

Two-Year Evaluation of Anti-retroviral Medicines Availability and Utilization in Supported Health Facilities in Osun State

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ABSTRACT

Background: Antiretroviral (ARV) drugs have reduced the burden of human immune-deficiency virus globally availability of these medicines and adherence to treatment guideline are crucial in sustaining the control of the infection. This study aims to evaluate the availability and use of ARV medicines in supported health facilities in Osun State over 2 years.

Methods: Combined Report and Requisition Forms of antiretroviral medicines prepared and transmitted, via e-mail to the State Logistics Management Coordinating Unit, between January 2017 and December 2018 from the HIV clinics of supported health facilities were reviewed. The collated data were analyzed using Microsoft Excel[®] software package.

Results: Patients that were on ARV medicines in the period was 3555.9 ± 1170.35 (100%). The patients were comprised of 3068.4 ± 846.02 (86.29%) and 107.7 ± 87.31 (3.03%) adults on first and second-line ARV medicines respectively. The paediatrics on first and second-line ARV medicines were 195.3 ± 123.25 (5.49%) and 14.2 ± 12.19 (0.40%) respectively. Tenofovir/lamivudine/efavirenz (TDF/3TC/EFV) was the most commonly ordered, supplied and consumed drug regimen, followed by Zidovudine/lamivudine/ nevirapine (AZT/3TC/NVP). The adult first line fixed dose combinations were mostly ordered, supplied and consumed (85.63%, 85.38%, 85.83%), followed by paediatric first line fixed combinations (7.84%, 8.04%, 8.09%) and then adult second-line components (2.72%, 2.81%, 2.65%). The overall performance was 101.1%.

Conclusion: ARV medicines used for patients in this study are in line with recommended standards. The first line ARV combination regimens (Tenofovir/lamivudine/efavirenz) were the most commonly ordered, supplied and consumed for both adults and paediatric populations.

Keywords: Antiretroviral medicines, Osun State, Use, Availability

1. INTRODUCTION

The sub-Saharan Africa is said to constitute the highest burden of HIV/AIDS worldwide, in that it has over two thirds of all people infected with HIV globally [1,2]. However, with the introduction of Highly Active Antiretroviral Therapy (HAART), the morbidity and mortality rates of People Living with HIV/AIDS (PLWHA) have been curbed with substantial progress. Since antiretroviral drugs are to be taken for life without interruption, an efficient drug supply system is, therefore, not an option but a necessity. First-line antiretroviral therapy (ART) in many African countries consists of a generic fixed-dose triple-drug combination, usually taken as a single tablet twice a day [3]. Current trends, however, now recommend fixed-dose combinations and once-daily regimens as preferred treatment for antiretroviral therapy [2,4]. This is with a view to curb resistance to first-line antiretroviral drugs through adherence to once-daily regimens. Resistance to first-line therapy means switching to a more complicated,

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expensive, toxic and less effective second-line regimens, and as far as possible, this must be avoided. Developing an antiretroviral therapy procurement model that allows rational drug forecasting and uninterrupted drug supplies should always be advocated and encouraged [3]. In Nigeria, antiretroviral (ARV) medicines are made available from fundings by different consortiums to supported health facilities in all states across the country. The supported health facilities offering HIV care services to the people living with HIV/AIDS (PLWHAs) in the State of Osun were forty-five as at the end of December 2018. The Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM), through counterpart funding, empowers the National Agency for the Control of AIDS (NACA) in supplying thirty-one health facilities with HIV commodities, the remaining fourteen (14) health facilities were being supplied by GHSC-PSM funded by the USAID under the President's Emergency Plan for AIDS Relief (PEPFAR) programme. Only six out of the 31 GFATM-supported sites while seven out of the 14 PEPFAR-supported sites offer comprehensive ART services. The remaining thirty-one HIV health facilities, which are mainly Primary health Centres (PHCs), offer Prevention of Mother to Child Treatment (PMTCT) services to patients [4]. This study sought to evaluate the availability and use of ARV medicines in supported health facilities in Osun State over 2 years period.

