



## Adherence and Contributing Factors among HIV Infected Children in Adama Hospital Medical College, Ethiopia

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### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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### ABSTRACT

**Background:** Human Immunodeficiency Virus/ Acquired immune deficiency syndrome (HIV/AIDS) is a public health problem and major development crisis that affects all sectors. In 2013, an estimated 35.2 million people were living with HIV worldwide and 3.5 million of these were children under 15 years of age. Children continue to be born with HIV worldwide; however, sub-Saharan African is the most affected. The introduction of highly active antiretroviral treatment has extended and improved the quality of life for people living with HIV by reducing their viral load, often to undetectable levels. Strict adherence to anti retro viral treatment is essential in pediatrics in order to obtain desired benefit and to avoid the emergence of drug resistance, clinical failure.

**Objective:** To assess Anti-Retro Viral drug adherence and factor associated with it among HIV infected children

**Methods:** Cross sectional study was conducted in Adama Hospital Medical College, March 08 to June 08, 2015. Systematic random sampling technique was used and data was collected by three

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of the group members by using pretested structured check list. Qualitative data was categorized and summarized into matrices, figures and tables based on the kind of tools used. Quantitative data was entered and analyzed using SPSS version 16.

**Results:** A total of 165 caregivers of children were included in the study. The majority 92 (55.8%) of the children were females. Though 81(49.1%) of care givers did not identify the correct regimen that has been taken by a child, most of them have good knowledge and perception regarding to ART. According to Morisky Medication Adherence Scale (MMAS-8), 101(61.2%) of children were non-adherent. Age (1.0, 0.99) and sex (0.98, 0.62) of care givers, care-giver relation to the child (0.907), job of care-giver (0.99), educational status of care-giver (0.95) and marital status of care – giver (0.99) are not significant predictors of adherence.

**Conclusion:** Greater than half of the children were non-adherent. Age and sex of care givers, care-giver relation to the child, job of care-giver, educational status of care-giver, and marital status of care giver are not significant predictors of adherence.

*Keywords: ART; non-adherence; pediatrics and HIV.*

## ABBREVIATIONS

AHMC : Adama Hospital Medical College  
AIDS : Acquired Immune Deficiency Syndrome  
ART : Antiretroviral Therapy  
ARV : Antiretroviral  
CD4 : Cluster of Differentiation  
DOT : Directly Observed Therapy  
EFMOH : Ethiopian Federal Ministry of Health  
HAART : Highly Active Antiretroviral Therapy  
HIV : Human Immune Deficiency Virus  
OI : Opportunistic Infection  
USA : United State of America  
MMAS-8 : The 8-Item Morisky Medication Adherence Scale

## 1. BACKGROUND

Human Immunodeficiency Virus (HIV) infection is one of the most destructive epidemics in which the world has ever witnessed. In 2013, an estimated 35.2 million people were living with HIV worldwide and 3.5 million of these were children under 15 years of age [1]. Furthermore, in 2012, 260,000 children less than 15 years were newly infected and 210,000 died from AIDS-related causes. In the last decade, HIV has emerged as one of the leading causes of childhood mortality and morbidity in sub-Saharan Africa [1]. According to 2010 World Health Organization global report on AIDS epidemic estimates the number of people living with HIV was 34 million, of these 22.9 million were from Sub Saharan African [2].

Standard antiretroviral therapy (ART) consists of the combination of antiretroviral (ARV) drugs to maximally suppress the HIV virus and stop the progression of HIV disease. WHO recommends ART for all people with HIV as soon as possible after diagnosis without any restrictions of CD4

counts. Strict adherence towards their medication is mandatory. Adherence is defined as the extent to which a patient takes a medication in the way intended by a health care provider. It is double burden in pediatric patients due to their age [3].

Many problems lead children's to non-adhere to their treatment plan due to frequent dosing and are supplied in formulations that may be difficult for children to tolerate (large pills, bitter-tasting liquids, and gritty powders). Children fail to tolerate adverse effects of ART medications, since it is more frequent and severe. Antiretroviral syrups, which used in young children, require refrigeration. Some households don't have any sort of refrigeration, and even those that do have, may not have enough space to store large quantities of these formulations.

Adherence is influenced by factors associated with the disease and its treatment, with the relationship between the patient and the health-care provider and with patients themselves, such as socioeconomic status which is often based on

employment or occupational status in addition to educational level and income [4,5].

Poor adherence increases the risk of drug resistance and HIV treatment failure. It increases rate of morbidity and mortality, prolonged hospital stay. Even such complication is worse in children [3].

