


# Changes in Antiretroviral Regimens among People Living with HIV Followed at the Diocesan Center of N'Djamena, Chad

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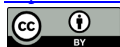
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## Abstract

**Introduction:** Switching antiretroviral (ARV) regimens is a key component in optimizing the long-term management of people living with HIV (PLWH). This study aims to analyze the profiles and reasons for antiretroviral therapy (ART) changes among patients followed at the Diocesan Center for Information and Support of Patients (CEDIAM) in N'Djamena between January 2022 and August 2024. **Methods:** A prospective cross-sectional study was conducted among adult patients receiving ART. Data were collected using a standardized form through patient interviews and review of medical records, and analyzed using Epi Info 3.5.2 software. **Results:** Of the 573 patients on ART, 253 were included, representing a participation rate of 44.15%. Nearly all patients (99.2%) were infected with HIV-1. At initiation, 65.21% were on a TDF/FTC/EFV-based regimen. The majority of regimen changes (90.51%) involved a transition



to Dolutegravir-based regimens. Additionally, 61.7% of patients experienced a single treatment change, while 6.7% had three changes. **Conclusion:** Changes in ARV regimens should be based on national treatment guidelines and accompanied by rigorous follow-up. Therapeutic adherence remains a key factor in virological success, emphasizing the importance of continuous patient education throughout the care pathway.

## Keywords

Treatment Switch, Antiretrovirals, HIV, Dolutegravir, Chad, CEDIAM

## 1. Introduction

Human Immunodeficiency Virus (HIV) infection remains a major global public health challenge. According to the UNAIDS 2023 report, approximately 39.9 million people were living with HIV worldwide, with 30.7 million receiving antiretroviral therapy (ART) [1]. These therapies have transformed HIV from a rapidly fatal illness into a controllable chronic condition, reducing morbidity and significantly improving life expectancy and quality of life for people living with HIV (PLWH) [2] [3]. The main goals of ART are to prevent progression to AIDS, restore immune function, and maintain an undetectable viral load [4]. However, treatment adjustments may become necessary due to virological failure, side effects, drug interactions, or the emergence of resistance [5] [6]. Recent advances, particularly the introduction of Dolutegravir (DTG), have enabled the use of more effective, better-tolerated, and simpler regimens [7] [8]. Switching ART regimens is therefore a crucial step in HIV care. It must be tailored to the patient's virological and clinical profile, while considering comorbidities, coinfections, adherence levels, and treatment history [9] [10]. Patient education plays a fundamental role in this process, directly impacting treatment outcomes [11].

Despite therapeutic progress, there is still no definitive cure for HIV. ART remains the only effective means of long-term infection control [10]. In Chad, HIV is a generalized epidemic with a prevalence of 1.6% among people aged 15 to 49, disproportionately affecting women (1.8%) compared to men (1.3%) according to the 2014-2015 DHS-MICS survey [12]. To address the epidemic, the Chadian government made ART free of charge in May 2007, leading to a rise in the number of PLWH on treatment. By December 2023, a total of 69,188 patients were receiving ART in the country [13]. However, limited data are available regarding treatment switching practices in care settings. This study aims to analyze changes in ARV regimens among patients followed at CEDIAM in N'Djamena to improve understanding and inform better strategies for HIV care in Chad.

## 2. Materials and Methods

### 2.1. Study Setting, Type, and Period

This descriptive cross-sectional study was carried out at the Diocesan Center for

Information and Support of Patients (CEDIAM) in N'Djamena, Chad. CEDIAM is a faith-based health structure recognized for its comprehensive HIV care, including medical, psychosocial, and therapeutic support. Data collection was carried out over 32 months, from January 2022 to August 2024.

## 2.2. Study Population

The study included adults ( $\geq 18$  years) living with HIV, receiving ART, and regularly followed at CEDIAM during the study period. Only patients who had experienced at least one ARV drug change and had a complete medical record were eligible. Excluded were patients seen only once with no follow-up, those who did not undergo treatment changes, and those with incomplete files.

