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Evaluation of HIV/AIDS Patients' Antiretroviral Therapy (ART) Attendance in Lokoja, Nigeria

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Abstract

Despite the notable free HIV/AIDS testing and treatment services, adherence to scheduled clinical visits in the prescribed manner as recommended by healthcare providers has become a topic of concern. This study sought to evaluate HIV patients' drug administration attendance in Lokoja, Kogi State, Nigeria. The intervention theory was adopted in this study to ascertain the extent to which government provision of free antiretroviral therapy has helped to reduce the burden of HIV. The study used secondary data of People Living with HIV/AIDS collected from the Kogi State Specialist Hospital, Lokoja. The case registry data contained the bio-demographic information of HIV patients receiving care services in the facility. Yearly total was obtained by summing values for the respective years. A total of 996 patients were receiving Antiretroviral Therapy in the health facility. Sixty-nine percent of the infected females aged 25 – 34yrs started ART in 2008. From 2009 to 2015, 67.1% were receiving Antiretroviral Therapy (ART). Out of this number, 41.5% were 31 – 40years old. The highest number of patients attending ART was recorded in 2009 and 2010 respectively. A high percentage of patients were confirmed low Cluster of Differentiation (CD4 count). CD4 count decreased by 67.4% within the period under review. A total of 42.1% were active on ART; 27.6% lost to follow-up; 10.9% were transferred (referral) out of the present facility; 5.3% stopped ART; 1.4% were defaulters and 12.6% were dead. All these lend credence to the intervention theory, even though some of the patients were not committed to treatment. These findings have adverse implications on the realization of the policy objectives of the universal health coverage.

Keywords: People Living with HIV/AIDs, Antiretroviral Therapy, Scheduled clinical visits, Lokoja Nigeria.

1. Introduction

Universal treatment of persons diagnosed with Human Immunodeficiency Virus (HIV) has the potential to reduce HIV incidence but will become extremely difficult unless patients adhere to Antiretroviral Therapy hospital visits, using drugs correctly or taking the right drug in the right dose, in the right frequency, and at the right time. Adherence to HIV treatment also entails attendance to all scheduled visits at health centers or hospitals to undertake regular check-ups and clinical assessments. Regular Non-adherence is the patient's refusal to take drugs correctly, or attend scheduled (ART). Adherence to antiretroviral therapy is essential for the general improvement of the quality of life of People Living with Human Immunodeficiency Virus (PLHIV). Adherence to treatment involves regular clinical follow-ups may include clinical appointments, laboratory tests and prescription refills. Unfortunately, HIV patients do not keep to scheduled clinical visits. Incorrect drug taking may not only be inefficient in treating HIV infection, but it may also lead to drug resistance. clinical visits in the prescribed manner as recommended by their health professional.

This has a number of implications for the health outcome of HIV patients. A patient who is not taking drugs correctly will have poor health and get ill with opportunistic infections frequently. They may also end up developing resistant strains of HIV (or other infectious agents in the case of non-adherence to treatment for opportunistic infections) that will be difficult to treat with conventional means. While there is evidence that uptake of medication by People Living with HIV/AIDs is growing, non-adherence is still widespread.

Existing studies (e.g Johnson, Catz, Remien, Rotheram-Borus, Morin, Charlebois, 2004 and Joglekar, Paranjape, Jain, Rahane, Potda, Reddy and Sahay, 2011) have identified a number of barriers to adherence which can be grouped into personal, economic and community factors. Personal circumstances that negatively influence adherence are patients that repeatedly forget to take their medication, patients that travel away from home without medication, and patients who develop mental health issues, or who have a history of drug or alcohol abuse that may interfere with their ability to take drugs as prescribed. Economic factors, such as lack of money for transportation to the healthcare provider can also negatively affect adherence. Other population issues relate to low literacy or lack of

understanding of the treatments a patient should be taking as well as religious beliefs. At the household or community level, stigmatization and/or discrimination may make it difficult for a patient to adhere to ART due to the absence of a supportive environment, including pressure from others to comply with certain practices that may negatively affect adherence.

