

Determinants of Treatment Adherence Among Orphans and Vulnerable Children Infected with Hiv/Aids in Rivers West Senatorial Districts

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Article History	Abstract
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Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.	
Citation: Thompson Salvation Chinezom & Prof. Daprim S, Ogaji. (2025). Determinants of Treatment Adherence Among Orphans and Vulnerable Children Infected with Hiv/Aids in Rivers West Senatorial Districts. UKR Journal of Medicine and Medical Research, 1(2), 104-121.	<i>There are several antiretroviral (ARV) drug combinations available for the therapy of HIV infection, but adherence to the prescribed treatment is crucial for good therapeutic outcomes. Poor adherence can have dire health repercussions for patients, including failure to achieve viral suppression and development of drug resistance, which can render some antiretroviral drugs permanently ineffective. Hence, the use of combination antiretroviral medication is crucial in the efficient management of HIV. The complexity of the treatment regimens may, however, pose additional hurdles to adherence. Such challenges are especially severe for children, adolescents and people who depend on carers for health care support. Adolescence is a period of fast physical; psychological and physiological development and these changes may present particular difficulties for commitment to therapy. Therefore, monitoring adherence to ART among orphans and vulnerable children living with HIV is critical to identify barriers to adherence and create suitable treatments to enhance health outcomes.</i> Methodology: The study was carried out in Rivers west senatorial district of Rivers State among children and adolescent between 0-17 years. This cross sectional descriptive was used to explore the treatment adherence among the population of study with a total sample size of 340 participants. A structured self-administered questionnaire was used to elicit response from the respondents and this quantitative data was analyzed using SPSS to determine the treatment plan. Result: It is evident that individuals with high viral load made most of the study sample accounting for hundred and fourth respondents. Among the lower viral load, adherence was at 57.14% and non-adherence was 42.7% and low viral load group, adherence was 69.6% and non-adherence was 30.4%. A chi-square test of independence shows that there was no significant association between viral load and adherence $X^2 (1, N = 165) p = .262$. The p value is greater than the significant value thus, it is accepted that there is no statistically significant relationship between viral load of the children infected with HIV/AIDS and adherence. It also shows that there is a statistically significant association between age and adherence to medication. Participants in the age range of 0-9years were more adherent to medications compared with those between 10-17 years (100% vs 44.1%; $p=0.0001$). Also, the table revealed that the respondents who are young were 2.268 times more likely to adhere to medications than who older participants (OR: 2.268; CI = 1.975-2.605). Conclusion: The study has highlighted specifically that orphan and vulnerable children in Rivers West senatorial district has very good adherence as the mean adherence for the study was 92%. It is advice that it should be maintained since high adherence rate relates positively with viral load when the CD4 has not reached 500 cell/mm³ knowing very well that low viral load reduces risk of infections, as majority of guidance/caregivers strictly adhered to treatment therapy, and it is believed that they have basic knowledge of treatment plan for HIV Keywords: Antiretroviral Therapy (ART), HIV Treatment Adherence, Orphans and Vulnerable Children, Viral Load, Age-Related Adherence, Rivers State.

Introduction

Despite a significant amount of research and efforts made to combat it, HIV remains a significant public health threat in the world and has resulted in enormous mortality and burden to health care systems, especially in developing countries (Volberding, 2011). Secular changes in HIV care have included the development of effective antiretroviral (ARV) medications, which have enabled people to live with HIV as a chronic illness, rather than always as a terminal one (Groh et al., 2011; Tougas, Hayden, McGrath, Huguette, & Rozario, 2015). Adherence to the recommended HIV treatment (ART) is one of the basic elements of successful HIV treatment. Patients' adherence to the prescribed medications plays an important role in their effectiveness, as do patients' attitude, understanding and commitment to their treatment regimens (Jimmy, Jose Beena Jimmy, & Jose, 2011; Viswanathan et al., 2015).

The critical part of successful HIV treatment is adherence to antiretroviral (ARV) drugs (World Health Organization, 2015). HIV infection can be treated with different combinations of ARV drugs, but they all have different therapeutic purposes – which means it is important for patients to adhere to their treatment plans. Determination of the factors associated with treatment adherence could guide HIV implementing partners (IPs) together with the Nigeria's Federal Ministry of Health (FMoH) to enhance enrolment in care, retention in care and design effective adherence support interventions. The results of this research might also help guide interventions to promote people with HIV to seek treatment at a facility near where they live, which could help lower obstacles to ongoing treatment. In addition, if treatment adherence is found to be correlated with low levels of viral detection, it may be possible to draw upon this evidence to focus adherence counsellors on maintaining adherence, and not just on people who are new to treatment programmes.

Ajakaiye, Jerome, Nabena, and Alabi A. Olufunke (2015) reported Nigeria's per capita gross domestic product (GDP) was about US\$2,980 in 2013, making it the 131st nation in the world. Nigeria has always been considered a low and middle-income country. The first reported HIV case in Nigeria was in Lagos in 1986 followed by two in 1987, 33 in 1988, and 9,715 in 2000. In the early phase of the epidemic, some citizens of the world even doubted its existence, and its sources, seeing it as a possible effort by the West to try to displease sex or to control the expansion of African population (Zezeza & Kakoma, 2003). The acronym AIDS was allegedly redefined by some critics as the “American idea of discouraging sex.” Prior to the first sentinel surveillance survey, the national HIV prevalence was reported to have risen from 1.8% in 1991 to 3.8% in 1993, 5.4% in 1999, and 5.8% in 2001 (National Agency

for the Control of AIDS [NACA], 2015). Nigeria in 2011 had an estimated population of 180 million with an HIV prevalence rate of 3.3% (Bashorun *et al*., 2014). In 2015, the estimated population was 185 million, with about 49% of people being female and 51% male, and the prevalence rate for HIV was reported to be 3.1% (PEPFAR, 2016). Further, the 2012 National HIV/AIDS and Reproductive Health Survey (NARHS) also surveyed a larger population than the antenatal clinic (ANC) sentinel survey and indicated an HIV prevalence rate of 3.4% (NACA, 2015).

Compliance means consistency of a patient in following up a health care provider's advice and instructions (De Geest & Sabate, 2003). As related to HIV treatment, this includes taking medications as prescribed, according to the agreed treatment plan, and as recommended by the diet (if needed). By taking ART regularly, the virus can be kept under control, less damage to the immune system, and better long-term health outcomes. HIV treatment is also making it possible for people infected with HIV to live longer and healthier lives. Furthermore, people with viral suppression from the right treatment have a much lower risk of transmitting HIV through sexual activity, which makes taking medication a key part of looking after your health and protecting public health.

Poor compliance to Human Immunodeficiency Virus (HIV) medication can cause immunological suppression and impact the body's ability to fight infection. Another important effect of inconsistent use of medication is the development of resistance to antiretroviral medications that may limit future treatment options. Poor or intermittent adherence to antiretroviral therapy (ART) can allow for continued replication of HIV, resulting in progressive deterioration of the immune system, falling CD4 T-lymphocyte counts, the emergence of AIDS-related symptoms, and an increased risk of premature mortality (Arg, Tietjen, Gatonye, Ngwenya *et al*., 2016). Historically, the importance of adherence levels above 95% for optimal treatment outcomes with some ART regimens has been emphasised (Achipa, Madi, Bhaskaral, Ramapuran, *et al*., 2013). But the degree of adherence needed for efficient viral suppression depends on the treatment regimen and individual clinical circumstances.

