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Original Research Article

Magnitude of Stunting, Thinness and Associated Factors among HIV Positive Children Attending Chronic HIV Care and Support in Adama Hospital Medical College, Adama, Oromia Regional State, Ethiopia

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ABSTRACT

Background: Approximately 70 percent of children live in Africa where food insecurity and undernutrition are endemic. Even though underlying undernutrition makes difficulty to combat HIV/AIDS, the factors of this underlying problem is not still well known.
Objective: To assess Magnitude of stunting, thinness and associated factors among pediatric age group (<15 years) HIV positive children who are on chronic HIV care and support follows up at AHMC, Adama, Ethiopia 2017.
Method and Materials: Institution based cross sectional study design was employed using quantitative methods on 412 children (< 15 years) in Adama Hospital Medical College who are on chronic Anti Retroviral Therapy care and support. WHO Anthros plus 2010 software was used to analyze the anthropometric indices. Bivariate and multivariable Logistic regression with the 95% confidence interval was computed and interpreted. P-value <0.05 was declared as statistically significant.
Result: A total of 412 children included in the study. Stunting among children on chronic HIV care and support is low (13.4%) but thinness is very high (21.8%). On Multivariable logistic regression and BMI for age analysis, variables like Male Sex (AOR, 1.99; 95% CI: 1.19, 3.32) and Problem of eating (AOR, 2.2; 95% CI: 1.19, 4.11),Age greater than 10 years (AOR, 0.24; 95% CI: 0.08, 0.73) and Monthly income of care giver (AOR, 0.40; 95% CI: 0.20, 0.79) shows significant association with thinness and Parental status (AOR, 0.26; 95% CI: 0.08, 0.80), Presence of opportunistic infection (AOR, 4.495% CI: 1.97, 9.89) and dietary pattern (AOR, 5.40; 95% CI: 1.20, 24.22) were significantly associated with stunting.
Conclusion and Recommendation: Stunting among children on chronic HIV care and support is low (13.4%) but thinness is very high (21.8%). Factors like Sex, Age, Monthly income of care givers and eating problem were significantly associated with thinning and Parental status, presence of opportunistic infection and dietary pattern were significantly associated with stunting. Health care givers and program managers should work prevention of opportunistic diseases and dietary pattern counseling especially for male children at adolescent age children should work on income generation of care givers.

Key words: *Adama, Stunting, Thinness*

1. INTRODUCTION

1.1 Background

'Malnutrition' is a general term for a medical condition caused by an improper or

insufficient diet. The term usually refers to generally bad or faulty nutrition and is most often related to undernutrition. According to the World Health Organization (WHO), malnutrition is the 'cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance and specific functions', and is the greatest risk factor for illness and death worldwide. [1] Again WHO define as, "The term malnutrition generally refers both to undernutrition and overnutrition", but the term refers solely to a deficiency of nutrition. Many factors can cause malnutrition, most of which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. [2]

Nutrition is a critical component of HIV treatment, care, and support, as recommended by The U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the World Health Organization (WHO), United Nations Program on HIV/AIDS (UNAIDS), and the World Food Program (WFP). [3] It is an important factor at all stages of HIV. Clinical studies show that HIV positive peoples have reduced appetite and ability to consume food, as well as a higher incidence of diarrhea resulting in malabsorption and nutrient losses. Fungal infections (Candidiasis) in the mouth or throat may cause pain when swallowing, while nausea impedes normal eating patterns and food intake. [4] Human Immune Virus and undernutrition interact in a vicious cycle: HIV-induced immune impairment and increased risk of infection can worsen nutritional status, lead to nutritional deficiencies through decreased food intake, mal-absorption syndrome and increased utilization and excretion of nutrients. These processes in turn hasten the progression of HIV infection to AIDS at individual level, while HIV infection exacerbates malnutrition by attacking the immune system and by negatively impacting nutrient intake, absorption and the body's use of food. [5] Due to the cyclic nature of HIV and poor nutritional status, failing to meet nutritional needs may lead to decreased immunity and increased susceptibility to opportunistic infections (OIs), which can lead to further poor nutritional status. [6]

Like HIV /AIDS, undernutrition also compromises the immune function and thus increases susceptibility to severe illnesses and reduces survival. Nutritional status modulates the immunological response to HIV infection, affecting the overall clinical outcomes. [7] Weight loss is an important predictor of death from AIDS. The links between nutrition and HIV/AIDS increase the negative effects of HIV infection on human development at individual, household, community and national levels. [8]

A well nutritional status is believed to be has an impact on the adherence of ART drug intake; whereas undernutrition boosts an increased risk of developing opportunistic infections and malnutrition, particularly. Wasting and those individuals require greater protein and micronutrient intake than from that of non HIV/AIDS infected individuals to support and recover their weakened immune system. [9]

Early mortality with advanced disease of HIV is common features of individuals who are already enrolled on ART drugs. [10,11] The co-morbidities include undernutrition, tuberculosis, and diarrheal disease which have negative interaction for individuals living with HIV. [12,13] Those people living with HIV (PLWHA) and co-infected with tuberculosis (TB), leads to even greater metabolic stress and risk of malnutrition. Nutritional support has a role within clinical and community services in case of commitment, adherence and retention in care and treatment. [14]