Johnson, Catz, Remien, Rotheram-Borus, Morin, and Charlebois (2004) observed that adherence to antiretroviral therapy (ART) remains a major setback in efforts to maximize HIV treatment benefits. Previous studies like Monjok, Smesny, Okokon, Mgbere and Essien (2010) on antiretroviral adherence are limited by low statistical applications, homogeneous samples, and biased assessment methods (with most studies focused on antenatal women). The world over, government and scholars alike have been looking for ways to achieve universal coverage on HIV/AIDs prevention and treatment through effective implementation of the World Health Organization's 2016 recommendation ''treat all''. According to researchers, while many African countries have implemented some of the recommendations, empirical studies to assess the results of these interventions, including its uptake and impact, is critical, along with research to identify and address major obstacles preventing effective implementation (Ying, Barnabas and William, 2014). Based on the interventionist theory, the aim of this study is to evaluate HIV patient's clinical visits in Kogi State Specialist hospital over time, with a view to providing theory-based, empirically guided direction in understanding adherence to ART in the developing countries.

Theoretical framework and literature review

The theoretical framework adopted for this study is the intervention theory. Intervention theory is concerned with the analysis of decisions or action taken to improve a medical condition by intervening effectively in order to achieve predetermined outcomes. The theory aims to reduce health-risk behaviors and/or to promote positive actions that support healthy living. The theory was developed by Argyris (1970) in his book titled "*Intervention Theory and Method*''. The theory argues that effective HIV intervention depends on adequate and useful knowledge that provides a range of clearly defined choices. The aim is to make as many people as possible to be committed to the most effective option chosen and to feel responsibility for prevention and medication. Expectedly, such interventions should generate a situation in which stakeholders own the program rather than see severe external influences on implementation. The Joint United Nations Program on HIV/AIDS (UNAIDS) recently renewed its global targets for antiretroviral therapy (ART) for HIV-infected persons under which 90% of HIV-positive persons are tested; 90% of those are on ART, and 90% of those achieve viral suppression. Also, UNAIDS has targeted zero new HIV infections by 2030 including eliminating new HIV infections among infants born to HIV-positive mothers, and promoting the health status of mothers. According to the World Health Organization [WHO] (2016), the objective is to routinely test and treat all PLHIV. The idea behind the Universal Health Coverage (UHC) is that all people living with HIV have easy access to quality health services they need without suffering financial hardship. The goal is to realize universal access to focused healthcare as well as promote healthy outcomes. Based on this forgoing, it is important to anchor this study on the interventionist theory to find out the number of People Living with HIV that are committed to ART and whether the decision of intervening in HIV treatment services by concerned agencies has yielded the desired results especially with respect to treatment.

A number of studies have shown the relationship between demographic characteristics of HIV patients and ART attendance. Uma, Srijayanth, Valarmathi, Sekar, Kabilan, Mayilvahanan, Nataranjan (2012) carried out a socio-demographic profiling of HIV/AIDS patients at ART centers in Chennai. In the study, out of 296 patients, infected males were more than females and only a negligible 5 percent were transgender. A large number of the study subjects were between the ages of 18-41 and could read and write. With respect to marital status, among married males, 5.1 percent were separated and 7.7 percent were widowers. In women, 97.7 percent were married, 29.9 percent were widow and 9.8 percent were separated. In terms of employment, majority of males were employed compared to their female counterparts, and earned <4000rs per month. The study concluded that low socio-economic status with high risk behavior and lack of awareness were prevailing among the HIV patients.

The study by Johnson, Catz, Remien, Rotheram-Borus, Morin, and Charlebois

(2004) also reported that being African American, being in a primary relationship, and a history of injection drug use or homelessness in the past year were associated with greater likelihood of non-adherence. Adherence self-efficacy and being able to manage side effects and fit medications into daily routines were protective against non-adherence. The study disclosed that being tired of taking medications was associated with poorer adherence whereas a belief that non-adherence can make the virus stronger was associated with better adherence. These review outcomes point to the need for multi-targeted interventions to improve medication adherence that address logistical barriers, substance use, attitudes and expectancies, as well as skills building and self-efficacy enhancement. It is on this note that Toure (2015) explored user fee exemption policies in Mali. The study noted that exemption services significantly improved users' access to healthcare, but their implementation revealed deep dysfunctions in the healthcare system that truncated their desired outcomes. These exemption policies provoked resistance among health workers that manifested in their practices and revealed, in particular, the profit-generation motive within which they operated. These dysfunctions reflected the State's incapacity to exercise its regulatory role and to establish policies that are aligned with the way the health system really functions.