Following the treatment that has been provided is very important if people are to get good results when they are treated for long-term disorders such as HIV infection. Poor adherence can lead to various undesirable outcomes, particularly poor viral suppression and development of resistance to some antiretroviral (ARV) drugs. Antiretroviral therapy (ART) is the mainstay of HIV treatment and is used in combination to reduce viral load. The cost of medication may be a further barrier for some

patients. Poor adherence may be due to multiple variables, including complex treatment schedules, frequent dosing, high pill burden, treatment fatigue, medication side effects, lack of knowledge regarding therapy, poor patient-provider relationships, limited access to ART services and the financial costs of treatment (Kenneth, 2013). Therefore, overcoming these hurdles is critical for increasing continuity of treatment and maintaining viral suppression.

Ensuring that persons who test positive are successfully linked to suitable healthcare institutions and remain engaged in care until they initiate ART is a critical problem in early HIV care. Pre-antiretroviral therapy (pre-ART) care has been generally characterised as a period between the diagnosis of HIV-positive status to the commencement of antiretroviral medicine. Poor retention can also occur during this period among those who know their HIV status, especially if they only seek medical care when they suffer a significant sickness. In Nigeria Pre-ART services comprised early diagnosis, counselling and clinical assessment including viral-load assessment when applicable to aid patient care and treatment commencement (Agu, Isah, Oqua, King *et al.*, 2012). Hence, it is vital to improve patient linkage, follow up and retention in care to reduce delays in treatment and improve long-term health outcomes.

In 2017, roughly 10% of the estimated 36.9 million persons living with HIV globally were children and adolescents, with about 80% of this population living in sub-Saharan Africa (UNICEF, 2017). The incidence of new HIV infections in children fell by 35% between 2010 and 2017, however the number of infections remained a substantial public health concern despite advances in avoiding mother-to-child transmission (UNAIDS, 2018). These situations underscore the ongoing need to expand HIV prevention, early diagnosis and treatment services for younger populations. Specific focus is also needed to enable children and adolescents to maintain consistent adherence to ART, particularly where treatment is provided through carers or if developmental and social issues prevent children and adolescents from engaging with health professionals.

The advent of efficient antiretroviral therapy (ART) in the 1990s resulted in a dramatic reduction in the morbidity and mortality associated with acquired immunodeficiency syndrome (AIDS). Thus, adherence to prescribed ART became a crucial determinant of the long-term survival and better health outcomes of people living with HIV (Simoni *et al.*, 2017). Besides the therapeutic benefits, continuous adherence to ART has emerged as a key public health strategy to decrease onwards transmission of HIV at the community level, as long as therapy achieves and maintains viral suppression (Enane, Vreeman, & Foster, 2018).

Many children in sub-Saharan Africa are affected by extreme poverty and bear a disproportionate burden of disease and illness (UNICEF, 2014). The under-five mortality rate has been decreasing, but it is still much higher than in affluent nations and children keep dying from preventable and curable illnesses such as pneumonia, diarrhoea and malaria (United Nations, 2014). The vulnerabilities faced by children in this environment particularly those related to HIV have thus attracted substantial interest from researchers, health practitioners and policy makers (UNICEF, 2013). Adherence to HIV treatment entails starting the specified regimen, keeping planned medical appointments, and taking the medications as prescribed by health care providers. Adherence is critical to attaining viral suppression, maintaining immunological function and promoting long-term health for those living with HIV.”

Children and adolescents have specific difficulty with adherence to ART (Simoni *et al.*, 2017). Children are generally reliant on carers to provide medication and organise healthcare, and teenagers undergo rapid physical, psychological and social changes that can present age-specific hurdles to continuous therapy (Nichols, Steinmetz, & Paintsil, 2017). Reported levels of adherence in these people in resource-limited settings have varied from 49% to 100%, reflecting disparities in sociocultural contexts and the absence of standardised methods of adherence measurement (Vreeman, Wiehe, Pearce, & Nyandiko, 2008). Compliance can be measured using subjective and objective measures (Haberer & Mellins, 2009). Self-report and caregiver-report are subjective measures that are susceptible to over-estimation of adherence due to recall bias and social desirability bias (Haberer *et al.*, 2017). Objective approaches include pharmacy refill records, pill counts, electronic medication monitoring, drug detection in biological samples, and plasma HIV viral-load testing. Some of these measurements can be expensive or less appealing to patients (Smith *et al.*, 2016) yet they can also give helpful evidence. Considering the advantages and disadvantages of each method, a mixture of different assessment methods might provide a more realistic estimate of adherence. Poor adherence can lead to suboptimal viral suppression and the development of medication resistant HIV, which increases the chance of treatment failure, reduces future treatment options, and increases the risk of poor health consequences including death (WHO, 2006).

Compliance with ART is a complex process influenced by a number of interacting factors. These influences can be categorized as child/teen factors, caregiver/family factors, factors of health care providers, factors of sociocultural factors, and factors of medication (Vreeman, Wiehe, Pearce, & Nyandiko, 2008). These influences take place on

various levels and this complexity complicates the relationship between individual circumstances and optimal adherence to treatment. Poverty, food insecurity (Young et al., 2014), poor quality comprehensive health care services, and limited access to medical facilities have been identified as some of the major barriers that impact the health of young people living with HIV in low and middle-income countries (Hudelson & Cluver, 2015).

Preventing HIV transmission from mother to child has been a priority of the Global Plan to eliminate new HIV infections in children. New HIV infections in children dropped 43% between 2009 and 2013 in the 21 priority countries in sub-Saharan Africa (SSA) (UNAIDS, 2014). Despite this progress, many of the children living with HIV are not diagnosed and thus restricted in their ability to access timely treatment and adequate health care support (Pufall et al., 2014). These situations highlight the importance of enhancing early diagnosis, increasing access to HIV testing and improving the identification and linkage to HIV treatment of children who might fall outside of existing HIV treatment programs.

Beyond the direct consequences of paediatric HIV infection, children can be very vulnerable when living in families and communities that are profoundly HIV impacted. The impact has been a rise in the number of children who have lost one or both parents. While there are many causes for parental mortality, it is estimated that in sub-Saharan Africa 15 million children lost one or both parents to AIDS by 2013 (UNICEF, 2013). The absence of parents may leave children vulnerable to economic hardship, loss of parental support, and a lack of or disruptions to access to key services. There have also been studies that link the orphaned status with lower health and educational outcomes than those of children who have not lost their parents (Beegle, De Weerd, & Dercon, 2010). These conditions can also hinder the capacity of vulnerable children to have regular contact with health services and take their medication as prescribed to manage HIV.

While about 83% of the adolescents with HIV in the world live in sub-Saharan Africa, treatment outcomes among these adolescents have been reported as poor compared to those of adults (Ankrah et al., 2016; Maskew et al., 2016). However, after the start of ART, adherence to treatment is key to good health (Heestermans, Browne, Aitken, Vervoort, & Klipstein-Grobusch, 2016). However, problems with adherence can arise even for those who have previously maintained good adherence to their treatments (Ngarina, Popenoe, Kilewo, Biberfeld, & Ekstrom, 2013). Adverse medication side effects, forgetfulness, financial constraints, and stigma associated with HIV may cause adolescents and others with HIV to not adhere to treatment (Gare et al., 2015; Shigdel et al., 2014). These barriers

underscore the need to ensure ongoing age-appropriate, context-relevant support to help maintain treatment engagement.

