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Adherence to Highly Active Antiretroviral Therapy Among Patients Receiving Treatment in Imo State University Teaching, Hospital, Orlu, Nigeria

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ABSTRACT

This study investigated Adherence to Highly Active Antiretroviral Therapy (HAART) among HIV positive patients receiving treatment in Imo State University Teaching Hospital Orlu. A prospective descriptive survey was adopted which involved hundred and fifty-three respondents (153) and twenty-five (25) clinic staff working in the Community Medicine of the Hospital. The instrument for data collection was structured questionnaire. Data were analyzed using SPSS version 25. Findings revealed that majority of the respondents 87(82.9%) agreed that they adhered strictly to their drugs prescriptions as ordered. 80(76.2%) of the respondents had no complaints about side effects, while 20 (95.2%) of the respondents reported poverty as one the challenges experienced for non-compliance to adherence, 12(57.1%) of them indicated forgetfulness as a major factor affecting their compliance to the HAART regimen, which is below the adherence level of $\geq 95\%$ needed for HIV infected patients to reach full viral suppression. The study concluded that there is a fair adherence level of 87(82.9%) of HIV positive patients attending HAART clinic in IMSUTH but need to improve to reach $\geq 95\%$ to enable HAART patients achieve full viral suppression. Health personal should emphasis more on teaching HAART regimen to HIV infected patients and also should be more focus to achieve more results.

Keywords: Acquired immunodeficiency syndrome (AIDS), Adherence, Human Immunodeficiency Virus (HIV), Imo State

1. INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) is a major threat to the world's population and it is the most devastating disease humankind has ever seen. Statistics show that about 37.9 million people were living with HIV/AIDS globally of which more than 90% live in developing countries. Among these, children less than 15 years of age account for around 1.7 million. African alone contains two-thirds of the world's total prevalence (Berihun, Tadis and Antanch 2014). People infected with HIV/AIDS in 2016, of these, 22.5 million (68%) are in sub-Saharan Africa and about 3 million alone in Nigeria. This makes it the country with the second highest burden of HIV and AIDS in the world after South Africa (Oka, Owoaje, Ige and Oyoita 2013). Incidence of new HIV infections in Nigeria are driven by factors such as low perceptions of personal HIV risk, multiple sexual partnerships, transactional and intra-generational sex, poor treatment services for sexually transmitted infections (STIs), and inadequate access to quality health care services. Other contributing factors include gender inequalities and inequities, poverty and HIV/AIDS stigma and discrimination (Abiyot and Abelaw 2018).

The Human Immunodeficiency Virus (HIV) infection does not only upset the health of individuals but also impacts on households, communities, and the development of nations. When countries are affected by HIV, they also suffer from other infectious disease, food insecurity, and other serious problems. (Abiyot and Abebaw, 2018). Oku and colleagues (2013) opined that in the absence of a cure antiretroviral therapy (ART) has remained the only available option that offers the possibility of dramatically reducing HIV/AIDS-related morbidity and mortality, while improving the status of PLWHA. It has proved effective in reducing viral load, improving the quality of life of People Living with HIV AIDS (PLWHA). However, successful long-term treatment of HIV requires strict adherence to the Highly Active Antiretroviral Therapy (HAART) regimen. This is especially important in countries such as Nigeria where PLWHA make up 10% of the global burden of HIV/AIDS and about 1.5 million require treatment (Oku et al., 2013; Krystian et al., 2019; Imuwahen et al., 2019).

Although there is no universally accepted definition, medication adherence is defined as the extent to which a patient takes a medication in the way intended by a healthcare provider. Adherence is not the only determinant of HAART failure or success. Other factors include genetic differences in drug metabolism, severe baseline immune suppression, prior resistance, and concurrent opportunistic infections.

All round efforts such as increasing accessibility of HIV screening, counseling, and HAART services by private, government and non-government organizations will be made to reduce morbidity and maintain the quality of life of HIV-positive individuals (Oguntibeju, 2012). Poor -adherence to highly active antiretroviral therapy (HAART) diminishes the effectiveness of ART and accelerates viral dissemination and drug resistance. This catastrophic event affects patients by reducing their quality of life and the community as well as the health system by increasing medical costs.

Adherence is the extent to which a person's behavior in taking medications corresponds with the agreed recommendation from a health care provider. Meanwhile, the rates of adherence for individual patients are usually reported as percentage of the prescribed doses of medication actually taken by the patient over a specific period (Anyaike, Atoyebi, Musa, Akeem, Adekunle, Oluwole and Babatunde 2019). Although, there is no consensual standard for what constitutes adequate adherence. Abiyot (2018) stated that adherence >95% to therapeutic schemes is required for HIV infected Patients to reach full viral suppression.

Oku et. al., (2013) asserted that with the realization of the central role played by adherence in success of HIV/AIDS treatment, several studies conducted in various parts of the world including reviews have reported non-adherence rates ranging from 50% to 80% in different contexts. However, in reality adherence rates are often lower than 95%. Besides, recent studies in Africa have revealed a suboptimal medication adherence of about 77%. (Negesa, Demeke and Mekonnin 2017) noted that the magnitude of adherence among the patients in Soweto, South Africa was 88%, while in Ethiopia an adherence rate of 83% was reported.

