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Magnitude and Associated Factors of Non-Adherence to Highly Active Antiretroviral Therapy among Children in Fiche Hospital, North Shewa, Ethiopia, 2016

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Abstract

Antiretroviral Therapy (ART) increases the length of life, quality of life and productivity of people living with HIV/AIDS. However, the effectiveness of ART relies on strict adherence to it though such data are lacking in the study area. The objective of this study is to assess non-adherence to antiretroviral treatment and associated factors among children living with HIV/AIDS in Fiche Hospitals, North Shewa, and Ethiopia. Institutional based cross-sectional study design involving 120 participants (patients and their caregivers) was conducted from May to August, 2016. Data was collected using interviewer administered questionnaires. Data analysis was done using SPSS version 20.0 software packages. Descriptive data was generated and placed in terms of frequency and percentage. Chi-square test and binary logistic regression analysis were used to estimate association between variables. Findings were presented using tables, graphs and figures. In this study, the overall prevalence of non-adherence was 35.8%. Most frequently identified reason of missing their dose was forgetting (44.2%). Age of the child, educational level of caregivers, occupational status of the caregiver and World Health Organization disease stages of the child were significantly associated with non-adherence. Adherence level obtained in the study was lower than what is recommended by World Health Organization which is greater than 95%. Forgetfulness was most frequently mentioned barrier of adherence. Effective work need to be done to optimize adherence to antiretroviral therapy in order to make children fully benefit from their medication.

Keywords: Non-adherence; Antiretroviral therapy; Children; Primary caregiver

Introduction

The human immune deficiency virus/acquired immune deficiency syndrome (HIV/AIDS) is one of the most destructive epidemics and major threat to world population affecting over all social, economic, and political wellbeing as well as individual health [1-3]. There were an estimated 34 million people living with HIV/AIDS in 2011 [1]. The majority, 97%, of them were from low and middle income countries [2]. Sub Saharan African is the most affected region contributing more than 69% of total [1]. In Ethiopia there were about 789,900 people living with HIV/AIDS in 2013 [3,4]. According to the 2011 Ministry of health report, about 333,453 people living with HIV and manifestations of AIDS (PLWHA) were on ART in Ethiopia [5].

Children continue to be born with HIV worldwide, of them Sub Saharan African is the most affected. 90% of estimated 3.4 million children less than 15 years living with AIDS were from Sub Saharan African [6]. Children less than 15 years newly infected with AIDS were 390,000. Although children under the age of 15 years represented about 14.8% of 22.9 million people living with HIV in Sub Saharan African, they accounted for 13.8% of the 1.8 million deaths and HIV/AIDS account for 9% of mortality in children aged below five years [7].

Free Antiretroviral Treatment (ART) service was launched in Ethiopia in January 2005 and hospitals began providing free ART in March 2005. The government focused on accelerated access to ART in June 2006. This accelerated access, especially in health centers, was not accompanied by an equally rapid rise in ART uptake as expected [8].

Even though it doesn't cure Highly Active Antiretroviral Therapy (HAART) has remained the only available option in reducing HIV/AIDS related morbidity and mortality. It has long been found to be effective in reducing viral load, improving immune function, and quality of life of PLWHA [9-11]. However, successful long term treatment of HIV requires strict adherence to the HAART regimen [12]. Inadequate adherence increases the risk of drug resistance and treatment failure. Therefore, optimal adherence is highly essential for sustainable success to HAART [13]. Taking greater than 95% of prescribed doses is recommended for optimal virology suppression [14,15].

Statement of the problem

The importance of adhering to ART has been widely accepted as critical element in the success of ART. There is limited data on adherence to antiretroviral therapy worldwide, few studies of HIV infected children show adherence to antiretroviral drugs as a major problem in children. Adherence to ART in children is a problem due to multiple factors which include high pill burden, poor palatability, side effects, long term toxicity, forgetfulness and caretaker factors [16-18].

Many factors can affect the ability of HAART to suppress viral replication, including low potency of one of the drugs in the combination, viral resistance, inadequate drug exposure and inadequate adherence to therapy. The major factor determining the success of HAART is sustained and optimum adherence to therapy, as

poor adherence increases the risk of virology failure and viral resistance [19,20].

Establishing and maintaining adherence to medication is a difficult goal for individuals with chronic illness, even when the treatment regimen is simple and the patient is clearly symptomatic. Antiretroviral therapy for HIV disease often highly demands requiring multiple medications and frequent dosing with significant negative adverse effects [16]. Children and adolescents with HIV infection may face additional and unique obstacles to achieving adherence, such as cognitive deficits, parental illness, depression, or behavioral problems [2,4].