2. MATERIALS AND METHODS

2.1 Materials

Electronic copies of individual facility-based bimonthly-prepared Combined Report and Requisition Forms (CRRFs) for Antiretrovirals and Medicines for treating Opportunistic Infections (OIs) submitted bimonthly to the State Logistics Management Unit (LMCU) was used to retrieve data for this study.

2.2 Methods

This research is a two-year longitudinal and retrospective study conducted at the LMCU domiciled in the Department of Pharmaceutical Services of the State Ministry of Health, Osun State, in the Southwestern part of Nigeria. The LMCU was set up in June 2014, in line with the approval of the National Council on Health in 2014. Before the establishment of LMCU, the different consortiums managed the ARV programmes and data individually. Data collection form was designed to record HIV/AIDS medicines ordered, supplied and consumed to the State of Osun, from January 2017 to December 2018 from the Combined Report and Requisition Forms (CRRFs). The ARV medicines are Lamivudine (3TC), Abacavir (ABC), Atazanavir (ATV), Atazanavir/ritonavir (ATV/r), Zidovudine (AZT), Zidovudine /Lamivudine/Nevirapine (AZT/3TC/NVP), Nevirapine (NVP), Tenofovir (TDF), Tenofovir/Lamivudine/Efavirenz (TDF/3TC/EFV), Lopinavir/ritonavir (Lp/r) and Dolutegravir (DTG). Only the ARV medicines that are currently being stocked and dispensed to clients in the health facilities, at the time of conducting this study were retrospectively investigated, thus eliminating obsolete regimens. The non-antiretroviral medicines used in the treatment of opportunistic infections in PLWHA were excluded from the study.

Ethical clearance for this study was obtained from the Osun State Health Research Ethics Committee (OSHREC) of the State Ministry of Health, Osogbo, State of Osun, with Reference No. OSHREC/PRS/569T/160

2.3 Statistical Analysis: Data generated was entered into templates designed on the Microsoft Excel® software package and descriptive analysis was done to determine average values and standard variations, proportions of medicines ordered, supplied and consumed in the study period. Categories of the analysis was also done for paediatric and adult population and for supported health facilities.

3. RESULTS

Throughout the two (2) years of retrospective study, an average number of registered patients that were on antiretroviral (ARV) medicines supplied to the HIV clinics of supported health facilities in the State of Osun on bimonthly basis was 3555.9 ± 1170.35 (100%). The patients were comprised of 3068.4 ± 846.02 (86.29%) and 107.7 ± 87.31 (3.03%) adults on first and second-line ARV medicines respectively. The paediatrics on first and second-line ARV medicines were 195.3 ± 123.25 (5.49%) and 14.2 ± 12.19 (0.40%) respectively. There were no patients on third line or salvage ARV therapy. PMTCT Mothers, exposed infants and post exposure prophylaxis patients were 122.7 ± 82.63 , 44.0 ± 16.13 and 3.6 ± 2.82 respectively. The average number of clients increased with each year in the study period. For GFATM supported facilities it was 2083 to 4287 in 2018, while in PEPFAR supported facilities, it was 2407 in 2017 and increased to 4711. For both consortia, it was 2299 in 2017 and 4491 in 2018.



3.1 Ordering of ARV Medicines

A total of twenty (20) different ARV medicines were investigated in this study for a retrospective period of two years, from year 2017 to 2018. Of the total quantity of 165,185 unit packs of ARVs ordered in 2 years, TDF/3TC/EFV (300/300/600mg) had the highest (82747, 50.02%) followed by AZT/3TC/NVP (300/150/200mg) 28.45%, then AZT/3TC/ NVP (60/30/50mg) 5.45%. The least ordered ARV medicines were DTG (0.04%) and LPV/r (40/10mg) pellets (0.03%).

