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12-Month Treatment Outcomes Amongst HIV-Positive Orphans and Non-orphans

Poster: #845

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INTRODUCTION

Background

- The AIDS epidemic has resulted in a large population of orphans in South Africa – in South Africa alone, it is estimated that about 3.4 million children have lost one or both parents - this is equivalent to 18% of all children in the country (1).
- Evidence indicates that orphans are more at risk of being HIV-positive. Without parents, these children may be more at risk of delayed healthcare and poorer outcomes (2).
- Little research has investigated treatment outcomes for HIV-positive orphans versus non-orphans; the research that has been done shows mixed results (3-5).

Objectives

We sought to evaluate the association between orphan status at antiretroviral treatment (ART) initiation and treatment outcomes by 12 months among HIV-positive infants, children and adolescents attending two large public-sector HIV clinics in Johannesburg, South Africa

METHODS

Study Population and Data Sources

- Retrospective cohort study in urban Johannesburg, South Africa
- All HIV-positive ART naïve infants, children and adolescents 18 years and younger initiating on standard first-line ART between June 2004 and May 2013 (N=902)
- Data from two large public-sector HIV clinics
- Electronic medical records (captured using TherapyEdge-HIV™) and physical patient files were reviewed.
- Orphan status (orphan vs. non-orphan) at baseline was obtained from the patient file for a visit 6 months before up to 6 months after the ART initiation start date.

Primary Outcomes

- All-cause mortality by 12 months
- Loss to follow-up (LTFU): defined as being >3 months late for the last scheduled visit
- Failure to achieve viral suppression: defined as a viral load (≥400 copies/ml) 12 months after ART initiation

Statistical analysis

Poisson regression was used to estimate the associate between orphan status and all-cause mortality, loss to follow-up and having a detectable viral load at 12 months on ART.

RESULTS

Patient Characteristics

		Orphans (n=244)		Non-orphans (n=658)	
		n	%	n	%
All Ages (n=902)		**244**	**27.1**	**658**	**72.9**
Sex	Female	118	48.4	354	53.8
	Male	126	51.6	304	46.2
Age at initiation (years)	< 1 year	11	4.5	162	24.6
	1 to 5.9	64	26.2	289	43.9
	6 to 9.9	86	35.3	103	15.7
	10 and older	83	34.0	104	15.8
	Median (IQR)	8.5	(5.2-11.6)	3.0	(1.0-7.4)
Nationality	South African	230	94.3	595	90.4
	Non-South African	2	0.8	61	9.3
	Missing	12	4.9	2	0.3
CD4 measurement at ART initiation*	Very low	26	10.7	36	5.5
	Low	32	13.1	123	18.7
	Moderate	60	24.6	194	29.5
	High	104	42.6	216	32.8
	Missing	22	9.0	89	13.5
WHO clinical stage	I or II	169	69.3	407	61.9
	III or IV	75	30.7	251	38.1
TB at ART initiation	Yes	44	18.0	108	16.4
	No	200	82.0	549	83.4
	Missing	0	0.0	1	0.2
Hb at ART initiation (g/dL)	<10	42	17.2	187	28.4
	≥10	157	64.3	351	53.3
	Missing	45	18.4	120	18.2
Hb at ART initiation (g/dL)	Median (IQR)	11.1	(10.1-12.0)	10.5	(9.4-11.4)
Baseline ART regimen	NRTI				
	Tenofovir (TDF)	5	2.0	15	2.3
	Abacavir (ABC)	98	40.2	298	45.3
	Stavudine (d4T)	141	57.8	344	52.3
	Lamivudine (3TC)	244	100.0	657	99.8
	NNRTI				
	Efavirenz (EFV)	216	88.5	330	50.2
	Nevirapine (NVP)	1	0.4	7	1.1
	PI				
	Lopinavir (LPVr)	27	11.1	320	48.6
	Ritonavir (RTV)	0	0.0	1	0.2
Site	S1	186	76.2	380	57.8
	S2	58	23.8	278	42.2

*CD4 classification as follows: Very low CD4:<5% for <6 years and <25 cells/mm³ for ≥6 years; Low CD4:5-15% for <6 years and 25-50 cells/mm³ for ≥6 years; Moderate CD4:15-25% for <6 years and 50-200 cells/mm³ for ≥6 years; High CD4:>25% for <6 years and >200 cells/mm³ for ≥6 years

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- We included 244 (27.1%) patients classified as orphans (either maternal, paternal or both) and 658 (72.9%) as non-orphans at ART initiation in our analysis.
- Median ages were 8.5 years (IQR:5.2-11.6) and 3.0 years (IQR:1.0-7.4) for orphans and non-orphans, respectively.
- Among those orphaned at baseline, 1 (0.4%) orphan died in the first 12 months following ART initiation and, among those not orphaned at baseline, 16 (2.4%) died in the same period.
- Among all with a baseline orphan status, 19 (7.8%) and 117 (17.8%) of orphans and non-orphans were LTF respectively.
- Among those with a viral load test, a total of 37 (18.7%) orphans and 133 (29.4%) non-orphans had a detectable viral load after 12 months on ART.
- Among those 6 years and older, adjusted modified Poisson regression showed that being an orphan has a protective effect on the risk of LTF (0.59; 95% CI:0.43-0.81) when compared to non-orphans.
- Among those younger than 6 years, analysis showed that being an orphan has a protective effect on the risk of mortality (0.89; 95% CI: 0.82-0.96) and failure to achieve viral suppression (0.48; 95% CI: 0.40-0.59).

