Research Article

Determinants of Adherence to HIV Treatment Amongst Adolescents Living with HIV/Aids in Two Hospitals in the Southwest Region

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Abstract

Background: Antiretroviral medication has been incorporated for HIV-positive patients to live longer and healthier lives, yet the human immunodeficiency virus remains one of the most destructive diseases the world has ever faced. Antiretrovirals play a huge role in mitigating the effects of this serious illness. However, adherence to ARVs is low among adolescents. Evaluating the level of adherence and determining the factors associated to adolescents is a baseline towards reducing the overall burden of HIV.

Objective: To assess determinants of adherence to ARV therapy in adolescents living with HIV in the SW region of Cameroon.

Methods: A cross-sectional study was conducted from March to April 2023 in the Buea and Limbe regional hospitals, including adolescents aged 10 to 19 years receiving ARV treatment for at least 6months before study. Adherence to ARV treatment was evaluated using self-report adherence measurement and the pill count method. Sociodemographic characteristics, psychosocial and medical team related factors which could affect adherence were collected. Data were analysed with SPSS version 25 and Statistical significance was set at a p-Value <0.05 and at a 95% CI. Multivariate analysis was used to test for predictions for adherence.

Results: A total of 217 patients were recruited with 111(51.2%) females. The modal age group was 15-19. About 125(58.0%) were adherent with self-report adherence measurement and 113(52.1%) were adherent with the pill count method. Having a fixed time to take medications daily (AOR :3.6, [1.598-8.421]), good family support (AOR = 9.171, [1.781-47.221]) and the age group 10 to 14years (AOR: 3.3, [1.202-9.060]) were significantly associated with adherence.

Conclusion: About half of adolescents were adherent to their ARV drugs irrespective of the assessment tool used, reflecting the suboptimal level of adherence among adolescents. Interventions to improve adherence should focus on a precise time for medication and a good psychological support relationship with family.

Keywords: Adherence; Adolescents; Anti-Retroviral Therapy; Determinants; Human Immune Deficiency Virus

Introduction

Human Immunodeficiency Virus (HIV) is one of the most destructive epidemics the world has ever faced [1]. According to World Health Organization (WHO), an estimated 38.4 million people are living with HIV globally including 1.7 million adolescents (160 000 new infections in 2021 compared to 150 000 in 2020). The burden of the disease is highest in Africa, where 66% of these patients are located that is about 25.7 million [2]. In 2021, it was estimated that 1.47 million of HIV patients in Sub-Saharan Africa (SSA) were adolescents [3]. Antiretrovirals (ARVs) play a huge role in mitigating the effects of this serious illness [1]. The goal of

ARV is to achieve maximal and durable suppression of viral replication and in turn reduce destruction of CD4 cells. The benefit is possible only if HIV-positive patients adhere by more than 95% to the treatment according to World Health Organisation [1]. Adherence to antiretroviral therapy is a principal determinant of virologic suppression and the extent to which a patient's behaviour corresponds with the prescribed medication-dosing regime, including time, dosing and interval of medication intake [4]. Poor adherence reduces the therapeutic effect and results in resistance to ARVs.

In Cameroon, overall adult HIV prevalence continues to decrease, moving from 5.4% in 2004 to 4.3% in 2011, 3.4% in 2017 and 2.7% in 2018 [5]. The percentage of people accessing to ARV in Cameroon steadily increased from 20% in 2010 to 80% in 2021 [5]. Self -report adherence among adolescents in a study in Yaounde in 2017 was 36% [6]. Children and adolescents struggle with adherence to ARV therapy for various reasons, including a poor psychosocial support system and clinic attendance [7]. The rise in number of newly infected adolescents living with HIV around the world and in Cameroon is a cause for concern. Non-adherence to ARVs constitute the main cause of therapeutic failure. Poor adherence results in worsening disease progression, development of resistance and an increase in HIV morbidity and mortality. So, this study aimed at providing the main factors determining adherence to ART in adolescents living with HIV in the Southwest region of Cameroon thus forging the way forward to increase and strengthen adherence.

Material and Methods

Study Design
A hospital-based cross-sectional study was conducted from 8th of March to 28th of April 2023 at the Buea and the Limbe Regional Hospitals in South-West regions.