Furthermore, Adult first line fixed dose combinations had the highest orders with 85.63%, followed by paediatric fixed dose combinations (7.84%), then Adult second line ARV components (2.72%), paediatric single dose medicines (2.16%), Adult first line single dose components (1.30%), while the least ordered were paediatric first line medicines (0.35%). The total ordering of ARV medicines in 2017 was 74,373 units, but 73,132 units were supplied, while 77, 798 units were consumed. In 2018, the order increased by 22.1% (90,812 units) with 23.1% increase in supply (90,040 units) and 11.3% increase in consumption (86,626 units).

3.2 Supply and Consumption of ARV Medicines

For the study period, 165,185 unit packs of ARV medicines were ordered, 163,172 unit packs were supplied, while 164,424 unit packs were consumed. The supply for ARV medicines is presented in Table 1 and 2. Of the total quantity of 163,172 unit packs of ARVs supplied, TDF/3TC/EFV (300/300/600mg) was the highest (80310, 49.22%) followed by AZT/3TC/NVP (300/150/200mg) 28.84%, then AZT/3TC/NVP (300/150/200mg) 5.44%. The least supplied ARV medicines were NVP 200mg (0.02%), DTG 50mg (0.05%) and LPV/r (40/10mg) pellets (0.06%). The adult first line triple ARV regimens were most consumed with TDF/3TC/EFV (300/300/600mg) being the highest (83616, 50.85%), followed by AZT/3TC/NVP (300/150/200mg) 29.36%.

Table 1: Quantities and percentage of adult ARV medicines ordered, supplied and consumed in supported health facilities in the State of Osun between January 2017 and December 2018

Antiretroviral medicine	Pack size	Total ARV medicines ordered	% ordered	Total ARV medicines supplied	% supplied	Total ARV medicines consumed	% consumed
Adult first line fixed dose combinations		141,456	85.63	139,318	85.38	141,130	85.83
AZT/3TC/NVP(300/150/200)	60 tabs	46,995	28.45	47,053	28.84	48,283	29.36
ABC/3TC (600/300mg)	60 tabs	1,773	1.07	1,739	1.07	1,627	0.99
AZT/3TC (300/150 mg)	60 tabs	2,049	1.24	2,094	1.28	2,291	1.39
TDF/3TC (300/300 mg)	30 tabs	4,360	2.64	4,273	2.62	4,274	2.60
TDF/3TC/EFV (300/300/600)	0 tabs	82,747	50.09	80,310	49.22	83,616	50.85
TDF/3TC/DTG (300/300/50)	1 tabs	3,532	2.14	3,849	2.36	1,039	0.63
Adult first line single dose components		2,145	1.30	2,019	1.24	2,049	1.25
DTG 50mg	0 tabs	74	0.04	83	0.05	76	0.05
EFV 600 mg	0 tabs	1,565	0.95	1,636	1.00	1,685	1.02
NVP 200 mg	0 tabs	268	0.16	27	0.02	9	0.01
AZT 300mg	0 tabs	238	0.14	273	0.17	279	0.17
Adult second line components		4,494	2.72	4,590	2.81	4,354	2.65
ATV/r 300/100mg	0 tabs	1,368	0.83	1,384	0.85	286	0.78
LPV/r 200/50mg	120 tabs	3,126	1.89	3,206	1.96	3,068	1.87

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Table 2: Quantities and percentage of paediatric ARV medicines ordered, supplied and consumed in

