion, I will request you to listen carefully to, what I am going to read for you about the purpose of the study, and you will tell me whether you agree or disagree to participate in this study at the end. The purpose of this study is to assess the nutritional status of Adolescents who are getting care and support at government health facility in Addis Ababa, Ethiopia.

The study will be conducted through structured questionnaire and by taking Anthropometric measurements. You are going to fill a questionnaire about yourself and the food type you frequently eat, per day and per week, and I am going to take some anthropometric measures. You are not obliged to answer any question that you don't want to answer. If you decide not to participate or to withdraw from the study it will have no effect on any services or treatment you are currently receiving, that means, your participation in this study does not involve any direct risk or benefit for you, but it is very useful since your answer will provide information for further nutrition intervention program. Your name will not be required for this study and all the information you provide us will be strictly confidential.

Are you willing to participate in this study?

1. [ ] Yes. 2. [ ] No

Thank you!!

NB: 1. if the study subjects agree to participate in the study, go to consent form

*. No need of enforcing the clients to be included in the study

Section II. Consent form for Adolescent (10-19) years old (English Version)

I the undersigned have been informed about the purpose of this particular research project. I have been informed that I am going to respond to this question by answering what I know concerning the issue. I have been informed that the information I give will be used only for the purpose of this study and my identity as well as the information I give will be treated confidentially. I have also been informed that I can refuse to participate in the study or not to respond to questions if I am not interested. Furthermore I have been informed that I can stop responding to the questions at any time in the process. Based on the above information, I agree to participate in this research voluntarily.

Signature: _____

Date: _____

NB:

1. If the study subject is voluntary to participate in the study, start the interview.
2. Interviewer signature certifying that informed consent has been given verballyby the respondent.

Name _____

Signature _____

Date _____

3. If there are things that require clarification please don't hesitate to ask the interviewer or the principal investigator for clarification.

Address of the principal investigator

birraabdulkarim@gmail.com

Addis Ababa University

College Of Health Science, School Of Public Health

Mobile: 0911-548809

Addis Ababa

	Date Of Interview	|__|__| Day |__|__| Month |__|__||__|__| Year	
	Time Started |__|__|	Hour |__|__| Minutes	
	Time Ended |__|__|	Hour |__|__| Minutes	
	Result * |__|		
	Interviewer Name _____ Supervisor _____ Checked By _____ Entered By 1 Principal Investigator Investigator		
	*Result Codes:	1=Completed 2=Not 3=Postponed 4=Refused 5=Partly Completed 6=Incapacitated 7=Other (Specify)	

Part one:

Section I Anthropometric measurements (should be taken twice)

100	Weight	1st----------kg 2nd----------kg Average-------kg	
101	Height	1st……centimeter 2nd----------centimeter Average----------centimeter	

Questions pertaining to socio demographic characteristics of respondents

S.NO	Question	Category and code	Skip option
102	Sex	Male…….1 Female……..2	
103	In what month and year you were born?	Month……Don't know……999 Year..……Don't know……999	
104	How old are you?(completed years)	_____	
105	What is Your Religion?	Orthodox……1 Muslim……2 Protestant……3 Other (Specify)….....999	
106	To which ethnic group do you belong?	.Oromo…….....1 Amhara…..……...2 Tigre……...3 Gurage…….....4 Other Specify……..999	
107	What is Your Educational Status?	Primary (1-8)……1 Secondary (9-10…….2 Preparatory (11-12)……....3 Tertiary Education…….....4	
108	Educational status of mother	1.No formal education……1 2.Primary (1-8)……..2 3.Scondary (9-10)……..3 4.Preparatory (11-12)……4 5.Tertiory Education……..5	

