World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Effectiveness of Dolutegravir in Children Living with HIV in Chad

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World Journal of Advanced Research and Reviews, 2025, 28(03), 729–735

Publication history: Received 30 October 2025; revised on 06 December 2025; accepted on 09 December 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.28.3.4077

Abstract

Dolutegravir (DTG) is recommended as first-line antiretroviral therapy for children because of its high efficacy and favorable safety profile. However, pediatric real-world data remain scarce in Chad. This study evaluated clinical, nutritional and virological outcomes among children and adolescents receiving DTG-based regimens at the University Hospital of Mother and Child in N'Djamena.

A retrospective before–after cohort study included patients aged <18 years who received DTG for ≥6 months. Sociodemographic, clinical, anthropometric and biological data were extracted from records. Outcomes included changes in weight, BMI, WHO stage and viral load at 12 months. Paired t-tests and chi-square tests were used. Factors associated with undetectable viral load (<50 copies/mL) were analyzed through bivariate methods.

A total of 113 participants were included (mean age 13.4 years; 53.1% male). After 12 months, median weight gain was +4 kg and normal BMI increased from 46.0% to 92.9%. WHO stages I–II rose from 80.1% to 96.4%. High viral load decreased from 75.2% to 9.7%, while undetectable viral load rose from 9.7% to 77.8% ($p < 0.001$). DTG was well tolerated, with 86.7% reporting no adverse effects. Clinical evolution was favorable in 78.8%, although mortality remained notable (9.7%). No factor was significantly associated with viral suppression.

DTG-based regimens led to substantial clinical and virological improvements among children and adolescents in routine care. These findings support DTG as an effective first-line option in pediatric HIV programs. Strengthening adherence and follow-up may further improve outcomes.

Keywords: Dolutegravir; Pediatric HIV; Viral suppression; Adolescents; Chad.

1. Introduction

Combination antiretroviral therapy (ART) has profoundly transformed the management of HIV/AIDS, contributing to substantial declines in morbidity and mortality worldwide [1]. Over the past two decades, therapeutic regimens have become more potent, better tolerated and easier to administer, thereby improving adherence and long-term outcomes [2].

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Despite these advances, HIV remains a major global public health concern. According to UNAIDS 2023, 39.9 million people were living with HIV worldwide, including 1.5 million children under 15 years old, yet pediatric ART coverage remains markedly lower than among adults [3]. Sub-Saharan Africa carries the highest burden, accounting for the vast majority of pediatric infections and more than 4 million children and adolescents living with HIV [4]. Regional reports continue to show gaps in viral suppression among children, reflecting challenges in early diagnosis, adherence and treatment monitoring [5].

In Chad, HIV prevalence has declined modestly over the past decade, from 1.6% in 2015 to 1.2% in 2020 [3]. However, pediatric treatment outcomes remain suboptimal due to several system-level constraints, including limited access to viral load testing, irregular follow-up and recurrent ART stockouts [6]. In 2020, Chad adopted dolutegravir (DTG)–based regimens, including TLD and ABC/3TC/DTG, following updated WHO recommendations [7].

Dolutegravir is a potent integrase strand transfer inhibitor characterized by rapid virological activity, a high genetic barrier to resistance and a favorable safety profile [7]. Although international pediatric studies have reported encouraging outcomes, real-world data remain scarce in Chad.

This study therefore aimed to assess the clinical, nutritional and virological outcomes of children and adolescents receiving DTG-based ART at the University Hospital of Mother and Child (CHU-ME) in N'Djamena.

2. Patients and methods

This was a retrospective analytical before–after cohort study conducted in the Department of Medical Pediatrics at the University Hospital of Mother and Child (CHU-ME) in N'Djamena, from July 1, 2023, to June 30, 2024. The study included children and adolescents living with HIV-1 who were receiving routine follow-up at CHU-ME. Eligible participants were individuals aged <18 years who had been on a dolutegravir (DTG)–containing antiretroviral regimen for at least six months and whose parents or guardians had provided consent. Children were excluded if they had received DTG for less than six months, had incomplete medical records or were followed outside the study period. An exhaustive sampling method was used, including all available and eligible medical files; therefore, no formal sample size calculation was required.

Data were extracted from patient records using a standardized form. The variables collected included sociodemographic characteristics (age, sex, residence and school attendance), clinical parameters (general condition, WHO clinical stage and reported adverse events), anthropometric indicators (weight and body mass index) and biological measurements. BMI was interpreted in accordance with WHO Child Growth Standards: underweight was defined as a BMI-for-age z-score < –2 SD, normal weight as a z-score between –2 SD and +1 SD, overweight as > +1 SD to +2 SD and obesity as > +2 SD.

