FACTORS ASSOCITED WITH VIRAL LOAD SUPPRESSION AMONG HIV POSITIVE ADOLESCENTS AND YOUNG ADULTS AT MUHIMA DISTRICT HOSPITAL, RWANDA.

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KeyWords

Viral load suppression, prevalence, Associated factors, Rwanda

ABSTRACT

Background

It was estimated that 36.7 million people lived with HIV globally, and approximately half were on antiretroviral therapy. In both resourced and resource-limited settings, retention in care and rates of viral suppression are lower in adolescents and young adults when compared with older adults or younger children. In Rwanda, among adolescents and young adults (those aged 13-24 years), the prevalence of HIV varied geographically, ranging from 2.2% in the North to 4.3% in the City of Kigali. The aim of this study was to assess the factors associated with viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital.

Methods:

A cross-sectional study with quantitative approach was conducted on 361 selected sample using systematic sampling techniques, data were collected using interviewer-administered questionnaires and processed and analyzed using SPSS Version 21, bivariate and multivariate logistic regression analysis were used to determine the factor associated with viral load suppression among HIV positive adolescents and young adults at Muhima district hospital, significant of statistical association will be tested using 95% confidence interval and p-value (<0.05).

Results:

Among 361 respondents, Female were 68.1%; 82.3% were single and 85.6% were aged from 20-30. The results indicated that 62% of respondents took the ARV as prescribed (good adherence) to ART; 98.1% observed positive health benefits from using ARV drugs, however 16.1% failed to take prescribed ARVs because of hiding from friends their HIV status and 15% due to forgetfulness. Non-suppressed viral load was found from 29% of respondents. Adolescence period (15-20) (AOR=1.14 95%CI: 1.008 - 2.442), Having no formal education (AOR=2.71, 95%CI: 1.211-3.061, P=0.002) primary education (AOR = 1.84, 95%CI: 1.154-2.074, P=0.019), failure to attend clinic schedule (AOR=3.29, 95%CI: 1.009 - 4.120, P=0.022), alcohol consumption (AOR=4.09, 95%CI: 2.03 - 6.302, P=0.026), comorbid condition (TB) (AOR = 2.08 , 95%CI: 1.042 - 3.981, P=0.029) increased the odds to non-suppressed viral load.

Conclusion: The viral load suppression is quite lower than the county's viral load suppression. Interventions targeting adherence support, stigma reduction, and peer support should be implemented to improve viral load suppression among HIV-positive adolescents and young adults.

Introduction

Globally, in 2020, 84% of people living with HIV knew their HIV status, of them 87% were accessing treatment, and among people accessing treatment, 90% were virally suppressed [1]. Adolescents (13–19 years old) and young adults (20–24 years old) (AYA) with HIV consistently account for about one-fifth of new infections in the World [2]. Most notably, The study conducted in south Africa showed that only 40% of AYA with HIV are aware of their diagnosis and only 6% to 30% are virally suppressed [3]. These numbers are significantly worse than documented in older adults with HIV [2].

Achieving human immunodeficiency virus (HIV) viral load supppression is a central means for improving the well-being of those living with HIV, including reducing morbidity and mortality, increasing quality of life, and decreasing the likelihood of transmission to uninfected partners [4]. The study in Ethiopia has revealed that despite the benefits of viral suppression, it is estimated that only 58% of persons with diagnosed HIV are suppressed [5]. Even fewer are likely to be durably suppressed [6], [7].

Anti-retroviral therapy (ART) suppresses HIV replication and by doing so, it has transformed HIV infection from a deadly disease into a manageable chronic illness [8]. The recent HPTN052 clinical trial has shown that viral suppression due to ART can reduce HIV transmission by up to 96% [4]. In order to maximize the benefits of ART globally, the second and third targets of the Joint United Nations Program me for HIV/AIDS (UNAIDS) 90-90-90 target call on at least 90% of PLHIV to be on ART and 90% of those on ART to have viral suppression by 2020 [9].

