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## Outcomes of Paediatrics HIV care at the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu after ten years of service

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**Abstract:** *Background:* Anti-retroviral therapy is associated with improved survival among HIV-infected children. In Nigeria, HIV treatment scale up was extended to children over a decade ago. This poses new challenges of sustained quality care.

*Aim:* To determine the outcomes for HIV infected children and factors that influenced retention in care at the University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu.

*Methods:* This was a study of HIV-infected children seen between September 2004 and October 2015 and at the Paediatric HIV clinic of the University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu. Data collected include socio-demographics, HAART regimen and outcomes. Data analysis were done with Statistical Package for Social Sciences (SPSS) version 19 (Chicago IL).

*Results:* Five hundred and nine-

teen of 555 enrolled children with complete data were included in the data analysis. Two hundred and sixty-seven (51.4%) were females. Three hundred and thirty-nine participants (65.3%) were still in care, 12345 (23.7%) had been lost to follow up, or 22 (4.2%) dead while 35 (6.87%) were transferred out to other health facilities or into the adult ART clinic. Factors associated with retention in care were both parents being HIV positive ( $p < 0.0001$ ), commencement of HAART ( $p < 0.0001$ ) and HIV disclosure status of the child (Fisher's exact Test = 0.003).

*Conclusions:* About a quarter of our HIV-infected children were lost to follow up. Prompt initiation of HAART and HIV disclosure will positively influence retention in care.

**Key words:** Paediatric HIV, children, outcomes, Enugu.

### Introduction

Since the beginning of the HIV epidemic, almost 78 million people have been infected with the virus and about 39 million people have died of HIV.<sup>1</sup> In sub-Saharan Africa, many communities and countries have suffered from the ravages of the epidemic, making the sub-continent the epicenter of the scourge.<sup>2</sup> More than 90% of the children who acquired HIV infection live in sub-Saharan Africa and Nigeria has the highest burden of paediatric HIV disease.<sup>3</sup> The advent of highly active antiretroviral therapy (HAART) in mid-1990s revolutionized HIV treatment, and brought significant reduction in HIV morbidity and mortality.<sup>4,5</sup> The introduction of HAART changed HIV disease from a nearly universally fatal and catastrophic illness to what is now often a manageable chronic illness.<sup>5</sup> Subsequently, there was a scale-up of anti-retroviral (ARV) therapy around the world. In Nigeria, ARV treatment scale-up started in

2004 with success stories.<sup>6,7</sup> However, ARV treatment scale-up among children in developing countries presented both benefits and challenges. The benefits included improved survival to adulthood, as well as reduction in HIV-related morbidity and mortality.<sup>8</sup> There still remain the persisting challenges to optimize scale-up effectiveness especially in sub-Saharan Africa. Treatment-eligible children living with HIV in sub-Saharan Africa are only about half as likely to receive antiretroviral therapy as HIV-positive adults.<sup>9</sup> Non-disclosure of HIV status to peri-natally infected children and adolescents is still a major concern in the sub-region. These have implications for adherence and treatment failure. The life-long therapy also presents the challenge of treatment fatigue, non-adherence to care and treatment and loss to follow up among these children. All of these outcomes have implications for treatment failure in settings of already limited ARV options occasioned by global financial meltdown. There is also the emerging

issue of transiting adolescents from the pediatric to adult care during which period emotional instability and peer pressure may affect smooth and complete transition among these adolescents.

The University of Nigeria Teaching Hospital (UNTH) is the largest HIV treatment center in south-east Nigeria for over a decade. This study sought to evaluate the outcomes for HIV infected children at UNTH, Enugu since its inception of HIV services more than a decade ago.

## Materials and methods

### Study site

The Paediatric HIV clinic was established at University of Nigeria Teaching Hospital, Enugu in March 2004. It is a weekly clinic created to provide care and treatment for HIV-infected children. The clinic receives referrals from health facilities within and outside Enugu. It was the pioneer Paediatric HIV Clinic in South-east Nigeria but currently, more centers including missionary hospitals now offer HIV care and treatment to children in the region.

### Study population

All HIV positive children enrolled into care at the paediatric HIV clinic since its inception.

### Data collection

This was a retrospective study. The electronic medical records of all enrolled HIV infected children between September 2004 and October 2015 were critically reviewed. Data extracted included gender, current age, age at HIV diagnosis, socio economic class, use of first or second line ARV regimens (with duration), parental HIV status and clinic outcomes (still in care, dead or lost to follow up (LTFU), referred/ transferred out).