	Pack Size	ARV Ordered N (%)	ARV Supplied N (%)	ARV Consumed N (%)
Paediatric fixed-dose combination		12,952 (7.84)	13,124 (8.04)	13,303 (8.09)
AZT/3TC/NVP (60/30/50mg)	60 tablets	8,999 (5.45)	8,880 (5.44)	9,167 (5.58)
ABC/3TC (60/30mg)	60 tablets	1,882 (1.14)	2,172 (1.33)	2,049 (1.25)
AZT/3TC (60/30mg)	60 tablets	2,071 (1.25)	2,072 (1.27)	2,087 (1.27)
Paediatric single dosage medicines		3,563 (2.16)	3,418 (2.09)	3,048 (1.85)
EFV 200mg Scored	90 tablets	1,329 (0.80)	1,298 (0.80)	1,176 (0.72)
AZT 50mg/5mL	240 mL	177 (0.11)	132 (0.08)	83 (0.05)
NVP 50mg/5mL	100 mL	2,057 (1.25)	1,988 (1.22)	1,789 (1.09)
Paediatric second-line medicines		575 (0.35)	703 (0.43)	540 (0.33)
LPV/r 100/25mg	60 tablets	524 (0.32)	613 (0.38)	508 (0.31)
LPV/r 40/10mg Pellets	300 mL	51 (0.03)	90 (0.06)	32 (0.02)

Supported health facilities in the State of Osun between January 2017 and December 2018

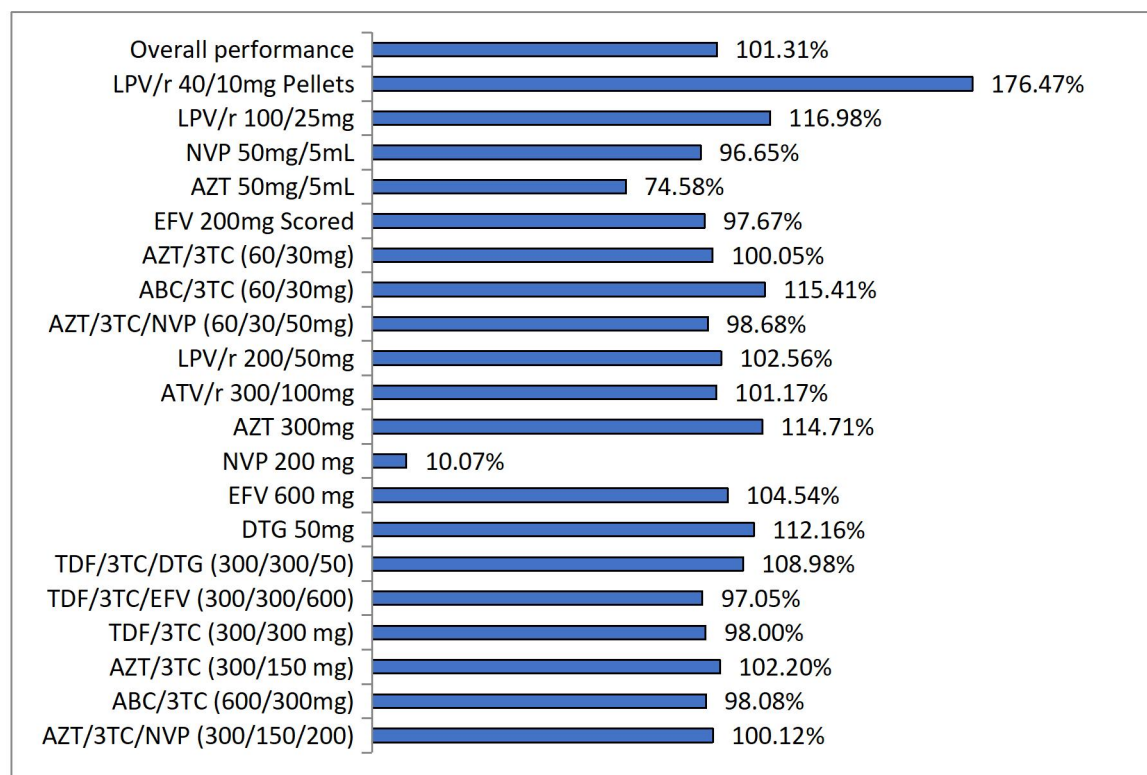


Figure 1: Percentages of antiretroviral medicines supply over order in the State of Osun in the year 2017 and 2018

The proportion of the supply of ARV medicines over ordering in the supported health facilities in the State of Osun for the two-year period under investigation is as presented in Figure 1. The overall performance was 101.1% which shows that medicines ordered were equivalent to those supplied. However, of the twenty ARV medicines, twelve had the proportion of the quantity supplied over the quantity ordered. The highest was observed with LPV/r (40/10mg) pellets with 176.47%, while the lowest was with NVP 200mg (10.07%).