Adjusted predictors of mortality, loss to follow up and viral suppression among children and adolescents 6 years and older, 12 months after initiating ART (N=376)

	Adjusted Hazard ratio and 95% confidence interval (CI)	
	Loss to follow-Up (n=39)	Failure to achieve viral suppression (n=63)
Orphan status at ART initiation		
Non-orphan	Reference	Reference
Orphan	0.59 (0.43-0.81)	0.96 (0.69-1.35)
Sex		
Female	Reference	Reference
Male	0.66 (0.36-1.23)	1.03 (0.94-1.14)
Age at ART initiation (years)		
6 to 9.9	1.26 (0.95-1.67)	0.63 (0.24-1.70)
10 and older	Reference	Reference
CD4 classification at ART initiation*		
Very low	2.35 (1.60-3.45)	0.83 (0.30-2.26)
Low	1.27 (0.64-2.52)	1.48 (1.17-1.89)
Moderate	0.84 (0.68-1.07)	0.89 (0.83-0.94)
High	Reference	Reference
Hb at ART initiation (g/dL)		
< 10	Reference	Reference
≥ 10	0.52 (0.38-0.70)	0.95 (0.75-1.20)
WHO clinical stage at ART initiation		
I or II	Reference	Reference
III or IV	0.84 (0.65-1.08)	1.43 (1.16-1.75)
NRTI		
Stavudine (d4T)	Reference	Reference
Abacavir (ABC) or Tenofovir (TDF)	1.35 (1.27-1.43)	2.72 (2.11-3.50)

Adjusted predictors of mortality, loss to follow up and viral suppression among infants and children younger than 6 years, 12 months after initiating ART (N=526)

	Adjusted Hazard ratio and 95% confidence interval (CI)		
	Mortality (n=13)	Loss to follow-Up (n=90)	Failure to achieve viral suppression (n=98)
Orphan status at ART initiation			
Non-orphan	Reference	Reference	Reference
Orphan	0.89 (0.82-0.96)	0.62 (0.25-1.55)	0.48 (0.40-0.59)
Sex			
Female	Reference	Reference	Reference
Male	1.01 (0.57-1.79)	1.08 (1.01-1.16)	1.13 (1.10-1.15)
Age at ART initiation (years)			
< 1 year	Reference	Reference	Reference
1 to 5.9	1.26 (0.76-2.09)	1.03 (0.74-1.42)	0.81 (0.65-1.00)
CD4 classification at ART initiation*			
Very low	1.43 (1.26-1.62)	0.80 (0.35-1.81)	1.05 (0.75-1.47)
Low	0.35 (0.29-0.42)	0.75 (0.55-1.04)	0.91 (0.80-1.04)
Moderate	0.29 (0.11-0.80)	0.86 (0.83-0.90)	0.94 (0.68-1.30)
High	Reference	Reference	Reference
Hb at ART initiation (g/dL)			
< 10	Reference	Reference	Reference
≥ 10	0.57 (0.41-0.81)	1.12 (0.82-1.54)	1.27 (1.09-1.47)
WHO clinical stage at ART initiation			
I or II	Reference	Reference	Reference
III or IV	0.94 (0.65-1.36)	0.80 (0.73-0.87)	1.11 (0.90-1.37)
NRTI			
Stavudine (d4T)	Reference	Reference	Reference
Abacavir (ABC) or Tenofovir (TDF)	0.56 (0.21-1.50)	1.14 (1.00-1.31)	2.48 (1.82-3.37)
Protease Inhibitor			
No	Reference	Reference	Reference
Yes	2.54 (1.34-4.83)	0.71 (0.68-0.73)	1.04 (1.02-1.05)

CONCLUSIONS

- Results show that orphans were less likely to die and fail to achieve viral suppression (under 6) or be lost to follow-up (6 and older).
- This surprising result needs to be analysed further, but may arise from orphans being more integrated into care due to orphan-specific programming or foster care.
- Understanding the impact of orphan status on short- and long-term ART outcomes could improve targeted strategies, and subsequent treatment and developmental outcomes, for HIV-positive infants, children and adolescents. Additional research investigating age-specific outcomes will be important to further elucidate these effects.

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