### Data analysis

Retrieved data were analyzed using the Statistical Package for Social Sciences (SPSS) version 19.0 (Chicago IL). Descriptive statistics (mean and median) were used to summarize quantitative variables (age of study participants, age at HIV diagnosis and ARV duration). Student t test and Analysis of Variance (ANOVA) were used to compare the means of continuous variables while chi-squared and Fisher's exact tests were used to test for significant association of categorical variables. All statistical tests were done at the 5% level of significance and a p-value less than 0.05 was considered statistically significant.

### Ethical Consideration

Ethical approval was obtained from the Health Research and Ethics Committee of UNTH Enugu.

## Results

### Characteristics

Five hundred and nineteen of 555 enrolled children had complete data and were included in the data analysis. Two hundred and sixty-seven (51.4%) were females. The mean age of the participants was  $9.9 \pm 4.6$  years while the mean age at HIV diagnosis  $5.2 \pm 3.9$  years. The median age of the study participants was 9.0 (range, 0.2 – 22.0) while the median age at HIV diagnosis was 4.2 (range, 0.1 – 16.6) as shown in Table 1. Two hundred and thirty children (44.3%) had been orphaned {(paternal, 103 (19.8%); maternal, 63 (12.1%); and double 64 (12.3%)}. Mother-to-child transmission accounted for 481 (92.7%) of HIV transmission. Four hundred and four (77.8%) were on HAART. Fifty-six of 404 children on HAART (13.9%) had been switched to second line regimen. The longest duration on first and second line HAART regimens were 10.8 and 6.0 years respectively. The mean duration of first and second line ARVs were  $4.4 \pm 2.6$  and  $4.5 \pm 1.6$  years respectively. The median duration (IQR) of first and second line regimens were 3.8 (2.6 – 6.3) and 5.3 (3.5 – 5.7) years respectively.

**Table 1:** Characteristics of the study participants

Age of study participants (years)	
Mean (SD)	9.9 (4.6)
Median (Range)	9.0 (0.2 – 22.0)
Age at HIV diagnosis	
Mean (SD)	5.2 (3.9)
Median (Range)	4.2 (0.1 – 16.6)
Sex	
	<i>n</i> (%)
Male	252 (48.6)
Female	267 (51.4)
Mode of HIV transmission	
MTCT	481 (92.7)
Blood transfusion/Sharps	17 (3.3)
Sexual abuse	2 (0.4)
Unknown	19 (3.6)
Orphan status	
	<i>n</i> (%)
None	289 (55.8)
Maternal	63 (12.1)
Paternal	103 (19.8)
Double	64 (12.3)
HIV positive mothers	446 (85.9)
HIV positive fathers	319 (61.5)
Socio-economic class	
	<i>n</i> (%)
Upper	24 (4.8)
Middle	137 (27.4)
Lower	339 (67.8)
Outcomes	
	<i>n</i> (%)
Still in care	339 (65.3)
LTFU	123 (23.7)
Transferred/Referred	35 (6.8%)
Dead	22 (4.2)

MTCT=mother-to-child transmission, LTFU=loss to follow up, SD =standard deviation

Three hundred and thirty-nine participants (65.3%) were still in care, 12345 (23.7.3%) had been lost to follow up, or 22 (4.2%) were dead while 35 (6.87%) were transferred out to other health facilities or into the adult ART clinic. HIV statuses were known in 475 of the mothers and 437 of the fathers. Four hundred and forty six of the mothers (93.9 %) and 319 of fathers (73.0 %) were HIV-infected. Both parents of 316 participants (60.9%) were HIV-infected while 203 (39.1%) were discordant couple. Data on HIV status disclosure was available in 361 study participants. Seventy-four of them (20.5%) knew their HIV status.

## Determinants of the Outcomes

### Age and Gender

The mean age of those still in care, LTFU/dead and transferred/referred were  $9.6 \pm 4.4$ ,  $9.6 \pm 4.5$  and  $13.1 \pm 4.3$  years respectively ( $F=9.49$ ,  $df = 2$ ,  $p<0.001$ ). One hundred and seventy-two of 267 (64.4%) females compared to 167 of 252 (66.3%) males were still in care. There was no statistically significant difference in the proportion of males and females who had various outcomes ( $\chi^2 = 0.52$ ,  $df = 2$ ,  $p = 0.77$ ).