109	Educational status of /father	No formal education…….1 Primary (1-8)……2 Secondary (9-10)……..3 Preparatory (11-12)……4 Tertiary Education……5	
110	Type of primary care giver?	both parents…...1 mother…..2 father……..3 relatives……4 other (specify…999	
112	How many people are living in your home? ***check family matric***)	……..	
113	Do you have any **social support**?	Yes……..1 No……2	IF NO SKIP 128
114	If your answer is yes, from whom you get it? ***(ask the care giver***)	NGO……..…1 Government…….…2 Others …specify……..999	
115	What kind of support do you get?	Financial ……..1 Food aid ……2 Educational material……..…4 Other (specify)…….….999	
	Questions related to behavioral factors		
116	Do you smoke cigarette?	Yes…….,,,,,1 No…….2	
117	Do you drink alcohol?	Yes……..1 No……..2	
118	Do you skip meal in the previous two weeks?	Yes……..1 No……2	
119	If yes, which one do you frequently skip?	Breakfast……..1 Lunch…….2 Snack----------3 Supper…….4	
120	Did you get Nutritional counseling at health facility in your previous appointment?	Yes……1 No…….2 ⟶	122
121	If Yes, what was the counseling about?	Eating balanced diet…..1 Keeping hygiene of meal2 Avoiding raw food……3 Other (specify)---------- .999	
	SECTION II Questions related to clinical condition of respondents		
122	Do you Have the trends of visiting health facility as soon as you feel sick? ***check follow up card***)	Yes……..1 NO……....2 ⟶	124
123	If yes, do you visit this health	Yes……1	

	facility for illness in the last one month? ***check follow up card***)	No ……2	
124	What was your diagnosis? (***check follow up card***)	Chronic cough…….1 Chronic diarrhea…..…….....2 Skin infections…… 3 Other ---------- 999	
125	Duration on ART (***check follow up card***)	----------years Less than five years……..1 Greater than or equal five years….2	
126	Current WHO T stage ***check follow up card***)	TS1……..1 TS2……..2 TS3……..3 TS4……..4	
127	Have you ever taken INH prophylaxis	Yes……1 No……..2	
128	Are you currently on TB treatment	Yes…….1 No……..2	
129	What was your CD_4 count in the previous six month (***check follow up card***)	< 500…….1 ≥500……..2	
130	Disclosure status ***(ask the care giver***)	disclosed…….1 not disclosed……. 2	

131	**Questions pertaining to household food insecurity measurements** Did you worry that your household would not have enough food in the past four weeks?	Yes.....1 No .....2 →	133
132	If your answer is yes, How often did this happen in the past four weeks?	Rarely (once or twice)----------1 Sometimes (three to ten times)----------2 Often (more than ten times)----------3	
133	Did you or any member of your household would unable to eat the kinds of foods you preferred because of a lack of resources, in the past four weeks? (**ask by giving specific example)**	Yes.....1 No .....2 →	135
134	If your answer is YES How often did this happen in the past four weeks?	Rarely (once or twice)…… 1 Sometimes (three to ten times)…….2 Often (more than ten times)…….....3	
135	Did you or any household member eat a limited variety of foods due to a lack of resources In the past four weeks? (**ask by giving specific example)**	Yes.....1 No .....2 →	**137**
136	If your answer is YES, how often did this happen in the past four weeks?	Rarely (once or twice)……1 Sometimes (three to ten times)……..2 Often (more than ten times)……3	
137	Did you or any household member eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food, In the past four weeks? (**ask by giving specific example)**	Yes.....1 No .....2 →	**139**
138	If your answer is YES, How often did this happen in the past four weeks?	Rarely (once or twice)…….1 Sometimes (three to ten times)……..2 Often (more than ten times)…….3	
139	Did you or any household member eat a smaller meal than you felt you needed because there was not enough food, In the past four weeks?	Yes.....1 No .....2 →	**141**