Adherence in children is especially challenging because of factors relating to children, caregivers, medications and the interrelationships of these factors. The lack pediatrics formulations, poor palatability, high pill burden or liquid volume, frequent dosing requirements, dietary restriction, and side effects may hamper the regular intake of required medications. Furthermore, the successful treatment of a child requires the commitment and involvement of responsible caregivers. This may be particularly complicated if the family unit is disrupted as a consequence of adverse health or economic condition [6,7].

Sustaining adherence represents a significant challenge for children getting the treatment, their caregivers as well as health care providers [20]. It is critical to focus on maximizing adherence in order to ensure the durability of effect of antiretroviral regimes and to minimize the emergency of drug resistance. So far, very few studies exist concerning the adherence of ART in the pediatrics population in Africa. In Ethiopia, there is a lack of studies that address pediatrics adherence in the era of antiretroviral therapy. In order to facilitate adherence to HAART and to improve outcome of HAART in HIV infected children, it is necessary to a deep understanding of the factors influencing adherence and to determine the possible interventions that can improve adherence in children.

Consequence of non-adherence to ART include increase in viral load, decrease of CD4 cell count, disease progression, antiretroviral drug resistance, risk of transmitting resistant viruses and limitation of future treatment option [2,5]. Therefore, high level of adherence is very crucial to maximize the usefulness of antiretroviral therapy. To my knowledge, no published work in the study area has been found on assessing level of non-adherence to ART and it is associated factors among children. That is why the current study was designed.

Significance of the study

Little is known about the impact of adherence on the response to therapy in children with HIV infection, and measures of adherence have not been widely applied to antiretroviral therapy trials in children. There are also no published data about the age of transition at which a child assumes responsibility of self-administering the medications.

As ART is lifelong treatment, it is important to assess level adherence and look for factors affecting it in children. This is one of the significance the present study. This study identifies barriers of adherence which is used for designing effective intervention to maximize adherence to ART among pediatrics. Moreover, identifying associated factors of adherence in children will contribute to improve adherence to ART. Lastly, this study will be used as important literature for the future researchers who want under take similar study in the study area.

Objectives

General objective

The general objective of the present study was to assess ART non adherence and associated factors among children living with HIV/AIDS in Fiche Hospital, North Shewa, Ethiopia, 2016.

Specific objectives

To determine the magnitude of ART non adherence among children attending ART clinic in Fiche Hospital, North Shewa, Ethiopia.

To identify factors associated with ART non adherence, in Fiche Hospital, North Shewa, and Ethiopia.

Methods and Materials

Study design

A facility based cross-sectional study was used.

Study area and period

Fiche Hospital is found in Oromia region of North Shewa in Fiche town which is located 112 km to the North of Addis Ababa. In the town there are different health facilities providing health services for population in the town and the local communities. Accordingly, there are two health centers and one Zonal Hospital in the town. Currently, one health center and the Hospital are giving ART provision service for people living with HIV/AIDS. In the Hospital, there is separate ART clinic at which care and follow up is given for PLWHA. At start of May 2016, there were 155 children on ART at this clinic. The study was conducted from May 5 till August, 2016.

Population

The study included all children who were on ART in Fiche Hospital fulfilling the inclusion criteria. Information about a child's ART adherence status was collected from their caregivers or guardians.

Inclusion and exclusion criteria

Inclusion criteria: Age less than or equal to 15 years.

Available during the specified data collection period.

Exclusion criteria: HIV/AIDS positive child who is on regular follow up but did not start ART.

Sample size determination

Determination of sample size was not required as the study was to include all children who are currently attending and being followed up at the Fiche Hospital. In this way the study included 120 patients from the total of 155 patients who are currently on ART at this clinic. From the total 8 of them were not willing to participate in this study, and the remaining 27 didn't attend any clinic during data collection period.

Sampling technique

All children who were attending ART clinic at Fiche Hospital were consecutively recruited to the study during the period of data

collection. ART registers was used to identify the total number of children who were being actively followed up at Fiche Hospital.

Study variables

Independent variables: Monthly income of caregivers; Age of the child; Sex of the child; Educational status of the caregivers; Occupational status of caregiver; Clinical stage of child (WHO stage I-IV).

Dependent variables: Non-adherence to ART.

Operational definitions

Non-adherence: Patients and caregivers' self-report of ever missing at least one dose regardless of the length of time since the missed dose.

Primary caregiver: Any person who lives with the child and participates in the child's daily care, support and takes the responsibility of giving the child medication and bringing them to clinic.