## 2.3. Sampling Procedure

Among the 573 people living with HIV (PLWH) who were regularly followed at the Diocesan Center for Information and Support of Patients (CEDIAM) in N'Djamena and who had experienced a change in at least one antiretroviral (ARV) molecule—the main eligibility criterion—253 patients were included in the study, representing a participation rate of 44.15%.

Participants were selected through two approaches:

- **112 patients (44.26%)** were included following a **telephone call**.
- **141 patients (55.73%)** were recruited during their **regular medical consultations**.

The **remaining 320 patients (55.80%)** were excluded due to **refusal to participate or unavailability**.

## 2.4. Data Collection

Data were collected using a standardized questionnaire, combining face-to-face interviews with patients and a systematic review of medical records and follow-up registers. This approach ensured the completeness and reliability of both self-reported and documented clinical data.

## 2.5. Variables Analyzed

The study analyzed both sociodemographic and clinical-therapeutic variables:

- Sociodemographic variables: age, sex, and place of residence
- Clinical and therapeutic variables: initial antiretroviral (ARV) regimens, number of regimen modifications, types of drug combinations used, and documented reasons for switching therapies.

## 2.6. Ethical Considerations

The study was conducted in accordance with established ethical standards. **Research approval** was granted by the **Faculty of Science and Human Health of N'Djamena University** (Ref. No. 184/PT/PM/MESR/S/SG/U/NDJ/SG/FSSH/2024), and **administrative authorization** was obtained from the management of the **Dioce-**

san Center for Information and Support of Patients (CEDIAM) in N'Djamena. All participants provided **verbal informed consent** prior to their inclusion in the study. **Data confidentiality** and **medical ethics principles** were strictly upheld throughout the research process.

## 2.7. Statistical Analyses

Data entry and analysis were performed using **Epi Info version 3.5.2**, with a **significance threshold set at  $p < 0.05$** .

## 3. Results

### 3.1. General Characteristics of the Study Population

Out of a total of 573 people living with HIV (PLWH) followed at CEDIAM, 253 patients were included in this study, having undergone a change in at least one antiretroviral (ARV) molecule. This corresponds to an inclusion rate of **44.15%**.

### 3.2. Sociodemographic Data and Place of Residence

The majority of participants were female (70.0%), yielding a male-to-female sex ratio of 0.43. Nearly all patients (96.8%) resided in N'Djamena, highlighting the urban concentration of HIV care services in the capital city.

### 3.3. Age Distribution, Clinical and Therapeutic Characteristics, Reasons for Treatment Change

The age group most represented in the study was 37 - 47 years (43.5%), followed by the 48 - 58 age group (30.4%). Younger and older individuals were less common, with patients aged 15 - 25 years representing only 0.4% of the sample.

Nearly all patients (99.2%) were infected with HIV-1, while only 0.8% had a co-infection with both HIV-1 and HIV-2. The primary reason for changing therapy was the **transition to Dolutegravir-based regimens**, which accounted for **90.51%** of cases.

At treatment initiation, the majority of patients (65.21%) were prescribed the TDF/FTC/EFV regimen, followed by AZT/3TC/NVP (34.39%). The use of TDF/FTC/LPV/r was rare, reported in only 0.40% of cases. Regarding the frequency of treatment modifications 61.7% of patients experienced one change in their antiretroviral regimen, 31.2% underwent two changes, 6.7% had three changes and only 0.4% had four or more treatment modifications (**Table 1**).

**Table 1.** Sociodemographic, clinical, and therapeutic characteristics of the patients (n = 253).

CATEGORY	VARIABLE	FREQUENCY	%
AGE GROUP (YEARS)	15 - 25	1	0.4
	26 - 36	51	20.2
	37 - 47	110	43.5

## Continued

	<b>48 - 58</b>	<b>77</b>	<b>30.4</b>
	≥59	14	<b>5.5</b>
<b>HIV TYPE</b>	HIV-1	251	<b>99.2</b>
	HIV-1 + HIV-2	2	<b>0.8</b>
<b>INITIAL ART COMBINATION</b>	TDF/FTC/EFV	165	<b>65.21</b>
	AZT/3TC/NVP	87	<b>34.39</b>
	TDF/FTC/LPV/r	1	<b>0.40</b>
<b>NUMBER OF TREATMENT CHANGES</b>	1 time	156	<b>61.7</b>
	2 times	79	<b>31.2</b>
	3 times	17	<b>6.7</b>
	≥4 times	1	<b>0.4</b>
<b>REASON FOR CHANGE</b>	Switch to dolutegravir-based regimens	229	<b>90.51</b>
	Therapeutic failure	20	<b>7.9</b>
	Renal insufficiency	2	<b>0.79</b>
	Intolerance	1	<b>0.39</b>
	<b>RUPTURE</b>	<b>1</b>	<b>0.39</b>