140	If your answer is YES, How often did this happen in the past four weeks?	Rarely (once or twice)……..1 Sometimes (three to ten times in)……2 Often (more than ten times)……..3	
141	Did you or any other household member have less preferred food due to lack of enough food, in the past four weeks? (**ask by giving specific example)**	Yes.....1 No .....2 →	**143**
142	If your answer is YES How often did this happen in the past four weeks?	Rarely (once or twice)……1 Sometimes (three to ten times)……2 Often (more than ten times)……3 3	
143	In the past four weeks, Was there ever no food to eat any kind of food in your household because of lack of resources to get food (**ask by giving specific example)**	Yes.....1 No .....2 →	**145**
144	If your answer is yes, How often did this happen in the past four weeks?	Rarely (once or twice)……...1 Sometimes (three to ten times)…….....2 Often (more than ten times)…..…. …3	
145	In the past four weeks ,did you or any household member go to sleep at night hunger, because there was not enough food, (**ask by giving specific example)**	Yes.....1 No .....2 →	**147**
146	How often did this happen in the past four weeks?	Rarely (once or twice i)…….1 Sometimes (three to ten times)…..…..2 Often (more than ten times ……..….3	
147	Did you or any household member remain a whole day and night without eating anything because there was not enough food ,in the past four weeks, (**ask by giving specific example)**	Yes..... ...1 No ....0 →	**149**
148	If YES, how often did this happen in the past four weeks?	Rarely (once or twice)……1 Sometimes (three to ten times)……..2 Often (more than ten times)……3	
	Questions pertaining to house hold dieatary diversity		
149	Any bread, rice, pasta, biscuits, or any other foods made from millet, sorghum, maize, rice, wheat?	Yes……..……..1 No…….0 Don't know…..……9999	
150	Any potatoes, bulla, *kocho* or any other food made from roots or tubers?	Yes……..…1 No……..0 Don't know……9999	
151	Any fruits?	Yes……..….1 No……0 Don't know…….9999	
152	Any vegetables?	Yes……..…….1 No…….0	

		Don't know……9999	
153	Any beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	Yes……..…..1 No…….0 Don't know……..…….9999	
154	Any eggs?	Yes……..…...1 No……..0 Don't know……..…….9999	
155	Any fresh or dried fish or shellfish?	Yes……..……..1 No……..0 Don't know…….9999	
156	Any cheese, yogurt, milk or other milk products?	Yes…….……1 No……..0 Don't know…….9999	
157	Any foods made with oil, fat, or butter?	Yes…….……1 No.....0 Don't know……..….9999	
158	Any foods made from beans, peas, lentils, or nuts?	Yes…….……1 No……..0 Don't know……..…….9999	
159	Any sugar or honey?	Yes……1 No……0 Don't know……..9999	
160	Any other food, such as condiments, coffee, tea?	Yes……..1 No……0 Don't know…….9999	

አዲስ አበባ ዩንቨርሲቲ ጤና ሳይንስ ኮሌጅ ህብረተሰብ ጤና ት/ቤት

በመንግሥት ጤና ተቋም የጤና ክትትል የሚያደርጉ ወጣቶች (10-19) የአመጋገብ ሁኔታን የሚዳስስ የዳሰሳ ጥናት፡፡

የመረጃ መጠያቂያ ቅፅ ፤

እንደምን አደርክ /ሽ ስሜ ----------ይባላል፡፡ይህ ጥናታዊ ዳሰሳ በ2008 ዓ/ም ከአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ ሕ/ሰብ ጤና ት/ቤት ተማራቂ ተማሪ የሚከናዋን ነዉ፡፡ ጥናቱን አጥኚዉ ለሚያደርገዉ ጥናት እኔና አንተ/ቺ አጠር ላሌና ከ30 ደቂቃ ለማይበልጥ ጊዜ ዉይይት ይሆናል፡፡ለዚህም ዉይይት እንዲትታባበረኝ/ርኚ በትህትና እጠይቃለሁ፡፡

ወደ ዉይይታችን ከመግባታችን በፊት ስለጥናቱ አላማ ስለማነብልህ /ሽ በጥሞና እንዲታምጠኝ/ኚ እጠይቃለሁ፡፡በመጨረሻም በጥናቱ ለመሳተፍ መስማማትህን/ሽን ወይም አለመስማማትህን/ሽን ትንገረኛለህ/ሽ ፡፡