Comparative evidence of the effects of rural–urban environments on ART adherence in developing countries is an important avenue for further research. A study in Uganda identified lower adherence as evidenced by hospital prescription refill record among the patients who lived and sought care at rural health facilities (Nabukeera-Barungi et al., 2015). But more studies are required to determine adherence in patients who live in rural communities but travel to far away facilities for treatment. Another barrier to ongoing medication adherence that has been suggested is distance between patients' homes and treatment centres (Conley et al., 2012). Therefore, understanding the link between residential location, access to health services, and adherence to treatment may offer insights into actionable interventions to enhance continuity of HIV treatment among people who live with HIV.

Research Methodology

Study Area

River's state is the most populous state in the whole Niger Delta area and Number six populated state in Nigeria with a population density of over five million (5million) people as stated by the 2006 census and anticipated to climb to 8million in 2020. Also, the influx of migrants to Rivers State for greener pastures as the heart of oil and gas activity in sub-Sahara Africa. Therefore, it is essential to point out that this study explains not only the topic of study but also the peculiarities of Rivers State.

Makama (2010) observes that Nigeria is the 8th populous country in the world with about 140million inhabitants. Nigeria's population is predicted to be increasing at 3.2 percent a year. 49% of the population is female. Of these, 51 percent are of reproductive age (15-49 years). Twenty three (23) per cent of women aged 15-19 are already moms or are expecting their first baby.

Rivers State is one of Nigeria's 36 states. Its capital is Port Harcourt which is the biggest city in the whole Niger Delta region and is of economic importance as a center of Nigeria oil and gas industries. Rivers State is found to the South of the Atlantic Ocean, to the North by Imo, Abia and Anambra State, to the East by Akwa Ibom and to the west by Bayelsa and Delta State. It is home to various indigenes or indigenous ethnic group which include Ikwerre, Ibani, Opobo, Abua, Eleme, Okrika and Kalabari, Etche, Ogba, Ogoni Engenni and more.

The central half of the state is tropical rainforest, along the coast the characteristic Niger Delta ecosystem with abundant mangrove swamps is found (Rivers State

government website, 2014). Rivers State was so named because of the many Rivers that surround the region or territory. Rivers State was part of the oil Rivers Protectorate from 1885 till 1893 when it became part of Niger coast protectorate. According to Obenade M. et al (2014) 1900. The territory was amalgamated with the chartered territories of the royal Niger company to create the colony of southern Nigeria. The state was founded in 1967 when the Eastern portion of Nigeria was divided up. Bayelsa

State was constituted out of Rivers State in 1996. (www.citypopulation.de/php/ng.admin.php).

"The Rivers State Senatorial district covers the local government areas of Abua–Odual, Ahoada East, Ahoada West, Akuku-Toru, Asari-Toru, Bonny, Degema and Ogba–Egbema–Ndoni. In 2014, it had a projected population of 2,366,158.



Fig 3.1 map of Rivers State showing Senatorial Districts.

Table 3.1: Projected population of Rivers State Senatorial District

S/N	Local Government Area	Projected Population	Wards
1	Abua–Odual	369,771	13
2	Ahoada East	210,882	13
3	Ahoada West	325,915	12
4	Akuku-Toru	203,848	17
5	Asari-Toru	287,597	13
6	Bonny	281,401	12
7	Degema	315,638	17
8	Ogba–Egbema–Ndoni	371,106	17
9	Total	2,366,158.	

Source: National Population Census, 2014

3.2 Study Population

The study population comprised of children within 0-17 years.

A sample is only a portion of the population. Samples are used since the researchers cannot test all the individuals in a given community. The sample must be representative of the population from which it was drawn large enough for statistical analysis.

The major purpose of the sample is to enable the researchers to carry out the study on the members of the population so that the findings of their study may be utilised to make inferences which will hold for the full population. It's very much a back and forth process. The population "provides" the sample and then "derives" conclusions from the results gained from the sample.

Research Design

This is a cross Sectional Descriptive Study. cross Sectional Descriptive was used because it is quantitative research methodology aimed to explore and appraise the hindrances to the utilization of primary healthcare centers. The quantitative research method and the researcher to understand the population changes in other to obtain cultural and specific information (FHI, 2005).

Use of quantitative research method is better appropriate for exploratory study such as this study. This study method allows flexibility and in-depth inquiry of the thinking and experience of users and suppliers of Primary Healthcare Services. This is for a complete evaluation of the major concept or perceptions individuals may have with their observation and possible obstacles to the use of Primary Healthcare Service enabling the researcher to acquire extensive information from varied group of people in a freely communicative setting.

Sample Size Determination

Using a cross sectional descriptive study, the sample size was determined using the formula below.

$$n = \frac{z^2 P \theta}{d^2}$$

Where

n=Minimal Sample Size determined

z= Standard normal deviate taking 95% [1.96]

Proportion P =50% (gotten from pilot testing the questionnaires)

Q= 1-p=0.50

e= Margin of error at 95% confidence interval

e= 0.05

$$n = z^2 \frac{1-\alpha/2 \times p(1-p)}{d^2}$$

(Cochran, 1977).

$$z = 1.96$$

$$P = 50\%$$

$$q = 1-p$$

$$= 340$$

Sampling Technique

Multistage sampling method will be used.

- 1st stage: The senatorial district is made up of 8 LGAs
- 2nd stage: the LGAs is made up of political wards, which will be selected for the study
- 3rd stage: this includes the communities in the selected wards of the LGAs

Methods of Data Collection

The data collection method is a method of procedure and methodology and tool used while collecting data from the sample respondent. The data is collected using qualitative and quantitative methods, utilising statistical and mathematical methodologies. The research connects the quantitative method with the detailed study of people and small group of population.

The quantitative method of data gathering technique will be used in this investigation. It was focused on the bases that the quantitative technique helped to characterise the comprehension and zeal of the people. This helped to corroborate the respondents grasp of the outcome of the study. The researcher judged it necessary to employ a close ended semi-structured questionnaire for the available technique of data collecting.

Reliability

The reliability of an instrument refers to its consistency in producing intended results. To ensure that the instruments were reliable, a test-retest of the instrument was done in the University of Port Harcourt Teaching Hospital using an interval of two weeks. The reliability of the instruments was determined by subjecting the instruments (pre-test and post-test instruments) to statistical analysis. Using Cronbach Alpha formula for reliability, the consistency of the responses was compared. The questionnaire yielded a reliability coefficient of 0.79 making it suitable and reliable for the study.

Questionnaire

The questionnaire is characterised by numerous categories of questions, typically closed-ended enquiries, that are

intended to collect data to learn about the population or participant's characteristics.

Mavodza (2010) states. Questionnaire is a statistical examination of a sample population by asking questions about age, income, opinions and other aspects of persons lives. A questionnaire is a list of questions that are asked in a survey.

Data Analysis

Quantitative data were sorted, cleaned and analysed manually using SPSS. All data were analysed in relation to the general purpose and objective of the study. Quantitative research analysis is the process of evaluating, synthesising and interpreting data to describe and explain a phenomenon (Fossey, Harvey, Mcdermott & Davidson 2002).