Undernutrition is a significant factor affecting human immune deficiency virus (HIV) care and treatment in resource limited settings and contributes to other infections, including tuberculosis. [15,16] With regard to this problem, chronic underlying poor nutritional status and its intersection with food insecurity, poverty, and co-infections

also pose a serious threat to efforts to combat HIV/AIDS by denying access to a nutrition-rich diet, hindering the chance of good health outcomes. [9,17]

Different literatures showed various types of problems that affect quality of life among individuals living with HIV, such as drug adherence problems, nutritional problems, and other problems, however little is understood about the magnitude of undernutrition and associated factors among HIV/AIDS positive pediatric children living in Ethiopia including the study area. Therefore, this study will be conducted to assess the magnitude of undernutrition and associated factors among pediatric age group (<15 years) living with HIV/AIDS in Adama Hospital Medical college in Adama town.

1.2 Significance of the Study

The result of this study may help to attract the attention of public health authorities (Oromia region health facilities since AHMC follow significant number of children affected by HIV), and other stakeholders in the study area on the need to re-evaluate current strategies concerning undernutrition, by making sure that the various factors contributing to undernutrition among HIV positive pediatric children have been identified. The study may also be important for parents, care takers and children in familiarizing the factors for undernutrition and the way of decreasing its condition. In addition, this study will enrich literatures available on the issue and can be used as a baseline for other studies.

1.3 Conceptual Framework

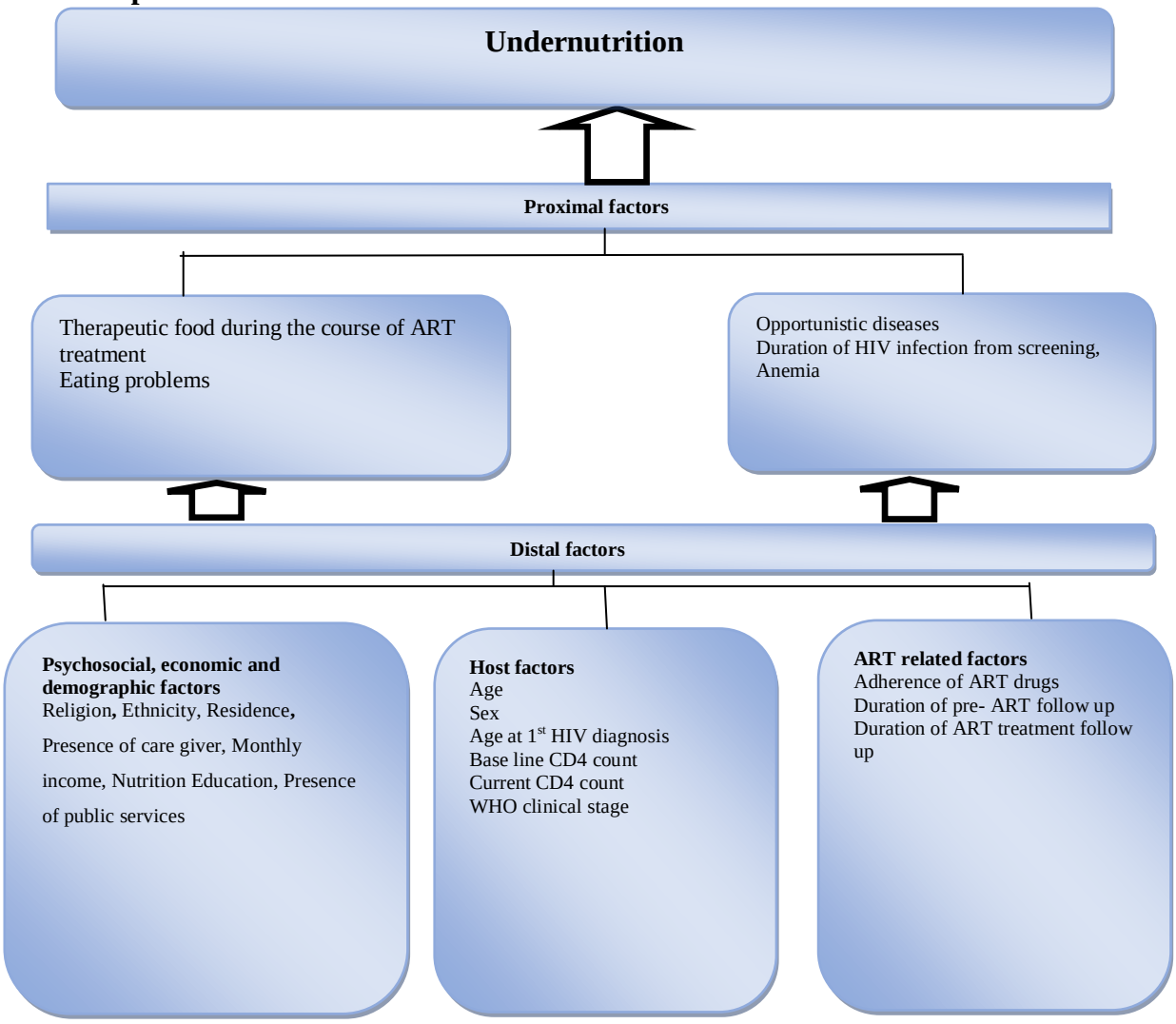

Figure 1: Conceptual framework (Derived from Literature Review) Source: lesson from literature

2. OBJECTIVES

2.1 General Objective

To assess magnitude of under nutrition and associated factors among pediatric age group (<15 years) living with HIV/ in children on follows up at AHMC, Adama, Ethiopia 2017.

