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Research Article

Effects of the COVID-19 pandemic on the consumption of antiretrovirals and HIV/AIDS prevention indicators at the Treichville University Hospital (Ivory Coast)

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Abstract

Objective: To understand the impact of Covid-19 on the prevention and consumption of antiretroviral drugs at Treichville University Hospital.

Methods: This was a retrospective cross-sectional study with a descriptive, multicenter aim, carried out in six screening and treatment departments for HIV patients at the Treichville University Hospital. Monthly order reports from January 2019 to December 2021 from six services were used to collect data on screening and antiretroviral treatment. After a univariate analysis, an Anova made it possible to carry out a comparison of several variables between the study periods.

Results: In total, a decrease of 40 to 55% ($p>0.05$) in the consumption of antiretrovirals was recorded compared to 2019. The antiretrovirals affected more specifically were tenofovir 300mg, lamivudine 150 mg, abacavir / adult lamivudine, lopiritonavir and the tenofovir / adult lamivudine combination ($p<0.05$). Therapeutic protocols and prevention data varied between 2019 and 2021 with a drop in the prescription of dolutegravir to the profile of efavirenz and a drop of 17.5% of individuals screened in 2020.

Conclusion: The Covid-19 health crisis has led to a drop in the frequency of HIV testing and a non-significant effect on the consumption of antiretrovirals essential for the management of the disease.

Keywords: Covid-19; Antiretrovirals; Prevention; HIV

INTRODUCTION

HIV/AIDS remains one of the most important public health challenges in the world, particularly in low- and middle-income countries such as Côte d'Ivoire where the prevalence was 2.4% in 2019 [1, 2, 3, 4]. One of the ways to combat the disease is antiretroviral therapy. Indeed, effective antiretroviral treatment (ART) consisting of one or more drugs is an effective prevention tool reducing the risk of onward transmission by 96% and improving the quality of life of infected patients [5]. In Côte d'Ivoire, the 390,000 people living with the disease in 2020 benefited from therapeutic coverage estimated at 74% [4]. These figures could be threatened by the arrival of Covid-19 in 2019 because it would have led to a reduction in attendance at health centers and a change in the availability and consumption of several medications [6]. The consequences would be serious for HIV/AIDS patients since antiviral treatment must be available, accessible, taken every day and throughout the subject's life. In cases where antiviral treatment becomes ineffective for reasons such as loss of contact with healthcare providers or drug shortages, the potential for disease transmission increases and patient health becomes even more problematic with repercussions that could lead to death [5]. This work was carried out with the objective of knowing the impact of Covid-19 on the consumption of antiretroviral drugs (ARV) and HIV prevalence indicators at the Treichville University Hospital in Abidjan.

METHODS

A retrospective multicenter study with a descriptive aim was carried out and concerned patients living with HIV (PLHIV) followed in six hospital departments of the Treichville University Hospital from January 2019 to December 2021: medicine, obstetrics and gynecology, dermatology and allergology, pediatrics, pulmonology and phthisiology (PPH) and infectious and tropical diseases (MIT). The study consisted of a comparative analysis of ARV drug consumption data and some prevention indicators before (2019) and during Covid-19 (2020 and 2021).

The study data was collected from monthly reports from different departments. A compilation of the reports from each service was carried out downstream of the study in the form of monthly order reports on behalf of the Treichville University Hospital. The reports included in the study were those sent to the national AIDS control program and relating to antiretroviral drugs and opportunistic infections (PNLS_ARV-IO). These reports should be normal order reports and contain information on stock, number of patients screened, positives as well as therapeutic protocols used. Urgent order reports, reports sent to the nutrition program, medical consumable reports, as well as reports not containing all information on stock, screening or therapeutic management were excluded from the study.

The information collected from the reports was: the number of people screened, number of HIV-positive people, ARVs consumed, pharmacotherapeutic classes and therapeutic protocols used. The ARVs consumed as well as the therapeutic protocols have been restricted to the national HIV prevention and care guidelines [7].

