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Predictors of retention in HIV care among youth (15–24) in a universal test-and-treat setting in rural Kenya

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Keywords

HIV/AIDS; sub-Saharan Africa; Retention in Care; Youth

Introduction

In 2013, 4 million youth age 15–24 years were living with HIV and 85% of HIV-infected youth live in sub-Saharan Africa[1], where AIDS is the number-one cause of death of adolescents[2]. The magnitude of the HIV epidemic among youth in sub-Saharan Africa is expected to increase as demographic projections predict a “youth bulge”, increasing the population at risk for new infections, and leading to a doubling of the 15–24 year old HIV-infected cohort in sub-Saharan Africa by 2020[3]. Retention in HIV care among this age group

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Conflicts of interest:

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is essential to maximizing the benefits of antiretroviral therapy (ART), including improved quality of life, greater life expectancy, and prevention of new infections.

Prior to guidelines for universal treatment, HIV-infected youth who started ART were more likely to be lost to follow-up[4–6], report lower adherence[4,6], and were more likely to have detectable viral loads than older age groups[4,5,7]. After two years of universal HIV testing and treatment in rural east Africa as part of the Sustainable East Africa Research in Community Health (SEARCH) trial, 82% of all adults with HIV in intervention communities were virally suppressed compared to only 67% of those age 15–24[8]. These data suggest that even when high levels of viral suppression are achieved at the population level, current disparities could be exacerbated under universal treatment unless engagement in care among youth is specifically addressed.

Understanding factors associated with retention in care, including any unique predictors, among this vulnerable age group will help develop additional interventions. We describe predictors of 12-month retention in HIV care among youth (15–24 years) who are linking to HIV care for the first time in rural Kenya as part of the ongoing SEARCH universal test-and-treat trial and compare these to young adults (25–29 years) and older adults (≥30 years).

Methods

SEARCH is a community cluster-randomized controlled trial (NCT01864683) in 12 pair-matched communities of approximately 10,000 persons each in rural Kenya and 20 pair-matched communities in rural Uganda. Each community underwent a census followed by population-wide HIV testing at baseline (June 2013 – June 2014) using a hybrid model that combined multi-disease community health campaigns with home-based testing for non-attendees[9]. In the intervention communities all HIV+ individuals were offered facilitated linkage to ART[10] delivered in a streamlined, patient-centered approach at quarterly visits[11]. Patients who missed a clinic visit received a tiered series of interventions to re-engage them in care, including a phone contact, home visit, and facilitated transport to return to clinic[12,13].

This analysis includes all stable residents (>6 months/past year in the community) age ≥15 years in the six SEARCH intervention communities in Kenya who linked to care for the first time following baseline HIV testing. Those who linked to HIV care more than one year after testing or after database closure (September 16, 2015) are excluded from this analysis.

Retention in care was defined as not more than 90 days late to a scheduled follow-up visit. Patients were considered out of care (non-retention) if they were found alive, in the community and not enrolled in HIV care, were reported moved out of the community without a documented transfer to other care facility, or were lost to follow-up.

Demographics were obtained during the baseline year. Age was stratified into three categories: 15–24, 25–29, and ≥30 years. Retention was homogenous within these categories and did not violate the proportional hazards assumption as assessed graphically and with Schoenfeld residuals. All analyses were stratified by age category in order to evaluate age-specific predictors of retention.

Baseline demographics were compared by age group using chi-square test. Time-to-event analysis was performed for the primary outcome retention in care at 12 months in order to capture time in care for each individual. Patients entered the risk group (T_0) at their first clinic visit after baseline HIV testing. Time to non-retention was calculated as the time between T_0 and a patient's last scheduled clinic visit. Kaplan-Meier survival estimates were used to calculate probability of retention at one year. Hazard ratios for retention were computed using Cox proportional hazards modeling. Patients who had a documented transfer or died were censored. Follow-up continued until non-retention, censoring due to death or transfer, or 365 days after linkage. All models used robust standard errors and included community as a fixed-effect to control for clustering by community[14]. It was determined *a priori* to include gender in multivariate analysis due to significant gender imbalance across age strata, and to adjust for any variables that were significant at $p<0.10$ in univariate analysis. Stata v14 (College Station, Texas) was used for analysis.

Ethical review boards of Makerere University, Uganda National Council of Science and Technology (Kampala, Uganda), Kenya Medical Research Institute (Nairobi, Kenya), and University of California, San Francisco (USA) approved this study. Participants provided consent for study participation.