Africa is the most influenced continent, and it is estimated to have a burden of over two-thirds of the world's total viral infections [10]. The sub-Saharan Africa region carries the highest burden of the disease, with nearly 70% of all people living with HIV (PLHIV), and 76% of all HIV related deaths coming from this region [1]. Many studies have demonstrated that lower HIV viral suppression appears together with a wide range of factors in different settings; however, the level and cause of the problem differ from country to country, for example, the no suppression rate of viral load in South Africa is 15%, Swaziland 16%, Uganda 29%, Cambodia 23.2%, Zimbabwe 14%, and Los Angeles 27% [11]–[14]. In these studies, socio-demographic and psychological factors, previous treatment failure, long periods on ARV therapy, low baseline CD4, ARV regimen, poor absorption of ARVs, poor adherence to treatment, comorbidities, drug resistance, drug toxicity, substance abuse, weak social support networks, sexually transmitted infections (STIs), and poor awareness of the benefits of viral suppression were negatively associated with viral load suppression on ARV therapy [15]. On the contrary, the factors promoting viral load suppression have also been identified: use of community interventions, setting up adolescent-specific care spaces, and maintaining adherence > 95% [3], [16], [17]. However, most of the recommendations from these studies require financial support, which is scarcely available in low-income countries, and interventions may collapse once support is withdrawn.

In Rwanda, prevalence of HIV among adults in Rwanda was 3.0% [18]. This corresponds to approximately 210,200 adults living with HIV in Rwanda with more women (3.7%) than men (2.2%) living with HIV [18]. Prevalence of HIV among young adolescents (those aged 10-14 years) was 0.4%, corresponding to approximately 5,900 young adolescents living with HIV in Rwanda, of the 216,000 people living with HIV among those aged 13-24 years (RPHIA, 2019). RPHIA (2019) revealed that 67.4% of adolescents and young adults who were aware of their HIV were on ART treatment, but it did not assess their adherence. In the last 20 years, Rwanda has made tremendous progress in the fight against HIV, with a massive increase of HIV counseling and testing services and the decentralization of ART provision [19]. In Rwanda, the first and the second UNAIDS targets are close to be reached: in 2016, an estimated 87% of 220,000 PLHIV knew their status and 90% of PLHIV were on ART [8].

In Rwanda, among adolescents and young adults (those aged 13-24 years), the prevalence of HIV varied geographically across Rwanda, ranging from 2.2% in the North to 4.3% in the City of Kigali [18]. HIV prevalence was 1.9 times higher in urban areas compared to rural areas [18]. The prevalence of viral load suppression (VLS) among all HIV-positive adults was

76.0%: 79.1% among women and 70.5% among men [18]. The prevalence of VLS was highest among those aged 35-44 years (85.2%) and lowest in adolescents and young adults namely those aged 15-24 years (62.3%) [18]. This is below UN-AIDS ambitious 90–90-90 targets: by 2020, 90% of all PLHIV should know their serological status, 90% of all diagnosed PLHIV should receive antiretroviral treatment (ART), and 90% of all PLHIV on ART should have a suppressed viral load (VL) [1].

Muhima District Hospital is located in Kigali City where the prevalence of HIV among adolescents and young adults is higher (4.3%) than the National prevalence of HIV (3.3%). This prevalence does not indicate the findings of viral load suppression were regardless of knowledge of HIV status or use of antiretroviral (ART) therapy. This highlights the need of the study that revealed viral load suppression specifically among HIV positive patients on ART and their adherence level to ART. It is in this perspective that the current study will assess adherence ART and viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital.

Materials and Methods

Study design, setting and participants

A research design is described as a blueprint for the conduct of a study that maximizes control over other factors that could interfere with the study's desired outcome (Mishra, 20100; Singh, 2006; Mugenda and Mugenda, 2003). For this research, the study was cross-sectional and data were collected from respondents using quantitative research approach with structured questionnaire. The study population for this study were all HIV positive adolescent and young adult patients (15-24 years old) attending antiretroviral therapy care and treatment services at Muhima District Hospital and some of their HCs as CORUNUM; RUGARAMA; KABUSUNZU and BILYOGO HCs presented by 568 clients in total responding to eligible criteria. Fisher formula was used to find the sample size , the total sample size from the study were 361 adolescents.

Data collection instrument and procedures

The data were collected using structured questionnaire to eligible participants. The researcher has distributed the questionnaire to the HIV positive adolescents and young adults in their catchment area. Structured questionnaire was developed based on the variables of the study. The tool was validated before being used in the study.