Data were analysed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were computed to describe the socio-demographics Frequency, percentage, mean $\pm$ standard deviation. Inferential statistics such as chi-square was done. Dichotomous variables were created and analysed. Associations between factors and adherence were found. Odds ratio and confidence interval were reported with p-value at < 0.05 statistically significant.

Estimating Adherence

ART medication adherence was calculated as the proportion of days covered (PDC) using pharmacy refill data. Many techniques to calculate medication adherence have been cited in the literature but the PDC was selected

as this is the metric suggested by the Pharmacy Quality Alliance. PDC was determined as the total number of days that a patient was in possession of an adequate regimen divided by the number of days between the patient's initial fill date and last fill date + days' supply of the last fill. PDC is expressed as a percentage and ART medicine is suggested to be greater than or equal to 90% PDC.

Ethical Consideration

Letter of introduction as gotten from the Director, University of Port Harcourt School of Public Health, also authorization letter was gotten from the Rivers State Primary Healthcare Development Board. It was addressed to the LGA PHC department authorizing the study and verbal consent of the people to be interviewed before the study was also gotten prior to commencement of the study.

Inclusion and Exclusion Criteria

Inclusion Criteria

The caretakers for the families of children infected with HIV within 0-17 years who live in Rivers West senatorial district on ART, present and willing to participate in the study

Exclusion Criteria

Caretakers of under 0-17 years on ART but absent from home on two consecutive home visits by the researcher or research assistant, and those who decline to consent for the interviews.

4.1.1. Sociodemographic Profile of the Respondents

Table 4.1: Sociodemographic features

Variables		Frequency	Percentage %
Sex	Male	125	37.9%
	Female	205	62.1%
Age	0-4 years	33	9.9%
	5-9 years	43	13.0%
	10-14 years	137	41.6%
	15-17 years	117	35.4%
Religion	Islam	0	0.0%
	Orthodox	29	8.7%
	Protestant	188	57.1%
	Catholic	109	32.9%
	Others	4	1.2%
Class of ward	No formal education	18	5.5%
	Kindergarten	22	6.7%
	Basic education	172	52.1%
	SSCE	118	35.8%

The social and demographic characteristics of the children who participated in the study are detailed in table 4.1, which can be found above. In terms of the gender composition of the population in the wards, females made up the majority, accounting for 62.1% of the total, while males made up 37.9% of the total. Most were aged 10-14 years accounting for 41.6% of the research population, which was followed by children aged 15-17 years of age accounting for a significant 35.4% others. Most of the children practiced Christianity, which accounted for 98.8% of the respondents who were either Christian orthodox, protestant, or Catholic.

The children's religion was predominantly Christian. In terms of education, the bulk of the people who responded had completed or were now enrolled in basic education, which accounts for 52.1% of the population, while 35.8% of the others had already completed their SSCE.

4.1.2. Research Question 1

What is the level knowledge of treatment plan among orphans and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Table 4.2: Level of Knowledge of Treatment Plan

Questions		Frequency	Percentage %
Does your ward know how to take his/her medications?	Yes	264	80.0%
	No	66	20.0%
Does your ward know the number of tablets he/she should take in a day?	Yes	248	75.2%
	No	82	24.8%
Does your ward know the name of the ART medication he/she is on?	Yes	253	76.7%
	No	77	23.3%
How long does your ward think he/she should be taking their ART medications?	Lifetime treatment	253	76.7%
	For sometimes	6	1.9%
	Others	71	21.4%
What does your ward believe is the purpose of his/her ART treatment?	To suppress the activities of the HIV virus but not cure	321	97.3%
	To cure HIV/AIDS	9	2.7%

The findings of an evaluation of the respondents' ART knowledge are presented in the table 4.2 that can be found above. According to the findings, 89 percent of the respondents stated that their wards are aware of how to take their antiretroviral therapy (ART) pills, and 75.2 percent of the respondents revealed that their wards are aware of the appropriate quantity of tablets to be taken on a daily basis. In addition, the respondents stated at a rate of 76.7% that their ward is aware of the name of their antiretroviral therapy drugs. Also, 76.7% of the respondents reported that

their ward understands that their treatment is an ongoing treatment for their lifetime, and 97.3% of the respondents understands the purpose of their treatment, which is to suppress the activities of the HIV virus as opposed to curing the HIV infection. Both of these statistics are impressive.

4.1.3. Research Question 2

What are the factors influencing adherence among amongst orphans and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Table 4.3. Factors Influencing Adherence

Variables	Mean	Std. Deviation	Remark
Simply forgot	2.7515	1.31319	Rejected
Were away from home	2.3272	1.19954	Rejected
Were busy with other things	2.4277	1.27020	Rejected
Had change in daily routine	2.4691	1.06423	Rejected
Fell asleep/slept through dose	2.5064	1.06859	Rejected
Felt ill or sick	2.1529	1.22561	Rejected
Wanted to avoid side effects	1.7625	1.11303	Rejected
Felt depressed/overwhelmed	1.8354	1.19445	Rejected
Felt there were too many pills	2.2548	1.38168	Rejected
Did not want others to notice you taking pills	3.8528	1.26800	Accepted (moderate)
Felt like the drug was toxic/harmful	2.8025	1.50296	Rejected
Ran out of pills	3.1152	1.09548	Accepted (low)

Criteria mean: $x=3.0$; 3.0-3.49 – accepted low; 3.50-3.99 – accepted moderate; > 4.0 – accepted high; <3.0 : rejected.

The table above shows some personal factors that could influence adherence to ART medications among orphans and vulnerable children infected with HIV/AIDS in Rivers State. Among all factors highlighted, the most significant were shyness or social reasons, in which most respondents failed to adhere to their treatment plan because they never wanted anyone to notice that they are on ART medications ($x=3.85$): another obvious issue leading to poor adherence

to the medications was running out of medications which was accepted but to a low degree ($x=3.11$).

4.1.4. Research Question 3

What is the level of the treatment adherence in line with standard treatment guidelines among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Table 4.4: Adherence to ART Using a 12-month follow-up period

Categories	Percentage	PDC	Criteria
Grossly non-adherent	22.3%	<79%	Ideal PDC level should be >90%
Fairly adherent	20.1%	80-89%	
Adherent	57.6%	>90	

The results above show the Proportion Days Covered (PDC) in percentage of the respondents which is used to report on their level of adherence to ART in the study area. From the result, 22.3% of the study sample were grossly non-adherent with a PDC score below 70%. 20.1% of the respondents were fairly adherent with a PDC score between

80-89%. However, the correct/ideal adherence rate for antiretroviral treatment (ARV) is PDC above 90%. Impressively, most respondents accounting for 57.6% of the study population were adherent with a PDC above 90%. Still, with over 35% of the population being non-adherent, it raises some concerns.

Table 4.5. Level of Adherence

	Observed N	Expected N	Residual
Grossly non-adherent	74	110.0	-36.0
Fairly adherent	68	110.0	-42.0
Adherent	188	110.0	78.0
Total	330		
Test Statistics			
	Level of adherence		
Chi-Square	83.127 ^a		
Df	2		
Asymp. Sig.	.000		
a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 110.0.			
b. Significance: $p<.05$			

A chi-square test of goodness-of-fit was performed to determine whether the level of adherence was statistically significant. The results shows that the level of treatment adherence among the orphans was statistically significant, $X^2 (2, N = 330) = 83.127, p < .05$.

Table 4.6: Sociocultural factors and Adherence

What are the sociocultural factors influencing adherence to ART treatment among orphans and vulnerable children infected with HIV/AIDS?