In Nigeria, ART treatment adherence rates of 54% and 62.6% have been documented at the Aminu Kano Teaching Hospital Kano and Federal Medical Center, Makurdi respectively. This reported suboptimal treatment adherence to HAART will pose serious problems to the control of HIV/AIDS in Nigeria. The low adherence rate has been associated to stigmatization, stock out of drugs, health system, possible side effects of drugs, patient's forgetfulness, depression, being too busy and being away from home have also been identified as barriers to adherence. Other barriers affecting drug adherence include fear of disclosure, trouble incorporating work and family responsibilities with combined antiretroviral therapy (cART), travelling long distances to receive treatment and complicated regimen. HIV disclosures, between 3.5% and 14.6% of women in Africa have reported experiencing a violent reaction from a partner (Anyaike et. al., 2019).

With the ART medication adherence in Africa estimated at 77% and Nigeria being the 3rd in the burden of HIV infection in Sub-Saharan Africa, there is a challenge in ensuring an optimal level of treatment adherence to prevent the development and spread of resistant strain of the Human Immunodeficiency Virus. Effective treatment is the only option to prevent this complication and prolong life; which can only be achieved with optimal treatment adherence rate of 95% and above, required for the effective suppression of viral replication and prevention of drug resistance. Optimal management of PLWHA can be ensured if clients with indicators of poor adherence can be identified and closely monitored. This study will focus on adherence to highly active antiretroviral therapy among people receiving treatment at Imo State University Teaching Hospital (IMSUTH), Orlu.

Identifying and overcoming the factors that hinder adherence to the polytherapy active antiretroviral therapy is of utmost importance for prolonged viral load suppression and subsequent prevention of the development of drug resistance through mutation of the virus. This study is of great importance to the government; health facility and health workers; HIV/AIDS patients care providers; families, friends and relatives of patients living with HIV (PLWHA); and also are beneficial to the HIV-infected patients themselves. It also helps to provide evidence based data for the planning of health care by the government in such a way as to capture the welfare of the patients living with HIV (PLWHA) holistically. It enables her to put in place modalities that ensures effective and efficient HIV control program at the tertiary level and grassroots, thus prevent the spread of HIV infection and reduce mortality and morbidity amongst PLWHA.

The findings of this research study is of benefit to the health facility entrusted with the care of HIV-positive individuals by bringing to their awareness the various reasons why their beneficiaries: the HIV-positive patients skip or miss their medications and don't adhere to instructions given them about their health challenges such as preventive measures these HIV-positive patients should endeavour to adopt in other to protect their partners or spouse from contracting the HIV; and signs and symptoms to look out for when they suspect they have developed a co-infection like Tuberculosis and HIV-associated nephropathy (HIVAN). Also

the research findings from this work helps the HIV/AIDS patients care providers, friends and relatives adequately support these PLWHA and serve as encouragement to the challenges they face during their medication period which is life long, such as the moderate to severe side effects of the anti-retrovirals (especially lamivudine which is an important base in the polytherapy ARV, and is notorious for Headache and dry mouth; as well as Efavirence which causes abnormal dreams, drowsiness, dizziness, confusion and rash.

This makes the PLWHA feel loved, cared for and accepted thus eliminating the major cause of non-adherence viz-a-viz social discrimination. Furthermore, the information generated from this study enables these PLWHA to be properly informed on their health challenges and retroviral status, so that they would first of all accept their diagnosis and treatment medication that it is a lifelong affair. This would allow them on their own adopt measures and strategies to ensure they adhere to their medications despite the antiretrovirals' multiple side effects and other challenges they may be faced with as PLWHA.

They would also, through the information provided by this study be encouraged to be open minded and feel safe to communicate any such challenges to their health care providers; and this would in turn create a healthy atmosphere for doctor-patient interaction leading to an effective and efficient healthcare delivery system.

This study also serves in the furtherance of knowledge and fills in the gap about information on the adherence to HAART in IMSUTH. Specific objectives of the study include (1). to determine the type of drug combination used in HAART regimen in IMSUTH for patients living with HIV, (2) to identify the side effects experienced by the HIV-positive patients on HAART attending healthcare in IMSUTH, (3) to assess the level of adherence to HAART regimen, (4) to ascertain the measures adopted by IMSUTH and her health workers to ensure patients adherence to HAART.

2. MATERIALS AND METHODS

2. 1. Research Design

The study adopted a prospective descriptive survey design (Onyeneke et. al., 2020). Structured questionnaire was used to collect data on the adherence of HIV-patients assessing HAART-care, their experiences and the care-givers perceptions on the topic. The study was focused on HIV-positive patients on HAART for the past one year (January 2020 to December 2020) in IMSUTH and both primary data source (patients and their hospital care givers) and secondary data source (information from patient's folder and drug schedule program/report).