2.2 Specific Objectives

- ✓ To determine the magnitude of under nutrition among pediatric age group (<15 years) living with HIV/ in children on follows up at AHMC, Adama, Ethiopia 2017
- ✓ To identify factors associated with under nutrition among pediatric age group (<15 years) living with HIV/ in children on follows up at AHMC, Adama, Ethiopia 2017

3. METHODS AND MATERIALS

3.1 Study Area and Period

The study was conducted in Adama Hospital Medical College (AHMC) ART clinic which is located in central Oromia, Ethiopia. It is found at about 100km southeast from Addis Ababa. AHMC provides general medical service for more than 5 million of its catchment area population per year. It provides ART care and support for 7091clients per year, out of which 480 children under 15 years are currently chronic ART care and support users. This study was conducted from May to September 2017.

3.2 Study design

Health institution based cross sectional study design was employed from June30 to September 30, 2017.

3.3 Population

3.3.1 Source Population

All Pediatric age children (0-15 years) whose reside in Adama town and Adama Hospital medical college service Catchment area.

3.3.2 Study Population

All Pediatric age children (6 month to 15 years) whose HIV sero - status was confirmed HIV positive and has current follow up at the ART clinics in AHMC.

3.4 Inclusion and Exclusion Criteria

3.4.1 Exclusion Criteria

Paediatric children (0-15 years) whose care givers are not able to communicate with data collectors because of health problem or mental health problem and those whose sero-status was not confirmed and children who are seriously ill was excluded.

3.5 Sample Size Determination and Sampling technique

3.5.1 Sample Size Determination

The required sample size for this study was calculated using single population proportions estimation formula by taking the magnitude of undernutrition among HIV positive children for stunting 65%, Underweight 41.7% and wasting 5.8%. [18] The calculated sample size for the first specific objective was:

$$n = \frac{(Z_{\alpha/2})^2 pq}{d^2}$$

Where; n = Minimum sample size for a statistically significant survey

Z = Normal deviant at the portion of 95% confidence interval two tailed test= 1.96

P =Magnitude of undernutrition among HIV positive children of age 6 month to 14 years =42.9%= 0.429 (Berihun et al., 2011).

q= 1-p, d = margin of error acceptable is taken as 5%= 0.05

Using the above formula, sample size was calculated and the result for stunting, underweight and wasting is 385, 412 and 92 respectively after adding 10% for non-respondents. The largest sample size is 412.

3.5.2 Sampling Procedures

In AHMC, 889 children was enrolled and started ART but currently 480 are active and taking their medication, but the sample size required to carry out this study is 412 based on the sample size determination. Therefore, all 412 of active ART care and support service user children were included into the Study. 412 children were selected randomly from the ART registration list of AHMC.

3.6 Study Variables

3.6.1 Dependent Variable

Undernutrition (Stunting and Thinness/Wasting)

3.6.2 Independent Variables

Socio-demographic and economic variables (age, sex, religion, residence, ethnicity, presence of care giver, nutrition education, presence of public facilities, and monthly income,), WHO clinical stage HIV/AIDS base line and current, Opportunistic diseases, Age at 1st HIV diagnosis, Eating problems, baseline and Current CD4 count, Adherenceto ART drugs, Therapeutic food during the course of ART treatment, Duration of pre- ART, Duration of ART follow up, Follow up interval of ART treatment, Total duration of HIV/AIDS infection (starting from time of screening)

3.7 Data Collection Methods

3.7.1 Data Collection Instruments

Data was collected using a structured questioner. Some of the questions were adapted from other prior similar study conducted in Ethiopia. [18] Then, the questionnaire was further adopted based the objectives of the study. The questionnaire was developed in English and interpreted into two common local languages (Afan Oromo and Amharic) and modified further after pre-test was conducted.

3.7.2 Data Collectors and Data Collection Procedure

Data was collected with interviewer and additional review of medical record charts. The interview and chart review was done by four ART service provider nurses who are working in AHMC ART. They were offered two days training on data collection. In addition to data collectors there was one supervisor. Supervisors were recruited from other health facilities.

Data collectors inform the study participants and parents (care takers) about the purpose of the study and informed consent were taken from each study participate. Then after, interview was conducted in AHMC at exist of ART care and support service.

All children were weighed and measured once while wearing light-weight clothing. Children aged less than 2 years of age were laid horizontally and weighed using children`s scale. The measurement was recorded to the nearest 0.05 kg. Their lengths was measured using height or length measuring board stretching in a recumbent position using a measuring tape to the nearest 0.01m. Children aged 2-15 years was weighed standing unassisted and bare footed on digital weight scale the nearest 0.1kg and their height was measured using a stadio meter with the nearest 0.01m. Height was measured with subjects standing straight on a smoothly flat horizontal surface with their heels together, eyes straight forward, and touching the standing board at the heels, buttocks and the back of the head. All anthropometric measurements was taken by following standard anthropometric techniques the measurements was collected in twice and the largest values was used for analysis.