#### 4. Discussion

Among the 573 people living with HIV (PLWH) followed at CEDIAM, 253 patients underwent a change in at least one antiretroviral (ARV) molecule, representing an overall frequency of **44.15%**. This proportion highlights the significant rate of therapeutic adjustments in the long-term management of HIV, often driven by continuously evolving national and international guidelines [1]. The most represented age group was **37 to 47 years** (43.5%), consistent with findings by Diallo *et al.* in Senegal (40.9%) [14] and slightly higher than that reported by Traoré in Mali (32%) [15]. This predominance reflects the concentration of the epidemic among the sexually active population. In Chad, the highest prevalence is found in the 35 - 39 age group (2.9%), compared to 1.6% in the general population [12]. Additionally, the success of advanced testing strategies and improved access to care has enabled earlier identification of cases, including asymptomatic individuals [16]. Females accounted for **70%** of the study population, similar to findings from Diemer *et al.* in the Central African Republic (69.8%) [17] and Maïga in Mali (73.46%) [18]. This female predominance is well documented and attributed to both **biological vulnerability** (e.g., genital anatomy, higher prevalence of STIs) and **socioeconomic factors**—such as poverty, gender inequality, and cultural practices like levirate or sororate, which increase exposure risk [19] [20]. Almost all patients resided in **N'Djamena (96.8%)**, explained by both the location of CEDIAM in the capital and the fact that nearly one-third of PLWH in Chad live in this area [13]. As for HIV type, **99.2%** of patients were infected with **HIV-1**, which aligns with the regional distribution in Central Africa as re-

ported by Samaké (97.9%) [21] and Boubacar (94.1%) in Mali [22]. The predominant reason for treatment change was the **transition to Dolutegravir (DTG)-based regimens**, accounting for **90.51%** of cases. This transition reflects Chad's national policy to shift toward the **TLD regimen (TDF + 3TC + DTG)**, which has been in line with updated WHO recommendations since 2019 [23]. Chad officially adopted this directive in 2020, aiming to progressively replace older regimens containing efavirenz (EFV) or nevirapine (NVP), which have higher toxicity and lower genetic barriers to resistance [24]. Prior to this shift, most patients were on **TDF/FTC/EFV (VIRADAY)** (65.21%) or **AZT/3TC/NVP (DUOVIR-N)** (34.39%), consistent with earlier national guidelines [25]. Following the transition, **90.51%** of patients were placed on the TLD regimen. This is slightly lower than the rate reported by Samaké in Mali (98%) [21], but higher than that found during Chad's 2023 active file audit (62.6%) [26]. The difference may be explained by the fact that this study was conducted **after** the national protocol update in February 2023, which formally established TLD as the preferred first-line regimen [27]. Regarding the therapeutic line, **91.30%** of patients remained on first-line treatment—higher than reported by Traoré (80.3%) [15] and Bougoudogo *et al.* (65.86%) [28]. This could indicate **good adherence** to treatment and the **effectiveness of support strategies** implemented at CEDIAM, such as educational talks, personalized follow-up, and differentiated service delivery models, all of which enhance patient retention and therapeutic compliance [29].

## 5. Conclusion

At CEDIAM, **91.3%** of patients remained on first-line antiretroviral therapy. Over **61%** had experienced a single treatment change, primarily motivated (**90.5%**) by the national transition to **Dolutegravir-based regimens**. These findings reflect strong alignment with national treatment protocols and satisfactory patient adherence.

It is essential that any ARV regimen change be conducted in strict compliance with national guidelines, combined with **close clinical monitoring** and **continuous patient education**, to ensure long-term treatment success and virological suppression.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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