2. 2. Area of the study

The area of the study is Imo State University Teaching Hospital, Orlu (IMSUTH), Imo State. IMSUTH is a tertiary health care facility and the only teaching hospital in Imo State. It is a government approved HIV-care-control centre with a good community medicine department headed by a consultant and staff strength of HIV-care specially trained nurses, community extension workers, social welfare group, laboratory staffs and a well-stocked up to date pharmacy/dispensary. It is located centrally in the state, about 45minutes drive from the capital city, Owerri. It serves both the local indigenes in Orlu, and their environs as far as the entire Eastern Nigeria; No wonder Imo State is called the Eastern Heartland.

2. 3. Population of the study

The study population consists of all HIV-infected patients both adult male and female who have been accessing HAART-care in IMSUTH within the past one year (January 2020 to December 2020), and are currently available and seen during the study period. The study period took two visits each month, for a period of 12 months giving a total of 24 days for the collection of data. The study participants was any adult male and female people living with HIV complete registration with IMSUTH; intake and follow-up forms will be included in the study.

2. 4. Sample and Sampling Techniques

Convenience sampling was used for the study. The study subjects were randomly selected based on the inclusion criteria. Profiles of all patients on HAART during the study period were evaluated. All HIV- positive patients that assessed healthcare in IMSUTH that willingly agrees to participate in this study. All HIV/AIDS clinic staff in IMSUTH, that are involved in patient care and HAART dispensary. Out of the target population the researcher selected sample size using the Taro Yamane formula (Onyeneke et. al., 2020) thus:

$$n = \frac{N}{1 + [N(e^2)]} \quad (1)$$

where:

n = Sample size

N = the population of study (i.e. 6806)

e = the marine error in the calculation (i.e. 0.08)

$$n = \frac{6806}{1 + [6806(0.08^2)]} = 152.7 \quad \sim 153 \text{ Sample size}$$

2. 5. Instrument for Data collection

A self developed well structured questionnaire contains both closed-and open-ended questions were administered to the patients after due explanation and consent obtained.

2. 5. 1. Validity of Instrument

The face and content validity of the instrument were carried out by giving the questionnaire to the research supervisor and two of the experts in HAART unit. The necessary corrections were effected by the researcher in the final refinement of the instrument.

2. 5. 2. Reliability of the Instrument

A pilot study was conducted on 10% of participants among HIV/AIDS positive patients on HAART receiving treatment at FMC, Owerri who are not part of the study population using objectively structured questionnaires. Internal consistency of our collection instrument was validated using Cronbach's Alpha or Coefficient Alpha (CA). The value obtained was 0.8 showing that our instrument was reliable.

2. 6. Method of Data collection

With the ethical approved and letter of introduction from the Head of Department Nursing Science, an administrative permit was obtained from the chief medical Director and the unit head in charge before data collection. Self administered questionnaire were administer to the patients after obtaining consent from the respondents who were willing to participate in the study. Self reporter administers the copies of questionnaire to the patients during the clinical hours who met inclusion criteria. Data collection lasted for a period of fourteen days.

2. 6. 1. Variables

The main outcome measure was self reporting adherence rates within (1stJanuary 2020 to 31st December 2020), on HAART follow-up date. The independent variables were sex, age, marital status, educational status, employment status, religion, duration on HAART and type of HAART drug used.

2. 7. Data Analysis

Data was coded or entered using Chi-square and SPSS 25 and the data analysis method used to measure the association of each variable to either negatively or positively affects the outcome (that is adherence nlevel of responants to HAART regimen). The outcome (or pivot (Pr) was $P \geq 0.05$. Results were presented using table, figures and charts.

2. 8. Ethical Approval

Identification letter was collected from the department and submitted to IMSUTH, Orlu, Health Research Ethics committee approved for the study. Names or identification numbers of HIV/AIDS patients were not included in the data abstraction sheet. Informed consent was obtained from the respondents. They were assured of confidentiality and anonymity.

3. RESULTS AND ANALYSIS

The Questionnaires were administered to Two (2) groups of respondents which are: The Patients attending HIV Clinic in IMSUTH who are on HAART therapy and the Clinical staff. A total of 153 questionnaires were administered to the Patients on HAART out of which 105 were correctly filled and returned, while 48 were either improperly filled or were not filled. A total of 25 questionnaires were administered to the Staff, 21 were properly filled and returned while 4 were returned empty. The data collected were analyzed in percentages and presented using frequency distribution tables and graphs, using the statistical package SPSS version 25. Data transcription was done according to the filed notes and questionnaires while coding was done by manually input into the computer according to the listed variables and narratives. Table 1 shows socio-demographic data of the respondents.

From the table most of the respondents 79 (75.2%) were female and were between the age of 36-50 years; 50(47.6%) and were majorly 60 (57.1%) married. About 50 (47.6%) of the respondents attained secondary school education while 2 (1.9%) of the respondents had no formal education. Furthermore, 62(59.0%) of the respondents are self-employed while 3 (2.9%) are students and retired respectively. 102 (97.1%) of the respondents were Christians while 3(2.9%) are traditionalist.

Table 1. Socio-Demographic Data.