Study Site
These Hospitals are secondary referral hospital and serves as an academic institution for practical sessions of students studying health sciences. They both have HIV treatment and care centers for both adults and children with capacity to offer care and follow up to thousands of patients. These services are responsible for handling HIV patient visits, provides counselling, clinical follow-up, prescription of HIV medications and distribution of ARVs. These centres work from Monday to Friday from 8am to 4 pm. The staff comprises of a general practionner, a ward charge and nurses. The particularity of the Limbe Regional Hospital (LRH) is the fact that, it has a children's day care center devoted for children and adolescents and sometimes they organize follow up for the 10-14 years and 15-20 years on Saturdays. Special Services rendered to paediatric patients in LRH include the following: Adherence counselling, Therapeutic education, Psychosocial counselling to assess any patient for adherence, patients above 10years are being asked whether they have missed doses within few days, weeks or a month. For patients below 10years, the patient's carers are asked if they respect the timing for the patient's medications. Leftover pills are counted and the number of remaining pills is compared to what is expected to be left.

Inclusion Criteria
This study included adolescents aged 10 to 19 years who had been diagnosed HIV, have been receiving ARV treatment for at least 6 months and were being followed up at the children's day care centres of Buea and Limbe regional hospitals during the study period.

Exclusion Criteria
Those who had been on ARVs for less than 6 months and participants whose HIV status had not been disclosed to them.

Sample Size
The estimated minimum sample size needed for the study was calculated using the Cochran formula and a prevalence of 83% adherence from a study carried out in the South West and North West regions of Cameroon [8]. Inputting the variables in the formula resulted in a minimum sample size of 216 participants.

Ethnic and Administrative Considerations
Ethical approval was sought from the institutional review board of the Faculty of Health Sciences, University of Buea (IRB FHS-UB). This was followed by obtaining administrative authorizations from the Regional Delegation of Public Health for the South

West Region, then from the directors of the Buea Regional Hospital and Limbe Regional Hospital. Verbal permission to interview participants upon presentation of all signed authorizations was then obtained from the general supervisors and unit heads of the children's daycare centres. Assent was sought from the caregivers or parents with children < 18 years and met the inclusion criteria, while consent was sought from the accessible population above 18 years.

Sampling Method
The 2 HIV care centres were selected using convenience sampling. Then consecutive sampling was used to recruit participants in each of the centre. Participants who fulfilled the inclusion criteria were selected for the study.

Data Collection Tool
Data was collected using modified case adherence questionnaires which was used in a similar study by Alice Ketchaji in 2019 [9]. The questionnaire consisted of 5 sections including sociodemographic factors, psychosocial, health personnel-related factors, medication-related factors and a list of probable reasons which could strengthen adherence were used. The questionnaire was then administered to recruited study participants and filled with assistance of the principal investigator.

Data Treatment and Analysis
The data collected was coded and inputted in Microsoft Excel Software version 2016 and stored in a restricted Google Drive document. The data was cleaned and imported into the Statistical Package for Social Sciences (SPSS) version 25 for analysis. The independent variables included: health-care provider determinants, drug-related determinants, psychosocial and environmental determinants. Adherence was the dependent variable. Categorical variables (gender, occupation) were summarized as frequencies and percentages while continuous variables were summarized as means and standard deviation. Binary logistic regression model was used for bivariate analysis and multivariate analysis. Multivariate analysis was done to test for prediction. Statistical significance was set at a p-Value <0.05 at 95% confidence interval. For each participant, adherence was determined by subtracting the number of left pills from the number of pills originally given for a defined period. This difference was divided by the total number of pills given and multiplied by 100 to be converted to a percentage (≥95%= adherent, ≤95%=not adherent). Odds Ratio (OR) were used to determine association between each independent variable and adherence. For every given independent variable, the odds of adherence were compared with the odds of nonadherence to calculate the OR. If OR >1 then this means the determinant is positively associated with adherence and vice versa if OR< 1.

Result

Recruitment of Participants
In total, 250 adolescents living with HIV were approached, 7(2.8%) were nondisclosed, 6(2.4%) had been on treatment for <6 months and 20(8%) dropped out. The study included 217(86.8%) adolescents with HIV, among whom 193(88.9%) were from LRH and 24(11.1%) were from the BRH.

Sociodemographic Characteristics of Participants
The minimum age was 10 years and maximum were 19 years. Majority of our participants were females 111 (51.2%). More than half 150(69.1%) of the participants were aged 15-19 years. Most of them were students 165 (76%) as shown on Table 1.