Therefore, this study aimed at measuring the prevalence and factors associated with adherence to ART among caregivers of HIV-infected children in Adama hospital medical college.

### 1.1 Significance of the Study

ART is life-long therefore it is important to assess level of adherence and look for factors affecting adherence in children. The identified factors that lead to non-adherence are used for designing effective intervention to maximize adherence to ART among pediatrics. Moreover, identifying associated factors of adherence in children will contribute to improve their disease state. The finding also enables concerned bodies to design better programs to alleviate the problem of non-adherence to ARV in children and it might also serve as base line information for further research.

## 2. OBJECTIVE

### 2.1 General Objective

To assess adherence of ART and factor for non-adherence among HIV infected pediatrics in adama hospital medical college in 2015.

### 2.2 Specific Objective

To determine the level of adherence among pediatric HIV/AIDS patients in adama hospital medical college in 2015.

To identify factors for non-adherence among pediatric HIV/AIDS patients in adama hospital medical college in 2015.

## 3. MATERIALS AND METHODS

### 3.1 Study Area and Period

Adama medical college hospital is located 99 km from Addis Ababa, Ethiopia. The hospital was named as Hailemariam Mammo memorial hospital little bit after establishment but its name

was changed to Adama Referral Hospital in mean time and now it renamed Adama Hospital Medical College by Oromia regional state health bureau. AHMC serves large size of population from Middle East and southern Oromia, Afar, Somali, Southern Nation Nationalities and People (SNNP) and even from some parts of Amhara region. The hospital has about 465 workers of which 257 were health professionals and the remaining are administrative workers. The study was performed in the ART clinic to assess adherence and factor for non-adherence among pediatrics in three month period from January to June in 2015.

### 3.2 Study Design

A hospital based cross-sectional study was conducted.

### 3.3 Source and Study Population

#### 3.3.1 Source population

All children and adolescents, who were on ART, are the sources of population.

#### 3.3.2 Study population

The study population comprised of HIV-infected children aged 6 months to 18 years, taking ARV medications and who accessed care at the HIV Clinic of AHMC during data collection period.

##### 3.3.2.1 Inclusion criteria

- Age less than 18 years
- Whose caregiver is willing to participate
- Available during data collection period

##### 3.3.2.2 Exclusion criteria

- Child whose age is less than five

### 3.4 Sample Size and Sampling Techniques

Sample size was determined by using 17.2% proportion according to the study done on the adherence of ART in Addis Ababa, Ethiopia (17) and 95% confidence interval and 5% marginal error using the formula below.

$$n_i = \frac{(Z_{\alpha/2})^2 p (q)}{d^2}$$

where  $n_i$  = initial sample size,  $d$  = margin of error,  $z$  = confidence interval.

p= proportion of non-adherence to ART

N= 500, Where total patients currently on ART follow-up

nf =152+ (non-response rate 10% of nf) =**165**

Systematic random sampling was used as a sampling technique.

### 3.5 Study Variables

#### 3.5.1 Dependent variable

- Adherence to ARV treatment.

#### 3.5.2 Independent variables

- Age and sex of care givers
- Length of antiretroviral treatment
- Caregiver's marital status
- Occupation of care givers

- Relationship of care giver
- Caregiver education level

### 3.6 Data Collection Procedure

Data collection was undertaken from 08 March-08 May, 2015 in AHMC. Data were collected through medical record reviews of patients using a prepared standard checklist and interview with care providers. The structured questionnaire and interview were translated to their local language. The consent of care provider was taken. The contents of standard questionnaire include socio-demographic characteristics of care-giver, psycho-social opinion on ART drugs, and Morisky adherence scale-8. Three intern pharmacists were involved to collect the data. Some data from patient card were collected, while more data were found from interview with care provider.

**Table 1. Socio-demographic characteristics of the child and care giver in Adama hospital medical college adama, Ethiopia, 08 March- 08 May, 2015 (with n=165) (P=significance level, AOR=adjusted odds ratio, CI=confidence interval)**