Furthermore, comparison of the total quantities of ARV medicines ordered, supplied and consumed in Global Fund and PEPFAR sites, as indicated in Figure 2, consumption (55,382 unit packs) was higher than supply (54,018 unit packs) in GFATM supported sites while supply (109,154 unit packs) was higher than consumption (109,042 unit packs) in PEPFAR supported sites.

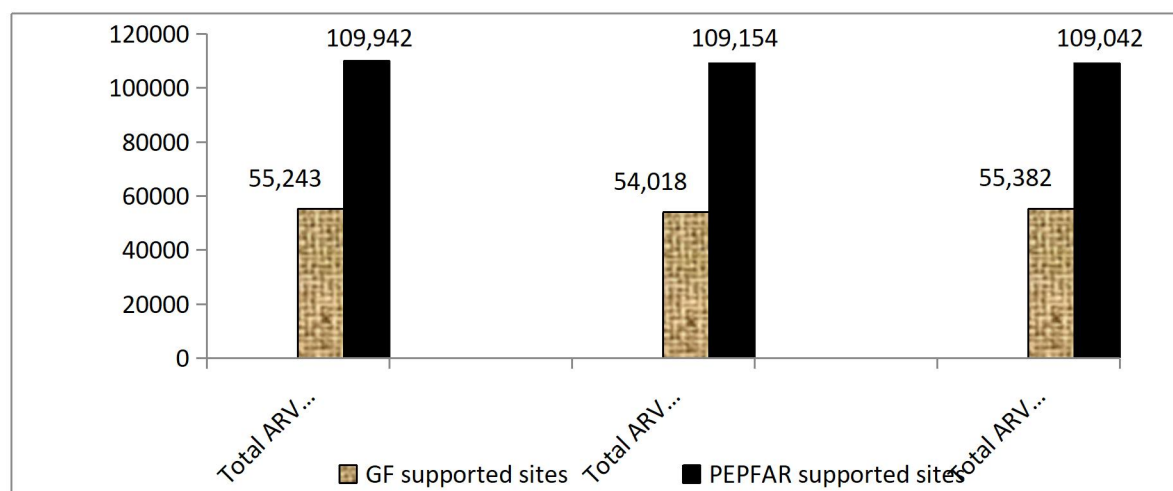


Figure 2: Comparison of total quantities of antiretroviral medicines ordered, supplied and consumed in GFATM and PEPFAR supported sites

Table 3: Stock level of antiretroviral medicines in supported health facilities in the State of Osun as at 31st December 2018