Variable	Frequency	Percentage %
Gender		
Male	26	24.8
Female	79	75.2
Total	105	100
Age		
20-35 years	23	21.9
36-50 years	50	47.6
51-65 years	30	28.6
>65 years	2	1.9
Total	105	100
Marital status		
Divorced	2	1.9
Married	60	57.1
Separated	7	6.7
Single	14	13.3
Widowed	22	21.0
Total	105	100
Educational level		
No formal education	2	1.9
Primary	34	32.4
Secondary	50	47.6
Tertiary	15	14.3
Post-Graduate	4	3.8
Total	105	
Employment	19	18.1

Unemployment	18	17.1
Students	3	2.9
Retired	3	2.9
Self-employed	62	59.0
Total	105	
Religion		
Christianity	102	97.1
Traditionalist	3	2.9
Islam	0	0

Table 2 is a frequency table showing drug combination patients on HAART regimen are given/placed on in IMSUTH. 48 (45.7%) were placed on Alluvia (+ Lamivudine + Tenofovir), 35 (33.3%) were placed on Dovato (dolutregavir+ Lamivudine + Tenofovir), 9(8.6%) were placed on Abacavir (Emtricitabine + Tenofovir) while 13 (12.4%) of the patients were placed on Atazanavir (+ Lamivudine + Tenofovir).

Table 2. The types of drug combination used in HAART regimen.

Types of drug combination taken in HAART	Frequency	Percentage %	Remark
Dovato	35	33.3	Highly Utilized
Abacavir	9	8.6	Poorly Utilized
Aluvia	48	45.7	Highly Utilized
Atazanavir	13	12.4	Poorly Utilized
Total	105	100	

Table 3. Shows Respondents awareness/ knowledge of HAART.

Item	Frequency	Percentage %
Heard about HAART		
Yes	99	94.3

No	6	5.7
Total	105	100
Source(s) of Information of HAART regimen		
No Idea	6	5.7
In the Hospital	70	66.7
Social media	6	5.7
Books	2	1.9
People	21	20.0
Total	105	100

Table 3 shows that 99(94.3%) of the respondents are aware of HAART while 6(5.7%) were ignorant of the HAART and the common source of information were from Hospital 70(66.7%) social media 6(5.7%) and books 2(1.9%).

Table 4 shows the side effects experience by HIV positive individuals place on different drug combination on HAART. 80 (76.2%) had no complaints, 10(9.5%) complained of either insomnia or dizziness, 6(5.7%) reported either body aches or hotness, 5 (4.8%) complained of headache, while 4 (3.8%) complained of blurred vision after taking the drugs of which most are mild 16 (15.2%), some moderate 6 (5.7%) and severe 3 (2.9%). On the degree of side effects of HAART, 21(20.0%) claimed to have reported to care giver while 4 (3.8%) did not report at all.

Table 4. Side effects experienced by HIV positive individuals placed on different drug combination on HAART.

Items	Frequency	Percentage %
No Side effect	80	76.2
Body ache/Hotness	6	5.7
Headache	5	4.8
Insomnia/Dizziness	10	9.5
Blurred vision	4	3.8
Total	105	100

Degree of side effect experienced by respondents		
No Side effect	80	76.2
Mild	16	15.2
Severe	3	2.9
Moderate	6	5.7
Total	105	100
When you started experiencing side effects you reported		
No side effect	80	76.2
Yes	21	20.0
No	4	3.8
Total	105	100

Figure 1 showed the frequency of drug intake among those on HAART regimen in IMSUTH. 1 (1%) stated that she disliked taking her drugs, 5 (4.8%) took their drugs whenever they remembered, 12 (11.4%) affirmed that they would take their drugs so long as it was available while 87 (82.9%) stated that they always took their medications as prescribed.

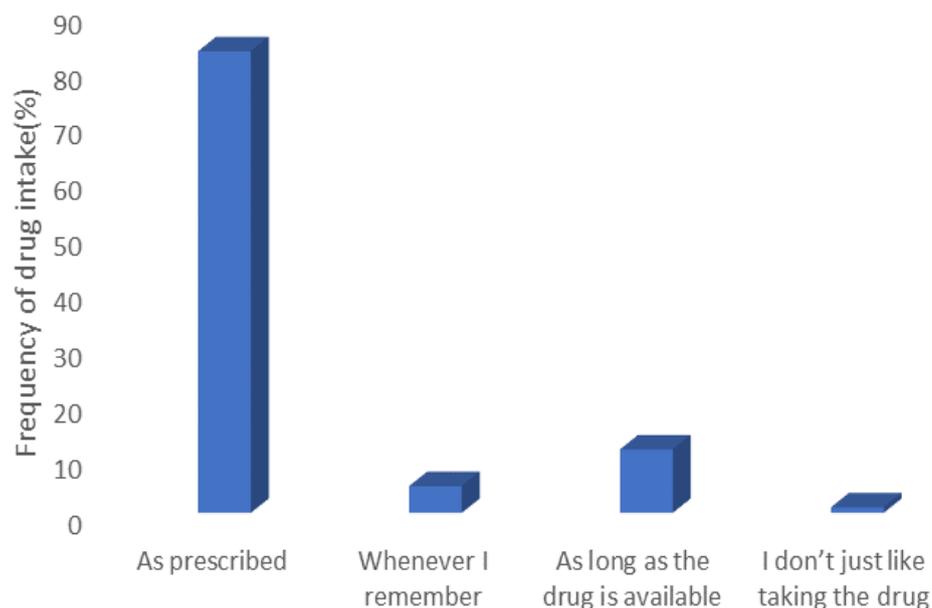


Figure 1. The adherence level of HIV positive patients on HAART regimen.

