Virologic control in people living with HIV starting first line or switching to second line antiretroviral therapy in Zimbabwe: A cohort study

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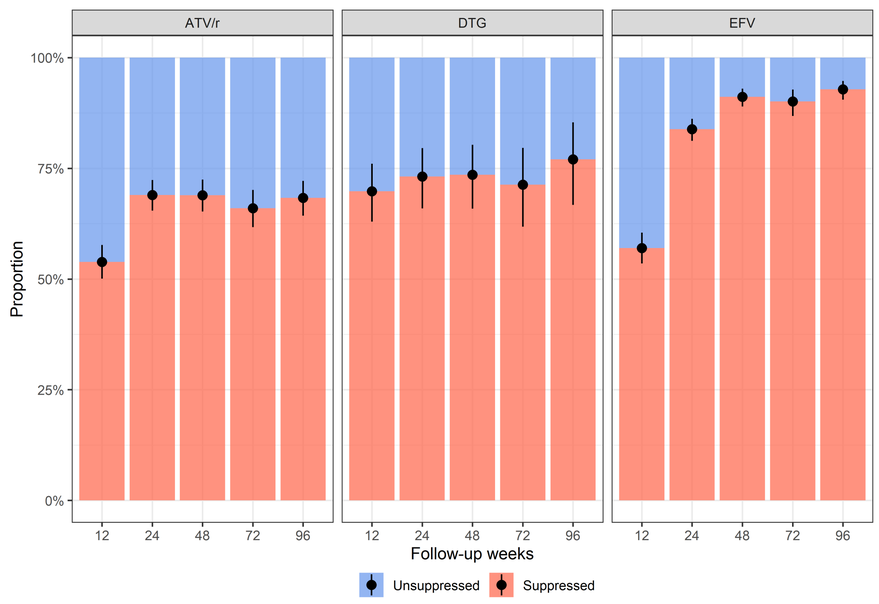
INTRODUCTION

- Antiretroviral therapy (ART) has significantly improved with potent regimens that come with simpler dosing becoming more accessible to people living with HIV in resource limited settings.
- Successful ART as measured by virologic suppression can be achieved through the combination of multiple factors including treatment adherence and the use of effective antiretrovirals.
- With currently available antiretrovirals, most patients achieve virologic suppression and sustain it for prolonged periods with lifespans comparable to HIV negative individuals.
- A smaller proportion of patients fails first line therapy due to sub-optimal adherence to ART, transmitted resistance, or other less common factors and require switching to second line ART which targets different processes in the HIV lifecycle from the first line targets.
- It is unclear whether patients switching to second line ART achieve viral suppression at rates similar to those commencing ART for the first time.
- We compared virologic suppression rates among patients who initiated efavirenz (EFV), a non-nucleoside reverse transcriptase inhibitor based first line ART with those who switched to atazanavir (ATV/r) (protease inhibitor) or dolutegravir (DTG) (integrase strand termination inhibitor) based second line ART.

Figure 1. Observed proportions (and 95% confidence intervals) of virologic suppression over time after start or switch by treatment regimen



METHODS

- We abstracted routinely collected patient records from the electronic medical records system of Newlands Clinic in Harare, Zimbabwe.
- We included patients aged 12 years and older at the time of commencing ART or switching to second-line ART who had at least 24 weeks on the new ART regimen.
- We computed virologic suppression rates (HIV viral load <50 copies/mL) at weeks 12, 24, 48, 72, and 96 post initiation or switch to the respective regimen.
- We estimated the odds of virologic suppression and probability of virologic suppression **at week 48** by post-switch treatment regimen, sex, age, and CD4 cell count (at start/switch) using univariable and multivariable logistic regression models.

Figure 2. Unadjusted and adjusted odds ratios and 95% confidence intervals for virologic suppression at 48 weeks after start/switch. Adjusted for all variables listed.