የጥናቱ ዓላማ በመንግሥት የጤና ተቋም ክትትል የሚያደርጉ ወጣቶች የአመጋገብ ሁኔታን የሚዳስስ ጥናት ነዉ፡፡ጥናቱ የሚካሔደዉ መረጃ ሰብሳቢዉ በሚያቀርበዉ መጠይቅ ይሆናል፡፡ መጠይቁየአንተን/ቺንየአመጋገብሁኔታንየተመለከተይሆናል፡፡በዚህጥናትላይመሳተፍህ/ሽበፍቃዳኝነትላይየተመሠረተሲ ሆንማንኛዉንምጥያቄአለመመለስወይምበመሀልየማቋረጥመብትህ/ሽየተጠበቀነዉ፡፡የምትሰጠኝ/ጪኝመረጃምስጢራዊነ ቱየተጠበቀሲሆንስምህ/ሽለጥናቱአያስፈልግም፡፡በዚህጥናትላይመሰተፍህ/ሽምንምዓይነትጥቅምወይምጉዳትአይኖረዉም፡ ፡ነገርግንከአንተ
/ከአንቺየሚገኘዉምላሽየወጣቶችንየአመጋገብሁኔታንለማሻሻልለሚመለከተዉአካልለመጠቆምይረዳናል፡፡

በጥናቱለመሳተፍፈቃደኛነህ/ሽ ?

1. አዎ 2. አይደለሁም

የፍቃደኝነትመጠየቂያቅጽ

ከታችፊርማዬንያኖርኩትግላሰብለዚህጥናትአላማለምጠየቀዉጥያቄየማዉቀዉንለመመለስዝግጁመሆኔንበተጨማሪምየ ምሰጠዉመረጃለዚህጥናትአገልግሎትብቻየሚዉልመሆኑን፤ስሜእናየምሰጠዉመረጃበምስጢርእንደሚጠበቅየተነገረኝሲ ሆን፤ፍላጎትከሌለኝበጥናቱያለመሳተፍ፤ጥያቄያለመመለስና፤በጥያቄዉወቅትአቋርጦመተዉእንደምችልተነግሮኛል፡፡በዚ ሁመሰረትጥናቱላይለመሳተፍፈቃደኛመሆኔንበፊርማዬአረጋግጣለሁ፡፡

ፊርማ ----------ቀን ----------

የመጠይቁ መረጃ		
መጠይቁ የተደረገበት ቀን	……ቀን……ወር……ዓ/ም	
የተጀመረበት ሰዓት	……ደቂቃ……ሰዓት	
የተጠናቃቀበት ሰዓት		
ዉጤት		
የጠያቂዉ ስም 1 2 3 4 **የተቆጣጣሪዉ ስም ፤** ሰኚ ጫሊ (B.sc, MPH Candidate)		
ዳታዉን የመረመረዉ		
ዳታዉን ያስገባዉ		
የዉጤት ኮዶች		
	1 የተጠናቃቀ	
	2 በከፊል የተጠናቃቀ	
	3 ያልተገኙ	
	4 ለመጠየቅ ያልተስማሙ	
	5 መጠየቅ የማይችሉ	
	6 ሌላ ካለ ይገለጽ	