		Frequency(N=217)	Percentage (%)
Sex	Girl	111	51.2
	Boy	106	48.8
Age range	10-14	67	30.9
	15-19	150	69.1
Religion	Christian	194	89.4
	Muslim	8	3.7
	Others	15	6.9
Education Level	Primary	90	41.5
	Secondary	116	53.5

	University	11	5.1
	Alone	9	4.1
	With biological parents	99	45.6
	With friends	1	0.5
Current Housing	With another guardian	108	49.8
	Apprentice	4	1.8
Occupation	None	36	16.6
	Student	165	76.0
	Worker	12	5.5
Guardian Care for Needs	No	138	63.6
	Yes	79	36.4
Siblings Taking Drugs	No idea	11	5.1
	No	182	83.9
	Yes	24	11.1

Table 1: Description of socio-demographic characteristics of adolescents.

Proportion of Adherent Participants Who Reported Good Adherence with Pill Count Method
Amongst these adolescents, 52.1% of the participants presented good adherence using the pill count formular method, as seen on Table 2.

Variable	Values	Percentage	Minimum	Maximum
Pill Count Adherence Measurement	Adherent	52.1	10.0	100.0

Table 2: Proportion of adolescents who reported good adherence with pill count method.

Proportion of Adherent Participants Using Self Report Adherence Method
Amongst the participants, 58% of them were adherent to ART using the self-report adherence method as shown on Fig. 1.
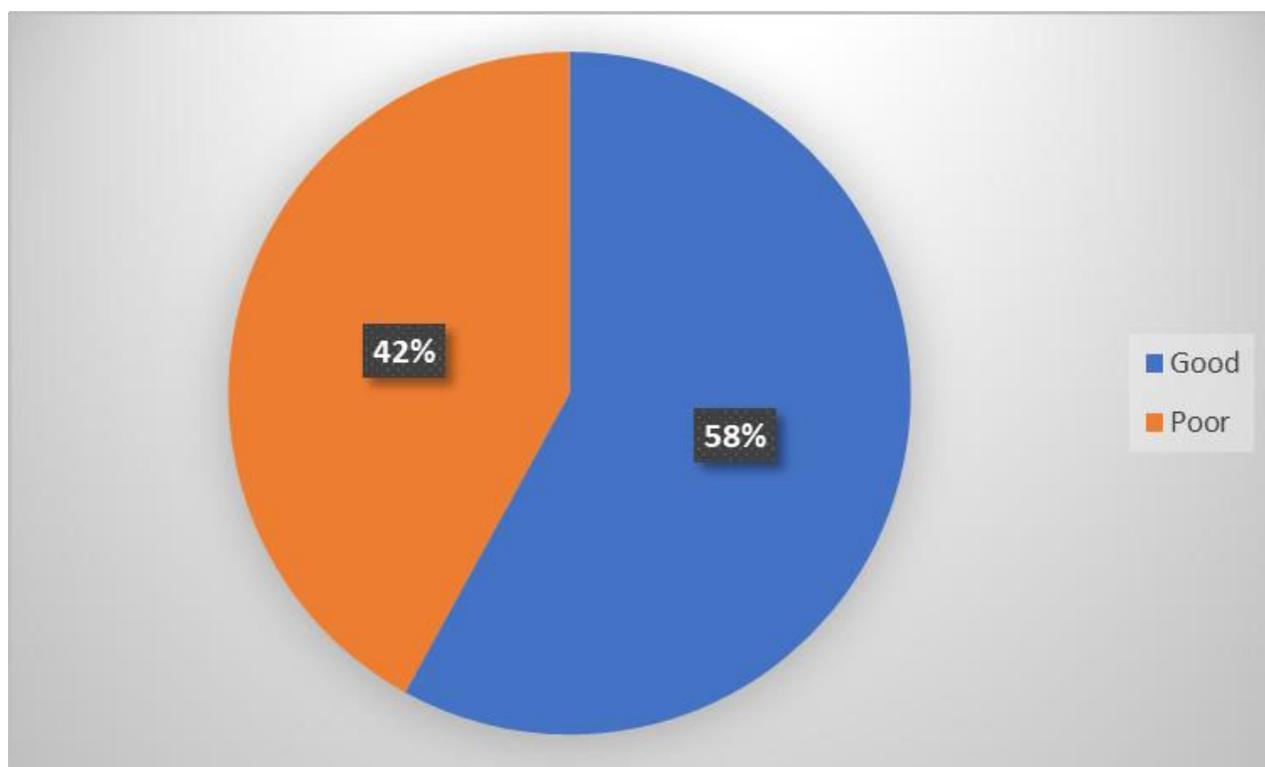
Figure 1: Proportion of adolescents who reported good adherence using the self-report method.