Biological parameters included viral load at baseline (corresponding to DTG initiation), at 6 months and at 12 months, as well as liver transaminases and serum creatinine. Viral load was considered undetectable when <50 copies/mL, suppressed when ≤1,000 copies/mL and high when >1,000 copies/mL.

Primary outcomes included changes in weight, BMI category, WHO clinical stage and viral load after 12 months of DTG. Baseline values corresponded to measurements recorded at the date of DTG initiation.

Data were entered using Excel 2013 and analyzed with Sphinx IQ3. Quantitative variables were expressed as mean ± standard deviation, and qualitative variables as frequencies and percentages. Normality of continuous variables was assessed using the Shapiro–Wilk test. Paired t-tests were used for normally distributed quantitative variables, while non-parametric tests were applied when appropriate. Chi-square tests were used for categorical variables. Factors associated with undetectable viral load (<50 copies/mL) at 12 months were explored using bivariate analyses. Statistical significance was set at $p < 0.05$.

Ethical approval was obtained from the University of Adam Barka in Abéché (UNABA) and authorization was granted by CHU-ME. Verbal parental consent was obtained before data collection. Anonymity and confidentiality were strictly maintained throughout the study.

3. Results

A total of 113 children and adolescents living with HIV-1 and receiving dolutegravir (DTG)–based antiretroviral therapy were included. The mean age was 13.4 years (range: 6 months–18 years). The 10–14-year age group was the most represented (52.2%), followed by adolescents aged 15–18 years (38.1%). Children younger than 10 years accounted for 9.7%. There was a slight male predominance (53.1%). Nearly half of the participants were not attending school (49.6%), and 54.0% lived in urban areas. Sociodemographic characteristics are summarized in Table 1.

Table 1 Sociodemographic characteristics of the infants

Variables	**n**	**%**
Age (years)		
0–9 years	11	9.7
10–14 years	59	52.2
15–18 years	43	38.1
Sex		
Male	60	53.1
Female	53	46.9
School attendance		
Yes	57	50.4
No	56	49.6
Residence		
Urban	61	54.0
Rural	52	46.0

Before DTG initiation, 54% of the children were classified as underweight and 66% presented with a poor general condition. According to WHO staging, 80.1% were in stages I–II and 19.9% in stages III–IV. Baseline clinical and biological parameters are shown in Table 2.

Table 2 Baseline clinical and biological parameters

Variables	**n**	**%**
Weight (kg)		
<13	4	3.5
14–21	23	20.4
22–28	36	31.9
29–36	22	19.5
37–44	25	22.1
≥45	3	2.7
BMI		
Underweight	61	54.0
Normal	52	46.0
Overweight	0	0.0

Obesity	0	0.0
General condition		
Poor	75	66.0
Good	38	34.0
WHO stage		
Stage I–II	91	80.1
Stage III–IV	22	19.9

After 12 months of DTG therapy, significant improvements were observed. Median weight gain was +4 kg ($p < 0.001$), and the proportion of children with normal BMI increased from 46.0% to 92.9% ($p < 0.001$). The proportion with good general condition increased from 34.0% to 94.0% ($p < 0.001$). WHO clinical stage improved significantly, with stage I–II rising from 80.1% to 96.4% ($p = 0.002$).

Virological response was highly favorable. The proportion of children with high viral load (>1,000 copies/mL) decreased from 75.2% at baseline to 9.7% at 12 months ($p < 0.001$), while undetectable viral load (<50 copies/mL) increased from 9.7% to 76.1% ($p < 0.001$). These changes are presented in Table 3.

Table 3 Changes in viral load between baseline and 12 months of dolutegravir-based treatment

Viral load (copies/mL)	Baseline n (%)	12 months n (%)	p-value
Undetectable (<50)	11 (9.7)	86 (76.1)	<0.001
Suppressed (≤1,000)	17 (15.1)	16 (14.2)	0.37
High (>1,000)	85 (75.2)	11 (9.7)	<0.001
Total	113 (100)	113 (100)	—

Regarding safety, 86.7% of participants reported no adverse events after DTG initiation. The most frequently reported symptoms were headaches (19.4%), digestive disturbances (10.6%) and anorexia (6.1%) (Table 4).

Table 4 Adverse events reported under DTG

Adverse events	n	%
None	98	86.7
Headaches	22	19.4
Digestive disorders	12	10.6
Anorexia	7	6.1

Overall clinical evolution was favorable in 89 children (78.8%). Unfavorable outcomes occurred in 13 children (11.5%), including 11 deaths (9.7%). The main causes of death were severe opportunistic infections (n = 6), advanced AIDS-related complications (n = 3) and severe malnutrition with multi-organ failure (n = 2). These outcomes are summarized in Table 5.