3.8 Data quality control

The data was collected and checked for completeness. Records with incomplete information were excluded from entry. The research activities was supervised and controlled by the investigators.

3.9 Data processing and analysis

All the interviewed questionnaires were checked visually. Data was coded, cleaned and entered using Epi Data version 3.3.1 software. Double entry was made to cross check the data for completeness before analysis. The entered data was exported and analysed with Statistical Package for Social Science (SPSS) version 21.0 software.

Anthroplus Software was used to determine the magnitude of malnutrition using the indicators of weight for-age (WFA), height-for-age (HFA), for BMI for age analysis. To determine undernutrition, World Health Organization (WHO) reference standards taking –2SD as the cut-off point indicating malnutrition (between -2SD and -3SD for moderate malnutrition and less than the -3SD for severe malnutrition) for under-five children and the National MUAC classification chart for HIV positive children were used to categorize nutritional status. Age in months, weight in kilograms, height/length in centimeters and others was entered into Epi

Data version 3.3.1 software. Then the anthropometric measurements (WFA, HFA and WFH and their z-scores) was calculated using the Anthros WHO 2010 nutrition program software (Anthros for those children <5 years and Anthros plus for children 5-15 years). Then it was exported to SPSS version 21 for further analysis.

Simple descriptive statistics such as a frequency distribution and percentages was performed to describe the socio demographic and economic and other characteristics of the respondents. Then a bivariate logistic regression was performed for each independent variable and outcome variable. By considering the result of bivariate analysis, variables were selected for the multivariable analysis to control for confounding. A variable whose bivariate test has a p-value <0.25 was a candidate for multivariable model along with all variables. Once the variables were identified, multivariable analysis was begun with a model containing all of the selected variables.

The Hosmer and Lemeshow's goodness-of-fit test model coefficients was considered to assess whether the necessary assumptions for the application of multiple logistic regression was fulfilled. A good fit as measured by Hosmer and Lemeshow's test was yield a large P-value.

Finally, multivariable logistic regression model was done to determine independent predictors of undernutrition. Crude and adjusted odds ratios together with their corresponding 95% confidence intervals was computed and strength of association seen. All tests were two-sided and P <0.05 was considered statistically significant.

3.10 Ethical consideration

Ethical clearance was obtained from AHMC Research Ethics Review Committee (IHRERC). Patient information was taken in way which is respect the confidentiality, data was collected from their charts and Interview was conducted in separate, confidential and secured room inside the facilities. The study ensured individual information was not being disclosed and was kept confidential. There was no payment for study participants.

4. RESULT

4.1 Socio-demographic characteristics

Table 1: Sociodemographic statues of study participant pediatric age group living with HIV/AIDS in AHMC, Adama, Ethiopia 2017

Variable	Frequencies	Percentage
Age		
<= 5 years	26	6.3
5-10 years	76	18.4
>10 years	310	75.2
Sex		
Male	212	51.5
Female	200	48.5
Religion (Family or care givers`)		
Orthodox	285	69.2
Muslim	60	14.6
Protestant	65	15.8
Others	2	0.5
Ethnicity		
Oromo	179	43.4
Amhara	177	43.0
Gurage and Silte	34	8.3
Tigre and Argoba	14	3.4
Other	8	1.9
Residence		
Rural	61	14.8
Urban	351	85.2
Parental living status		
Both alive	162	39.3
Mother died	49	11.9
Father died	74	18.0
Both died	67	16.3
Separated/ divorced	60	14.6
Children live with		
Parents	321	77.9
Sister/Brother	14	3.4
Aunt/Ankle	33	8.0
Grand parent	32	7.8
Sibling	12	2.9
Have care givers		
No	7	1.7
Yes	405	98.3
Source of care givers		
Both Parents	153	37.1
Mother	129	31.3
Father	38	9.2
Sibling	35	8.5
Religious father	56	13.6
Others	1	0.2
Monthly family income		
< 15000 birr	258	62.6
1501 – 3000 birr	114	27.7
> 3000 birr	40	9.7

A total of 412 children who are on chronic ART care and support were interviewed and their follow up card was also reviewed. The majority 310(75.2%) of participants children were at the age greater than 10 years with the mean age of 11.5 year (SD ±3.18) and 212(51.6%) them were

female children. Concerning the religion of the participants majority 285(69.2%) and 65(15.8%) were orthodox and protestant respectively. When we look over the ethnicity of the study participants, majority 179(43.4%) were Oromo .About 351(85.2%) of them were from urban. Regarding parental status of participants, majority 162(39.3%) of them had alive parents both mother and father. The majority 321(77.9%) of children live with their parents. 405(98.3%) and 153(37.1%) of the study participants had care giver and care was given by both parent (mother and father). The majority 258(62.6%) of study participants family earn less than 1500 birr per month.