Description of Psychosocial, Medication Related and Health Care Related Factors of Adherence

With respect to the psychological lifestyle of these adolescents, we found that 137(63.1%) of the participants felt they had a closed relationship with their family and friends who provided emotional security and well-being. It was also found that 150(69.1 %) of them had been stigmatized before and lastly, 194 (89.4%) of the adolescents felt lonely or discouraged. With regards to medication, 151 (69.6%) of them said their family encouraged and reminded them of when to take their drugs. It was found that 198 (91.2%) of them believed that their medications kept them healthy. Also, 195 (89.9%) of the participants said the side effects of the drugs were very minimal. Among the health care related factors, 207 (95.4%) of the participants trusted the service provider, 197 (90.8%) said the health providers were welcoming and encouraging. We had 158(72.8%) who received moral and social support from the personnel and 195(89.9%) revealed the personnel gave patients adequate information concerning the drug and state of health.

Bivariate Analysis of Determinants of Adherence

On bivariate analysis, adolescents aged 10-14years (p= 0.03) and those who were students (p=0.04) were found to be significantly associated with adherence to ARV. Among the medication-related factors, having a family who encouraged and reminded of when to take the drug (p=0.000), having a particular time to take drugs (p=0.000), having the belief that the drug kept them healthy (p=0.001), consistency of food to eat (p=0.001) and having minimal drug side effect (p=0.004) were all statistically significant to adherence. Trusting the services provided (p=0.015), receiving information given by health care providers on their state of health and medication (p=0.002) and the fact that participants received moral support from the health personnel (p=0.002) were all statistically significant respectively. Feeling supported by family and friends (p=0.000) and feeling comfortable to talk about worries with families (p=0.000) were also all significantly associated with adherence.

Multivariate Analysis of Determinants of Adherence

After the logistic regression analysis, adolescents aged 10- 14 years was found to be 3 times more likely to have good level of adherence when compared to those aged 15-19 years (AOR: 3.3, p=0.021 CI:1.202-9.060). Participants who felt comfortable talking to their families about their worries were 4 times more likely to have good adherence when as compared to those who did not (AOR: 3.6, p=0.002 CI: 1.598-8.421) as shown in Table 3.

Variable	Category	Adjusted Odds Ratio (AOR)	Confidence interval		P-value
			Lower	Upper	
Age Range	10-14	**3.3**	1.202	9.060	**0.021**
	15-19	1			
Occupation	Apprentice	0.070	0.002	2.195	0.130
	None	1.140	0.159	8.172	0.896
	Worker	0.533	0.102	3.006	0.492
	Student	1			
Feeling comfortable talking to my family about my worries	No	**3.6**	1.598	8.421	**0.002**
	Yes	1			
Not having close relationship with family	No	1.025	0.498	2.111	0.946
	Yes	1			
If any emergency there is someone on whom I can rely on	No	1.232	0.486	3.128	0.660
	Yes	1			
Feeling my family and friends provide me with emotional security and well-being	No	1.904	0.321	11.311	0.479
	Yes	1			

Table 3: Sociodemographic and Psychosocial determinants of ART adherence among adolescents living with HIV.

Participants who had a particular time at which they took their drugs were 9 times more likely to have a good level of adherence when compared to those who did not (AOR = 9.171, p=0.008 95%CI: 1.781-47.221) as in Table 4.

Variable	Category	Adjusted Odds Ratio (AOR)	Lower Limit 95%CI	Upper Limit	P-value
Family encourages and reminds of when to take drug	No	0.619	0.221	1.735	0.36
	Yes	1			
Have same time at which I have to take my drug	No	9.171	1.781	47.221	0.008
	Yes	1			
My drug keeps me healthy	No	0.121	0.007	2.084	0.146
	Yes	1			
Availability of food so drugs can be taken at right time	No	0.449	0.112	1.804	0.259
	Yes	1			
Minimal side effects	No	0.453	0.079	2.569	0.374
	Yes	1			

Table 4: Medication-related determinants of ART adherence among adolescents living with HIV.

