VIRAL LOAD PREDICTS VIROLOGIC FAILURE ON REPEAT TESTING IN CHILDREN ON ANTIRETROVIRAL THERAPY AT A LARGE CLINIC IN KISUMU, KENYA: A RETROSPECTIVE COHORT STUDY

 J J Robinson[1], B Samba[2], N Okoko[2], F Odhiambo[2], CR Cohen[3], EA Bukusi[2], L Abuogi[4]

[1] School of Medicine, University of Colorado Anschutz Medical Campus, Aurora, CO.
[2] Family AIDS Care and Education Services (FACES), Research Care and Training Program, Kenya Medical Research Institute, Kisumu, Kenya
[3] Department of Obstetrics, Gynecology & Reproductive Sciences, University of California San Francisco, San Francisco, CA
[4] Department of Pediatrics, University of Colorado Denver, Aurora, CO

Background: The association between recent viral load testing on subsequent virologic failure in children with HIV on antiretroviral treatment (ART) has not been extensively studied.

Methods: This retrospective cohort study included children with HIV at a large urban clinic in Kisumu, Kenya, ages 0-14 years on ART with at least 2 viral load (VL) results in January 2015-July 2018. First VL during the study period was compared with subsequent VL. Undetectable VL was defined as 0-39 copies/mL, LLV 40-999 copies/mL, and virologic failure $\geq$ 1000 copies/mL. Chi square test was used to measure the association between first viral load and other risk factors. Multivariate logistic regression was performed controlling for sex and time on ART to evaluate association with virologic failure on repeat VL as main outcome.

Results: A total of 172 children were included: 49% female with a median age of 10 years, IQR: 8-12 (Table 1). Within this cohort, 110 (64%) children had undetectable virus, 22 (13%) had LLV, and 40 (23%) had virologic failure (VF).   Among children with VF on first VL, 32.5% had VF on subsequent VL, compared to 7.3% with undetectable VL and 9.1% with LLV (p=0.001). Children with VF were on ART for shorter periods (median 19.8 months, IQR: 10.3-53.3) compared to undetectable children (median 62 months, IQR: 31.3-92.3) and those with LLV (median 65.6 months, IQR: 34.9-88.5) (adjusted Odds Ratio (aOR) 6.8, 95% confidence interval (CI) 2.2-20.5). In multivariate analysis, there was no significant difference in subsequent virological failure between LLV and children with undetectable virus at baseline (aOR 1.4, 95% CI 0.3-7.3).

Conclusion:
Children with virologic failure are at highest risk of continued failure on subsequent viral load. Further studies should evaluate interventions to improve treatment optimization in children with virologic failure and further explore outcomes in children with LLV.

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Table 1. Characteristics and virologic outcomes among children on ART.

	Children with undetectable VL	Children with LLV	Children with VF		
	0-39	40-999	1000+	Total	P value
	110 (64.0%)	22 (12.8%)	40 (23.3%)	172	
Sex					
Female	57 (51.8%)	13 (59.1%)	15 (37.5%)	85 (49.4%)	0.187
Male	53 (48.2%)	9 (40.9%)	25 (62.5%)	87 (50.6%)	
Age category					
0-4 years	8 (7.3%)	3 (13.6%)	5 (12.5%)	16 (9.3%)	0.538
5-9 years	36 (32.7%)	5 (22.7%)	9 (22.5%)	50 (29.1%)	
10-14 years	66 (60.0%)	14 (63.6%)	26 (65.0%)	106 (61.6%)	
Median age (IQR)	10 (8-13)	10 (7-11)	12 (6-12.5)	10 (8-12)	0.530
Time on ART (Median in months, IQR)	61.2 (30.9-91.0)	65.6 (34.5-87.3)	19.6 (10.2-52.6)	47.6 (21.6-86.2)	0.001
Regimen at time of 1st VL					
NNRTI	58 (54.2%)	12 (54.6%)	21 (52.5%)	91 (53.9%)	0.418
PI	38 (35.5%)	10 (45.5%)	13 (32.5%)	61 (36.1%)	
Others	11 (10.3%)	0 (0%)	6 (15.0%)	17 (10.1%)	
Virologic failure at repeat VL					
No	102 (92.7%)	20 (90.9%)	27 (67.5%)	149 (86.6%)	<0.001
Yes	8 (7.3%)	2 (9.1%)	13 (32.5%)	23 (13.4%)	
Repeat viral load					
0-39	82 (74.6%)	13 (59.1%)	16 (40.0%)	111 (64.5%)	<0.001
40-999	20 (18.2%)	7 (31.8%)	11 (27.5%)	38 (22.1%)	
1000+	8 (7.3%)	2 (9.1%)	13 (32.5%)	23 (13.8%)	