4.2 Diet and Diet related factors

Factors related to diet were assessed in this study. Majority 321(77.9%) were counseled for diet. Regard frequency of eating breakfast in the week, most of 406 (98.5%) study participants eat their breakfast always in the week. Majority of children eat cereals /bread 239(58.09%) for their breakfast. Most 406(98.5%) of study participants eat their lunch and dinner always. Regarding their pattern of diet during lunch and dinner, the majority 291(70.6%) of their diet were different every day. Concerning their content of usual diet, majority 287(69.7%) of study participants diet were different every day. The majority 294(71.4%) of children have their snack every day. Type of snack food majority 129(43.9%) have Biscuits. About 57(13.8%) children have been given nutritional therapy through ART care and support course. Regarding problems of eating, majority 339(82.3%) do not have eating problem and out of those who had eating problem, the majority 64(87.7%) had loss of appetite.

In this study, some factors that may have relation with nutritional status of the study participants were assessed. The majority 280(68.0%) of the study participants were counseled about nutrition and 66(16.02%) of them get nutritional support and 57(86.4%) of those who get nutritional support and completed the support before the study time.

Table 2: associated factor with malnutrition of study participant pediatric age group living with HIV/AIDS in public health facilities, at AHMC, Adama, Ethiopia 2017

Variable	Frequencies	Percentage
Dietary counselling		
No	91	22.1
Yes	321	77.9
Frequency of breakfast		
Always	406	98.5
Sometimes	6	1.5
Content of breakfast		
Cereals / bread	239	58.09
Pasta /macaroni	43	10.4
Any homemade food	130	31.6
Frequency of lunch and dinner		
Always	406	98.5
Sometimes	6	1.5
Pattern of diet		
Different every day	291	70.6
Different sometimes	60	14.6
Different only at weekend	39	9.5
Monotonous	22	5.3
Contents of usual diet		
High protein	29	7.0
High carbohydrate	86	20.0
High fat	10	2.4
Different every	287	69.7
Eat snack		
No	118	28.6
Yes	294	71.4
Content of snack		
Fruits	30	10.2
Biscuits	129	43.9
Fried Potatoes	17	5.8
Corn	21	7.1
Any homemade food	53	18.0
Enjera	31	10.5
Baso	13	4.4
Eating problem		
No	339	82.3
Yes	73	17.7
Type of eating problem(N=73)		
Loss of appetite	64	87.7
Others	9	12.3
Nutritional counseling		
No	132	32.0
Yes	280	68.0
Time of nutritional support (N = 66)		
At the time of diagnosis	3	4.5
Before the study time	57	86.4
During the study time	6	9.1
Duration of nutritional support (N= 61)		
<= 30 days	5	8.2
>30 days	56	91.8
Currently on nutritional therapy		
No	404	98.1
Yes	8	1.9
Feeding situation for under 6 months (N = 7)		
Exclusive breast feeding	3	42.9
Replacement feeding	1	14.3
Mixed feeding	3	42.9

When we look over the length of nutritional support, the majority 56(91.8%)

of them given nutritional support for more than 30 days. Concerning the current nutritional support only 8(1.9%) of the study participants are on nutritional therapy. Regarding the feeding situation of under six month age, 3(42.9%) of them were exclusively breast feed and 3(42.9%) of them were feed mixed feeding. When we see the over all of the nutritional status of study participants, the majority 347(84.4%) of them are in the range of less than 18.5 kg/m2 BMI range.

4.3 Factors related to HIV infection

Table 3: Factor with related to HIV infection of study participant pediatric age group living with HIV/AIDS in AHMC, Adama, Ethiopia 2017

Variables	Frequency	Percentage
Duration of HIV infection		
< 5 years	73	17.7
5-10 years	240	58.3
>10 years	99	24.0
WHO Clinical Stage		
Stage 1	86	20.9
Stage 2	137	33.3
Stage 3	167	40.5
Stage 4	22	5.3
Baseline CD4(N=370)		
>= 500 cell/mm3	128	34.9
350-499 cell/mm3	68	18.4
200-350 cell/mm3	88	23.8
< 200 cell/mm3	85	23.0
Current CD4 (N= 371)		
>= 500 cell/mm3	272	73.3
350-499 cell/mm3	54	14.6
200-350 cell/mm3	26	7.0
< 200 cell/mm3	19	5.1
Presence of opportunistic diseases		
No	371	90.0
Yes	41	10.0
Type of opportunistic diseases (N= 41)		
Pneumonia	3	7.3
TB	24	58.5
Diarrheal diseases	4	9.8
Skin infections	9	22.0
Others	1	2.4
Adherence to ART drugs		
Good	394	95.6
Fair	11	2.7
Poor	7	1.7
Adherence to ART Programs		
Good	403	97.8
Poor	9	2.2

Some of the factors related to HIV infection were analyzed. Regarding duration of HIV infection, the majority 240(58.3%) was between the ages of 5-10 years. Baseline WHO clinical stage of most of study participant children were stage 3 and stage 2 which was 167(40.5%), 137(33.3%) respectively. Concerning the level of CD4, the majority 128(34.9%) and 272(73.3%) had more than 500 cell/mm^3 of base line and current CD4 respectively. Opportunistic infections are the most common problems that worsen HIV infection. Out of the total participants, only 41(10.0%) of them had opportunistic infection. Of those who had opportunistic infection, the majority 24(58.5%) of participants are suffering from tuberculosis. Regarding adherence to ART drug and ART care and support program, the majority 394(84.4%) and 403(97.8%) were good adherence to ART drug and ART care and support programs respectively. See table below

4.4 Magnitude of thinness and stunting

BMI for Age analysis was used to analyze level of thinness among the study participants. Out of 412 study participants, about 90(21.8%) of children were wasted or thinned. The highest level of wasting or thinning 80(25.8%) was observed among children of greater than 10 years old. Similarly, the highest wasting or thinning 58(27.4%) was observed among male children. Concerning the stunting of the children, height for age was analyzed. About 55(13.4%) of the study participants were stunted. The highest level of stunting 5(19.2%) and 32(15.1%) were observed among children of age less than 5 years and male children respectively.

