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Original article

Age Matters: Increased Risk of Inconsistent HIV Care and Viremia Among Adolescents and Young Adults on Antiretroviral Therapy in Nigeria

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A B S T R A C T

Purpose: Interruptions in HIV care are a major cause of morbidity and mortality, particularly in resource-limited settings. We compared engagement in care and virologic outcomes between HIV-infected adolescents and young adults (AYA) and older adults (OA) one year after starting antiretroviral therapy (ART) in Nigeria.

Methods: We conducted a retrospective cohort study of AYA (15–24 years) and OA (>24 years) who initiated ART from 2009–2011. We used negative binomial regression to model the risk of inconsistent care and viremia (HIV RNA >1,000 copies/mL) among AYA and OA in the first year on ART. Regular care included monthly ART pickup and 3-monthly clinical visits. Patients with ≤3 months between consecutive visits were considered in care. Those with inconsistent care had >3 months between consecutive visits.

Results: The cohort included 354 AYA and 2,140 OA. More AYA than OA were female (89% vs. 65%, $p < .001$). Median baseline CD4 was 252/μL in AYA and 204/μL in OA ($p = .002$). More AYA had inconsistent care than OA (55% vs. 47%, $p = .001$). Adjusting for sex, baseline CD4, and education, AYA had a greater risk of inconsistent care than OA (Relative Risk [RR]: 1.15, $p = .008$). Among those in care after one year on ART, viremia was more common in AYA than OA (40% vs. 26% $p = .003$, RR: 1.53, $p = .002$).

IMPLICATIONS AND CONTRIBUTION

This study highlights important differences in clinic use and virologic outcomes between adolescents and young adults (AYA) and older adults in Nigeria, home to 10% of HIV-infected AYA. The findings underscore both the importance of reporting AYA-specific outcomes and of considering age-appropriate interventions to eliminate unacceptable disparities in clinical outcomes.

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Conclusions: In a Nigerian cohort, AYA were at increased risk for inconsistent HIV care. Of patients remaining in care, youth was the only independent predictor of viremia at 1 year. Youth-friendly models of HIV care are needed to optimize health outcomes.

Nigeria has the second largest global population of people living with HIV (3.4 million) [1]. Successful efforts to combat the pandemic have led to reductions in HIV-related morbidity and mortality [2]. High rates of loss to follow-up (LTFU) and unplanned interruptions from HIV care have challenged these efforts and may be of particular concern among adolescents and young adults (AYA) as they transition to adulthood [3–5]. Indeed, HIV/AIDS is now the leading cause of death among AYA in sub-Saharan Africa, and nearly 1 in 10 HIV-infected AYA worldwide reside in Nigeria [6,7].

The WHO defines adolescents as individuals aged 10–19 years [8]. This period overlaps with the transition to independence sometimes defined as youth or young adulthood (15–24 years) [9]. This is a unique time of development characterized by new psychosocial stresses, desire for autonomy, risk taking, concrete thinking, variable levels of social support, and unique perceptions of risk [10,11]. These factors, coupled with high prevalence of affective disorders among adolescents with chronic illness, often directly oppose the circumstances necessary for adherence to complex, chronic medical therapies [12]. HIV-infected AYA in particular also contend with important issues around disclosure and transmission while negotiating the framework of a chronic, stigmatizing disease [13]. Poor adherence to care among AYA may have serious negative consequences in resource-limited settings with limited access to second- and third-line treatment options [10]. Importantly, while HIV deaths overall have decreased by 30% in Africa over the past 8 years, deaths have increased by 50% among adolescents [8,14].

Despite such concerning trends, HIV-infected youth, and particularly adolescents, remain understudied [15]. While many reports are not disaggregated to highlight HIV outcomes in these groups, AYA with a range of chronic disease appear to have poorer adherence to care and worse clinical outcomes than children and older adults [16,17]. The aim of our study was to determine whether adolescence and young adulthood is an independent risk factor for inconsistent care after antiretroviral therapy (ART) initiation and to compare rates of viremia among AYA and older adults who remain in care in the first year on ART.

Methods

Setting

This study was conducted at the HIV clinic of the Ahmadu Bello University Teaching Hospital (ABUTH). ABUTH is located in a semi-urban community in Kaduna, Nigeria, where the state's HIV prevalence is 5.1% [2,18]. With President's Emergency Plan for AIDS Relief (PEPFAR) support, ABUTH began providing comprehensive HIV care in 2006 that was free of charge to all eligible patients. Children are cared for in the pediatric clinic from birth to 14 years and in the adult clinic from 15 years of age on. During the study period, the clinic was managed by the AIDS Prevention Initiative in Nigeria (APIN), a PEPFAR-supported NGO. APIN is also one of the largest HIV treatment programs in Nigeria.

Study design

We conducted a retrospective cohort study of ART eligible patients who enrolled in the ABUTH "adult" clinic between January 1, 2009 and December 31, 2011. Data were censored on December 31, 2012. Visit patterns were assessed during the first year on ART and HIV viral load after 1 year on ART. Inclusion criteria included age >14 years at the time of enrollment and documentation of initiation of ART. Women who were pregnant at enrollment or became pregnant during the follow-up period were seen in the prevention of mother to child transmission clinic and not included in this analysis. All data, including baseline demographic information, transmission risk factor, clinical visits and evaluations, laboratory visits with viral load results, and pharmacy drug pickup visits were recorded on structured data collection forms and entered into APIN's electronic clinical database. These data were abstracted retrospectively for this analysis.

Visits were most frequent in the first 2 months after ART initiation when patients are scheduled to be seen at 2, 4, 8, and 12 weeks for adherence counseling, clinical examination, and tuberculosis (TB) symptom screening (clinical visits). Subsequently, patients are seen for ART pickup every 4 weeks (pharmacy visits), clinical examination and adherence counseling every 12 weeks (clinical visits), and laboratory testing (including CD4 count and HIV viral load) every 24 weeks (laboratory visits) [19].

Outcome measures

Outcomes were assessed at the end of the first year on ART. We categorized patients into two mutually exclusive groups based on their visit patterns. A visit was defined as any clinic encounter for clinical, laboratory, or pharmacy services. Patients were defined as being *in care* if the time between any two consecutive visits was ≤3 months and the time between the last visit and censor date was ≤6 months. All other patients were defined as having *inconsistent care*. The latter group comprised both patients who had unplanned care interruption (UCI) (if the time between any two consecutive visits was ever >3 months, but they returned to clinic before the censor date) and patients who were inactive from the clinic (if the time between any two consecutive visits was ≤3 months, but the time between the last visit and the censor date was >6 months) (Figure 1). Patients known to have transferred care or died during the follow-up period were categorized based on their visit patterns before transfer or death. Under routine circumstances, an absence from the clinic of at least 3 months implied that a patient missed three ART pickup visits and at least one clinical visit. In select circumstances, clinic protocol permitted dispensing of 2-month ART prescriptions (usually reserved for patients virologically suppressed on ART for >1 year). We chose a 3-month window to define UCI to ensure no overlap with this select group of stably suppressed patients.