Data Analysis

The collected data were cleaned, re-coded and entered into the computer using the statistical package for social science (SPSS) version 21 for analysis. The finding will be reported in chapter four and will be presented in table and graphs. Descriptive statistic such as frequency distributions and percentages were used to describe various variables under study such aa socio-demographic characteristic of respondents and viral load suppression. Additionally bivariate and multivariate logistic regression analysis will be computed to determine statistical association between the outcome and the independent variables, significant of statistical association will be tested using 95% confidence interval and p-value (<0.05).

Ethical consideration

Ethical clearance to conduct the research was obtained from Mount Kenya University. Approval was obtained from Muhima district hospital. Questionnaire was coded instead of using names as identification and hence, confidentiality was assured throughout the study. The data were stored in the secured manner, ensuring anonymity with the password granting access to only researchers, supervisors and the Mount Kenya University.

RESULTS

Socio-demographic characteristics of respondents

The table above (Table 1) details the demographic information of respondents to our study that intends to evaluate the adherence on ART and viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital. The results show that 68.1% of respondents were females as compared to 31.9% who were males. The marital status, 82.3% of respondents were identified being single, 12.7% got separated, 2.5% were windowed and 2.5% co-habit with their intimate partners. Huge proportion of respondents did not have chance to go far in education, as only 1.7% got to university, 3% attended vocational training, 24.4% completed secondary education and the majority (35.7%) of respondents attended primary education whereas 35.2% have never been at school.

Regarding the age range of the respondents, the majority (85.6%) were aged between 20 and 24 years while 14.4% were teens. 1 in 3 respondents was a student (29.9%), 38.5% were unemployed, 15.2% were self-employed while 11.9% had a part-time job compared to 4.4% who had a full time job. About the distance from home to the health care facility, about a half of respondents (49.6%) reported that they travel an average distance to reach the health facility, 36.8% responded that they live closely to health facility and only 13.6% reported a large distance to travel from home to the health facility, however, the preferred mode of transport is different among respondents, more than a half (51.5%) of respondents walk, 31.9% of the respondent take a public bus and 16.6% use private cars to reach the health facility. The distance to health facility for clinic visit was declared an obstacle for 28.8% of respondents.

Table 1: Socio-demographic characteristics of Respondents

Characteristics	Frequency (N)	Percent (%)
Gender of respondent		
Male	115	31.9
Female	246	68.1
Marital status		
Single	297	82.3
Separated	46	12.7
Widower/Widowed	9	2.5
Co-habiting	9	2.5
Level of Education		
No formal education	127	35.2
Primary	129	35.7
Secondary	88	24.4
VTC	6	3.0
College/University	11	1.7
Age		
15-20	52	14.4
20-24	309	85.6
Occupation		
Student	108	29.9
Employed full time	16	4.4
Employed part time	43	11.9
Self-employed	56	15.6

Unemployed	138	38.2
Distance to the Health Facility		
Nearby	133	36.8
Average distance	179	49.6
Very far	49	13.6
Transport type		
Public bus	115	31.9
on foot	186	51.5
Private	60	16.6
Distance poses any obstacle to clinic visit		
Yes	104	28.8
No	257	71.2

Source: Researcher's data, 2023

Patients related information

Regarding the knowledge of ART among HIV positive as shown in the table above (Table 4.2), 78.4% of respondents responded that they know that ARV drugs reduced the progress of HIV, 10.5% know that the ARV drugs cure, 9.7% responded that ARVs reduce the pain while 1.4% responded that they do not know why they take ARV drugs, However, 98.1% of all respondents agreed that ARV drugs have brought positive health outcome and as a result of taking ARV drugs. The benefits from using ARV were stated, 38.8% of respondents declared no more frequent sickness, 33.7% kept growing normally and 23.5% gained more weights.

The use of substances such as alcohol and cigarettes were assessed, 48.2% responded that they take alcohol, 1.1% smoke cigarette and a half 50.7% do not take neither alcohol nor cigarette. To relate the substance, use and failure to take ARVs, 21.9% of respondents said that they fail to take ARVs because of taking alcohol or cigarette, 78.1% of respondents were not put off to take ARV drugs as a result of substance use.

Regarding the relationship status of respondents, 45.4% were found not engaged in relationship, 31.9% were in stable relationship, 22.2% changes partners frequently while 0.6% have multiple partners at time.

As a result of their relationship status, respondents have different sexual behaviors and some respondents do not use condoms during sex as 32.1% of participants responded, 45.2% of respondents sometimes forget the condoms while 9.4% constantly remember the condom during every sexual intercourse.