Earlier study by Johnson, Catz, Remien, Rotheram-Borus, Morin, and Charlebois (2004) has observed that adherence to antiretroviral therapy (ART) remains a challenge in efforts to maximize HIV treatment benefit. In the study, thirty-two percent of the PLHIV reported less than 90 percent adherence to ART in the prior 3 days. In an attempt to explore ways in seeking wider access to HIV testing and counseling, Sam-Agudu, Folayan and Ezeanolue (2016) observed that HBCT counseling and testing uptake was high in sub-Saharan Africa. But the difference in counseling and testing uptake between pregnant and non-pregnant women was small. Pregnant women with at least primary education were more likely to present themselves for HIV testing in HBCT.

According to Mugavero, Lin, Willing, Westfall, Ulett, Routman, Abroms, Raper, Saag and Allison, (2009) 60 percent of HIV patients on ART missed a visit within the first year. Inconsistent ART was consistent with high mortality of HIV patients. As a result, the mortality rate was 2.3 deaths per 100 person-years, compared with 1.0 deaths per 100 person-years for those who attended all scheduled appointments during the first year after establishing outpatient treatment.

Joglekar, Paranjape, Jain, Rahane, Potda, Reddy and Sahay (2011) conducted a study to understand factors and influencers of adherence to ART and their follow ups among patients attending ART centers in Maharashtra, India. Evaluation of the outcome of the study reveals that patients identified a number of barriers to ART adherence and follow up. These include (1) Financial barriers such as unemployment, economic dependency, and debt; 2) socio-cultural barriers which include social norm of attending family rituals, and fulfilling

social obligations; 3) personal factors which are influenced by patients' belief, attitude and behavior towards medication and self-perceived stigma, and; 4) long waiting period, doctor-patient relationship and less time spent in counseling at the ART center contributed to missed visits.

One important inference from the review of literature is that existing studies on HIV/AIDs patients receiving ART have focused on the demographic/socioeconomic profile of patients as well as barriers to effective ART uptake. The literature reviewed, however, shows that little or no geographical studies have been carried out to evaluate trends in ART uptake and changes in the biomedical characteristics of HIV patients. The implication of this omission is that effective monitoring of progress is hampered, leaving a serious policy and program gap. Therefore, it was critical to explore the trends in HIV patient ART attendance. This understanding makes monitoring of progress more effective and provides avenues for measuring the impact of ongoing interventions aimed at reducing the incidence of HIV/AIDs.

2. Study Area

Lokoja, the capital of Kogi State is located between latitude 7º45'N-7º51'N and longitude 6º41'E-6º45'E. Its altitudes range from 45-125meters above sea level. It is situated on the western bank of the River Niger at its confluence with the River Benue. It is sandwiched between the River and the Mount Patti (Figure 1). The town is characterized by tropical climate that comprises wet and dry seasons and falls within the Guinea Savannah vegetation belt. The annual rainfall is about 1150mm, with mean annual temperature of about 27.7ºC.
The town grew to become a cosmopolitan settlement peopled mostly by different ethnic groups, notably Oworo, Nupe, Igala, Ebira, Hausa, Bassange, Yoruba, Igbo and Kakanda. Today, Lokoja is a rapidly growing urban area. In 1991, the town had 77,519 inhabitants, which increased to 196,643 in 2006 (FGN, 2007). The 2006 population census data puts the population of males to be 101,146 persons and recorded 95,498 female populations. Lokoja's population pyramid, shows it has a young population structure, with 41.2% of the population in the age range of 0 to 24 year, therefore structured with a broad based and tapers rapidly upward; depicting a situation of high fertility. Maternal women represent a significant contribution to Lokoja's total fertility population with approximately 47 percent of women being mothers before they reach 20 years. These women visit both public and private health centers for their maternity care. There are two Secondary Health Care (SHC) and a few Primary Health Care (PHC) centres in the area. Lokoja also houses several private health care centers.