Table 5 Clinical evolution under DTG

Evolution	n	%
Favorable	89	78.8

Unfavorable	13	11.5
Deaths	11	9.7
Total	113	100

In bivariate analysis, none of the variables examined were significantly associated with viral suppression at 12 months. School attendance (OR = 0.78; 95% CI: 0.39–1.55; p = 0.47), ART regimen (ABC+3TC+DTG vs TDF+3TC+DTG: OR = 0.89; 95% CI: 0.43–1.81; p = 0.74) and age ≥10 years (OR = 0.71; 95% CI: 0.24–2.07; p = 0.53) showed no significant association. These results are presented in Table 6.

Table 6 Bivariate Analysis of Factors Associated With Viral Suppression (<50 copies/mL) at 12 Months

Variables	**OR**	**95% CI**	**p-value**
School attendance (Yes vs No)	0.78	0.39–1.55	0.47
ART regimen (ABC+3TC+DTG vs TDF+3TC+DTG)	0.89	0.43–1.81	0.74
Age group (≥10 years vs <10 years)	0.71	0.24–2.07	0.53

4. Discussion

This study, conducted among 113 children and adolescents living with HIV and treated with Dolutegravir (DTG), highlights a substantial improvement in clinical, nutritional and virological outcomes after 12 months of therapy. In a setting characterized by limited resources and irregular biological monitoring, our findings support the relevance of DTG-based regimens for pediatric HIV management in Chad.

The cohort was predominantly composed of adolescents, with the 10–14-year age group representing more than half of the sample. This distribution reflects improved survival linked to PMTCT programs and is consistent with findings reported by Nelly et al. in Cameroon [8]. The slight male predominance (53.1%) aligns with observations from Burkina Faso (Tiendrebeogo et al.) but was higher than that reported in Malawi (Makonokaya et al.) [9,10].

Nearly half of the children were not attending school, a proportion higher than that reported in recent West African cohorts (Kamidani et al., Ekouevi et al.) [11, 12], highlighting the social vulnerability, stigma and chronic morbidity associated with pediatric HIV.

A median weight gain of +4 kg was observed at 12 months, higher than results reported in West African pediatric cohorts but comparable to those of Calmy et al. [13]. The near-complete normalization of BMI (92.9%) and the marked improvement in general clinical condition (94% vs. 34% at baseline) indicate substantial nutritional recovery.

The proportion of children in WHO stages I–II increased from 80.1% to 96.4%, exceeding levels reported in a multicountry cohort where non-adherence remained a major challenge (Bacha et al.) [14].

The rate of undetectable viral load reached 77.8% at 12 months, similar to pediatric cohorts reported by Frange et al., Taki, and Calmy et al., which documented suppression rates of 78.8%, 83% and 74%, respectively [13,15,16].

Our results remained lower than those reported in the multicountry CALHIV cohort by Bacha et al. (92%) [17]. This gap may be explained by higher baseline viral loads, challenges in adherence among adolescents, or incomplete biological follow-up. Despite this, more than 90% of children achieved either suppressed or undetectable viral load, reinforcing the high effectiveness of DTG in routine care settings.

DTG was well tolerated in our cohort: 86.7% of children reported no adverse events, and the observed manifestations (headaches, digestive symptoms and anorexia) were mild. These findings are consistent with the ODYSSEY trial (Turkova et al.), the IMPAACT P1093 study (Ruel et al.), and a systematic review by Townsend et al., all of which confirm the excellent safety profile of DTG in children with minimal hepatic or renal toxicity [18–20].

Overall clinical outcomes were favorable in 78.8% of children. Mortality, however, remained notable at 9.7%, slightly higher than levels reported in recent pediatric cohorts in West Africa [11,12]. This excess mortality may reflect poor adherence, severe opportunistic infections or delayed access to care.

No statistically significant association was found between viral suppression at 12 months and the variables studied. Nevertheless, descriptive trends emerged: school-attending children had slightly higher proportions of undetectable viral load; suppression rates were similar across the ABC+3TC+DTG and TDF+3TC+DTG regimens; and children aged ≥10 years showed marginally higher suppression rates.

These trends echo findings from studies conducted in Tanzania (Khamadi et al.) and Cameroon (Djiyou et al.) [21,22], though interpretation remains limited by small subgroup sizes.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] B**angsberg DR, Ragland K, Monk A, Deeks SG.** A single-tablet regimen is associated with higher adherence and viral suppression than multiple-tablet regimens in HIV-positive homeless and marginally housed adults. *AIDS.* 2010;24(18):2835–40.

[2] **UNICEF.** HIV/AIDS: Fifteen minutes to understand. Paris: UNICEF France; 2020.