ማንኛዉምገለጻየሚስፈልጋቸዉነገሮችካሉመረጃሰብሳቢዉምሆነዋናተመራማሪዉንበአካልምሆነበአድራሻይጠይቁ፡፡

የዋናዉተመራማሪአድራሻ

አበባዩኒቨርሲቲ፤ጤናሳይንስኮሌጅ፤ህብረተሰብጤናት/ቤት፡፡

ብራአብዱልከሪምስልክቁጥር 0911548809

ክፍልአንድ፤የማህበራዊናሥነ- ባህርያትመገለጫመጠይቅ

ተ.ቁ	የአካላዊ አቋም መለኪያ		
100	ክብደት	ዝቅተኛ የክ/ መጠን በኪ/ግ…… ከፍተኛ የክ/ መጠን በኪ/ግ…… አማካይ የክብደት መጠን በኪ/ግ……..	
101	ቁመት	ዝቅተኛ የቁ/ መጠን ….ሜትር…ሴ/ሜትር ከፍተኛ የቁ/ መጠን…..ሜትር……ሴ/ሜትር አማካይ የቁ/ መጠን…..ሜትር……ሴ/ሜትር	
	መጠይቅና ማጣሪያ	***ኮድ***	***ይለፍ***
102	ጾታ	ወንድ----------1 ሴት----------2	
103	የትዉልድ ዘመን	……ወር……..ዓ/ም አላዉቅም----------999	
104	ዕድሜህ/ሽስንትነዉ ?	--------ዓመት 10-14----------1 15-19----------2	
105	ሀይማኖትህ/ሽ ምንድ ነዉ ?	ኦርቶዶክስ ----------1 ፕሮቴስታንት----------2 .መ.ስ.ል.ም----------3 ካቶልክ----------4 ሌላ----------999	
106	ብሔርህ/ሽ ምንድ ነዉ ?	ኦሮሞ ----------1 አማራ----------2 ትግራይ ----------3 ጉራጌ----------4 ሌላ----------999	
107	መልስህ/ሽአዎከሆነ፤የት/ደረጃህ/ሽ የትኛዉን ነዉ?	አንደኛደረጃ (1-8)----------1 ሁሌተኛደረጃ (9-10)---------2 መሰናዶ (11-12)----------3 ከፍተኛትምህርት----------4	
108	እናትህ/ሽ የተማሩት የትምህርትደረጃ የትኛዉን ነዉ ?	መደበኛትምህርትያላገኙ -----1 አንደኛደረጃ (1-8)----------2 ሁሌተኛደረጃ (9-12)----------3 ከፍተኛትምህርት----------4	
109	አባትህ የተማሩት የትምህርትደረጃ የትኛዉን ነዉ ?	መደበኛትምህርትያላገኙ -------1 አንደኛደረጃ (1-8)----------2 ሁሌተኛደረጃ (9-12)----------3 ከፍተኛትምህርት----------4	

110	ከማን ጋር ትኖራለህ/ሽ ?	ከአባት እና ከእናት.....1 ከእናት ጋር ብቻ.....2 ከአባት ጋር ብቻ.....3 ከዘመድ ጋር.....4 ሌላ ካሌ.....5	
111	በቤታችዉ ስንትሆናችዉትኖራላችዉ ወይም አጠቃላይ የቤተሰብ አባላት ስንት ነዉ ?	----------	
112	ከቤተሰብ ዉጭየሚረዳህ/ሽአካልአለህ ?	አዎ----------1 አይደለም--------2	
113	መልስህ/ሽአዎንከሆነየሚረዳህ/ሽአካልማንነዉ ?	መንግስታዊያልሆነድርጅት.....1 መንግስት.....2 ሌላ.....	
114	ምንዓይነትድገፍያደርጉልሃል /ልሻል ?	የገንዘብ እርዳታ----------1የምግብእርዳታ------2 የትምህርትመርጃ----------3 ሌላ----------	
	የስነ-ባህርያት መገለጫ መጠይቆች		
115	ሥጋራ ታጨሳለህ/ሽ ?	አዎ----------1 አላጨስም----------2	
116	አልኮልትጣጣለህ/ሽ ?	አዎ----------1 አልጠጣም----------2	
117	በለፉት ሁለት ሳምንት ምግብ የመዝለል (ሳትመገብ/ቢ) የመተዉ ባህር ነበረህ/ሽ ?	አዎ----------1 አይደሌም----------2	→ጥ121
118	መልስህ/ሽ አዎ ከሆነ በአብዛኛዉ የትኛዉን ነዉ የማትመገበዉ/ዊዉ ?	ቁርስ----------1 ምሳ----------2 መክሰስ----------3 እራት----------4	
119	በዚህጤናተቋምከዛሬ በፍት በነበረህ/ሽ ቀጠሮ ስለ አመጋገብ ሁኔታየምክርአገልግሎት አግኝተሃል/ ሻል?	1.አዎ----------1 2.አይደለም----------2	→124
120	መልስህ/ሽአዎከሆነየምክርአገልግሎቱ ስለ ምን ምን ነበር ?	ቤት ያፈራዉን የተመጣጠኑ ምግቦችን አዘወትሮ ስለ መመገብ.....1 ጥሬ የሆኑ ምግቦችን አለመጠቀም.....2 ምግብ ከመሰናዳቱ በፍትም ሆነ በኋላ በንፅህና መያዝ.....3 ትኩስ ምግቦችን ወይም ዉለዉ ያላደሩ ምግቦችን መጠቀም.....4 ሌላ ከሌ ይጠቀስ.....5	
	የጤንናት ሁኔታ ላይ የሚያተኩሩ መጠይቆች (ለጠያቂ ፤ ከ 126 እስከ 133 ያሉ መጠይቆች ከህክምና ካርድ የሚወሰዱ ናቸዉ)		ይለፍ
121	የህመምስሜትስለማህ/ሽወደህክምናተቋምየመሄድዝንባሌአለህ/ሽ ?	አዎ----------1 አይደሌም----------0	→ጥ134
122	መልስህ/ሽአዎከሆነባለፉት ሁለት ሳምንታትበህመምምክንያትወደዚህጤናተቋምመጥተህ/ሽተዉቃለህ/ሽ ?	አዎ----------1 አይደሌም----------0	