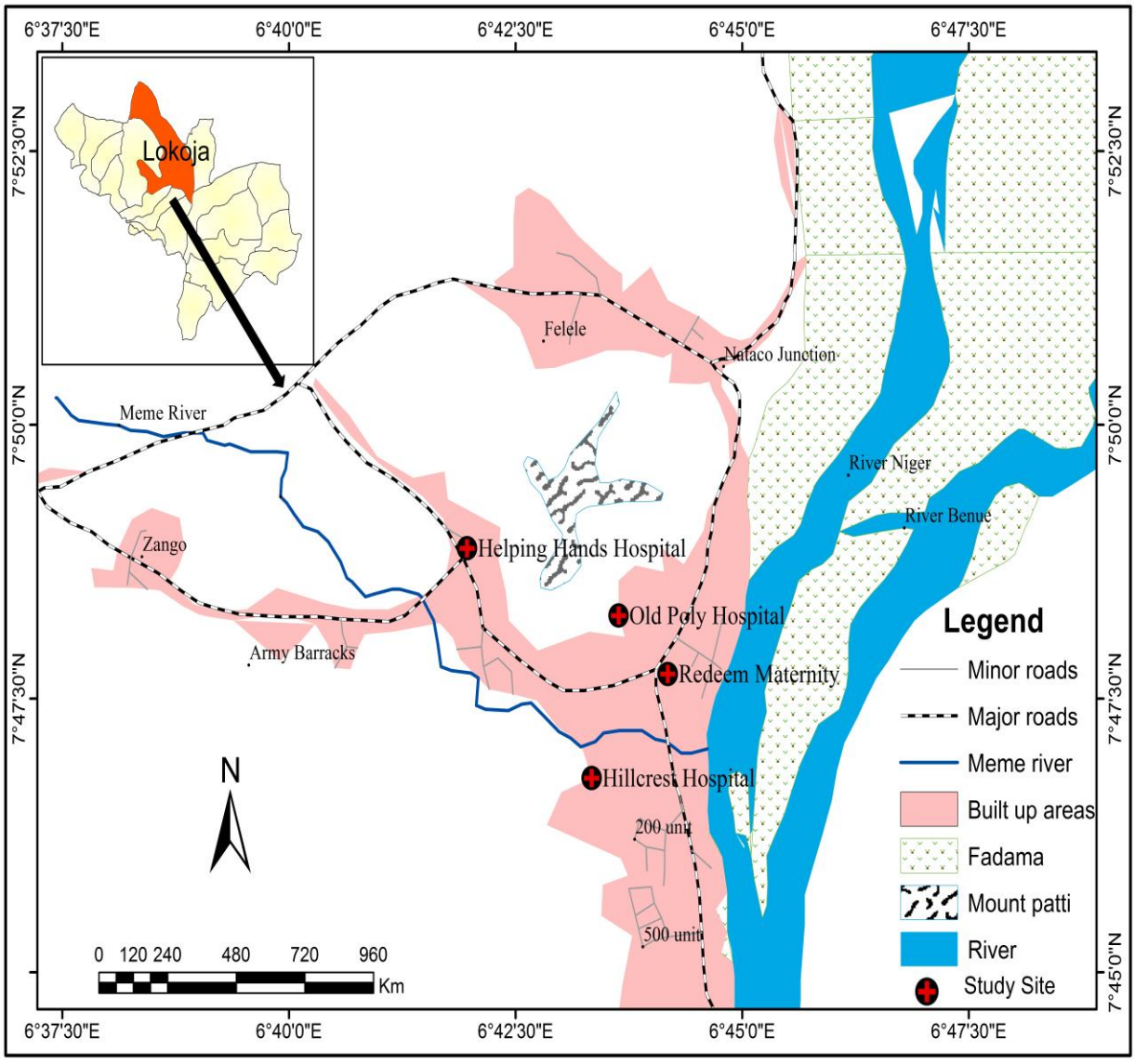

Figure1: Kogi State showing Lokoja
Source: Field Work, 2018

3. Methodology

The study utilized secondary data only which has been collected from the health record and statistical unit of the Kogi State Specialist hospital, Lokoja. The case registry data do not contain spatial data but demographic and biomedical information of 996 HIV patients receiving care services in the facility for eight years (2008- 2015). The

study used descriptive statistics to analyze the collected data. The descriptive statistics used which was informed by the simple nature of the data include frequency, percentage, line and bar graphs as well as tables. The hospital based data obtained in protected excel file was copied into a new environment (spreadsheet) to enable proper processing of the data. Afterward, it was exported into Statistical Package for Social Sciences (SPSS) for onward analysis. Descriptive statistics such as tables, frequency distribution and simple percentages were used for data analysis. Also, yearly total was obtained by summing values for the respective years and the variability was determined using trend analysis.