Variables	Mean	Std. Deviation	Remark
Lack of family support	3.1030	.85272	Accepted (high)
You did not disclose your status to friends and family	2.1394	.88274	Rejected
Your ward (or you) use drug or alcohol	1.8364	.97712	Rejected
Your religion doesn't support it	2.3576	.90359	Rejected
You are using traditional medicine	2.1152	.89310	Rejected
You don't want people to know of the treatment	2.6848	.96781	Accepted (Low)

Criteria mean: $x=2.5$; 2.50-2.49 – accepted low; 2.49-2.99 – accepted moderate; > 3.0 – accepted high; <2.5 : rejected.

The table above reported on the sociocultural factors that could influence ART treatment adherence among orphans and vulnerable children infected with HIV/AIDS in the study area. Among all studied factors, the most significant was family support which had a high acceptance mean for influencing adherence (3.10±0.85), as well as secrecy, i.e. not wanting people to know of the treatment due to perceived discrimination (2.68±0.97).

Table 4.7: Relationship between Viral Load Count and Adherence

What is the relationship between Viral Loads (above 500 cell/mm³) and adherence to antiretroviral treatment among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Viral Load				Frequency	Percentage %
Current Viral Load copies/mL 8 months)	Below 200 copies/mL	Have you ever missed some medication days (or even weeks)?	Yes	14	4.3%
			No	32	9.8%
	Over 500 copies/mL	Have you ever missed some medication days (or even weeks)?	Yes	121	36.8%
			No	162	49.1%

From the result above, it is evident that individuals with higher Viral Loads made most of the study sample accounting for a hundred and forty respondents. Among the Lower Viral Load, adherence was at 57.14% (49.1% in relation to the total population), and non-adherence was 42.7% (36.8% in relation to the total population). For the low Viral Load group, adherence was 69.6% (9.8% in relation to the total population) and non-adherence was 30.4% (4.3% in relation to the total population).

Table 4.8. Chi-square test showing relationship between Viral Load and Adherence

There is no significant relationship between Viral Loads and adherence to antiretroviral treatment among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State

	Value	Df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.259 ^a	1	.262		
Continuity Correction ^b	.798	1	.372		
Likelihood Ratio	1.297	1	.255		
Fisher's Exact Test				.361	.187
Linear-by-Linear Association	1.252	1	.263		
N of Valid Cases	163				
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.45.					
b. Computed only for a 2x2 table					

Significance: p , <.05

A chi-square test of independence showed that there was no significant association between Viral Load and adherence χ^2 (1, $N = 165$) $p = .262$. The p value is greater than the significance value, thus, it is accepted that there is no statistically significant relationship between Viral Load of the children infected with HIV/AIDS and their adherence.

Table 4.9: Association between Socio-demographic Characteristics and Level of Adherence to Medication

Variables	Level of Adherence to Medication χ^2					Odd ratio(OR) 95% (CI)
	Yes (n%)	No (n%)	Total	df	(p-value)	
Sex						
Male	125 (100.0)	0(0.0)	125 (100)	1	Fischer exact (0.0001)*	3.254 2.649-3.996
Female	63(30.7)	142(69.3)	205(100)			
Total	188(57.0)	142(43.0)	330 (100%)			
Age (years)						
0-9	76(100.0)	0(0.0)	76(100.0)	1	Fischer exact	2.268

10-17	112(44.1)	142(55.9)	254 (100.0)		(0.0001)*	(1.975-2.605)
Total	188(57.0)	142(43.0)	330 (100%)			
Religion						
Christianity	188(57.7)	138(42.3)	326(100.0)	1	Fischer exact (0.0001)*	2.330
Others	0(0.0)	4(100)	4(100.0)			(1.482-3.662)
Total	188(57.0)	142(43.0)	330(100%)	1		
Level of education						
<Secondary	188(88.7)	24(11.3)	212(100.0)	1	Fischer exact (0.0001)*	8.85R
≥Secondary	0(0.0)	118(100.0)	118(100.0)			(0.078-0.165)
Total	188(57.0)	142(43.0)	330 (100%)			

P≤0.05 (statistically significant), Fischer's exact, (R=Inverse of < 1 Odd ratio)

Table 4.9 shows that a statistically significant association was observed between sex ($p=0.0001$), age of the participants ($p=0.0001$), religion ($p=0.0001$), level of education completed ($p=0.0001$) and level of adherence to medication.

The table 4.9 revealed that there is a statistically significant association between sex and level of adherence to medication. Male participants are more adherent to medications compared to those who are females (100% vs 30.7%; $p=0.0001$). Also, the table revealed that respondents who are male are 3.254 times more likely to adhere to medications than female participants who are female (OR: 3.254; CI = 2.649-3.996).

The table 4.9 revealed that there is a statistically significant association between age and adherence to medication. Participants in the age range of 0-9years were more adherent to medications compared with those between 10-17 years (100% vs 44.1%; $p=0.0001$). Also, the table revealed that the respondents who are young were 2.268

times more likely to adhere to medications than who older participants (OR: 2.268; CI = 1.975-2.605).

The table 4.9 revealed that there is a statistically significant association between Christianity and adherence to medication. Participants who were Christians were more adherent to medications compared with those of other religion (57.7% vs 0.0%; $p=0.0001$). Also, the table showed that the respondents who of Christian religion were 2.330 times more likely to adhere to medications than those of other religion (OR: 2.330; CI = 1.482-3.662).

Also, table 4.9 showed that statistically significant relationship exist between level of education completed and adherence to medication. Participants who have completed below secondary school were more adherent to medications compared with those who have attended secondary schools and above (88.7% vs 0.0%; $p=0.0001$). Also, the table showed that the respondents who completed below secondary school were 8.85 times more likely to adhere to medications than those who attend secondary and above (OR: 8.85; CI = 0.078-0.165).

Table 4.10: Association between level of knowledge of treatment plan and level of adherence

Variables	Level of Adherence χ^2					Odd ratio (OR)
	Good (n(%))	Poor (n (%))	Total	df	(p-value)	95% (CI)
Your ward know how to take his/her medications						
Yes	170(64.4)	94(35.6)	264(100)	1	29.680 (0.0001) *	4.823 (2.654-8.765)
No	18(27.3)	48(72.7)	66(100)			
Total	188(57.0)	142(43.0)	330 (100%)			
Your ward know the number of tablets he/she should take in a day						
Yes	164 (66.1)	84(33.9)	248(100)	1	34.156 (0.0001)*	4.718 (2.740-8.125)
No	24(29.3)	58(70.7)	82(100)			
Total	188(57.0)	142(43.0)	330(100%)			
Your ward know the name of the ART medication he/she is on						
Yes	177(70.0)	76(30.0)	253(100)	1	74.644	13.974

No	11(14.3)	66(85.7)	77(100)		(0.0001)*	(6.991-27.932)
Total	188(57.0)	142(43.0)	330(100%)			
Duration your ward think he/she should be taking their ART medications						
Lifetime	177(70.0)	76(30.0)	253(100)	1	74.644 (0.000)*	13.974 (6.991-27.932)
others	11(14.3)	66(85.7)	77(100)			
Total	188(57.0)	142(43.0)	330(100%)			
Your ward believe is the purpose of his/her ART treatment						
To suppress the activities of the HIV virus but not cure	188(58.6)	133(41.4)	321(100)	1	Fischer exact (0.0001)	2.415R (0.364-0.472)
To cure HIV/AIDS	0(0.0)	9(100)	9(100)			
Total	188(57.0)	142(43.0)	330(100%)			

P≤0.05 (statistically significant), Fischer's exact, (R=Inverse of < 1 Odd ratio)

Table 4.9 shows that a statistically significant association was observed between children who know how to take their medications, children who know the number of tablets he/she should take in a day, children know the name of the ART medication he/she is on, duration the child thinks he/she should be taking their ART medications, children who believe the purpose of his/her ART treatment and level of adherence to medication at (p=0.0001).