Table 5 shows how long each respondents has been on HAART regimen 5(4.8%) have been on HAART for one year, 7(6.7%) for 6 months, 8 (7.6%) for 3 months, while 85 (81%) have been on HAART for over a year. Moreover there is tendency that the respondents skipped their medication. 56(53.3%) started that they had never skipped any dose of their medication before, 48(45.7%) admitted to have defaulted at least once on taking of their medication while 1(1%) could not remember if she had skipped any dose previously or not.

Table 5. Duration of HAART regimen.

Items	Frequency	Percentage %
Duration of HAART regimen		
3 Months	8	7.6
6Months	7	6.7
1 Year	5	4.8
More than one year	85	81.0
Total	105	100
Have you ever skipped medication		
No	56	53.3
Yes	48	45.7
Don't know	1	1.0
Total	105	

The adherence measures utilized by HAART clinic workers is presented in Figure 2. The highest measures were by phone call. In Figure 3, the qualifications of HAART Clinic workers is presented. Majority of the care givers comprises of 10 Community Health Extension Workers (CHEWS) (47.6%), 8 Nurses (38.1%), 1 Doctor (4.8%), 1 Lab Technician (4.8%) and 1 Treatment Support Specialist (TSS) (4.8%).

Figure 4 shows the Duration of workers experience in clinics utilized by HAART clinic workers. Moreover, majority of the clinic workers have severed for more than 5 years at 13 (61.9%) while 8 (38.1%) have served for less than 5 years.

Table 6 shows the challenges to non-adherence of HIV/AIDS patients to their medication as noted by HAART Clinic Staff. The clinic workers frequently identified reasons or causes of non-adherence of HIV/AIDS patients to their medication as noted by HAART Clinic Staff.

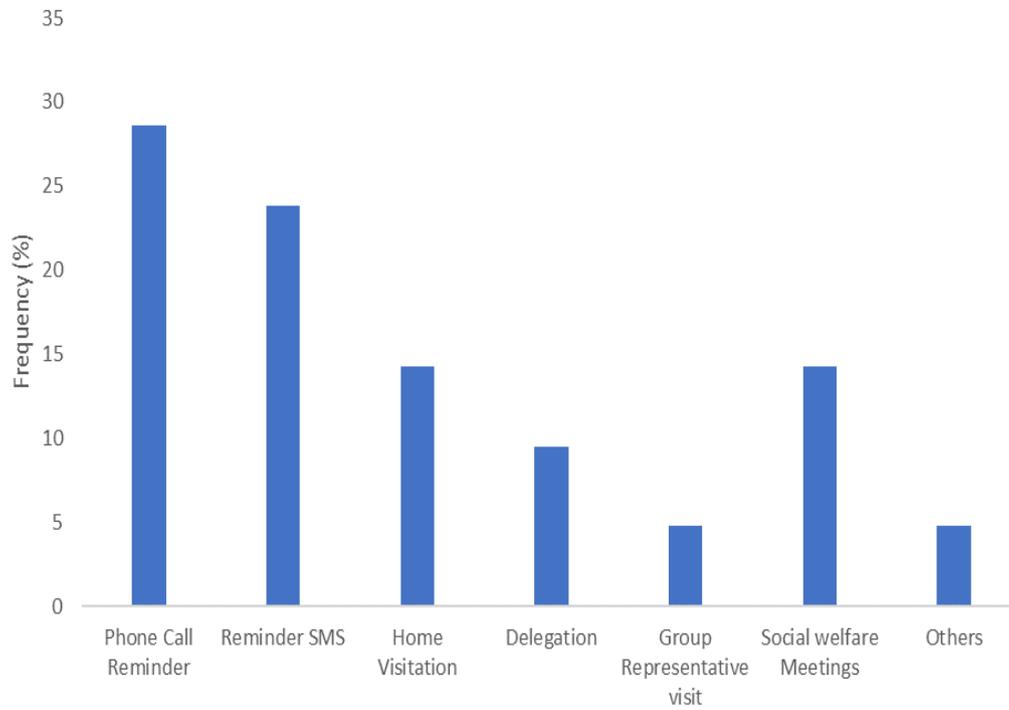


Figure 2. The adherence measures utilized by HAART clinic workers.