### Parental HIV status

Two hundred and twenty-five of 296 (76%) participants whose both parents were HIV positive compared to 114 of 188 (60.6%) HIV negative or discordant parents were still in care ( $p < 0.001$ ).

### Orphan status

One hundred and ninety-six of 222 non-orphans (72.1%), 43 of 60 maternal (71.1%), 61 of 93 paternal (65.6%) and 39 of 59 double orphans were still in care ( $\chi^2 = 1.92$ ,  $p = 0.59$ ) as shown in Table 2.

**Table 2:** Orphan status and retention in care

Orphaned status	Still in Care n (%)	Dead/LTFU n (%)
None	196 (72.1)	26 (27.9)
Maternal	43 (71.7)	17 (28.3)
Paternal	61 (65.6)	32 (34.4)
Double	39 (66.1)	20 (33.9)

LTFU = Lost To Follow Up.  $\chi^2 = 1.92$ ,  $p = 0.59$

### HAART Regimen

Three hundred and twelve of 378 (83.4%) study participants on first line compared to 27 of 110 (24.5%) who were not on HAART were still in care ( $p < 0.0001$ ) as shown in Table 3.

### HIV Disclosure

Sixty of 65 participants (92.5%) whose knew their HIV status compared to 206 of 271 (76%) with non-disclosed HIV status were still in care (Fisher's exact Test = 0.003).

**Table 3:** HAART and retention in care

HAART Regimen	Still in Care n (%)	Dead/LTFU n (%)	p-value
<i>First-line</i>			
Yes	312 (83.4)	62 (16.6)	<0.0001
No	27 (24.5)	83 (75.5)	
<i>Second-line</i>			
Yes	43 (87.8)	6 (12.2)	0.54
No	279 (83.1)	55 (16.9)	

LTFU = Lost To Follow Up, HAART = Highly active anti-retroviral therapy

## Discussion

An approximate two-third of the clients in our center was still in care while a third had either died or lost to follow up. Our rate of retention in care was lower than the previously reported 84.7% to 94.8% in Uganda.<sup>10</sup> A possible explanation could be the longer period of care in this study (11 years), compared to 7 years in the Ugandan study. A Malawian study showed that 50% of HIV-infected persons initially classified as lost-to-follow up were actually dead when contact tracing was done.<sup>11</sup> Although we did not do contact tracing, a sizeable proportion of children lost-to-follow up in this study could be dead. There is also the possibility that clients initially accessing services transferred to treatment centers near their homes in the course of scale up. Our clients were more likely to remain in care and less likely to die/ lost to follow up if both parents were HIV-infected. Children need adults to access care and having both parents requiring the same care invariably improve the chances of children's access to HIV care and treatment programs. In contrast, there was a higher rate of attrition among children of HIV discordant couples. This may not be unrelated to the high social stigma surrounding HIV in our context. Lack of support from spouse and non-disclosure to the extended family affects child's access to care and treatment. A cost-effective model for responding to the challenges of HIV prevention, treatment and care in resource poor settings is family-centered approach.<sup>12</sup>

Surprisingly orphan status did not affect adherence to care and treatment. This is a good testament of the extended family support system in Africa. A study done in Uganda demonstrated that extended families remain an important source of care and support for AIDS orphaned children and adolescents.<sup>13</sup> Thus, the HIV-infected orphan in Africa is guaranteed care and support through the extended family system.

HIV-infected children on HAART were more likely to remain in care compared to their counterparts who were yet to commence HAART. Receiving free anti-retroviral drugs could have been an incentive to keep coming back. In the early years of the epidemic, there were stricter criteria for initiating children into HAART. Adults were more likely to be initiated into HAART than children.<sup>9</sup> This obviously contributed to high rates of deaths and lost-to-follow up among ARV naïve

children.

In this study, disclosure of HIV status to the child ensured adherence to care and treatment. HIV disclosure to infected children is empowering and makes them to be part of the decision making process concerning their own health.<sup>14</sup> Though only about one-fifth of participants who had data on disclosure status knew their HIV status despite the benefits associated with pediatric HIV disclosure. There is need to sustain efforts in HIV disclosure among children especially those who were infected peri-natally.

## Conclusion

There is high rate of death/lost-to-follow up among our cohort of HIV-infected children. Prompt initiation of HAART, HIV disclosure and having both parents that were HIV-infected were associated with retention in care.

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