Data collection tool and technique

The data was collected using structured questionnaires which contain four main parts; socio-demographic characteristics of the child and caregiver, clinical marker of the child, access to care, and medication taking behavior of the child through face to face interview of the caregivers. The interview was conducted in a private room to create an atmosphere of empathy and confidence with in a secure environment. Data was collected by two clinical nurses who are currently working at Fiche Hospital ART clinic. The data collection process was supervised by the principal investigator.

Data quality assurance and analysis

To assure the quality of data, the following measures were undertaken: most of the questions were adapted from previously conducted studies with some changes based on the local context. Data was collected by health care providers. There was continuous supervision to control the data collection procedure. All the data was checked for completeness, clarity, and consistency by the principal investigator. Data was intensively cleaned before analysis. The data was entered and analyzed using SPSS version 20.0 software packages by principal investigator. Descriptive data were generated and placed in terms of frequency and percentage. Chi-square test and binary logistic regression analysis were used to estimate association between dependent and independent variables. The results were presented in the form of Crude Odds ratio (COR) with 95% confidence interval (CI) and p-value. In all cases $p<0.05$ was considered to be statistically significant. Findings were presented using tables, graphs and figures.

Ethical consideration

The study was approved by institutional ethical review board of health science faculty, Salale University. Formal letter was written to Fiche Hospital administration to ask permission to undertake the study. Written informed consent was obtained from the child's caregiver who was participating in answering the questionnaire. In addition each participant was assured of confidentiality.

Variables	Frequency (n=120)	Percent
Sex of the child		
Male	59	49.2
Female	61	50.8
Age of the child (in year)		
0-4	30	25
42983	42	35
42278	48	40
Religion of caregiver or child		
Orthodox	76	64.4
Muslim	37	29.8
Protestant	7	5.8
Ethnicity of the caregiver		
Amhara	24	20
Oromo	83	69.2
Tigre	7	5.8
Gurage	6	5
Educational level of the caregiver		
Illiterate	48	40
Elementary	26	21.7
High school	21	17.5
Diploma and above	25	20.8
Occupational status of the caregiver		
Farmer	47	39.2
Merchant	24	20
Employee	24	20
Jobless	25	20.8
Caregiver and child relationship		
Biological parent	95	79.2
Grand parent	19	15.8
Residential care volunteer/worker	5	4.2
Other**	1	0.8
Monthly income of caregiver		
≤500 ETB	59	49.2
>500 ETB	61	50.8
ETB: Ethiopian Birr; **Aunt		

Table 1: Socio-demographic characteristics of the children and caregivers, Fiche Hospital, Ethiopia, 2016.

Results

Socio-demographic characteristics of the children and caregivers

A total of 120 children caregivers responded to the structured questionnaire. 61 of the children (50.8%) were females. Majority of 48 (40%) among the children were 10-15 years. The mean age of the children was 2.15 with standard deviation of 0.8 years. A majority of 76 (64.4%) among the caregivers were orthodox in religion. Eighty three (69.2%) were Oromo in ethnicity. Forty eight (40%) were illiterate. Forty seven (39.2%) were farmers and 24 (20%) were merchants. All of the participants interviewed 120 (100%) were the primary caregiver of the children. Most of the caregivers interviewed 95 (79.2%) were biological parents of the children. Sixty-one (50.8%) of the respondents had monthly income levels above 500 Ethiopian birr (ETB) (Table 1).

Access to antiretroviral (ARV) services

Majority of 59 (49.2%) among the caregivers used the public bus to get to health facilities and 34 (28.3%) travelled by foot. Eighteen (15%) of the participants had a problem of money for transportation during appointment. From 120 caregivers 107 (89.2%) came regularly to collect the child's medication. Hundred (83.3%) of the children had an appointment in every month (Table 2) for missing dose(s).

Variables	Frequency (n=120)	Percent
Mode of transport		
Public Bus	59	49.2
Private Car	1	0.8
Private Bajaj	26	21.7
Walk	34	28.3
Money problem		
Yes	18	15
No	102	85
Frequency of appointment		
Weekly	3	2.5
Every two weeks	17	14.2
Monthly	100	83.3

Table 2: Access to ARV service, Fiche, Hospital, 2016.

Clinical marker of the child

Variables	Frequency (n=120)	Percent
WHO disease stage		
I	11	9.2
II	10	8.3
III	74	61.7
IV	25	20.8

Table 3: Clinical marker of the children, Fiche Hospital, Ethiopia, 2016.

Most of the children 74(61.7%) were in stage III based on WHO classification (Table 3).