The table 4.10 revealed that there is a statistically significant association between children who know how to take their medications and level of adherence to medication. Participants who know how to take their medications were more adherent to medications compared to those who do not know how to take their medications (64.4 % vs 27.3%; p=0.0001). Also, the table revealed that respondents who know how to take their medications are 4.823 times more likely to adhere to medications than children who do not know how to take their medications (OR: 4.823; CI = 2.654-8.765).

The table 4.10 revealed that there is a statistically significant association between children who know the number of tablets he/she should take in a day and level of adherence to medication. Participants who know the number of tablets he/she should take in a day were more adherent to medications compared to those who do not know (66.1 % vs 29.3%; p=0.0001). Also, the table revealed that children who know the number of tablets he/she should take in a day, are 4.718 times more likely to adhere to medications than those who do not know (OR: 4.718; CI = 2.740-8.125).

The table 4.10 revealed that there is a statistically significant relationship between children know the name of

the ART medication he/she is on and level of adherence to medication. Participants know the name of the ART medication he/she is on were more adherent to medications compared to those who do not know the name of the ART medication he/she is on (70.0 % vs 14.3%; p=0.0001). Also, the table revealed that children know the name of the ART medication he/she is on are 13.974 times more likely to adhere to medications than those who do not know the name of the ART medication he/she is on (OR: 13.974; CI = 6.991-27.932).

The table 4.10 revealed that there is a statistically significant relationship between duration the child thinks he/she should be taking their ART medications and level of adherence to medication. The children who thinks he/she should be taking their ART medications for lifetime were more adherent to medications compared to those who do not know the name of the ART medication he/she is on (70.0 % vs 14.3%; p=0.0001). Also, the table revealed that children who thinks he/she should be taking their ART medications for lifetime are 13.974 times more likely to adhere to medications than those who do not The children who thinks he/she should be taking their ART medications for lifetime(OR: 13.974; CI = 6.991-27.932).

The table 4.10 revealed that there is a statistically significant relationship between duration the child thinks he/she should be taking their ART medications and level of adherence to medication. The children who thinks he/she should be taking their ART medications for lifetime were more adherent to medications compared to those who do not know the name of the ART medication he/she is on (70.0 % vs 14.3%; p=0.0001). Also, the table revealed that children who thinks he/she should be taking their ART medications for lifetime are 13.974 times more likely to adhere to medications than those who do not The children

who thinks he/she should be taking their ART medications for lifetime (OR: 13.974; CI = 6.991-27.932).

The table 4.10 revealed that there is a statistically significant relationship between children who believe the purpose of their ART treatment and level of adherence to medication. The children who believe the purpose of their ART treatment suppress the activities of the HIV virus but not cure were more adherent to medications compared to those who do not believe the purpose (58.6 % vs 0.0%; $p=0.0001$). Also, the table revealed that children who believe the purpose of their ART treatment suppress the activities of the HIV virus but not cure are 2.415 times more likely to adhere to medications than those who do not believe the purpose of their ART treatment suppress the activities of the HIV virus but not cure (OR: 2.415R; CI = 0.364-0.472).

4.2. Discussion of Findings

1. What is the level knowledge of treatment plan among orphans and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

The results of the study of the respondents' familiarity with ART are detailed in the table 4.2, According to the data, 75.2 percent of the respondents revealed that their wards are aware of the right quantity of tablets to be taken on a daily basis, while 89 percent of the respondents claimed that their wards are knowledgeable of how to take their antiretroviral therapy (ART) pills. Moreover, the respondents reported, at a rate of 76.7%, that their ward is aware of the name of the antiretroviral therapy medications that they are taking. Also, 76.7% of the respondents reported that their ward understands that their treatment is an ongoing treatment for the rest of their lifetime, and 97.3% of the respondents understands the purpose of their treatment, which is to suppress the activities of the HIV virus as opposed to curing the HIV infection. Knowledge of ART adherence and the treatment in general has been optimal across studies, as respondents usually demonstrate above average level of knowledge. For example, Aderemi-Williams *et al.*, (2021) in a recent study found/reported knowledge level above 70% correctness for people using ART, as well as more than 64% of the respondents understanding what adherence to ART demands. In another study, a South-African based study, by Hornschuh *et al.*, (2017), good level of knowledge was also reported among ART users.

2. What are the factors influencing adherence among amongst orphans and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Among orphans and other vulnerable children afflicted with HIV/AIDS in Rivers State are shown in the table 4.3, along with other personal variables that could influence their adherence to their antiretroviral therapy (ART) treatments,

the majority of respondents did not adhere to their treatment plan because they never wanted anyone to notice that they are on ART medications ($x=3.85$): another obvious issue leading to poor adherence to the medications was running out of medications, which was accepted to a low degree ($x3.11$); among all the factors that were highlighted, the most significant were shyness or social reasons, in which the majority of respondents failed to adhere to their treatment plan because they never wanted anyone to notice that they are on ART medications. The findings by Iberi *et al.*, (2021) reported different results and partly similar results, as they found non-adherence to be linked with perceived effect of ART on patients' physical appearance, most of them found it tiring to be on their ART medication for a lifetime, fear of disclosure of their status, side effects, and using non-adherence as a form of rebellion. These differences in results could be as a result of the different approach to both studies, the current study adopted a quantitative approach while the presented adopted a quantitative approach which allowed the researcher to collect more spontaneous feedback from the respondents. In another Ugandan-based study, Nabukeera-Barungi *et al.*, (2015) reported similar results in which barriers such as poverty, fatigue, side effects, pill burden, depression among others impeded adherence.

What is the relationship between age and adherence to antiretroviral treatment among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

Participants in the age range of 0-9years were more adherent to medications compared with those between 10-17 years (100% vs 44.1%; $p=0.0001$). Also, the table revealed that the respondents who are young were 2.268 times more likely to adhere to medications than who older participants (OR: 2.268; CI = 1.975-2.605), this might be a result of the fact that this group depends solely on their caregivers who have good knowledge of treatment plan for the administration of their medication. Evidence does not supports the current findings, as Barclay *et al.*, (2007) reported a mean adherence rate across all 185 participants in their study as 75.8%, with older participants achieving a mean adherence rate of 84.9% and younger participants achieving a mean adherence rate of 72.8%, a difference that is statistically significant, $F(1, 183) = 11.78, p = .001$.

What is the relationship between sex and adherence to antiretroviral treatment among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

According to the findings, Male participants are more adherent to medications compared to those who are females (100% vs 30.7%; $p=0.0001$). Also, the table revealed that respondents who are male are 3.254 times more likely to

adhere to medications than female participants who are female (OR: 3.254; CI = 2.649-3.996).