No	Independent variables		Frequency (%)	P	AOR	CI 95%		
						L	U	
1	Age child	<1 year	1(0.6%)	1.000	2.828E8	.000		
		1-6 year	48 (29.1%)			.418	0.066	2.661
		7-12	101 (61.2%)			.933	0.216	4.026
		13-18	15 (9.1%)			1		
2	Sex of child	Male	73(44.2%)	0.977	0.989	0.460	2.123	
		Female	92(55.8%)					1
3	Age of care-giver	20-30	59(34.8%)	0.999	1.555E18	.000		
		31-40	98(59.4%)	0.999	1.555E18	.000		
		41-50	7(4.6%)	0.999	1.555E18	.000		
		>50	1(0.6%)	0.925	1			
4	Sex of care-giver	Male	36(21.8%)	0.629	1.885	0.144	24.64	
		Female	129(78.2%)					1
5	Marital status of care –giver	Married	125(75.8%)	0.999	.000	.000		
		Unmarried	1(0.6%)	1.000	.335	.000		
		Divorce	36(21.8%)	0.999	.000	.000		
		Married but one died	3(1.8%)	0.852	1			
6	Educational status of care-giver	Literate	97(58.8%)	0.955	0.951	.166	5.448	
		Illiterate	68(44.2%)	0.657	0.657	.103	4.203	
7	Job of care-giver	Merchant	39(23.6%)	0.999	6.211E8	.000		
		Employed	53(32.1%)	0.999	1.038E9	.000		
		Diver	8(4.8%)	0.999	1.102E9	.000		
		House wife	59(35.8%)	0.999	5.328E8	.000		
		Farmer	6(3.6%)	0.714	1			
8	Care-giver relation to the child	Father	35(21.2%)	0.907	0.799	.019	34.35	
		Mother	124(75.2%)	0.502	2.610	.159	42.92	
		Grand mother	5(3%)	0.899	0.239			
		Sister	1(0.6%)	0.534	1			

**Table 2. Knowledge and perception of care-givers on ART at adama hospital medical college from 08 March- 08 May, 2015 (n=165)**

No.	Variable	Response	Frequency (%)
1	What ART drugs are the children currently on? Can you identify them?	Yes	84(50.9)
		No	81(49.1)
2	How long has the child been on ARV?	<1 year	10(6.1)
		1-5	76(46.1)
		6-10	73(44.2)
		>10	6(3.6)
3	What is your opinion on ART therapy?	Good	158(95.8)
		Bad	7(4.2)
4	Are you able to follow the child's ARV therapy regimen?	Yes	160(97)
		No	5(3)
5	Are there any drug related problems or situations that make it hard to give the child every dose of the medication every day?	Yes	32(19.4)
		No	133(80.6)
6	What are your observations that leads to non adherence for ART	Side- effect /toxicity	20(12.1)
		Can't gate drug	0(0)
		Child refuse	141(85.5)
		Inter current illness	4(2.4)
7	Is the child currently on any other drug?	Yes	9(5.5)
		No	156(94.5)
8	For Q 7 If yes, is it adversely affecting ARV administration?	Yes	1(0.6)
		No	8(4.8)
9	What benefits have you seen from the child's use of ARV medication?	Weight gain	24(14.5)
		Normal growth	9(5.5)
		Reduced illness	109(66.1)
		Resolving symptoms	23(13.9)
10	Are you willing to continue administering the medication?	Yes	162(98.2)
		No	3(1.8)
11	What can be done to help you adhere to ART?	Reduce drug burden,	133(80.6)
		follow up, suitable	
		dosage form ,	
		sweeting of solutions	
	No idea	32(19.4)	

### 3.7 Data Collection Instrument

Data collection format was formulated by principal investigator based on objective of the research. It was collected from different similar researches.

### 3.8 Data Quality Management

Pre-test study was done among 5 patients before two days of data collection period to check for the uniformity and understandability of the questionnaire. The data collectors were trained for two days on how to collect the data.

### 3.9 Data Analysis

After data were collection, they were edited, coded, entered and analyzed using SPSS version 20.0. The results were summarized in tables. Logistic analysis was done to determine

factors for non adherence.  $P < 0.05$  is considered to be statistically significant.

### 3.10 Ethical Consideration

This study proposal was approved by ethical clearance committee of Ambo University. The formal letter was also written to AHMC research director.

### 3.11 Operational Definitions

**Pediatrics** - pediatrics are a group of individuals in the age range 0-18 years.

**Primary caregiver** – a person who has consistently assumed responsibility for the housing, health, or safety of the child (individuals who administered the child medication daily and bringing the child for clinic appointments).

**MMAS-8:** The 8-item Morisky Medication Adherence Scale for assessment of adherence.

**Adherence-** care giver whose score eight out of eight in according to eight questions in Morisky Medication Adherence Scale if miss at least one considered as non-adherence.