Medication administration caregivers

58 of the children taking ART (48.3%) received the medication through their biological parents (Table 4).

Variable	Frequency (n=120)	Percent
Child's ARV giver		
Both biological parents	58	48.3
Biological mother	25	20.8
Biological father	13	10.8
Grand parent	18	15
Nurse residential care	4	3.4
Other**	2	1.7
**Aunt, Uncle		

Table 4: Medication administration caregivers for the children, Fiche Hospital, Ethiopia, 2016.

The level of non-adherence and reasons for missing ARV drugs

Out of 120 children taking ART 43 (35.8%) of them had a history of missing at least one dose regardless of time reference

Out of 43 children who had ever missed a dose(s), most frequently mentioned reasons of missing their dose was forgetfulness 19(44.2%), child slept 10(23.2%), illness 7(16.3),because of transportation problem 4(9.3%), and religious beliefs leading to use of e.g. Holy water 3(7%) (Figure 1)

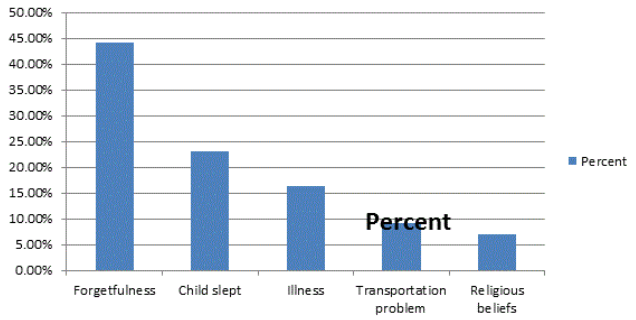

Figure 1: Reasons for missing pills in children who are receiving HAART, Fiche Hospital, 2016.

Factor affecting adherence to ART

As shown in Table 5, four variables namely age of the child (P=0.029), educational level of caregivers (p=0.002), and WHO disease stages of the child (p=0.045) were found to be significantly associated with non-adherence to ART in children.

Result of bivariate logistic regression analysis showed that children aged five to nine were 75% less likely to non-adhere than very young

children aged less than five years (COR 0.25, and 95% CI 0.09-0.74). The chance of non-adherence was 77% lower for those children whose caregivers learned till elementary schooling (COR 0.23, 95% CI 0.08-0.66) and 91% lower for those children whose caregivers learned till high school (COR 0.09, 95% CI 0.03-0.30) when compared with those children with illiterate caregivers. The chance of non-adherence to ART was 9, 7, and 3 times higher for those children whose caregivers worked as merchant, employee, and farmer, respectively (COR 8.89, 95% CI 2.31-34.25, COR 6.76, 95% CI 1.88-24.29, and COR 2.86, 95% CI 1.05-7.84) than those children whose caregivers had no job. Children who were in WHO disease stage four were 3.5 times more likely to non-adhere than those children who were in WHO disease stage one (COR 3.55, 95% CI 1.38-9.10). Child's sex (p=0.664) and monthly income of the caregiver (p=0.744), was not significantly associated with non-adherence to ART.

Variables	Non-adherence (n=43)	Adherence (n=77)	p-value	COR (95% CI)
Sex of the child				
Male	20	39	0.664	1.00
Female	23	38	0.015	0.85(0.401-1.789)*
Age of the child				
0-4	6	24	0.029	1.00
5-9	21	21	0.037	0.25(0.085-0.736)*
10-15	16	32	0.018	0.50(0.17-1.468)
Monthly income of the caregiver				
≤500ETB	22	37	0.744	1.00
>500ETB	21	40	0.53	1.13(0.537-2.389)*
Educational level of caregiver				
Illiterate	9	39	0.001	1.00
Elementary	13	13	0.007	0.23(0.08-0.664)*
High school	15	6	0.001	0.09(0.028-0.304)*
Diploma and above	6	19	0.599	0.73(0.227-2.353)*
Occupational status of the caregiver				
Farmer	18	29	0.002	2.86(1.047-7.836)*
Merchant	4	20	0.04	8.89(2.307-34.248)*
Employee	5	19	0.001	6.76(1.879-24.288)*
Jobless	16	9	0.003	1.00
WHO disease stage				
I	3	8	0.045	1.00
II	3	7	0.08	4.00(0.849-18.836)*
III	22	52	0.118	3.50(0.727-16.848)*
IV	15	10	0.009	3.54(1.381-9.101)*

ETB: Ethiopia Birr

*Indicates statistically significance association.

Table 5: Factors affecting adherence to ART among children, Fiche Hospital, Ethiopia, 2016.