Antiretroviral medicine	Pack size	Unit Price	Total SOH at GF and PEPFAR supported sites	Percent-age (%)	Total cost of stock at GF and PEPFAR supported sites
AZT/3TC/NVP (300/150/200mg)	60 tabs	\$ 8.58	4,946	25.22	\$ 42,436.68
ABC/3TC (600/300mg)	60 tabs	\$ 13.52	257	1.31	\$ 3,474.64
AZT/3TC (300/150 mg)	60 tabs	\$ 7.27	229	1.17	\$ 1,664.83
TDF/3TC (300/300 mg)	30 tabs	\$ 5.54	395	2.01	\$ 2,188.30
TDF/3TC/EFV (300/300/600mg)	30 tabs	\$ 10.52	7,431	37.89	\$ 78,174.12
TDF/3TC/DTG (300/300/50mg)	31 tabs	\$ 6.25	3,369	17.18	\$ 21,056.25
DTG 50mg	60 tabs	\$ 19.20	14	0.07	\$ 268.80
EFV 600 mg	30 tabs	\$ 3.33	245	1.25	\$ 815.85
AZT 300mg	60 tabs	\$ 8.20	35	0.18	\$ 287.00
ATV/r 300/100mg	30 tabs	\$ 25.00	161	0.82	\$ 4,025.00
LPV/r 200/50mg	120tabs	\$ 21.00	359	1.83	\$ 7,539.00
AZT/3TC/NVP (60/30/50mg)	60 tabs	\$ 3.89	914	4.66	\$ 3,555.46
ABC/3TC (60/30mg)	60 tabs	\$ 4.00	288	1.47	\$ 1,152.00
AZT/3TC (60/30mg)	60 tabs	\$ 2.99	265	1.35	\$ 792.35
EFV 200mg Scored	90 tabs	\$ 7.30	227	1.16	\$ 1,657.10
AZT 50mg/5mL	240mL	\$ 6.39	83	0.42	\$ 530.37
NVP 50mg/5mL	100mL	\$ 1.10	300	1.53	\$ 330.00
LPV/r 100/25mg	60 tabs	\$ 8.42	57	0.29	\$ 479.94
LPV/r 40/10mg Pellets	300mL	\$ 19.20	39	0.20	\$ 748.80
Total			19,614	100.00	\$171,176.49

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3.3 The Stock Level of ARV Medicines

Of the total quantity of 19,614 unit packs of ARVs in stock, the adult First Line triple ARV regimens were mostly stocked with TDF/3TC/EFV (300/300/600mg) being the highest (7,431 unit packs (37.89%), followed by AZT/3TC/NVP (300/150/200mg) 25.22%. TDF/3TC/EFV (300/300/600mg) constituted 17.18% of the usable stock level, followed by AZT/3TC/NVP (60/30/50mg) 4.66%. The least stocked product was AZT 300mg tablets (0.18%). The total cost of usable stock on hand of all the ARV medicines as at 31st of December 2018 was \$171,176.49 (Table 3).

4. DISCUSSION

This study investigated the utilization of ARV medicines in supported health facilities in Osun State. Patients on first-line ARV medicines were far more in number than those on second-line ARV Medicines. This is also in consonance with a study done in HIV clinic of Lagos University Teaching Hospital (LUTH) in which the frequency of prescriptions of the first, second and third lines of ART regimens in the were assessed [6]. It was found out that first line ART regimens (92.17%) were mostly prescribed, followed by second-line (9.5%). In this present study, there were no patients on salvage ARV therapy. This shows that patients patronizing HIV clinics in the State of Osun appear to adhere to antiretroviral therapy which has thereby curbed the problem of drug resistance. It is not surprising that majority (89.32%) of the patients on ARV drug regimens were adults, this might be because adolescent and adult age groups are the most sexually active. This is in agreement with studies carried out earlier in other states in Nigeria [7-9]. The ARVs being stocked in the HIV clinics in the State of Osun were based on WHO and national guidelines for treatment of HIV/AIDS patients. The extent of compliance with guidelines' recommendations is critical to success of HIV/AIDS control programme. This was also the observation in the study carried out at the antiretroviral (ART) section of the National Institute for Pharmaceutical Research and Development (NIPRD) Health Centre in Abuja, the capital city of Nigeria. The study observed that majority of the patients were given appropriate ART regimen at the right time based on the recommendations of national guidelines [10].

PMTCT mothers were captured due to the fact that pregnant women are made of undergo compulsory HIV screening at the antenatal clinic (ANC) of the health facilities in the State. This is with a view of detecting HIV positive pregnant women and placing them on ARV medicines used for the prevention of mother-to-child transmission (PMTCT) so as to protect their unborn babies from contracting the disease. The yearly increase in the average number of registered patients, may be due to increase in awareness of the public about the disease as well as wide-spread availability of free voluntary HIV testing in many public health facilities, as was the situation with free essential Medicines [9].