4. Results and Discussion

4.1. Demographic characteristics of HIV/AIDS patients

The demographic characteristics of patients currently receiving Antiretroviral Therapy (ART) and counseling in the study area are shown in Table 1. The sex of patients as shown in Table 1 showed that females dominated the list of patients with 69.4%, while males were 28.5%. The result obtained simply means that females are 40% more than the number of patients infected with the HIV/AIDS virus in the area. It also implies that they are more vulnerable to the virus than their male counterpart. Information on age of start of ART showed that 13.8% of the patients were <25yrs; a larger percentage (44.2%) were within the ages of 25 – 34years, 20.9% were 35-44years while those above 54yrs constituted 2.5% only. The result obtained simply implies that majority of the patients started ART at the age of <25 to 54yrs with young adults having the highest number. It further suggests that young adults mostly those within the ages of 25 - 44yrs are most vulnerable to the diseases. A plausible explanation for this subset of the population having the greatest infections could be that they are more sexually active with high risk behavior. This finding is in line with the result of Uma (2012) who reported infected males aged 18-41 years to be more than females in Asia.

The current (2015) age of patients receiving ART and counseling further showed that a larger percentage, precisely 41.5% were within the ages of 31 – 40yrs, followed by those within the ages of 21 – 30yrs and 41 – 50yrs constituting or making up 20.2 and 19.2% respectively. Patients within the ages of 11 – 20yrs had the lowest percentage of 0.5% followed by those with the ages of 1 – 10yrs. It therefore shows that those within the ages of 21 – 50yrs make up the majority (80.9%) of the current age of patients receiving ART and counseling in the study area. The fact that majority of these patients have been on ART for quite a while (almost eight years, 2008-2015) indicates that they should be able to take medications correctly and manage the adverse effects of the disease effectively. Information on pregnancy status of patients receiving treatments showed majority of them were not pregnant, while only 0.8% were

pregnant. Contrary to the finding of Sam-Agudu *et al.* (2016) that pregnant women with the lowest level of formal education were more likely to present themselves for HIV testing in sub-Saharan Africa, this result indicates that females who are not pregnant are 84 times more likely to receive HIV/AIDS treatment and counseling than those pregnant. This goes to show that young girls and adult women make up the largest number of patients receiving ART and counseling.

Table 1: Socioeconomic characteristics of respondents

Variables	Category	Frequency
Sex	Male	284 (28.5)
	Female	691 (69.4)
	No response	21 (2.1)
Age at start of ART	<25yrs	137 (13.8)
	25 – 34yrs	440 (44.2)
	35 – 44yrs	208 (20.9)
	45 – 54yrs	106 (10.6)
	>54yrs	25 (2.5)
	No response	80 (8.0)
Current age	1 – 10yrs	78 (7.8)
	11 – 20yrs	5 (0.5)
	21 – 30yrs	201 (20.2)
	31 – 40yrs	413 (41.5)
	41 – 50yrs	191 (19.2)
	>50yrs	106 (10.6)
	No response	2 (0.2)
Pregnancy status	Not Pregnant	673 (67.6)
	Pregnant	8 (0.8
	Undisclosed	315 (31.6)

Source: Researcher's fieldwork, 2018; values in bracket are percentages

4.2 Biomedical characteristics of HIV/AIDS patients

Table 2 gives vital information on the biomedical characteristics of HIV/AIDS patients. Result on the ART start date showed that 5.2 and 12% started receiving ART in 2008 and 2009 respectively; 11.3 and 8.3% started the therapy in 2010 and 2011 respectively; 10.7 and 9.7 started theirs in 2012 and 2013 respectively, while 7.3 and 2.3% started the therapy in 2014 and 2015 respectively. The result shows that from

2008 to 2015, a total of 668 representing 67.1% started ART with 2009 and 2010 recording high number of ART patients. To further understand the trend in ART start date in the study area, trend analysis was performed. The commencement of ART showed a decreasing trend implying that the number of persons receiving ART has decreased over time. It showed that in 2008, 52 patients started the ART. This value increased by 130.8% to 120 persons in 2009; thereafter, the number decreased by 5.8% to 113 persons in 2010. The number of people starting ART decreased rapidly and from 2010 to 2015, it decreased further by 79.6% to 23 persons that started ART. What this means is that the number of persons initiating ART has decreased substantially probably as a result of reduction in the incidence of the disease and the use of contraceptives.