Excel 2016 software was used for data recording and storage. Using a univariate analysis, quantitative variables such as "the number of patients screened, the number of HIV-positive patients, the quantities of drugs consumed" were expressed in the form of numbers. The qualitative variables relating to "ARV consumption by pharmacotherapeutic class, by essential active ingredients, and therapeutic protocols" were expressed as a percentage reduction or proportion. A bivariate analysis was then used to compare variables between years of study. Notably, a 2-way ANOVA followed by a Dunnett test for multiple comparison between groups and years of study were performed. The R 4.3.1 software. And GraphPad 8.0.2. made it possible to conduct the analyzes with a *p-value* of 0.05.

RESULTS

ARV consumption profile between 2019 and 2021 at Treichville University Hospital

From figure 1, we note a decrease in ARVs consumed between 2019 and 2021 with a percentage reduction in consumption of 40% between 2019 and 2020 and 55% between 2019 and 2021 ($p>0.05$). The consumption profile according to pharmacotherapeutic classes of ARV (table 1) shows a reduction in consumption of all classes except integrase inhibitors alone ($p>0.05$) and associated with nucleoside transcriptase inhibitors inverse (($p<0.05$). Some antiretrovirals showed a decline in their consumption between 2019 and 2021 (table 2). Data on treatment protocols were presented in table 3 and in figure 2.

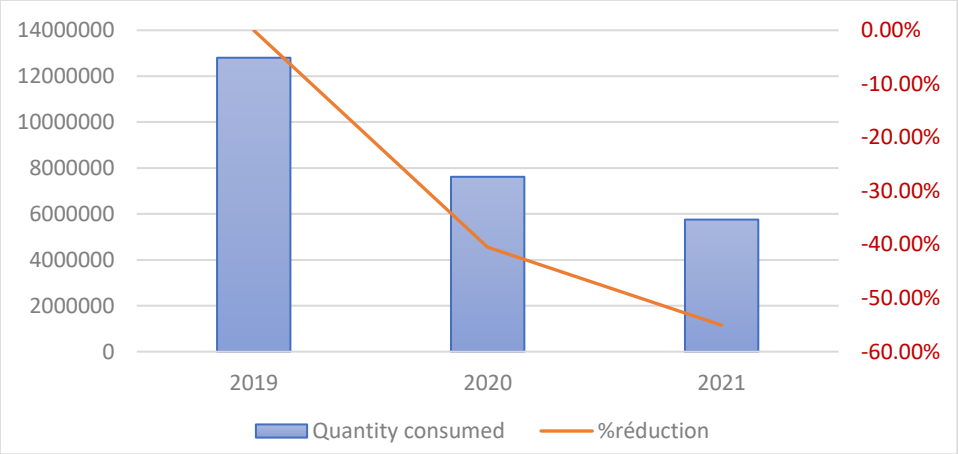

Figure 1: Unit consumption of ARV between 2019 and 2021

Table 1: Comparison of pharmacotherapeutic classes of ARVs consumed between 2019 and 2021 (significance compared to ARV consumption in 2019: *p≤0.05; **p≤0.01; ***p≤0.001)

	Percentage reduction compared to 2019		p -value	
	2020	2021	2020	2021
All antiretrovirals	40%	55%	0.7035	0.1158
Pharmaco-therapeutic Classes				
Reverse transcriptase inhibitors	46%	6%	0.0043**	0.9847
Protease inhibitors	12%	28%	0.6538	0.1957
Integrase inhibitors	-16%	-88%	0.7216	0.0019**
2 Nucleoside reverse transcriptase inhibitors	27%	52%	0.0354*	0.0084**
2 Protease inhibitors	24%	64%	0.3387	0.0003***
2 Nucleoside reverse transcriptase inhibitors + Integrase inhibitors	-433%	-523%	0.0011**	0.0020**
2 Nucleoside reverse transcriptase inhibitors + Non-nucleoside reverse transcriptase inhibitors	33%	70%	0.1817	0.0072**
Antibiotics	66%	75%	0.0206*	0.0297*