123	ህማሙስ ምን ምን ነበር ? (**ለጠያቂ ፤ከህክምና ካርድ የሚወሰድ)**	የቆየ ሳል……..1 የቆየ ተቅማጥ፤ትውከት……2 የቆዳ ማሳከክ……3 ሌላ……..	
124	በህክምናላይየቆይታጊዜህ/ሽ ወይም ዋናዉን መድሀኒት ከጀምርክ/ሽ ምን ያህል ጊዜ ነዉ ? (**ለጠያቂ ፤ከህክምና ካርድ የሚወሰድ)**	--------አመት----------ወር	
125	የህክምና ክትትልህን አቋርጠህ/ሽ ታዉቃለህ/ሽ (**ለጠያቂ ፤ከህክምና ካርድ የሚወሰድ)**	አዎ……1 አይደለም……..2	
126	የዓለም ጤና ድርጅት የህክምና ደረጃህ/ሽ ስንት ነዉ? (WHO T-stage) (ከህክምናካርድየሚወሰድ)	አንደኛ----------1 ሁለተኛ----------2 ሶስተኛ----------3 አራተኛ----------4	
127	የሳንባ በሽታ መከላከያ መድሀንት ተጠቅምህ/ሽ ታዉቃለህ/ሽ?(**ለጠያቂ ፤ከህክምናካርድየሚወሰድ)**	አዎ----------1 አይደለም----------2	
128	የሳንባ በሽታ ህክምና ክትትል ላይ ነህ/ሽ?	አዎ----------1 አይደለም----------2	
129	ያለፈዉ ስድስት ወር የCD_4 መጠንህ/ሽ ስንት ነዉ? ((**ለጠያቂ ፤ከህክምናካርድየሚወሰድ)**	---------- ከአምስትመቶበታች----------1 አምስትመቶእናከዛበላይ----2	
130	የጤንናት ሁኔታ ግንዛቤ(disclosure status) አለህ/ሽ ((**ለጠያቂ ፤ከህክምናካርድየሚወሰድ)**	አዎ……1 አይደለም……2	

ክፍል3	**የቤተሰብየምግብዋስትናመለኪያ፤ከዚህበመቀጠልደግሞበለፈዉአንድወርበቤተሳብህ/ሽስለነበረየምግብዋስትናአንዳንድጥያቄዎችንእጣይቃለህለሁ/ሽ።።**		
131	ባለፈዉአንድወርበቤታችዉበቂምግብየሌምብለህ/ሽተጨንቀህ/ሽታዉቃለህ/ሽ	አዎ----------1 አይደለም----------0	→ጥ133
132	ይህችግርምንያህል ጊዜ ተከስቶአል ?	አልፎአልፎ(በወር፤አንድወይምሁለትጊዜ---------1 አንዳንዴ(በወር ከሶስትእስከአስርጊዜ)……...2 ብዙጊዜ (በወር ከአስርጊዜበላይ)……..3	
133	በለፈዉአንድወርአንተ/ቺወይምሌላየቤተሰብአባልበማጣት (በችግር) ምክንያትየምትፈልጉትንየምግብዓይናትሳትመገቡቀርታቸዋል?*(ለጣያቂ፤ለምሳሌሥጋመብላትፈልገዉአልበሉም)*	አዎ----------1 አይደለም----------0	→ጥ135
134	ይህችግርምንያህልጊዜ ተከስቶአል ?	አልፎአልፎ (በወር፤አንድወይምሁለት ጊዜ…1 አንዳንዴ(በወርከሶስትእስከአስርጊዜ …….. 2 ብዙጊዜ (በወርከአስርጊዜበላይ)……..3	
135	በለፈዉአንድወርአንተ/ቺወይምሌላየቤተሰብአባልበማጣት (በችግር) ምክንያት ሁሌ አንድ አይነት ምግብ ታመግባችዉታዉቃላችዉ?(**ለጣያቂ፤ለምሳሌሁሌምስር ….**)	አዎ----------1 አይደለም----------0	→ጥ137