Information on the last visit date showed an increasing trend (Fig. 2) with 2014 and 2015 being the last visited years with 11.4 and 41.7% respectively (Table 2). The result also showed that 8.1, 8.9 and 9.5% visited the centre last in 2011, 2010 and 2012 respectively. It therefore suggests that before 2014, less than 100 patients visited the ART center. As shown in Figure 2, the periods 2008 to 2013 witnessed low visitations, while the last time patients visited the center increased from 2014 and 2015. Increased hospital visitation in 2014 to 2015 may be attributed to advocacy and concerted efforts by concerned authorities to reduce the prevalence of the disease.

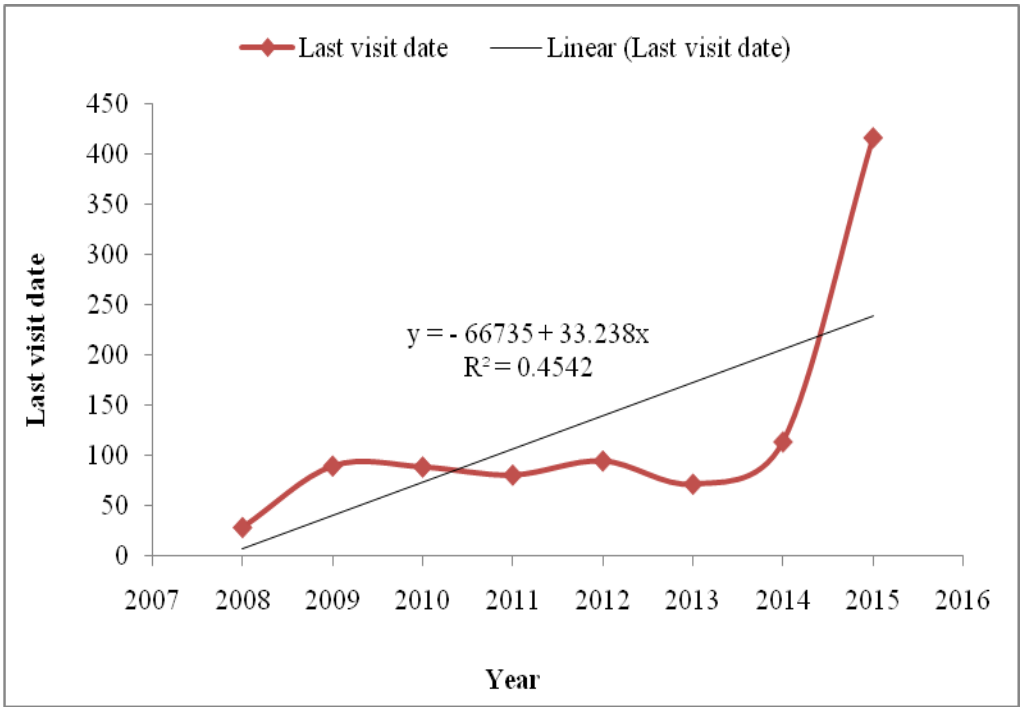

Figure 2: Trend of HIV/AIDS last visit

Cluster of Differentiation 4 (CD4) count is a screening parameter used in the treatment timing of HIV patients. These cells are often referred to as CD4 cells, T-helper cells or T4 cells. T- helper cells are white blood cells that are an essential part of the human immune system. CD4 serves as a receptor for human immunodeficiency virus envelope glycoprotein. If CD4 cells become depleted in an untreated HIV infection, the body is left vulnerable to a wide range of infections that it would otherwise have been able to fight. The normal CD4 count for HIV negative people ranged between 400 and 16000 cells/mm3. A CD4 count below 200 is an indication that HIV is more advanced. Result on the baseline CD4 values showed that 1 – 100 had the highest percentage of 17.6% followed by 201 – 300 and then 101 – 200 with 14.7 and 12.3% respectively (Table 2). The CD4 values for 301 – 400 constituted 11.8% and that of 401 – 500 was 7.6%, while low CD4 values were recorded for 501 – 800 and above. The results obtained show that 1 – 500 recorded the highest CD4 values representing 64% of the baseline CD4 values. This result indicates that majority of the HIV patients have started experiencing immune suppression at the time of admission. The baseline CD4 values displayed a decreasing trend. It showed that from 1 – 100 and >800, CD4 values decreased by 67.4%. This decrease in baseline CD4 values may be attributed to lassitude in seeking ART on time.