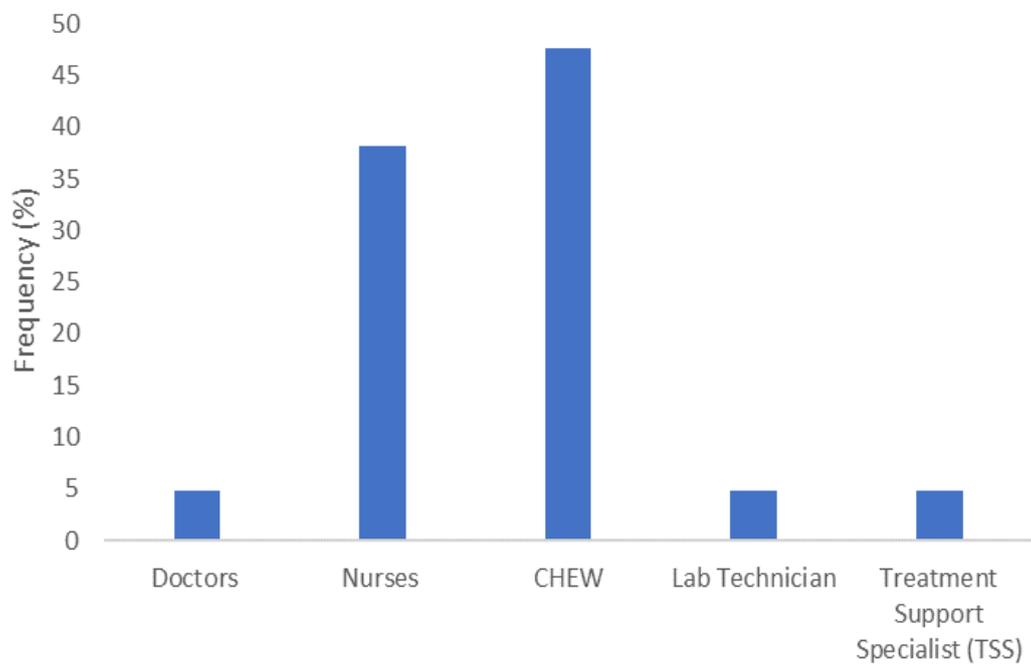


Figure 3. Qualification of HAART clinic workers

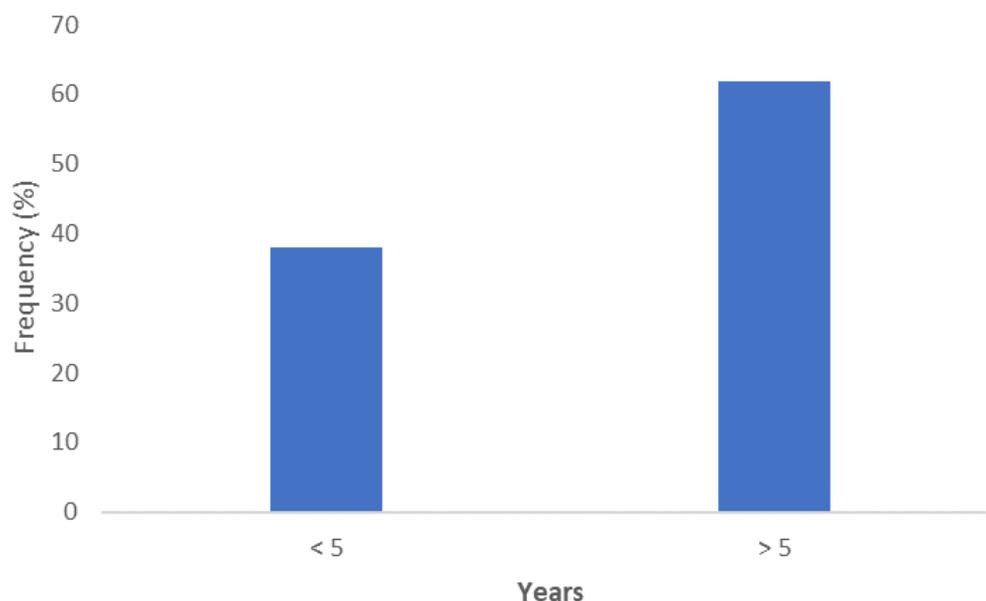


Figure 4. Duration of workers experience in clinics utilized by HAART clinic workers.

Table 6. Challenges to non-adherence of HIV/AIDS patients to their medication as noted by HAART Clinic Staff.

Challenges	Frequency	Percent (%)
Distance	8	38.1
Poverty (lack of finance/transport/food)	20	95.2
Emotional problems (eg: Stigma/Self -discrimination/ fear of disclosure/depression)	15	71.4
Forgetfulness	12	57.1
Problems with the medication order (e.g Medication times, drug quantity, reasons, duration etc)	13	61.9
Religious views (e.g quitting the drug by religious instruction/faith healing etc)	3	14.3
Total	86	100

From the multiple individual opinions of 21 members of Staff, 95.2% of the members of staff identified Poverty as a cause this includes lack of proper food, inadequate finance and inability to afford the transport fares. 71.4 % identified Emotional problems (such as; Stigma/Self -discrimination/ fear of disclosure/depression), 61.9% identified problems with the

medication or its order (eg; medication times, drug quantity, reasons, duration), 57.1% noted Forgetfulness, 38.1% identified Distance, 14.3% identified religious views as the most prominent causes of patient’s non-adherence to drugs used as part of their HAART regimen.