136	ይህችግርምንያህል ጊዜ ተከስቶአል?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ-------1 አንዳንዴ (በወር ከሶስትእስከአስርጊዜ.....2 ብዙጊዜ (በወርከአስርጊዜበላይ)..... 3	
137	በለፈዉአንድወርአንተ/ቺወይም ሌላ የቤተሰብአባልበማጣት(በችግር) ምክንያትበአከባቢማህበረሰብያልተለመደምግብተመግባቸ ዋል ? ***(ለጣያቂ፤ለምሳሌበችግርጊዜብቻየምበላምግብ)***	አዎ----------1 አይደለም----------0 ጥያቄ	→ጥ139
138	ይህችግርምንያህልጊዜተከስቶአል ?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ)-----1 አንዳንዴ(በወርከሶስትእስከአስርግዜ)..... .....2 ብዙጊዜ (በወርከአስርግዜበላ)..... 3	
139	በለፈዉአንድወርአንተ/ቺወይም ሌላየቤተሰብአባልበቂምግብባለመኖሩያነሰየምግብመጠንተ መግባቸዋል***(ለጣያቂ፤ለምሳሌብዙሰዉሆኖአንድእንጀራመ መገብ ሊሆን ይችላል።)***	አዎ----------1 አይደለም----------0	→ጥ141
140	ይህችግርምንያህል ጊዜ ተከስቶአል?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ)--------1 አንዳንዴ(በወርከሶስትእስከአስርጊዜ)..... .....2 ብዙጊዜ (በወርከአስርጊዜበላይ)..... 3	
141	በለፈዉአንድወርአንተ/ቺወይምሌላ የቤተሰብአባልበቤታችዉበቂምግብባለመኖሩበቀንዉስጥከ ተለመደዉጊዜያነሰምግብተመግባቸዋል ? ***(ለጣያቂ፤ለምሳሌበቀንሦሥትጊዜይመገቡከሆነከሦሥትጊ ዜበታችልሆንይችላል)***	አዎ----------1 አይደለም----------0	→ጥ 143
142	ይህችግርምንያህል ጊዜተከስቶአል ?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ)……1 አንዳንዴ(በወርከሶስትእስከአስርጊዜ).....2 ብዙጊዜ (በወርከአስርጊዜበላይ)..... 3	
143	ባለፈዉአንድወርበችግርምክንያትበቤታችዉበቂምግብበለ መኖሩየሚላስ /የሚቀመስጠፍቶያዉቀል ?	አዎ----------1 አይደለም----------0	→ጥ145
144	ይህችግርምንያህልጊዜ ተከስቶአል?	አልፎአልፎ (በወር፤አንድወይምሁለት)……..1 አንዳንዴ(በወርከሶስትእስከአስርጊዜ).....2 ብዙጊዜ (በወርከአስርግዜበላይ)..... 3	
145	በለፈዉአንድወርአንተ/ቺወይምለላየቤተሰብአባልበቤታች ዉበቂምግብባለመኖሩሳትበሉያዳራቹበትቀንአለ ?	አዎ----------1 አይደለም----------0	→ጥ147
146	ይህችግርምንያህል ጊዜተከስቶአል ?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ)……1 አንዳንዴ(በወርከሶስትእስከአስርግዜ)..... .....2 ብዙጊዜ (በወርከአስርግዜበላይ)..... 3	
147	በለፈዉአንድወርአንተ/ቺወይምሌላየቤተሰብአባልበቤታች ዉበቂምግብባለመኖሩሳትበሉዉላችዉያዳራቹበትቀንአለ ?	አዎ----------1 አይደለም----------0	→ጥ149
148	ይህችግርምንያህል ጊዜ ተከስቶአል ?	አልፎአልፎ (በወር፤አንድወይምሁለትጊዜ)……1 አንዳንዴ(በወርከሶስትእስከአስርጊዜ)..... .....2 ብዙጊዜ (በወርከአስርጊዜበላይ)..... 3	