The researcher further assessed for emotional feelings of HIV positive adults participated in the study and the decision that may be taken as a result of having HIV; as shown in the table above (Table 4.2), 61.5% of respondents said that they sometimes felt down, hopeless, restless because of being HIV positive, and 10.8% had these feelings almost every day, however, 27.7% of respondents felt hopeful despite of being a HIV positive patient. Consequently, 21.6% of respondents thought of committing suicide, 4.2% attempted but 74% never tempted to commit suicide.

Table 2: Patients related information

Patients related information	Frequency (N)	Percent (%)
ARV drugs usage		
Curing	38	10.5
Reducing pain	35	9.7

Reducing progress of HIV	288	79.8
ARVs brought a positive health outcome		
Yes	354	98.1
No	7	1.9
Benefits from using ARV drugs		
Gained more weights	85	23.5
No more frequent sickness	140	38.8
Growing normally	136	37.7
Frequently using substances		
Alcohol	178	49.3
None	183	50.7
Sexual Relationship Status		
Not in relationship at all	164	45.4
In stable relationship	115	31.9
Changing partners frequently	82	22.8
Experience/Practice concerning having safe sex		
I never use condoms	116	32.1
I consistently use condom during sex	34	9.4
Sometimes I use, but sometime not	163	45.2
Never been in Relationship	48	13.3
Feeling down, hopeless, restless		
Not at all	100	27.7
Sometimes	222	61.5
Nearly every day	39	10.8
Suicide temptation		
Never	267	74
Thought about it sometimes	78	21.6
Attempted to suicide	16	4.4

Source: Researcher's data, 2023

ART Adherence related characteristics

To understand if respondents have ever failed to attend clinic schedule, results showed that 62.9% of respondents have always attended to clinic schedule whereas 37.1% failed to adhere to clinic schedule. Participants in this research had been on ARVs for different period, 82.3% had more than 24 months, 16.3% were on ARVs for six months, 1.1% were on ARVs for 12 months while only 0.3% have been on ARVs for 18months. Failure to take prescribed ARVs was worrisome among respondents, during this study, from 37.7% of respondents who fail to take prescribed ARVs, 16.1% of them failed to take prescribed ARVs due to hiding the drugs from their friends at work, at school and at other mutual interactions, 15% responded that they always forgot to take the drugs, 3.9% responded lacking supplemental foods while 2.8% failed to take the prescribed drugs because of being on safari. As a result of failing to take ARV drugs as prescribed, 11.1% got tired of ARVs and ever stopped taking drugs, 4.4% stopped ARVs for feeling better, 1.7% stopped ARVs because of co-morbid conditions and 0.3% stopped ARVs in favor of other treatment.

Table 3: ART Adherence related characteristics

Potential adherence factors	Frequency (N)	Percent (%)
Adherence to medication		
Do you take ARV as prescribed?		
Yes	225	62.3
No	136	37.7
How long using ARV drugs		
6 Months	59	16.3
12 Months	5	1.4
18 + Months	297	82.3
Failure to attend clinical schedule		
Failed to attend clinic schedule		
Yes	134	37.1
No	227	62.9
Reason for failure to attend clinic schedule		
Lack of time	74	20.5
Poor weather	37	10.2
Lack of transport fare	23	6.14
Total	134	37.1
Missing	227	62.9
Reason for failure to take prescribed ARVs		
Forgetfulness	54	15
Being on safari	10	2.8
Hiding from friends	58	16.1
Lack of food	14	3.9
Never failed	225	62.3
Reasons for ever stopping ARVs		
Getting tired of ARV	40	11.1
Co-morbid conditions	7	2
Feeling better	16	4.4
Have never stopped ARV	298	82.5

Source: Researcher's data, 2023

Clinic characteristics of HIV patients followed under ART

To evaluate if ARVs had some side effects on users, 91.4% of respondents said that they had never experienced side effects from using ARVs use; 8.6% respondent that they had observed side effects but 6.6% could stop ARVs due to its side effects. World health organization classifies different clinic stages of disease for all patients, during this study among HIV positive adults, clinic stages were studied when starting ART and at the time of the research, 59.6% were found to be at first stage, 26.9% were found to be at second stage, 13.3% were at stage III while 0.3% of patients were at stage IV. Regarding the co-morbid condition among respondents, 70.4% responded that they had Blood pressure, 15% had Hepatitis B, 14.1% of respondents had Tuberculosis whereas only 0.6% of respondents had diabetes. Viral load level was suppressed among 71%, CD4 at initiation was measured from medical records showed that 33.2% was between 201 and 500, 32.1% had a CD4 between 501 and 1000, 14.1% had a CD4 of 0 to 200, however, CD4 from 6.4% of respondents were not recorded.