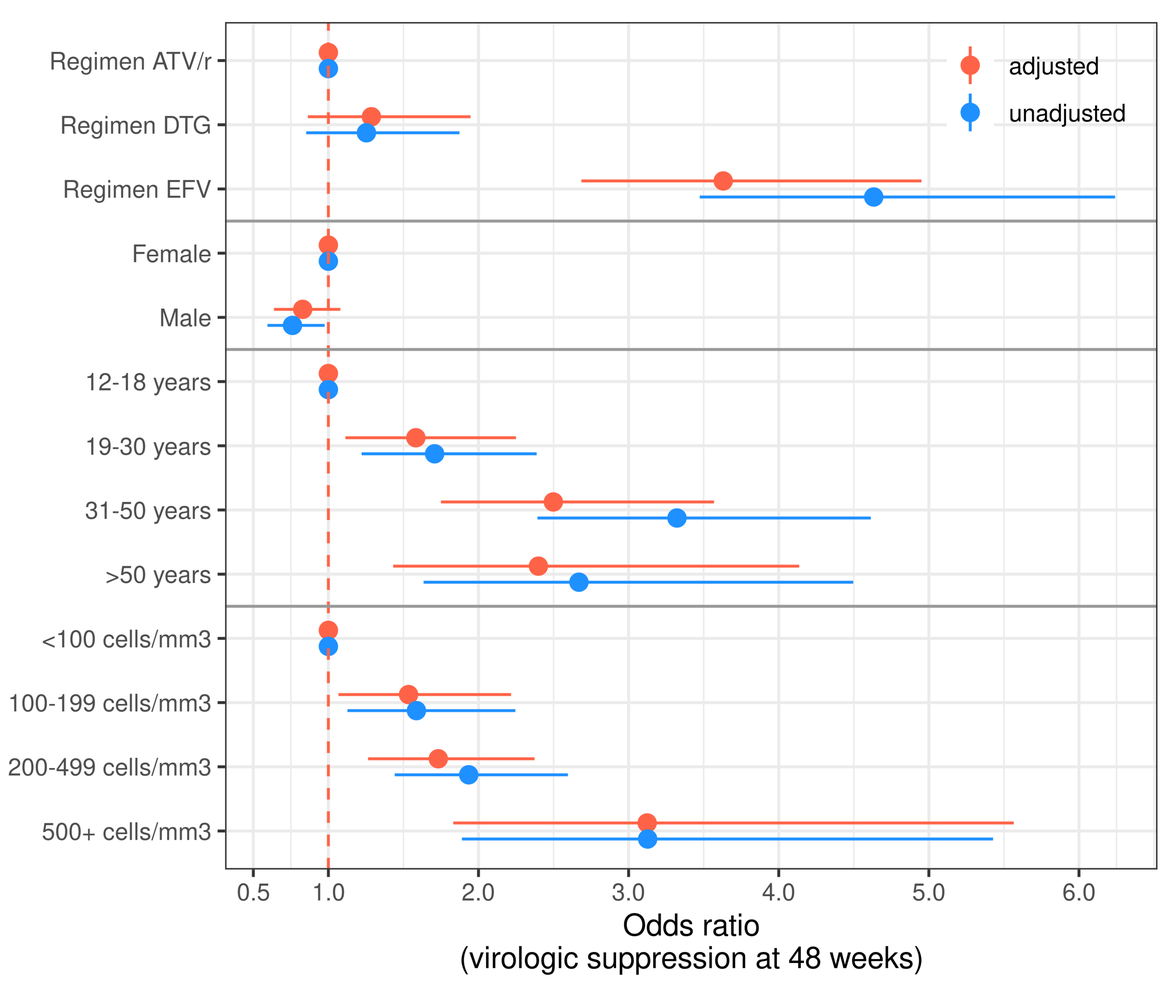


Table 1. Baseline demographic and clinical characteristics by treatment regimen

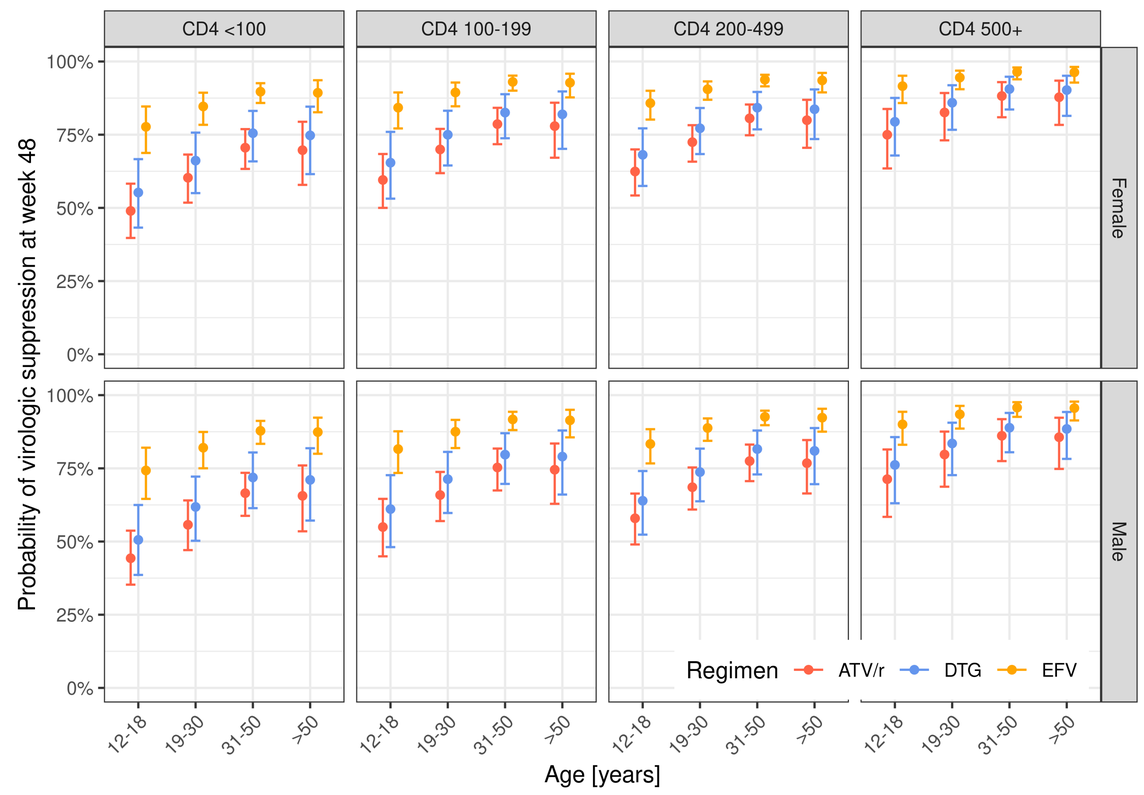
Regimen	ATV/r	DTG	EFV
N	872	242	1049
Male	366 (42%)	97 (40%)	404 (39%)
Female	506 (58%)	145 (60%)	645 (61%)
Age (years), median (IQR)	29 (19-41)	29 (19-42)	36 (28-44)
CD4 count (cells/uL)	182 (73-331)	252.5 (78-469)	251 (122-363)
CD4 <100	274 (31%)	69 (29%)	211 (20%)
CD4 100-199	187 (21%)	29 (12%)	215 (20%)
CD4 200-499	332 (38%)	98 (40%)	501 (48%)
CD4 >500	79 (9%)	46 (19%)	122 (12%)

EFV: Efavirenz, ATV/r: Ritonavir boosted atazanavir; DTG: Dolutegravir; IQR: Interquartile range; ART: Antiretroviral therapy

RESULTS

- We included 1049 (61% female) patients initiating first line ART and 11114 (58% female) patients switching to second line ART.
- The median age at ART start among first line patients was 36 years (IQR 28 – 44) and 29 years (IQR 19 – 42) at time of switching among the second line patients.
- Among the second line ART patients, 872 (78.3%) were switched to atazanavir based ART ("ATV/r") while 242 (21.7%) were switched to DTG containing ART (Table 1).
- Virologic suppression was lower in second line ART patients compared to first line ART patients, except at week 12 where DTG-based regimen showed higher suppression compared to EFV-based regimens (Figure 1).
- At week 48, first-line patients had around 3.5 times the odds of viral load suppression compared to second-line patients (Figure 2).