	የቤሰብ የአመጋገብ ሰብጥር ፤ ከዚህ በመቀጠል በትላንትና ዉ እለት ቀንም ሆኔ ማታ ቤተሰብህ/ሽ ስለተመገቡት ምግብ አንድ አንድ ጥያቄችን ይጠይቃሃለዉ/ቂሻለዉ። የተመገቡት ምግብ አንድ አይነት ወይም ከሌሎች ምግቦች ጋር በማደባለቅ ሊሆን ይችላል። በትላንትና እለት በቤት ዉስጥ ተዘጋጅቶ የተመገባቸዉት ምግብ ምንን ያጠቃልላል ? ***ቁርስ----------1*** ***ምሳ ----------2*** ***መክሰስ--------3*** ***እራት...4 ሊሆን***		
149	ዳቦ፤ፓስታ፤ሩዝ ወይም ከአጃ፤በቆሎ ፤ገብስ፤ስንዴ፤ማሽላ ወይም ከሌሎች የእህል ዘር የተሠራ ምግብ	አዎ----------1 አይደለም-------0	
150	ድንች፤ ፤ቀይ ሥር፤ ቆጮ ወይም ሥራቸዉ የሚበላ	አዎ----------1 አይደለም-------0	
151	እንደ ጎመን ና ሰላጣ ፤ካሮት፤ ደማቅ አረንጓዴ ቅጠል ያላቸዉ አትክልቶች	አዎ----------1 አይደለም-------0	
152	ፍራፈሬ (ብርቱካን፤ሙዝ፤ አናናስ፤ወዘተ)	አዎ----------1 አይደለም-------0	
153	ስጋ (የላም/የበሬ ፤የአሳማ ፤የፍያል ፤የበግ ፤የዶሮ) ወይም የሌላ	አዎ----------1 አይደለም-------0	
154	እንቁላል (የደሮ፤የጅግራ...ወዘተ)	አዎ----------1 አይደለም-------0	
155	ዓሣና ሌሎች የባህር ምግቦች	አዎ----------1 አይደለም-------0	
156	በቂላ፤አተር፤አኩር አተር፤ለዉዝ ፤ኑግ ፤ሰሊጥ ወይም ከሌሎችጥራጥሬዎች የተሰራ ምግብ	አዎ----------1 አይደለም-------0	
157	አይብ፤እርጎ፤ሌላ የወተት ተወፅኦ	አዎ----------1 አይደለም-------0	
158	ማንኛዉም ምግብ፤በምግብ ዘይት፤በቅቤ ወይም በሌላ ዘይት የተሰራ	አዎ----------1 አይደለም-------0	
159	ስኮር ፤ማር	አዎ----------1 አይደለም-------0	
160	ቡና ፤ሻይ	አዎ----------1 አይደለም-------0	

Declaration

I, the undersigned declare that this thesis is my own original work in partial fulfillment of the requirement for the degree of Masters of Public Health in Public Health Nutrition.

Name BirraAbdulkarim

Signature _____

Place of submission: to School of Graduate Studies, Addis Ababa University, Ethiopia.

Date of submission _____

This thesis work has been submitted for examination with my approval as university advisor.

Solomon Shiferaw (MDH, MPH)

Signature _____

ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical Conduct of the research project and for provision of required progress reports as Per terms and conditions of the Research Publications Office in effect at the time of Grant is forwarded as the result of this application.

Name of the student: _____

Date._____ Signature _____

Approval of the primary Advisor

Name of the primary advisor:_____

Date._____ Signature _____