Table 4: Clinic characteristics of HIV patients followed under ART

Potential factors	Frequency(N)	Percent(%)
ARVs side effects		
Yes	31	8.6
No	330	91.4
Side effects stopped the ARVs use		
Yes	24	6.6
No	337	93.4
Feeling down, hopeless, restless		
Not at all	100	27.7
Sometimes	222	61.5
Nearly every day	39	10.8
WHO disease/clinic stage of a patient when started ART		
Stage I	215	59.6
Stage II	97	26.9
Stage III	49	13.6
Co-morbid condition		
TB	51	14.1
Hepatitis B	55	15.6
BP	254	70.4
Viral load level		
Suppressed	258	71
Non-suppressed	103	29
CD4 at initiation		
Not Done	23	6.4
0-200	51	14.1
201-500	120	33.2
501-1000	116	32.1
1001 and above	51	14.1

Source: Researcher's data, 2023

The adherence level to ART among HIV positive adolescents and young adults at Muhima District Hospital

As shown in the table below (Figure 1) the results from the study revealed that 62% of respondents have good adherence to ART comparing to 38% who had bad adherence to ARV among HIV positive adolescents and young adults at Muhima district hospital.
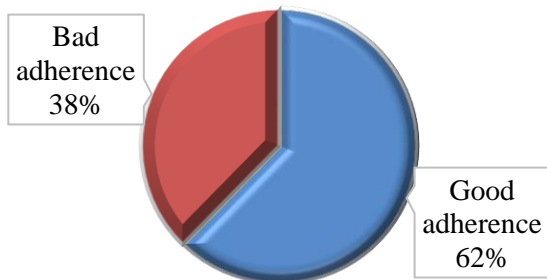
Adherence Level to ART

Figure 1: Adherence level to antiretrovival therapy

The prevalence of viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital

The results from this study revealed that 29% of the respondents were found with non-suppressed viral load level, this is a worrisome low prevalence and the researchers sought to find out the associated factors with non-suppressed as responded by the following specific objective.
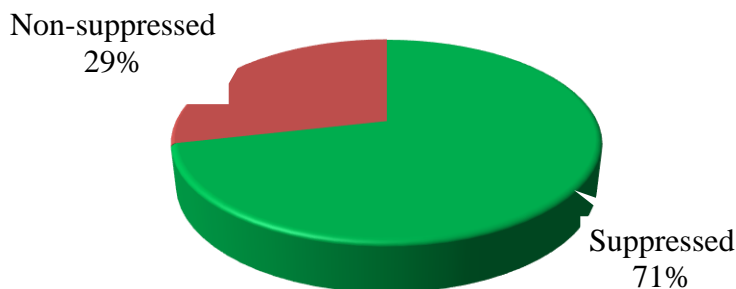

Figure 2: Prevalence of viral load suppression

The factors associated with viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital.

The table below shows the results from binary logistic regression, respondents aged below 20 years old were found to be 1.14 times more times more likely to be virally non-suppressed than those who are aged above 20 years old (AOR=1.14 95%CI: 1.008 - 2.442). Respondents with no formal education, primary education were 1.21; 1.10 times more likely to be virally non-suppressed respectively comparing to those with college/university education (AOR=1.21, 95%CI: 1.001 - 3.061, P=0.002 ; AOR = 1.10, 95%CI: 1.009-2.074, P=0.019).

Failure to attend clinic schedule increase the chance 3.29 times of having viral load suppression comparing to those who did not fail to attend clinic schedule (AOR=3.29, 95%CI: 1.009 - 4.120, P=0.022). respondents who frequently use substances such as alcohol were 4.09 times more likely to be virally non-suppressed comparing to those who did not take any substance (AOR=4.09, 95%CI: 2.03 -6.302, P=0.026).

Respondents experienced side effects from using ARVs drugs were 1.63 times more likely to be virally non-suppressed as compared to those who did not have side effects (AOR= 1.63, 95%CI: 1.037- 2.901, P=0.007). Respondents with TB were

2.08 times more likely to be virally suppressed than respondents with BP (AOR=2.08 , 95%CI: 1.042- 3.981, P=0.029).