Several studies have found disparities in treatment adherence based on gender. In their study, Li *et al.*, (2020) found that some populations of men were about twice as likely to experience disease progression compared to females, suggesting that females are more adherent in their study population. However, in an earlier study, Tapp *et al.*, (2011) found that females were less likely to access and adhere to antiretroviral therapy. This difference from the current findings could be attributed to the population group being studied, as Tapp and colleagues studied adult population who had to put extra efforts to gain access to ART therapy, compared to orphans in this study whose treatments and medications were readily available. Thus, suggesting that if social and economic barriers to adherence could be dealt with in females, they could become more adherent like males, or even more adherent.

3. What is the level of the treatment adherence in line with standard treatment guidelines among orphan and vulnerable children living with HIV in Rivers West Senatorial district, Rivers State?

The data present the Proportion Days Covered (PDC) in % of the respondents. This metric is intended to report on the respondents' degree of adherence to antiretroviral therapy (ART) in the study area. According to the findings, 22.3% of the study group had a PDC score that was lower than 70%, indicating that they were grossly non-adherent. With a PDC score between 80 and 89%, 20.1% of the respondents were considered to be fairly adherent. PDC above 90% is considered to be the correct or ideal adherence rate for antiretroviral medication (ARV). A staggering majority of respondents, comprising for 57.6% of the total population of the research, were adherent with a PDC that was higher than 90%. Even still, the fact that more than 35 percent of the population does not adhere raises some concerns about the matter. In a systemic review, Kim *et al.*, (2014) reported on global regional adherence rate, in which the lowest average lowest average ART adherence was in North America [53%], Europe [62%] and South America [63%] and, with higher levels in Africa [84%] and Asia [84%]. With this report, in relation to the current findings, the ART adherence is only higher than that of North America and well-below standards reported in Africa. However, the current findings are similar to those reported by Iberi *et al.*, (2021) in a recent Lagos-based study in which adherence proportion was reported at 58.8%.

4. What are the socio-cultural factors influencing adherence to ART among children in Rivers West Senatorial district, Rivers State?

Several social and cultural factors could influence adherence to ART medications. However, the study reported two significant factors. The sociocultural factors that potentially influence ART treatment adherence among orphans and vulnerable children infected with HIV/AIDS in the study area are detailed in the table 4.7. Family support, which had a high acceptance mean for influencing adherence (3.10 ± 0.85), was the most significant factor among all those that were studied. Another significant factor was secrecy, which can be defined as not wanting other people to know about the treatment due to the fear of being discriminated against (2.68 ± 0.97). Villiera *et al.*, (2022) found similar social and cultural factors influencing adherence in their study, according to them, a lack of status disclosure within the family, pressure from school, and inadequate support from guardians and parents are some of the reasons that contribute to poor ART adherence among teenagers. Other contributing factors include the type of ART regimen. At both the individual and the societal level, there are characteristics that make it easier for people living with HIV to adhere to antiretroviral therapy. Techniques of self-reinforcement and continued use of antiretroviral therapy over a prolonged period of time are examples of the personal variables. The availability of adolescent club services and clinics that provide psychosocial assistance are two of the elements related to the health system.

The patient's level of adherence to Antiretroviral Therapy (ART) plays a crucial role in successfully suppressing the virus in infected individuals. Poor adherence might refer to missed/delayed dosing of medication, interruption/discontinuation of medication, taking lower doses than prescribed, or partial dosing. Incomplete adherence to medication will result in low plasma concentrations of antiretrovirals (ARVs), which create favourable conditions for developing resistance to one or multiple medications of the regimen, leading to cross-resistance to other agents belonging to the same class of medications. The connection between adherence and drug resistance depends on certain variables, such as regimen efficacy, pharmacokinetics, pharmacodynamics, potential interaction with medicines, viral replication capacity, and barrier to resistance (Judd, Melvin, Thompson, *et al*., 2020; Parienti, Fournier, Cotte, *et al*., 2021). Failure in adherence will affect the efficiency of the regimen under consideration. In addition, suboptimal adherence limits subsequent treatment possibilities in the case of developing multidrug-resistant strains of HIV. Poor adherence to treatment also enhances the risk of spreading the drug-resistant strain to other people.

Insufficient adherence of pediatric patients to antiretroviral medicines represents a significant challenge in managing HIV-infected children and teenagers. Various factors play

a critical role in determining the adherence levels observed among children. Those include the type/formulation of medicine prescribed to the patient, frequency of dosing, adverse effects/toxicity induced by the agent, chronological age/level of maturation, and social-demographic/behavioural characteristics. Research evidence did not confirm the existence of a reliable set of predictors that distinguishes between adherent and non-adherent children with perinatal HIV infection (Gray, Nieburg, & Dillingham, 2017). The adherence behaviour could not remain constant throughout time. According to research results derived from PHACS (Pediatric HIV/AIDS Cohort Study) in the US, the non-adherence rates rise as children grow older (Kacanek, Huo, Malee, *et al.*, 2019). The analysis showed that the rate jumped from 31 percent (pre-adolescents) to 50 percent (adolescent and young adults), whereas the prevalence of unsuppressed viral load rose from 16 to 40 percent ($P < 0.001$) between the aforementioned groups of patients.

Accordingly, adherence education programs are crucial to establishing appropriate drug-taking habits. Adherence counseling needs to be initiated either prior to ART initiation/change or shortly after beginning treatment. It involves discussion of treatment objectives/goals, significance of adherence, and potential adherence strategies available to help patients adhere. Parents or caregivers must receive comprehensive information related to their responsibilities regarding administering the medicines, especially with reference to children. Educational activities aimed at enhancing caregiver knowledge and skill levels involve provision of printed material describing instructions for administration, demonstration of procedures involving utilization of the syringe/pillboxes, creation of charts that illustrate schedule of medication intake. Evaluation of medication-taking habits among caregivers and other members of households who take antiretroviral medicines or any long-term treatments. These actions will contribute to improving adherence performance in terms of proper administration of antiretrovirals.

Various behavioral techniques facilitate incorporation of medication intake into children's routine activities. Positive reinforcement and moderate incentives could prove effective methods in encouraging adherence behavior provided that they are applied correctly. Examples of incentives range from token reward systems to small cash bonuses depending on the suitability and feasibility of interventions under specific circumstances. The implementation of this strategy will depend on individual patient's needs/family context.

According to past literature, affectionate and encouraging expressions from the family members, support groups and

friends have been recognized as motivational factors for adhering to antiretroviral medications (Murphy, Wilson, Durako, Muenz, & Belzer, 2001). In the current study, the majority of respondents did not belong to any support groups but relied on assistance from the family members and friends. Contrary to the previous studies where some of the patients mentioned insufficient emotional and psychological support from relatives and friends leading to treatment abandonment, there was no such factor affecting the respondents of the current study (Mukhtar-Yola *et al.*, 2006; Olowookere *et al.*, 2008; Skhosana *et al.*, 2006; Uzochukwu *et al.*). On the contrary, the current study participants did not mention abandonment or lack of family support as a factor influencing their adherence to antiretroviral treatments. Instead, the participants reported receiving substantial help emotionally and practically from their social networks. Such help includes financing for transport to health care facilities, calling them to remind them of taking the medication and accompanying them to hospital appointments. The participants perceived such help as encouragement.