Table 7 shows that there is a significant relationship ($p < 0.05$) between gender and number of patients that adhered strictly to treatment. Table 7 also shows that there is a significant relationship ($p < 0.05$) between Age and number of patients that adhered strictly to treatment. There is a significant relationship ($p < 0.05$) between marital status and number of patients that adhered strictly to treatment, between educational level and number of patients that adhered strictly to treatment, between employment status and number of patients that adhered strictly to treatment, between religion and number of patients that adhered strictly to treatment, between the type of drug combination taken and the number of patients that experienced side effects and between adherence measures number of patients that adhered strictly to treatment (Table 7).

Table 7. Relationship between different factors and adherence to HAART

	N	Number of patients that adhered strictly to treatment	X ²	df	P-value
Gender					
Male	26	20(77%)	119	1	0.000
Female	79	67(85% nm)			
Total	105	87 (83%)			
Age in years					
20-35	23	15(3.8%)	100	3	0.000
36-50	50	44(42%)			
51-65	30	26(25%)			
>65	2	2(17%)			
Total	105	87 (83%)			
Marital status					
Divorced	2	2(100%)	100	4	0.000
Married	60	55(92%)			
Separated	7	5(71%)			
Single	14	10(71%)			
Widowed	22	15 (68%)			
Total	105	87 (83%)			

Educational level					
No formal education	2	1(50%)	94	4	0.003
Primary	34	25(88%)			
Secondary	50	45(90%)			
Tertiary	15	12(80%)			
Post graduate	4	4 (100%)			
Total	105	87 (83%)			
Employment status					
Employment	19	15(79%)	94	4	0.000
Unemployment	18	13(72%)			
Students	3	2(67%)			
Retired	3	3(100%)			
Self employed	62	54 (87%)			
Total	105	87 (83%)			
Religion					
Christianity	102	85(83%)	94	2	0.000
Traditionalist	3	2(67%)			
Islam	0				
Total	105	87 (83%)			
Drug					
Dovato	35	4(11%)	75	3	0.001
Abacavir	9	6(67%)			
Aluvia	48	7(15%)			
Atazanavir	13	8(62%)			
Total	105	25 (87%)			
Adherence measure					
Phone Call Reminder	6	85 (98%)			
Reminder SMS	5	80 (92%)	346	6	0.034
Home Visitation	3	87(100%)			

Delegation	2	78(90%)		
Group Representative visit	1	86(99%)		
Social welfare Meetings	3	79(91%)		
Others	1	77(89%)		
Total	21			

4. DISCUSSION

The result in Table 1 shows that the highest sexes of respondents were female, 79 (75.2%). Age were those between 36-50 years, 50 (47.6%) indicating the level of vulnerability of this category to HIV infection. This may be as a result of their exposure on their daily activities. Women and young people are mainly affected because they are in their active productive age. These findings disagreed with the findings of (Achappa, *et. al.*, 2013), were 116 subjects, were females. Majority 51(72%) of the study population was in the age group of 21-40 years. During the course of the study, it was discovered that the most effective source(s) of information of HAART regimen was the Hospital, 70(66.7%), followed by People (Word-of-mouth) 21(20.0%), while books 2(1.9%) was the least used medium. This shows that there is a need for better utilization of the Social media as a means of educating both the members of the Society and PLWHA about HAART regimen, health tips and other beneficial programs centered on HIV/AIDS so as to reduce the Stigma, Self- discrimination, depression, etc associated to these. Also, patients should be given proper Health Education by the Workers in all health facilities whenever they come to the HAART clinic to foster information circulation.

The results from the study show that at IMSUTH, there were four (4) antiretroviral drug combinations being administered to the patients who attended the HAART clinic, these are: Alluvia (+ Lamivudine + Tenofovir), Dovato (dolutregavir + lamivudine + tenofovir), Abacavir (emtricitabine + tenofovir), Atazanavir (+ Lamivudine + Tenofovir).

Amongst all these drugs, the drug combination most preferred by the patients was Alluvia which was used by 48(45.7%) respondents followed by Dovato, which was used by 35 (33.3%), then, Atazanavir, which was most preferred by 13(12.4%) respondents, while the least preferred was Abacavir used by 9(8.6%) respondents. This shows a more widespread acceptance for Alluvia and Dovato amongst PLWHA on HAART regimen and to further validate the results, prior to the administration of the data collection tool, the staff of the HAART clinic stated that these two drug combination types were the most administered.

From the findings of the study, the side effects experienced by HIV positive individuals placed on different drug combinations in HAART in IMSUTH, 80(76.2%) respondents had no complaints, about 21(20.0%) complained of common drugs side effects including; insomnia or dizziness, body aches, hotness, movement around the body and a very infinitesimal percentage of 4(3.8%) complained of more serious side effects like blurred vision after taking the drugs.

The data obtained showed that the major health risks associated with the intake of these HAART combination drugs were insignificant when compared to the benefits derived from them and as such more efforts should be made by governments, health workers, NGOs and

other media to increase the awareness of PLWHA of the overwhelming advantages of HAART regimen. This study is in agreement with the report of (Eggleton and Nagalli 2020), who highlighted on the most common side effects among the HIV/AIDS patients.