The current CD4 values showed that 201 – 300 and 301 – 400 as well as 401 – 500 had the highest current values with percentages of 13, 14.3 and 10% respectively. It also showed that 701 – 800, 601 – 700 and >800 had the lowest current CD4 values of 4.4, 5.2 and 7.9% respectively. It showed that from 1 – 100 and >800, current CD4 values decreased by 9.2%. It also reveals that current CD4 values decrease from 1 to above 800 showing similar trend with baseline CD4 values. This result implies that most of the patients still present weak immunity despite prolong use of ART. This could be attributed to irregular hospital visits and noncompliance to ART. The result in Table 2 shows that current CD4 values in the study area depict a decreasing trend over the period of investigation. The result shows clear variability and oscillation in the pattern of current CD4 values in the area of study.

Table 2: Biomedical characteristics of respondents

Variables	Category	Frequency
ART start date (Year)	2008	52 (5.2)
	2009	120 (12.0)
	2010	113 (11.3)
	2011	83 (8.3)
	2012	107 (10.7)
	2013	97 (9.7)
	2014	73 (7.3)
	2015	23 (2.3)
	Uncategorized year	328 (32.9)
Last visit date	2008	29 (2.9)
	2009	90 (0.3)
	2010	89 (8.9)
	2011	81 (8.1)
	2012	95 (9.5)
	2013	72 (7.2)
	2014	114 (11.4)
	2015	416 (41.7)
	Uncategorized year	10 (0.1)
Baseline CD4 values	1 - 100	175 (17.6)
	101 - 200	123 (12.3)
	201 - 300	146 (14.7)
	301 - 400	118 (11.8)
	401 - 500	76 (7.6)
	501 – 600	48 (4.8)
	601 – 700	48 (4.8)
	701 – 800	24 (2.4)
	>800	57 (5.7)
	Uncategorized values	18.2
Current CD4 values	1 - 100	87 (8.7)
	101 - 200	87 (8.7)
	201 - 300	129 (13.0)
	301 - 400	142 (14.3)
	401 - 500	100 (10.0)
	501 – 600	94 (9.4)
	601 – 700	52 (5.2)
	701 – 800	44 (4.4)
	>800	79 (7.9)
	Uncategorized values	182 (183)

Source: Researcher's fieldwork, 2018; values in bracket are percentages

4.3 Current and verified client status

The results in Table 2 show the current and verified client status on ART and counseling in the study location. It showed that a larger proportion of the patients (42.1%) were active on ART; 27.6% lost to follow-up, implying this group of patients on ART did not follow up their treatment, hence were not active on ART; 10.9% were transferred (referral) out of the present facility to another probably for better medication attention; 5.3% stopped ART and 1.4% were defaulters, while 12.6% died. The general idea is that an appreciable proportion of HIV/AIDS patients are still active on ART, while 34.3% need to be encouraged to follow up, and continue as well as not to default on the therapy. This is required in order to increase the number of active HIV/AIDS patients on ART. The likely reason for being active on ART is the awareness that noncompliant to medication may aggravate the virus and eventually lead to immune suppression. A similar observation was made by Johnson *et al*. (2004) in the United States of America where a large number of patients strongly believed that strict adherence could weaken the virus. On the contrary, prolonged drug uptake may make patients lost to follow-up or stop medication. Factors for nonadherence have been identified in earlier studies like those of Joglekar *et al*. (2011) in India and Johnson *et al*. (2004) in the United States of America.