4.5 Determinants of thinness and stunting

Anthroplus software analysis used to determine the magnitude of wasting and stunting among children. During bivariate analysis for BMI for age, factors like Sex, Age, Residence, Duration of HIV infection, level of current CD4, ART program and care adherence, Eating problem, and Pattern of diet shows significant association with wasting or thinning and factors like Sex, Age, Parental status, Monthly care givers income, Duration of HIV infection, snack type, counseling on nutrition, presence of opportunistic infection and patterns of diet shows significant association with stunting at p-value < 0.25.

On multivariable logistic regression, BMI for age analysis, variables like Sex, Age, monthly income of care givers and eating Problem shows significant association. Male children were 1.99(AOR, 1.99; 95% CI: 1.19, 3.32) more likely to be thinned compared to female children. Children of age greater than 10 years were 9.82(AOR, 9.82; CI: 1.23, 78.51) time more likely to be thinned compared to children age less than 5 years. Children whose care giver earn 1501-3000 Eth. Birr per month were 60% (AOR, 0.4; CI: 0.20, 0.79) less likely to be thinned compared to whose care giver earns less. Children who have eating problem were 2.22(AOR, 2.88; 95% CI: 1.19, 4.11) more likely to be thinned compared to those who have no eating problem.

Regarding the level of stunting, variables like Parental living status, Presence OIs and dietary pattern shows significant association. Parental living status shows negative association with stunting. Children whose father died were 74% (AOR, 0.26; 95% CI: 0.08, 0.80) less like to be stunted compared to those who had alive both parents. Children who had Opportunistic infection were 4.41(AOR, 4.41; 95% CI: 1.97, 9.89) more likely to be stunted compared to those who had no opportunistic infection. Children whose dietary pattern is monotonous and Different only on week end were 3.78(AOR, 3.78; 95% CI: 1.22, 11.70) and 2.71(AOR, 2.71; 95% CI: 1.10, 6.66) more likely to be stunted compared to those who had different dietary pattern every day respectively.

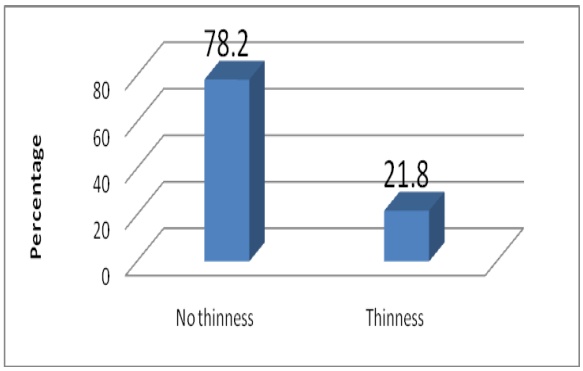

Figure 2: Graph which shows level of wasting among pediatric age group living with HIV/AIDS in AHMC, Adama, Ethiopia 2017

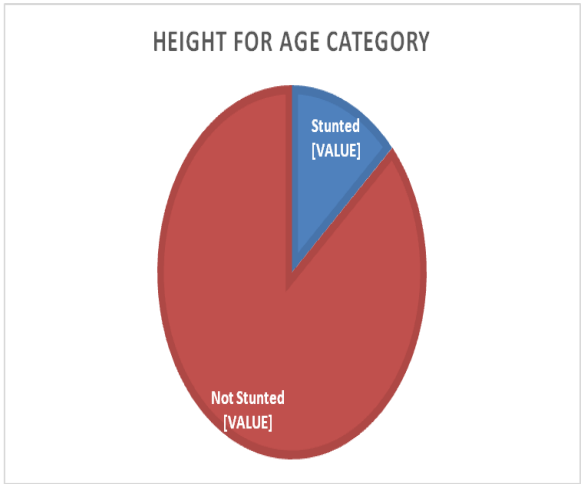

Figure 3: Diagram which shows level of stunting among pediatric age group living with HIV/AIDS in AHMC, Adama, Ethiopia 2017.