The observation that TDF/3TC/EFV (300/300/600mg) and AZT/3TC/NVP (300/150/200mg) were the highest ordered, supplied and consumed of the adult first line combinations, and that AZT/3TC/NVP (60/30/50mg) was also the highest ordered, supplied and consumed of the paediatric first line medicines, is because these regimens belong to the first line antiretroviral fixed-dose triple-drug combinations that are currently being used as Highly Active Antiretroviral Therapy (HAART). HAART is the gold standard in the management of HIV/AIDS and all persons who are eligible for antiretroviral therapy (ART) should be commenced on HAART as soon as possible [11]. In this study, ARV drug formulations with either a double-drug combination (i.e. AZT/3TC (300/150mg), TDF/3TC (300/300mg), ATV/r (300/100mg) and LPV/r (200/50mg)) or a single-drug component (EFV (600mg), NVP (200mg) and NVP (50mg/5ml) 100ml were not intended to be used as a double-drug or single-drug therapy in patients; they were ordered with the aim that they would be utilized together as combined Highly Active Antiretroviral Therapy (HAART) in line with the recommendations of the WHO and national guidelines.

The increase in the ordering, supply and consumption of ARV medicines from year 2017 to 2018 might be as a result of increased awareness of the people to the problems of HIV/AIDS which might have led to increased HIV voluntary testing with consequent increase in the number of new HIV-positive patients being detected and placed on ARV drug therapy. The fact that supply of these medicines is more than consumption reveals that the efficiency of drug distribution process. This is also evident from the overall performance which is greater than 100% and more for the combination of medicines used as first line therapy. In a review, the major cause of lack of medicines in Africa is attributed to weak procurement and distribution practices, which is a major concern with many countries that are scaling up antiretroviral therapy (ART) to thousands of patients [3].



The Nigerian Federal ministry of Health, in collaboration with treatment partners has since the year 2014, been implementing a regimen streamlining initiative for the National HIV/AIDS programme in the country [12]. This initiative summarily involves maximizing the use of Tenofovir-led regimen as the preferred adult first line regimen while promoting the use of triple fixed dose combinations in line with WHO recommendations. Moreover, the stock level of AZT/3TC/NVP (300/150/200mg) regimen was to decrease drastically as it phased out in 2019 [13]. This also applies TDF/3TC (300/300mg) restricted with second-line medicines (LPV/r (200/50mg) and ATV/r (300/100mg)) except when required for mop up of EFV (600mg) [5, 14].

The total cost of all the ARV medicines in stock was \$171,176.49. The majority of the financing for the procurement and supply of ARVs are provided by donors, while the State Government maintains the personnel. This present arrangement could create serious gap whenever the donors decide to pull out of the system. Similar trend was reported in a study in Nasarawa State where it was observed that the State lacked adequate commitment and capacity to independently operate a sustainable ownership in HIV/AIDS care and support programme [15].

5. CONCLUSION

This research shows that the antiretroviral medicines supplied to supported HIV clinics of the State of Osun, South west of Nigeria are in line with the National and WHO guidelines. Of the four types of first-line triple-component regimen supplied, Tenofovir/lamivudine /efavirenz (TDF/3TC/EFV) 300/300/600mg tablets were the most commonly ordered, supplied and consumed drug regimen, followed by Zidovudine/lamivudine/nevirapine (ART/3TC/NVP) 300/150/200mg tablets, then Zidovudine/lamivudine/nevirapine (ART/3TC/NVP) 60/30/50mg tablets, and lastly Tenofovir/lamivudine/dolutegravir (TDF/3TC/DTG) 300/300/50mg tablets. The ARV medicines that were ordered, supplied and consumed increased from the year 2017 to 2018 in the two-year period of retrospective study in line with increase in patient's patronage.

Conflict of Interest

Authors declare no conflict of interest.

Author's Contribution

AA -----Design, Conception, Data Collection, Analysis and Manuscript preparation

INA----- Design, Analysis and Manuscript preparation

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