Table 2: Comparison of consumption of essential ARVs between 2019 and 2021 (significance compared to ARV consumption in 2019: *p≤0.05; **p≤0.01; ***p≤0.001)

	Percentage reduction compared to 2019		p -value	
Essential antiretrovirals	2020	2021	2020	2021
Abacavir 300 mg tablet	41%	52%	0.1331	0.1295
Tenofovir 300mg tablet	84%	95%	0.0597	0.0422*
Lamivudine 150 mg tablet	12%	47%	0.7572	0.0469*
Zidovudine/ Lamivudine 60.30; 300/150 mg tablet	22%	52%	0.4595	0.0862
Abacavir / Lamivudine 300/300 mg tablet	36%	46%	0.0562	0.1248
Tenofovir / Lamivudine / Dolutegravir 90; 30 tablets	-433%	-523%	0.0011**	0.0020**
Lopi -ritonavir 40/10; 100/25; 200/50 mg tablet	19%	59%	0.5902	0.0012**
Tenofovir / Lamivudine 300/300 mg tablet	18%	61%	0.2793	0.0036**
Tenofovir / Lamivudine / Efavirenz 400; 600 mg tablet	33%	70%	0.1817	0.0082**
Nevirapine suspension	50%	61%	0.4941	0.1879

Table 3. Summary of prescriptions given during the study period

	Number of patients				Proportion
Populations	**2019-2021**	**2019**	**2020**	**2021**	
Adults (>10 years or weight > 35 kg)	127162	46778	39038	41346	97%
Children (≥10 years or weight≥ 35 kg)	4309	865	2206	1238	3%
Total	131471	47643	41244	42584	-
% reduction	-	-	13%	11%	-

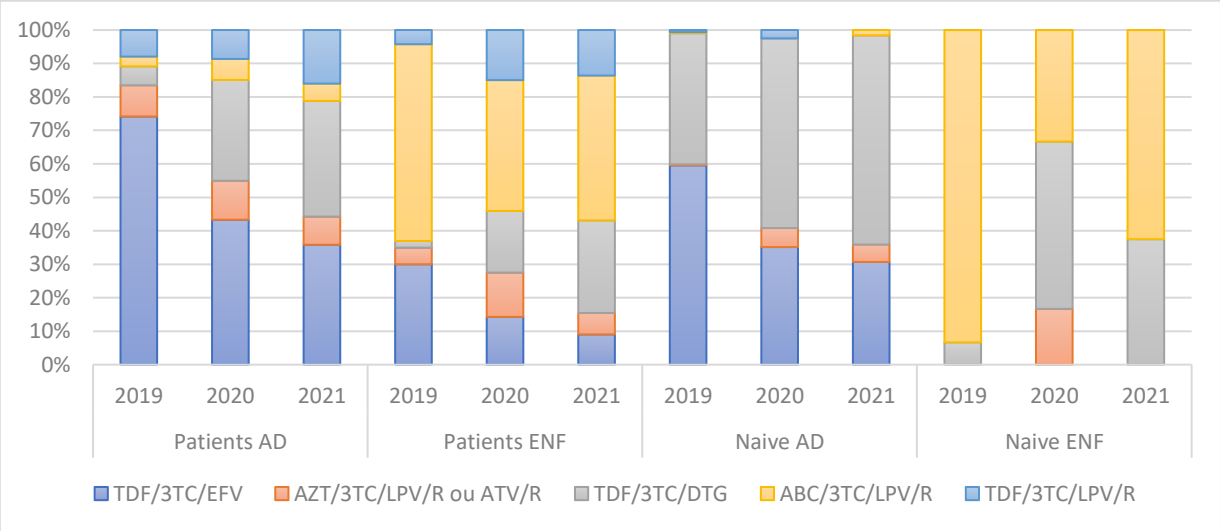

Figure 2: Distribution of therapeutic protocols by patient types between 2019 and 2021 (AD: adults; ENF: children under 10 years of age; TDF: tenofovir; 3TC: lamivudine; EFV: efavirenz; AZT: zidovudine; LVP/R: lopiritonavir; ATV/R: atazanavir-ritonavir; DTG: dolutegravir; ABC: abacavir)

HIV prevention indicators

Table 4 presents some indicators of HIV prevention during the study period. Screening trends were essentially the same with an increase in HIV positivity in 2020.