Table 4: Determinants of thinness among children on chronic HIV care and Support in AHMC, 2017

Variable	Thinness		COR	AOR
	Yes	No		
Sex				
Male	58(27.7%)	154(72.6%)	1.98(1.22,3.21)	1.99(1.19, 3.32)**
Female	32(16.0%)	168(84.0%)	1.00	
Age				
< 5 years	1(3.8%)	25(96.2%)	1.00	
5 – 10 years	9(11.8%)	67(88.2%)	3.36(0.41, 27.88)	3.75(0.42, 33.41)
>10 years	80(25.8%)	230(74.2%)	8.70(1.16, 65.22)	9.82(1.23, 78.51)**
Monthly Care Giver Income				
<1500 Birr	75(26.4%)	209(73.6%)	1.00	
1501-3000 Birr	12(12.6%)	83(87.4%)	0.40(0.21, 0.78)	0.40(0.20, 0.79)**
>3000 Birr	3(9.1%)	30(90.9%)	0.28(0.08, 0.94)	0.30(0.09, 1.04)
Eating problem				
No	66(19.5%)	273(80.5%)	1	
Yes	24(32.9%)	49(67.1%)	2.03(1.16,3.54)	2.22(1.19, 4.11)**
Adherence to ART care and support				
Good	85(21.1%)	318(78.9%)	1.00	
Poor	5(55.6%)	4(44.4%)	4.68(1.23, 17.8)	3.89(0.78, 19.44)

** Significant at p-value <0.05

Table 5: Determinants of stunting among children on chronic HIV care and Support in AHMC, 2017

Variable	Stunted		COR	AOR
	Yes	No		
Parental status				
Both alive	23(14.2%)	139(85.8%)	1	
Mother died	9(18.4%)	40(81.6%)	1.36(0.58,3.17)	1.26(0.53, 3.08)
Father died	4(5.4%)	70(94.6%)	0.35(0.12,1.04)	0.26(0.08, 0.80)**
Both died	12(17.9%)	55(82.1%)	1.32(0.61,2.83)	1.08(0.48, 2.43)
Separated / divorced	7(11.7%)	53(88.3%)	0.80(0.32,1.97)	0.87(0.34, 2.20)
Presence of Opportunistic infections				
No	328(88.4%)	43(11.6%)	1.00	
Yes	29(70.7%)	12(29.3%)	3.16(1.50, 6.64)	4.41(1.97, 9.89)**
Pattern of diet				
Different a day	33(11.3%)	258(88.7%)	1	
Different some day	9(15.5%)	51(85.0%)	1.38(0.62,3.06)	1.64(0.71, 3.81)
Different only week end	8(20.5%)	31(79.5%)	2.02(0.87,4.76)	2.71(1.10, 6.66)**
Very mono tonus	5(22.7%)	17(77.3%)	2.30(0.80,6.64)	3.78(1.22, 11.70)**

** Significant at p-value <0.05

5. DISCUSSION

This study shows that 21.8% of children were thinned and 13.4% were stunted. The result of this study shows that the level of stunting was lower compared to the study conducted in southern India in which 58% of children were stunted and thinness is higher compared to the study conducted in southern India in which 16% of children were wasted. [18] The result of study is lower compared to study conducted in another part of India in which the prevalence of stunting and wasting was 69.8% and 22.4%, respectively. [19] The result of this study is lower compared to study conducted in Gonder, Ethiopia. [18] The difference of the results of studies may due to difference in feeding habit, culture and economic status of respondents.

This study shows that highest 80(25.8%) and 44(14.2%) level of thinness and stunting was observed among children of age ten and greater than ten years old respectively. This study shows that sex of children is significantly associated with thinness among children who are on chronic ART care and support. Male children are 2.22 times more likely to be thin. The result of this study is different from the study conducted in India. [20] in which sex of children do not show any significant association and another study conducted in India as well as in Gonder, Ethiopia in which there is no difference among male and female to be thin. [18,21] The difference may be due to cultural feeding practice. This study reveals that as the age of the children increase the thinness increase, children of age more than ten years were 9.82 times more likely to be thin. The result of this study is similar with the study conducted in Ethiopia. [18] The similarity may be due to that as the children advance in age, the physiological need of children increase the demand for more energy consumption.

The result of this study shows that the economic status of children`s care givers were significantly associated with thinness in children who are on chronic HIV care and support. The result of this study is comparable with the study conducted in Ethiopia. [18] The similarity may be due to that care giver with low monthly income may not afford to feed their children properly.

The result of this study is comparable with the study conducted in Ethiopia, the result of both study shows that children with eating problem become thin. [18] The similarity may due to that children with eating problem may not eat their food properly and required amount of their daily need.

Parental status was significantly associated with stunting, no study was found comparable with this study. The result of this study shows significant association between Opportunistic infection and stunting. The result of this study is comparable with study conducted in Nepal. [22] The similarity may be due to that children with opportunistic infection may

lose their appetite and reduce dietary intake for long period and become stunted.

Pattern of children`s diet also shows significant association in this study, the result of this study is not comparable with any study. Most of study conducted does not assess the dietary pattern of children`s.

6. CONCLUSION

Stunting among children on chronic HIV care and support is low (13.4%) but thinness is very high (21.8%). Factors like Sex, Age, and Monthly income of care giver and problem of eating were significantly associated with thinness and factors like parental living status, presence of opportunistic infection and dietary pattern of children were significantly associated with stunting

7. STRENGTH AND LIMITATION

7.1 Strength

Primary data were collected by trained data collectors (female nurses) at post service (service exist) by interview data collection method. Two days training were given for the data collectors including pretest data collection. Pretest was done to check the validity and reliability. Structured questionnaires were used to collect data from clients. Height and weight of children was measured.