- In second line patients, there was some evidence for a slightly higher virologic suppression for DTG based treatment regimens, but the association failed to reach statistical significance at the 5%-level (aOR comparing DTG to ATV/r: 1.25, 95%CI: 0.85-1.87) (Figure 2).
- Predicted probabilites of virologic suppression ranged from 74.3% (95%CI 64.6 – 82.1%) to 96.5% (95%CI 93.9 – 98.0%) in first line patients and from 44.3% (95%CI 35.3 - 53.7%) to 90.6.4% (95%CI 83.6 – 94.8%) in second line patients (Figure 3).

Figure 3. Predicted probabilities and 95% confidence intervals of virologic suppression at week 48 at start/switch by regimen, age, sex, and CD4 cell count at switch.



CONCLUSIONS

- Second line ART patients had lower virologic suppression rates compared with those receiving first line ART.
- Our study shows that younger patients are less likely to achieve virologic suppression at week 48, more so if they are male. Both younger age and male sex are known to be associated with lower adherence to ART.
- This suggests that even with potent antiretrovirals with simpler infrequent dosing, behavior, that is, adherence to ART, appears to be the most important driver of viral suppression in this cohort.
- We recommend enhanced adherence counselling prior to, and regularly after switching to improve virologic suppression among young people living with HIV with history of virologic failure.

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