[3] **UNAIDS.** Global HIV statistics—2023 fact sheet. Geneva: Joint United Nations Programme on HIV/AIDS; 2023.

[4] **UNICEF; World Health Organization.** Children and AIDS: Statistical update—regional pediatric HIV burden. Geneva: WHO/UNICEF; 2022.

[5] **World Health Organization.** Global viral suppression among children living with HIV: HIV Estimates 2023. Geneva: WHO; 2023.

[6] **UNAIDS.** Country Factsheet: Chad—HIV and AIDS estimates. Geneva: Joint United Nations Programme on HIV/AIDS; 2023.

[7] **Ministry of Public Health, Chad.** National HIV Treatment Guidelines. N'Djamena: Ministry of Public Health; 2020.

[8] Nelly K, Veronique F, Claude K, Rachel K, Francisca A, Alexis N, et al. Factors associated with blood pressure in children living with HIV receiving antiretroviral treatment in Yaoundé. *Health Sci Dis.* 2023;24(6):26–31.

[9] Tiendrebeogo T, Karen M, Armel P, Albert M, Eugene M, Henri C, et al. Sex-based disparities in the transition to dolutegravir-based antiretroviral therapy in West African HIV cohorts. *Open Forum Infect Dis.* 2024;11(5):ofae223.

[10] Makonokaya L, Alice M, Kalitera LU, Wang A, Kapanda L, Dumbani K, et al. Early effets of scaling-up dolutegravir-based antiretroviral regimens among children living with HIV in Malawi. *AIDS Res Ther.* 2024;28(9):2148–55.

[11] Kamidani M, Diarra M, Coulibaly F, Traoré A, Sangaré H, Diallo S, et al. Adherence to antiretroviral therapy among HIV-infected children in West Africa: a multicenter evaluation. *Pan Afr Med J.* 2023;45:112–20.

[12] Ekouevi DK, Gbeasor-Komlanvi FA, Salou M, Atake K, d'Almeida S, Patassi AA, et al. Pediatric HIV treatment outcomes in West Africa: a multicountry cohort analysis. *BMC Infect Dis.* 2021;21:1042.

[13] Calmy A, Tamara ST, Charles K, Mireille M-E, Leroy S, Ségolène P, et al. Dolutegravir-based vs low-dose efavirenz-based regimens for initial HIV-1 treatment: 96-week results of a multicentre phase 3 trial in Cameroon. *Lancet HIV.* 2020;7(10):e677–87.

[14] Bacha JM, Dlamini S, Florence A, Judith G, Jacqueline BK, John F, et al. Realizing the promise of dolutegravir in children and adolescents in six African countries. *Pediatr Infect Dis J.* 2023;42(7):576–81.

[15] Frange P, Avettand-Fenoel V, Blanche S. Similar efficacy and safety of dolutegravir in HIV-1 infected paediatric and young adult patients ≥5 years. *HIV Med.* 2019;20(8):561–6.

[16] Taki K. Transition to dolutegravir 10 mg in children: experience from Koumassi General Hospital. *National AIDS Control Program (PNLS), Côte d'Ivoire.* 2021.

[17] Bacha JM, Dlamini S, Anabwani F, Gwimile J, Kanywa JB, Farirai J, et al. The fast and the continuous: Dolutegravir achieves impressive viral load suppression in CALHIV. *J Int AIDS Soc.* 2022;25(15):10–11.

[18] Turkova A, White E, Mujuru H, Kekitiinwa A, Khosa C, Violari A, et al. Dolutegravir as first- or second-line HIV treatment in children. *N Engl J Med.* 2021;385(27):2531–43.

[19] Ruel TD, Fairlie L, Taha TE, Williams P, Yates A, Kiser J, et al. Safety, pharmacokinetics and efficacy of dolutegravir in treatment-experienced children: IMPAACT P1093. *Lancet HIV.* 2022;9(11):e772–84.

[20] Townsend CL, Clayden P, Mansell C, Lazarus J, Collins IJ, Foster C, et al. Effectiveness and safety of integrase inhibitors in children and adolescents: a systematic review. *J Int AIDS Soc.* 2022;25(4):e25970.

[21] Khamadi SA, Dalandu AG, Mmbaga EJ, Machumi F, Mwenisongole E, Mgopa LR, et al. Factors associated with viral suppression and drug resistance in children and adolescents living with HIV in southern Tanzania. *PLoS One.* 2023;18(5):e10312299.

[22] Djiyou AB, Nchotib M, Mah E, Mungmem L, Ndzi N, Kenfack DK, et al. Viral load suppression in HIV-infected adolescents in Cameroon: a cross-sectional study. *BMC Pediatr.* 2023;23:3943.