Speaking of sociocultural barriers to adherence to ART, it should be noted that the respondents considered stigma associated with HIV to be the cause of great psychological stress because the discrimination might affect their career choices and independence financially. It should be pointed out that the results show that disclosure was the significant barrier, since the majority of the respondents wanted to disclose their HIV status only to their families and friends. As an example, several respondents explained that they were afraid of being fired and discriminated against at work places. Young adults explained that the risk of losing their job or being rejected by their friends and neighbours made them feel reluctant to take medication openly. Therefore, they delayed taking medication until they were alone in order not to break their regimen. Also, the respondents thought that their chances to get employment would be decreased if they disclose their condition to the employer.

Viral Load The importance of highly active antiviral therapy (HAART) in management of HIV disease is well established by reducing plasma HIV-1 RNA. HAART reduces morbidity and death in HIV infected individuals. However the best moment to start HAART is unclear.

Therefore, the recommendations about the best timing to start antiretroviral therapy vary widely (BHIVA2001). The study acknowledge that WHO criteria for beginning of ART were adhered to PLWHA are the vulnerable and orphans worried on ART at any WHO stage with CD4 cell count of 200-350mm. In 2009, this was changed to 350mm. load and loom (2009) in the collaborative analysis of cohort of PLWHA in high income countries which also suggested that Viral Load of 350 cell /ML should be the

lowest threshold for starting ART, when compared with the combination ART start at CD4 cell count of 351-450 cell / M4 start therapy at count of 251 -350/NL was associated with a significant 28% increase in risk of disease progression and morbidity regardless of the baseline viral load .

This study showed that there was regular monitoring based on WHO recommendation was followed. price WHO advised This study observes the practice of center as Viral Load is usually done every 6months or occasionally more frequently when indicated?

Adherence is a strong predictor of viral suppression and indirectly increases viral load and reversal of AIDS and death. This finding is in agreement with Karkit (2018) study that CD4 cell count continued to rise during the treatment period with a mean of 165.9cell/NL with the mean time of 10.4 months.

Britstein and colleagues observed similar increases in median Viral Load in ART programs in low and high-income countries. A study of 50,000 individuals on ART in the Nigeria national government had a median viral load (VL) at baseline of 260 cells /uL.

The WHO has identified the family as the main social actor in the promotion of health and well-being with a great influence on the health behaviour. (WHO 1976). This study further reiterates this as respondents with good family support stuck to their ARV Medications. Significant positive correlation was abstained between adherence level and family support. The finding of this study agreed with the finding of Burgoyne (2005) and also that of Omosanya O (2011) which demonstrated that PLWAHA who continuously use HAART enjoy better clinical benefits if they have social and family support. Beals and colleagues, in Los Angeles, found that a good attitudinal role of family carers was associated with better adherence to HIV drugs. (Omosanya (2011) Highlighted that supported adherence of patients is more likely to maintain undetectable viral loads and a correlation has been demonstrated between suppression of viral load, clinical outcome and adherence.

According to Lili et .al (2006) in china in 2006 also affirm that the strength of family and family network is instrumental to how well individual and communities are able to cope with the disease and its consequences (adherence to ART inclusive) when faced with social discrimination and other hardship related to HIV/AIDS.

Family support PLWHA. Strong support to the fact Mohanan and Kamath (2009) Social support network is important for people living with HIV/AIDS as studies have demonstrated . Family members are an important source of social support for families coping with HIV/AIDS and for

improving treatment adherence in HIV/AIDS and other chronic medical diseases.

Due to discrimination, most carers may not want people to know about the treatment. However, prior research has found that discrimination in the healthcare setting negatively impacts PLWH's delivery and utilisation of HIV services, but little is known about the impact of perceived stigma and discrimination in the healthcare setting on ART adherence among PLWH, which is directly related to HIV related health outcome. The study shows that discrimination through disclosure greatly affect adherence to treatment plan and if it in conformity to a study which was conducted in united states of America by the gap in knowledge by examining the associated factor between perceive discrimination in healthcare setting and sub-optimal HIV medication adherence among orphans and vulnerable children. It also showed the role of internalised HIV stigma and consequent depressed symptoms. The study identified a substantial association between felt discrimination within a healthcare context and sub-optimal adherence to ART.

Conclusion

The results of this study add to the existing knowledge of the factors influencing the adherence to anti-retroviral therapy (ART) among orphans and vulnerable children in Rivers West Senatorial District. The findings from the study will enable the implementing partners (IP) in the government of Rivers State who are working with the government to deliver HIV management programmes to the various health care facilities, to have a focused approach to improving adherence among patients who live near ART centres, as they had comparatively poorer adherence. Likewise the relatively low adherence rate seen among those employed suggests a need to develop interventions to support employed people to attend their scheduled pharmacy refill visits without compromising their employment. It is recommended that there is a call for enhanced implementation of the Discrimination Against Persons with Disabilities (Prohibition) Act, 2018 (where applicable) and the laws in Nigeria that prohibits discrimination against persons living with HIV. Advocacy should include advocating for workplace policies that allow employees living with HIV to confidentially and voluntarily disclose their status and to receive the authorization required to attend clinical consultations or to pick up refills of prescriptions without fear of discrimination and/or termination of employment.

The ART adherence rate among orphans and vulnerable children in Rivers West Senatorial District was not very different with a mean of 92%. This should be continued and enhanced by adequate counselling, follow up and support services. To maintain viral suppression, sustain immune

function and minimize HIV-related morbidity and mortality, consistent adherence is necessary. When viral suppression is achieved and maintained, effective ART can also significantly minimize the risk of HIV transmitting, with reduced viral load. There are several ARV regimens available to treat HIV, but the therapeutic effects of the ARVs rely on patient adherence to their treatment. Therefore, enhancing and maintaining adherence continues to be a key factor in meeting the UNAIDS 95–95–95 targets for ensuring that 95 percent of all people living with HIV are tested for HIV, 95 percent of those who are tested are diagnosed with HIV and begin treatment, and 95 percent of people diagnosed with HIV and on treatment are virally suppressed (UNAIDS, 2014, 2016). Enhancing adherence support for orphans and vulnerable children (OVC) is therefore crucial in the quest to improve treatment outcomes and progress towards ending the AIDS epidemic.

Recommendation

It is suggested to do a further study with a quantitative approach. Many elements that could have shed insight such as peer-pressure, social support, religion, culture and stigma were not recorded because of the fact that the researcher did not collect the original data for the study. The former would have given a better understanding of how the independent factors of the study influenced the study result which is the adherence rate to ART. In view of that, I urge for more in-depth study among orphans and vulnerable children utilising qualitative approach like focused group discussion where other aspects like the impact of peer pressure, religion and social support in adherence rate to ART would be studied. Let's just say it will be pricey. But my work will be a baseline for such recommended studies.

Moreover, interviewing orphans and vulnerable children on ART living in both rural and urban locations would provide further insight into additional factors that influence their adherence rate. To find out the views of orphans and vulnerable children in Rivers State West Senatorial Districts on the isolation of the HIV clinic and whether it influences the adherence rate. This is because stigmatisation is still a big problem in the Nigerian society. Future research should also include data from more than one health institution to explore the impact attitude of health care personnel have in adherence to ART among orphans and vulnerable children. Correlation of CD4 cell counts to adherence rate was only at CD4 500 cells/mm³ the reason why there is no further association over 500 cells/mm³ needs to be studied further. This will offer background to re-visit the ongoing continuous adherence counselling sessions for all patients irrespective of their CD4 levels.

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