Table 5: The factors associated with viral load suppression among HIV positive adolescents and young adults at Muhima District Hospital

Variables	Description	AOR	(CI at 95%)	P-Value
Age Category				
	15-20	1.14	(1.037-2.442)	**0.006**
	20-24	1*		
Education Level				
	No formal education	2.71	(1.211 - 3.061)	**0.002**
	Primary	1.84	(1.154 - 2.074)	**0.019**
	Secondary	1.23	(0.825 - 4.065)	0.075
	VTC	1.02	(0.691 - 2.217	0.125
	College/University	1*		
Failed to attend clinic schedule				
	Yes	3.29	(1.009 - 4.120)	**0.022**
	No	1*		
Frequently using substances				
	Cigarette	1.29	(0.472- 2.810)	0.094
	Alcohol	4.09	(2.03 -6.302)	**0.026**
	None	1*		
Comorbid condition				
	Tuberculosis	2.48	(1.042- 3.981)	**0.029**
	Hepatitis B	1.29	(1.081 -2.482)	0.618
	Diabetes	1.04	(1.038 -2.047)	0.304
	Blood pressure	1*		

Source: Researcher's data, 2023

DISCUSSION

The study aimed to identify factors associated with viral load suppression among HIV-positive adolescents and young adults at Muhima District Hospital and associated risk factors. The findings revealed that 29% of respondents had non-suppressed viral load, which is higher than the national rate for adolescents but lower than the rate for adults. Factors such as age, education level, failure to attend clinic visits, substance use, side effects of antiretroviral therapy (ART), and comorbid conditions were associated with viral load suppression. Non-suppressed viral load was more likely among younger individuals, those with lower education levels, non-adherence to clinic visits, alcohol consumers, and those with comorbid conditions. Adherence to ART was influenced by clinic attendance, duration on ARVs, substance use, side effects, distance to health facilities, and knowledge of ARV drug usage. These findings highlight the importance of addressing these factors to improve viral load suppression and adherence to ART among HIV-positive adolescents and young adults. This is in line with the study conducted in Northwestern Uganda which indicated that the viral load suppression among adolescents was 72% [20](Bennett, 2010).

Similar to this finding, the study conducted in Mbale district of Uganda by (Joel Maena, 2021) on 567 HIV infected adolescents showed that the VL non-suppression was 31.4%. Another study conducted in Zimbabwe among 842 adolescent HIV positive, showed that 35.1% were non-suppressed (Victoria Simms, 2019).

Several factors associated with viral load suppression were reported by different studies. Starting with viral load suppression, from our bivariate analysis, social demographic variables such as Gender, Age category, Marital status, Education level, failure to attend the clinic schedule were associated with viral load suppression among adolescents and young adults living with HIV in Muhima hospital. Different factors on respondents' knowledge and experience for ART such us ARV drug usage, Time initiation to ART, currently taking ART, Reasons for stopping ART, use of substances, failure to take ARVs due to substances, side effects from ARVs and sexual relationship behavior, suicide temptation, WHO staging, Comorbid conditions and CD4 at initiation were associated with viral load suppression.

Significant factors from bivariate analysis were regressed in multivariate analysis using Binary logistic regression with dependent variable which was viral load suppression. Age, Education Level, Failure to attend clinic visit, frequently use of substances, Side effects of ARVs and comorbid conditions remained associated with viral load suppression.

Respondents aged less than 20 years old were 1.14 times more likely to be virally non-suppressed comparing to others aged above 20 years old (AOR = 1.14, 95% CI: 1.037-2.442, P=0.06), this was also confirmed by the study conducted in Uganda which showed that ,the odds of virological non-suppression decreased with increasing age, young adolescents were found to be 4.1times more likely to be virally non-suppressed comparing to adults HIV positive people, (Bulage et al., 2017). Another research conducted in south Africa found that adolescent HIV patients aged 16-19 years old were 1.78times more likely to have non-suppressed viral load as compared to other age groups.

Education level of was significantly associated with viral load suppression, respondents with no formal education were 2.71 times more likely to have non-suppressed viral load than respondents who completed university and college, also having primary education was 1.84times more likely to have non-suppressed viral load (AOR=2.171 , 95%CI: 1.211 - 3.061, P=0.002 and AOR=1.84, 95%CI: 1.154-2.074, P=0.019), the same findings were observed from research conducted by (Joel Maena, 2021) on 567 HIV-infected adolescents, they found respondents with no formal education and primary education were 3.67 ; 2.23 times more likely to have non-suppressed viral load respectively as compared to having tertiary education.