The results of the study when comparing the frequency of drug intake among those on HAART regimen in IMSUTH, 87(82.9%) stated that they always take their medications as prescribed showing a high level of adherence of the respondents to HAART therapy. This implies that a more significant number of respondents on HAART regimen ensured they came regularly to the HAART clinic for their drugs and took them as prescribed, as opposed to those 12(11.4%) who did not always readily have their drugs because they failed to regularly come to collect their drugs and the others 6(6%) who either did not remember to take their drugs or hated taking them despite its availability.

This disagreed with the studies of (Negessa, et. al., (2017), which noted that the adherence rates in Nigeria were about 54% and 62.6% in Aminu Kano Teaching Hospital and Federal medical center, Markurdi respectively. However, when analyzing the tendency that the respondents skipped their Medications, 48 (45.7%) stated that they had never skipped any dose of their medications before, 56 (53.3%) admitted to have defaulted at least once on the taking of their Medications while 1 (1%) could not remember if she had skipped any dose previously or not.

In discussing the most commonly identified reasons or causes of non-adherence of HIV/AIDS patients to their medication as noted by HAART Clinic Staff were 20(95.2%) Clinic staff identified Poverty as a cause as it leads to lack of proper food, inadequate finance and inability to afford the transport fares. 15(71.4%) identified Emotional problems (such as; Stigma/Self -discrimination/ fear of disclosure/depression), 13(61.9%) identified problems with the medication or its order (eg; medication times, drug quantity, reasons, duration), 12(57.1%) noted Forgetfulness, 8(38.1%) identified Distance, 3(14.3%) identified religious views as the most prominent causes of patient's non-adherence to drugs used as part of their HAART regimen.

These findings corresponded to the study of Anyaika *et. al.*, (2019), which stated poverty as a major cause of Non-adherence to HAART regimen but disagreed with that active substances played a major role in drug non-adherence. Furthermore, out of the 105 participants involved in the study, only 2(1.9%) were aged 65 years and above showing that HIV infection significantly reduces the lifespan or life expectancy of a sufferer and non-compliance could also further reduce their lifespan thereby agreeing with the work of (Oguntibeju, 2012) which states that poor adherence to HAART therapy effectively diminishes the effectiveness of ART and increases Viral spread and drug resistance.

From the results of the study the Adherence Measures utilized by HAART Clinic workers in IMSUTH, 6(28.6%) said Phone Call reminders, 5(23.8%) said reminder SMS, 3(14.3%) each stated home visitation and social welfare meetings, 2(9.5%) mentioned delegation, while 1(4.8%) each mentioned group representative visit and other unspecified means. The individual effectiveness of each measure, however, could not be effectively ascertained but collectively, these measures could be said to be fairly effective as 87(82.9 %) of the respondents agreed that they adhered strictly to their drug prescriptions as ordered, despite the fact that 12(57.1%) of them noted forgetfulness as a major factor affecting their compliance to the HAART regimen.

This is below the adherence level of $\geq 95\%$ which was cited by (Abiyot, 2018), to be the therapeutic adherence level needed for HIV infected patients to reach full viral suppression.

4. 1. Implications of the Study

The findings from this study imply that:

The adherence levels of those attending HAART clinic in IMSUTH were commendable 87(82.9%) but had to be improved upon to reach the benchmark of $\geq 95\%$ to enable HIV patients achieve full viral suppression.

Existing strategies or measures if properly utilized by Health professionals would be more cost effective, easier to maintain or sustain by the management and are more easily accessible and acceptable by HIV patients in IMSUTH than any new methods or strategies of promoting adherence.

Poverty is a major cause of the rise in the incidence level of non-adherence to HAART regimen by HIV patients in Nigeria and by extension, most developing countries, thereby significantly accounting for the increase in the number of deaths caused by the disease.

4. 2. Summary

Summarily, there were several identified factors negatively affecting the adherence of PLWHA to the HAART regimen amongst those attending IMSUTH HAART Clinic. These include: Poverty, Distance. Nature of the drug orders, Forgetfulness, etc. There were some reports of side effects; however, there were no reports of any adverse effects of any of the drug combinations being administered, by any of the HIV patients on HAART regimen. The adherence level was 87(82.9%) which shows a fairly high level of adherence.

5. CONCLUSIONS

There is a fairly high level of adherence to HAART regimen by HIV patients attending HAART Clinic at Imo State University Teaching Hospital (IMSUTH) of 87(82.9%). The drug combinations being used were found to cause minimal side effects. The preexisting strategies aimed at fostering adherence were found to be effective but were not properly implemented and this led to not having a better adherence level, however, there is room for improvement.

From the results obtained and after careful consideration, the researcher recommended the following:

1. There should be an increased emphasis on the teaching of HAART regimen to HIV infected patients by health personnel in every part of Nigeria and beyond.
2. The results obtained from this study should be utilized by governments, NGOs, and other organizations (especially those focused on HIV/AIDS prevention and management) to improve or formulate better compliance strategies.
3. The results of this study should be published to educate the public on the benefits of HAART regimen and the minimal side effects of most drug combinations.

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