Discussion

Our study revealed that out of 217 participants, there were more girls 111 (51.2%) than boys with a ratio of 1.05 :1. This can be since girls are more vulnerable than boys because of biological reasons (greater mucus area exposed to HIV during penile penetration) and they are also exposed to transactional relationships. The results of this study as far as the proportion of HIV in adolescent girls was coherent with Tanyi, et al., (54.9%) in Kenya, Habumugisha, et al., (54%) in Rwanda and Ketchaji, et al., in Yaounde (55%) [7,9,10]. It was however lower than 63% by Nabukeera-Barungi, et al., in Uganda [11]. In contrast, Ugwu, et al., found out there were more boy affected (51.2%) [12]. This is probably because we had 69.1% of the participants included in the study were in the age group of 15-19 years, with a particularity that this age group may be in a "critical exposure period" in determining lifetime HIV risk since in this period, sexual behaviour patterns are formed. This was higher than a similar study made in Yaounde by Ketchaji, et al., (61.9%) [9]. It was noticed that 53.5% of the participants had reached secondary level of education. This can be because the research was carried out in a semi-urban area, where parents must try to educate their children. This was similar to the findings by Ketchaji, et al., in Yaounde who had 57% [9].

Adherence by pill count was 52.1%. This was significantly low as compared to the standard 95% optimal adherence accepted. This value was higher than 38.2% of Ketchaji, et al. [9]. It can be because many strategies have been developed to increase the level of adherence among these target group.

Our study also found out that only 58% of our participants were adherent following self-report adherence measurement. This could be because the responses are based on patient's recall memory for the past 30 days so there is a bias. This value was lower than the 60.6% from Ketchaji, et al., and 82.9% from Bongfen, et al. [8,9]. The lower adherence percentage could be because of other adherent strategies that have been put in place by these bigger centers of care and follow up.

Having close relationships with family and friends was significantly related with adherence This was like findings by Ugwu, et al., in Nigeria and by Damulira, et al., in Uganda [12,14]. This could be explained by the fact that the family might have HIV-related knowledge so, the importance maintaining good medication adherence is of priority [13]. Feeling of having family who provides emotional support was also significantly related with adherence. Perception of a supportive family environment in the form of receiving emotional support is likely to decrease negative effects associated with the disease, probably by increasing self-esteem and adaptive coping. However, after multivariate analysis it was found out that age was significantly associated with adherence. Adolescents of age group within 10-14 years were 9 times more adherent compared to the other group of adolescents. This can be since this age group mostly depend on their caregivers. Adolescents of this group may generally see things as good or wrong without much room in between so they need a good support from carers, which might be the case in our study. This contrasted with the findings by Lantche, et al., in Yaounde who did not find any association between age and adherence [15].

Feeling comfortable to talk about worries to the family was found to increase occurrence of adherence. This could be because in Sub-Saharan Africa, families rely on close network of kinship members for loyalty and support among members. Also, cohesive families will know the HIV status of the adolescents in the family and hence more likely to encourage them and remind them of when to take their drugs. This was seen in a similar study by Damulira, et al., in Uganda [14]. Having the same time at which the medication is taken was statistically significant. This was also found by Ketchaji, et al., in Yaounde [9]. This might be because of their effective memory techniques such as alarms clocks or the support from family members.

Having minimal side effects of the medications, believing the medication keeps healthy and presence of food when drug is to be taken and they were found to be significantly associated with adherence. This was like the findings of Habumugisha, et al., (patients see ART as good and they did not contract other illnesses since they began taking them consistently) [10]. Also, trusting the services by the providers, receiving moral and social support from the health care providers, the personnel are welcoming and encouraging and trusting the information from the personel on the drug and state of health. But all these significant determinants were not associated with adherence on multivariate analysis.

Conclusion
We can conclude that: 58% and 52.1% of adolescents were adherent to their medication with respect to self-report and pill count measurement respectively which means adherence is still sub- optimal in the Southwest region. Factors favouring adherence of these adolescents were related to a particular age group, the aspect of talking comfortably to family and a precise time for drug intake.

Conflict of Interests
The authors declare that they have no conflicts of interest.

Author Contributions
All authors participated in the design and review of this article; HVM and AB jointly wrote the manuscript.

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