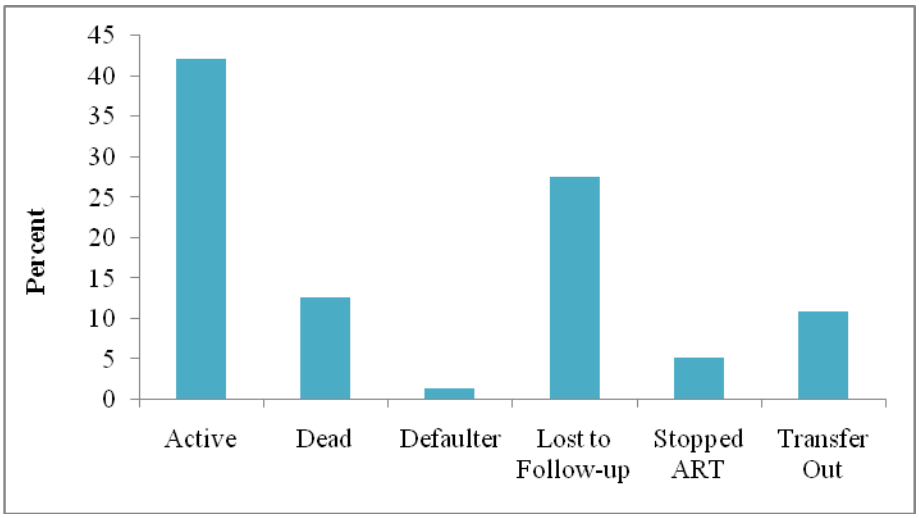

Figure 3: Current client status (2015)

Further information on the verified current client showed that in comparison to the number of HIV/AIDS patients, the number of active patients on ART is discouraging and an issue of deep concern. This is because out of the 916 patients that started ART, only a small number (259) are active on ART. It shows that 291 representing 29.2% are not active on ART and this portends danger and serious warning to the remaining healthy population. Though the actual number of HIV/AIDS patients active on ART cannot be categorically verified due to the category of no response, the available result implies that a comparatively appreciable number of HIV patients are not

active on ART and this call for urgent attention.

5. Theoretical implication of findings

The findings of this study have far-reaching theoretical implications. This study clearly confirms that HIV/AIDS is a global problem and the decision for government intervention in ART is to tackle major issues relating to access to treatment. One factor that supports the intervention theory is the finding that 41.2% of the HIV patients were active on ART. This goes to buttress the fact that the decision to intervene effectively in any health problem is to secure desired health outcomes. The intervention of the World Health Organization in HIV/AIDs prevention and treatment is to achieve universal coverage that will ultimately guarantee zero new HIV infections by 2030. In 2009 and 2010, large numbers of HIV patients with low CD4 started ART, but as access to treatment increased through routine medication uptake, the CD4 of patients improved slightly in 2014 and 2015 respectively.

The findings of this study have shown that although government may decide to intervene in any health problem, it is the individual (patient) who decides whether to use the service or not. Despite the fact that government intervened in ART, this study, observed that 27.6% lost to follow up, 5.3% stopped scheduled hospital visits and 12.6% died. This result serves to highlight the fact that almost 40% of the patients did not adhere to ART. The intervention theory proposes that effective intervention must attract a large number of the target population to be committed to the best option chosen. It should be stressed that although current interventions do not seem to be yielding the desired results in improving the health outcomes of HIV patients, the findings of this study indicate that an appreciable number of patients are active on ART even though adherence was poor. This goes to buttress the fact that some important policy objectives of the universal health coverage have not been realized.

6. Conclusion and Recommendation

This study provides a baseline for monitoring progress in treatment and exploring trends in the demographic and biomedical characteristics of HIV-positive persons receiving ART over time. The study observed that females were more than twice the number of men infected with the HIV/AIDS virus in the area. A large number of HIV-positive patients aged 25-54 years started ART in 2009 and 2010. The commencement of ART showed a decreasing pattern, while last visit displayed an upward trend. Almost half of the patients had CD4 less than 400 cells/mm3, indicating severe infection. The current CD4 values of HIV-positive persons did not show any considerable improvement from their baseline CD4 values even though an appreciable number of the patients were active on ART. All these show that policy gaps are still evident. Hence, understanding how intervention works within the context of a multi-focused framework can facilitate successful implementation of the universal health coverage, thereby addressing the generality of the problem. Based on the findings of the study, the following recommendations have been put forward:

(i) Adherence intervention should focus more on women who were found to dominate the list of HIV-positive patients in the study area.

(ii) Multi-dimensional intervention should be targeted at people aged 21-54 years that recorded the highest infection. Interventions to improve HIV/AIDS treatment adherence should take into account patient's health behaviors.

(iii) Counseling or discussions with HIV patients must focus on the clinical benefits of ART such as viral load suppression and immunity improvement as well as which circumstances imply adherence or non-adherence to medication intake.

(iv) HIV patients need to be encouraged to adhere to routine medication and clinical appointments in order to achieve UNAIDS target of zero new HIV infections by 2030. Adherence interventions should address the ways in which people on ART manage their daily lives.

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