Discussion

This facility based study has showed that the level of non-adherence to ART in children at Fiche Hospital was 36%. This means that over a third of these children were reported to have missed their daily dose of ART medication one or more times. This level of non-adherence in this study was comparable with the finding in a study conducted in Ambo, Ethiopia which showed a prevalence of caregiver reported non-adherence for their children to ART was 33% [21,22].

However, the level of adherence rate in this facility (64%) was lower than those compared with studies conducted in Soweto, South Africa which reported 88% [18]. This difference may be explained by differences in measurement of adherence assessment, socio-demographic, economic and cultural back ground of study populations. This study therefore highlights the need for focused intervention on pediatric ART adherence to ensure the effectiveness of ARV regimens and to minimize the possible emergence of drug resistance [19,20].

In this study forgetfulness was the most common reasons for non-adherence to the ART medication (44%). Similarly, a study conducted in Ambo, Ethiopia found that the main reason for non-adherence was simply forgetting (40%) [21]. Study conducted in USA also showed that the most frequently reported barrier by the caregiver was forgetfulness [22].

Adherence behavior is affected by many factors, which may be classified as characteristics the child, caregiver(s), type of drug regimen and cultural practices [21]. In this study, four variables namely: age of the child, educational level of caregiver, occupational status of the caregiver, and WHO stages of the child were found to be significantly associated with adherence to ART in children.

In this study, we found that older children were less likely to non-adhere than very young children. This is likely because infants are often sleepy and, unless caregiver's are more careful then the chance of non-adherence would be higher.

On the other hand, caregiver's of the child with more/higher education were less likely to non-adhere than the non-educated caregivers. This highlights the importance of education in a public health program more broadly and the need for repeated counseling before and after the start of ART medication to children and /or caregivers.

Moreover, a child with a caregiver of having a job was more likely to non-adhere than those without any job. This could be because caregiver's with a busy work schedule might more likely forget the child's ART schedule than those without a job and staying at home. An intervention like an alarm or diary reminder would likely help this group of parents from forgetting their child's medication.

In addition this study has found that children who were in early disease stage of WHO were less likely to non-adhere than those who were in advanced stage. This is probably because caregivers having a critically ill child might prefer other non-medical options like using religious practices such as holy water than giving ART. This highlights the need for repeated counseling throughout the follow up period to children and/or caregivers. Comparing the children and caregiver's characteristics with other studies, the study findings were similar to the study conducted in Gondar, Ethiopia [23,24], but was different to the study of Arun et al. in India and study in Addis Ababa [8,23]. This difference may be explained by differences in the measurement of adherence assessment, socio-demographic and economic background of the study populations.

Strength and Limitation of the Study

The study has several strengths. The study was conducted in a well-designed ART program in a hospital setting and covered nearly all the children enrolled in program. The data was collected by trained nurses at the facility, thereby increasing the quality of the study. This study however should be interpreted in the light of its limitations. Firstly, adherence assessment was based on caregivers self-report through interview, which may have resulted in social desirability bias. Beside this, in this study anyone who ever missed their dose was considered as non-adherent regardless of number of missed dose and time since missed which could lead to over-estimation of adherence and may also have been prone to recall bias.

Conclusion and Recommendations

Conclusion

Adherence level in this study was lower than that recommended by WHO which is greater than 95% [14]. Forgetfulness was the most frequently mentioned reason for poor adherence in this study. Age of the child, educational level of the caregivers, occupational status of the caregivers, and WHO stages of child, were found to be significantly associated with the level of non-adherence to ART in children.

Recommendation

The high proportion of non-adherence level identified in this study indicates that much work needs to be done by responsible bodies such as Fiche Hospital management team, Fiche Hospital health care and/or ART providers, and Fiche town health office/administration in order to achieve the standard adherence level of 95% [14]. The following recommendations have been pointed out to the respective partners:

Hospital management team

Provide training on ART adherence counseling to health care providers.

Healthcare and/or ART providers

Health care providers should provide intensive and ongoing counseling to a child and/or their caregivers before and throughout the course of ART, particularly to caregiver's whose children are critically ill, and to caregivers with busy work schedules e.g. employers.

In this study forgetfulness was the most common reason for poor adherence to the medication; therefore, adherence counseling and health information dissemination need to include strategies to minimize forgetfulness using memory aids such as diary or alarms.

Fiche town office/administration

Fiche town office/administration should work in collaboration with the Hospital in the area and of providing health education through different ways to the resident of the town in general and to caregivers in particular in order to create /increase awareness about adherence to ART and its significance.

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