Participants who failed to attend clinic visits were 3.29 times more likely to have non-suppressed viral load as compared to those who frequently attended clinic visits (AOR=3.29, 95%CI: 1.009-4.120, P=0.022).

Substances like alcohol and cigarette were often said to increase the risk to non-suppressed viral load, from this research findings, respondents who consume alcohol 4.09 times more likely to be virally non-suppressed as compared to others who did not take neither (AOR=4.09 , 95%CI: 2.03-6.302 , P=0.026), the similar results were found from the study conducted by (R. L. Cook, 2017) among persons living with HIV in floride who found that drinking alcohol increase the odds of failing to achieve optimal use of ARVs and hence the viral suppression (OR: 2.16) [21].

The presence of comorbid condition such as TB increased the odds of non-suppressed viral load as compared to respondents with BP (AOR=2.48, 95%CI: 1.042 - 3.981, P=0.029). similar to these findings, were obtained from (Joel Maena, 2021) who found that HIV patients with comorbidity condition are 3.28 times more likely to have non-suppressed viral load.

Regarding the factors associated with adherence to ART; Failure to attend clinic schedule, experience on ARVs drugs, frequent use of substances, observing ARVs side effect, distance to Health facility and ARVs drug usage were remained associated to adherence to ART during binary logistic regression [22].

Results from our study showed that failure to attend clinic schedule increases the risk of poor adherence to ART (AOR=0.83, 95%CI: 0.713-0.962, P=0.001), routine attendance to clinic schedule is recommended for good adherence to ART and for improving the health status of a HIV Positive patient, reasons for failure to attend clinic schedule include forgetfulness and getting tired of ARVs,Research by Tanyi et al (2021) also found that adolescents who missed the clinic days run out of pills and thus do not adhere to treatment requirements.

Participants who had been on ARVs drug for 6 months were 0.62 times less likely to have good adherence to ART (AOR=0.62, 95%CI: 0.549-0.802, P=0.002), new HIV diagnosed patients tend to hide from friends and relatives, have stigma comparing to others who had been on ART for longer period. Alcohol drinkers and cigarette smokers were less likely to have good adherence to ART, (AOR=0.93, 95%CI: 0.872- 0.997, P=0.001 and AOR=0.90 , 95%CI: 0.880 - 0.942, P=0.047) respectively. The study conducted in Nepal also pointed out substance use as 3.98 times more likely to influence poor adherence to ART (Shigdel R, 2013).

Observing side effects due to using ARVs increased the risk to bad adherence to ART (AOR=0.72, 95%CI: 0.172- 0.901, P=0.036), Shigdel R (2013) found that HIV positive adolescents were 4.88 times more likely to have bad adherence to ART. Distance to health facility increased the risk to good adherence to ART (AOR=1.69, 95%CI: 1.291- 2.394, P=0.004), study by Shigdel R (2013) found that the travel time to ART Centers increase 1.38times risk for good adherence to ART. Knowledge on ARV drugs usage as reducing the progress of HIV increase the risk for good adherence (AOR=2.91,95%CI: 1.469-3.484, P=0.002) [20].

Conclusion

The prevalence of adherence to ART among adolescents and young adults who were receiving antiretroviral therapy care and treatment services at Muhima District Hospital was quite poor and was influenced by failing to take prescribed drugs, taking substances such as alcohol and observing side effects of ARVs. Despite the UNAIDS target of viral load suppression, one in three of the respondents had a non-suppressed viral load, an increase in age of participant was associated with viral load suppression. Failure to attend clinic schedule, use of substances such as alcohol and comorbid conditions increased the risk to non-suppressed viral load.

Authors' contribution

E. Nyirabaributsa conceived of the study, devised the procedures, collected the data, and wrote the manuscript. C. Nsanzimana, M. Mochama oversaw the research project, made significant contributions to the research, and T. Kubahoniyesu participated in Data analysis and critically reviewing the paper for essential intellectual content.

Conflict of interest declaration

The authors state that the study was carried out in the absence of any form of relationship that may potentially lead to a conflict of interest. All authors agreed to submit to the current journal, accepted responsibility for all elements of the work, and granted final approval of the published version.

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