7.2 Limitation of the study

As this study was institution based study and conducted in urban areas among Chronic HIV care and support user children, it might undermine generalization of the study result to the general population for those who are HIV positive children. The study design is cross-sectional; therefore it may be difficult to establish a temporal relationship.

8. RECOMMENDATIONS

It is recommend that

- The family, care givers and the community should care for male children and children of age greater than 1o years (Adolescent) as they are in high growth and developmental physiological age and needs more nutritional care and feeding. And the community should give concern for dietary pattern for their children.
- Health care givers should give attention in identifying and providing care and treatment for children suffering from opportunistic infection and eating problem.
- The government should work on income generation of children`s care givers to facilitate food security of the family and strengthen the chronic HIV care and support to prevent the occurrence of opportunistic infection and to give treatment for eating problem and government should give attention for adolescent HIV positive children for their chronic HIV care and support.

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10. REFERENCES

1. Nikolaos Katsilambros M, et al., Clinical Nutrition in Practice: Athens University School of Medicine, Laiko University Hospital & Department of Nutrition and Dietetics, Harokopio University, Athens, Greece; 2010.
2. Blössner, Monika, de Onis, Mercedes. Malnutrition: quantifying the health impact at national and local levels. Geneva, World Health Organization, 2005.
3. UNAIDS. Global Nutrition Report Multi-Sectoral Nutrition Strategy Technical Brief: Nutrition, Food Security and HIV. 2015.
4. Weiser S., Kimberly A., Eirikka K., Viviane D., Aranka A., David R. ea. The association between food insecurity and mortality among HIV-infected individuals on HAART. J Acquir Immune Defic Syndr 2009, November;52(3):342-9.
5. Cornell University Press. The African food system and its interaction with human health and nutrition. 2010.
6. Rajshree Thapa AA DPP, and KB, M Sophia Newman. Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal. AIDS Research and Therapy2014;12(14).

7. O.O. Oguntibeju, W.M.J. van den Heever, and F.E. Van Schalkwyk. The Interrelationship Between Nutrition and the Immune System in HIV Infection: A Review. Pakistan Journal of Biological Sciences,2007;10(24):4327-38.
8. Colecraft E. HIV/AIDS: nutritional implications and impact on human development Proceedings of the Nutrition Society. . 2008;67(01109-13).
9. Kalofonos IA. "All I eat is ARVs": the paradox of AIDS treatment interventions in central Mozambique. Medical anthropology quarterly 2010;24(3):363-80.
10. Sabate E. Adherence to long-term therapies: evidence for action. Geneva: World Health Organization; 2003. WHO/MNC/03.01.[Links]; 2007.
11. Chesney MA. The elusive gold standard: future perspectives for HIV adherence assessment and intervention. JAIDS Journal of Acquired Immune Deficiency Syndromes 2006;43:S149-S552006;43:S149-S55.
12. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N ea. Prevention of HIV-1 infection with early antiretroviral therapy. . New England journal of medicine 2011;365(6):493-505.
13. Swaminathan S PC, Sukumar B, Iliayas S, Kumar SR, Triveni C, Gomathy P, et al. Nutritional status of persons with HIV infection, persons with HIV infection and tuberculosis and HIV-negative individuals from southern India. 2008;46:946-9. Clin Inf Dis2008;46:946-9.
14. Berhe Negassie DTaM, Alemayehu. Effect of Nutritional Factors on Adherence to Antiretroviral Therapy among HIV infected Adults: A Case Control Study in Northern Ethiopia. BMC Infectious Diseases 2013; 13:233.
15. Friis H. Micronutrient interventions and HIV infection: a review of current evidence. Tropical medicine & international health: TM & IH 2006;11(12):1849-57.
16. Semba RD, Darnton-Hill I, S. dP. Addressing tuberculosis in the context of malnutrition and HIV coinfection. Food & Nutrition Bulletin. 2010;.2010.
17. Talam NC GP, Rotich J, Kimaiyo S. Factors affecting antimicrobial drug adherence among HIV/AIDS adult patients attending HIV/AIDS clinic at Moil Teaching and Referral Hospital, Eldoret, Kenya. . East Afr JPublic Health2008;5(2):74-8.
18. Berihun Megabiaw, B.W, and NL, Rogers. Malnutrition among HIV-Positive Children at two Referral Hospitals in Northwest Ethiopia. Official Journal of College of Medicine and Health Sciences, University of Gondar, Ethiopia Journal of College of Medicine and Health Sciences2011.
19. Rakholia R, Bano M, V. R. Malnutrition among HIV- infected Children by Anthropometric Measures in Poor Outreach Area of a Developing Country and its Relationship with CD4 Counts. Int J Pediatr Res Pract 2016;4(4):1643-54.
20. Ambey R, et al. Assessment of nutritional status of HIV positive children in ART center a study from central India. Int J Pediatr Res Pract 2015(1):7-11.
21. Belaynew Wasie, YK AY. Nutritional status of adults living with HIV/AIDS at the University of Gondar, Northwest Ethiopia. Ethiop J Health Biomed Sci 2012;5(1).
22. Rajshree Thapa AA DPP KBa and, M Sophia Newman. Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal AIDS Research and Therapy 2014;12(14):1-10.

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