Table 4: Profile of HIV prevention indicators between 2019 and 2021 (significance compared to 2019: *p≤0.05; **p≤0.01; ***p≤0.001; PMTCT = prevention of HIV transmission HIV from mother to child)

	Number of patients			Positivity rate			p -value	
HIV testing indicators	2019	2020	2021	2019	2020	2021	2020	2021
Number of individuals tested for HIV	13776	11361	14094	-	-	-	0.8970	0.1793
Number of individuals tested positive for HIV	1487	1434	1540	11%	13%	11%	0.2361	0.3639
Number of individuals screened for HIV PMTCT	223	230	258	-	-	-	0.7074	0.5172
Number of individuals screened positive for HIV PMTCT	19	48	6	9%	21%	2%	0.1414	0.5149

DISCUSSION

Ivory Coast, like the countries affected by the COVID-19 pandemic, and in view of the increasing number of cases of contamination at the national level, has established a state of emergency accompanied by strict measures causing disruption of many activities at national level [8]. In the present work, an increasing decline ($p>0.05$) in ARV consumption was observed during the hot period of Covid-19 between 2020 and 2021. According to several studies, a decrease in resources, supply of care as well as the mobility of populations caused by confinement and the fear of being contaminated would explain this drop in consumption of antiretrovirals [9].

Notwithstanding the overall consumption data, certain pharmacotherapeutic classes including nucleoside inhibitors associated with integrase inhibitors deviate from these variation trends by increases in consumption of more than 500% ($p<0.01$), The year 2021 has more marked values. This is due to the combination of tenofovir + lamivudine + dolutegravir (TLD). Indeed, the results show a reduction in the prescription of TLE to the TLD profile in adult patients who represented 97% of the subjects treated compared to a reduction in the prescription of abacavir + lamivudine + lopiritonavir / atazanavir -ritonavir to the TLD profile in patients. children. These results would be due to modifications made to the protocols in view of the WHO recommendations of July 2018 implemented in July 2019 in Côte d'Ivoire [7] relating to the switch from first-line treatments to TLD. Overall and in agreement with consumption data, we note a drop in overall prescription of 13% and 11% respectively in 2020 and 2021. However, the main HIV management protocols mentioned in the national guidelines were found in the prescriptions during the study attesting to compliance in the quality of prescriptions compared to therapeutic recommendations during the Covid-19 health crisis.

Several studies have reported the drop in consumption of medicinal products, notably that carried out in France in 2020 where the consumption of antiretrovirals had been reduced to more than 10% in 2020 [10]. The decline in antiretrovirals coupled with that in drug prescriptions raises many concerns about achieving the 90-90-0 objectives and the reduction of new infections in addition to the risks of mortality and opportunistic infections incurred by PLHIV [11].

According to the data collected on HIV prevention, the number of people tested in 2020 was lower than in 2019 with a higher positivity rate. This also demonstrates the high risk of exposure of holy subjects during the Covid-19 pandemic despite efforts to guarantee the availability of prevention services [11]. The results would be attributable to the drop in supplies of preventive services as reported in a study conducted by the WHO in 2020 [12].

CONCLUSION

In short, the Covid-19 health crisis has led to a drop in the frequency of HIV testing and an under-consumption of ARVs essential for treating the disease. Several consequences could result from this situation, including increased exposure of the population to HIV and a high risk of morbidity and mortality. It is therefore important for the Ivorian health system to strengthen the fight against this disease in the post-pandemic period.

Conflicts of interest

No conflict of interest is declared by the authors.

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