**4. RESULTS**

**4.1 Socio-demographic Characteristics**

A total of 165 caregivers of children were included in the study. The majority, 92 (55.8%) of the children were females. Most of them are in age range of 7 to 12 years. Only, 53 (32.1%) of the caregivers had job. Most of the caregivers were female (129, 78.2%). Most of them were married (125, 75.8%). Nearly half (68, 41.2%) of the care givers were illiterate while 87(52.7) can read and write (Table 1).

**4.2 Knowledge and Perception of Care Givers on ART**

Though 81(49.1%) of care givers did not identify the correct regimen that has been taken by a

child, most of them have good knowledge and perception regarding to ART.

According to MMAS-8, 101(61.2%) number of children were non-adherent to ART. Forgetfulness (34 (20.6%) is the most common reason for non-adherence (Table 3).

**4.3 Factors Affecting Non Adherence**

Age (1.0, 0.99) and sex (0.98, 0.62) of care givers, care-giver relation to the child (0.907), job of care-giver (0.99), educational status of care-giver (0.95) and marital status of care –giver (0.99) are not significant predictors of adherence.

**5. DISCUSSION**

In this study, it is found that adherence rate was 38.8%. This is lower than recommended adherence level. At least 95% adherence rate is expected according to WHO guideline. Similarly, it is lower than the study conducted in Soweto, South Africa (88%) and in Yirgalem Hospital (88.3%) as well as study conducted at five hospitals in Addis Ababa (86%) in Ethiopia [6,7]. On the other hand, it is similar to West Africa (42%) [8].

**Table 3. Care-givers response to MMAS-8 (n=165) among HIV/AIDS pediatric patients in 08 March- 08 May, 2015 in Adama medical college hospital**

No	Variables	Response	Frequency (%)
1	Do you sometimes forget to give medication to your child?	Yes	34(20.6)
		No	131(79.4)
2	People sometimes miss giving medicines for reasons other than forgetting think over the past 2 weeks, were there any days when you did not giving medicine to your child?	Yes	19(11.5)
		No	146(88.5)
3	Have you ever cut back or stopped giving medicine w/o telling your doctor b/c he/he feel worse when she/he took it?	Yes	3(1.8)
		No	162(98.2)
4	When you travel/leave home do you sometimes forget to give medicine to your child?	Yes	2(1.2)
		No	163(98.8)
5	Did you give the entire child’s medicine yesterday?	Yes	165(100)
		No	0(0)
6	When you feel the child’s symptom under control, do you sometimes stop giving medicine to your child?	Yes	20(12.1)
		No	145(87.9)
7	Taking medicine every day is a real inconvenience for some people; does your child feel hassled about sticking to his/her treatment plan?	Yes	59(35.8)
		No	106(64.2)
8	How often do you have difficulty remembering to give medicine to your child?	Never	151(91.5)
		Once while	8(4.8)
		Sometimes	6(3.6)

In general, in this study forgetfulness was the most common reasons for poor adherence to the medication. Similarly, study conducted in USA as part of sub study of multicenter cohort study, showed that the most frequently reported barrier by either the caregiver or youth was “forgetfulness” [9]. The other problems cited by the caregivers are: children refuse to take due to side effect and pill burden. The study conducted in Addis Ababa, Ethiopia shows that the most common reasons for missing dose were lack of medication, the child slept and forgetfulness to give the drugs [9] while the survey conducted in the Aminu Kano Teaching Hospital, Nigeria reported that running out of medication and the inability to purchase, travelling difficulty, forgetfulness, and children sleeping as adherence were the most common barriers [10].

In this study, age and sex of children and care giver were not independent risk factor of adherence, while the study done on Mekelle town showed care givers’ whose age from 25-44 years are highly correlated with good adherence. This might be due to the fact that most of the care givers are illiterates. The study done in Nigeria showed similar finding with us [11,12].

Though most of the care providers were mothers, relationship of care provider with the child did not significantly affect adherence. Similar finding was done in Nigeria [12]. Marital status of care – givers did not significantly affect adherence, on the other hand the study done in Mekelle found it was the determinant factor for adherence. This might be due to low literacy level in our study [11].

Literacy level and job of care providers did not significantly affect adherence, since most care providers were illiterates.

## 6. CONCLUSION

Greater than half of the patients were non-adherent. The most common reason for non-adherence is forgetfulness. Age and sex of both children and care givers, care-giver relation to the child, job of care-giver, educational status of care-giver and marital status of care –giver are not significant predictors of non adherence.

## 7. RECOMMENDATION

Based on the finding, the following recommendations were forwarded:

Caregiver: to educate and train on how to improve adherence.

Health care providers: ought to educate both the patient and care provider about adherence.

Researchers: encourage researchers to find out possible risk factors and associated interventions.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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