Results

Seven hundred sixty HIV-infected persons age ≥ 15 years linked to care following baseline HIV testing in the six intervention communities in Kenya. Of those who linked to care, 124 (16%) were age 15–24, 157 (21%) were age 25–29, and 479 (63%) were age 30 or older. A large majority of youth age 15–24 were female (89%) compared to older age groups (72% among age 25–29 and 53% among age ≥30, $p<0.001$). Youth were also more likely to have an HIV-infected household member (36%, vs. 27% among 25–29 and 17% among ≥30, $p<0.001$). No differences were observed by age group in the proportion married ($p=0.26$), with access to a mobile phone ($p=0.20$), pre-ART CD4+ count above country treatment guidelines ($p=0.11$), or community health campaign vs. home-based HIV testing ($p=0.49$) [Table].

Overall retention at one year was 94% (95% CI 91–96%) among adults ≥30, 90% (95% CI 84–94%) among young adults 25–29, and 81% (95% CI 73–88%) among youth 15–24 years. Having an HIV-infected household member was associated with increased retention (aHR 2.94; 95% CI 1.35–6.25) among age 15–24, with one-year retention of 90% (95% CI 77–96%) in this subgroup. Among the 44 HIV-infected household members of the 15–24 year olds, 32 were spouses, 3 were siblings, and 9 were parents. One-year retention was 77% (95% CI 65–85%) among the 80 youth without an HIV-infected household member.

Retention was not associated with education, marital status, time to link to care, or mobile phone access in any age group. Among 25–29 year olds, unemployment was associated with decreased retention (aHR 0.13; 95% CI 0.04–0.45). Among those ≥30 years, those who started ART with CD4+ count above country treatment guidelines (aHR 4.2; 95% CI 1.6–11.1) and those who tested through home-based testing (aHR 3.2; 1.2–10.0) had increased retention [Table].

Discussion

Within Kenyan communities experiencing roll-out and scale-up of a universal HIV test-and-treat strategy, we found substantially lower rates of retention in care among the youth population, age 15–24 (81%, compared to 90–94% for persons age ≥25). We also found, however, that among youth, the presence of another HIV-infected household member substantially improved retention in care, indicating that youths may need and may benefit from augmented social support of family members in achieving durable success in HIV care.

Previous data from sub-Saharan Africa suggest an important role for social support among youth receiving HIV care. In an evaluation using routinely collected patient data from 160 HIV clinics in Kenya, Mozambique, Tanzania, and Rwanda attrition among youth who initiated ART was lower in clinics offering adolescent support groups[15]. An HIV support group and good parental supervision/monitoring were associated with lower non-adherence among adolescents in South Africa[16,17]. Women from multiple resource-limited settings in sub-Saharan Africa and Asia were less likely to be lost to follow up from pre-ART care if they co-enrolled with another adult household member, the majority of whom were spouses[18]. Youth age 15–21 in Kenya reported familial support, including financial and emotional support, facilitated retention in care[19]. We are continuing to analyze qualitative data to understand whether the higher retention observed among youth in our study who shared a household with another HIV-infected individual may reflect decreased stigma, increased support for clinic attendance, mechanisms for improved ART adherence, or a combination of these or other factors.

This analysis is limited to six communities in rural Kenya so these findings may not apply to other SEARCH intervention communities in Uganda or urban settings. Follow-up is limited to one year, however data suggests that most lost to follow-up occurs during the first year after ART initiation[20]. Finally, we do not have data on disclosure of HIV status, which could provide important context to social support provided by HIV-infected household members.

It is crucial to understand the obstacles to retention in HIV care youth face, and to implement tailored interventions to improve their outcomes at every stage of the HIV care cascade. Investigation of additional interventions that function to increase social support, such as peer navigation[21,22] and those leveraging the existing social networks of youth are urgently needed. Understanding the role that social support plays will provide important insight into how these social connections can be employed to improve engagement in care.

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Table

Retention by age category among all adults linking to care for the first time after baseline HIV testing in SEARCH intervention communities

	Age 15 – 24 years (N = 124)			Age 25 – 29 years (N = 157)			Age ≥ 30 years (N = 479)		
	n (%)	**HR (95% CI)**	**aHR (95% CI)**	**n (%)**	**HR (95% CI)**	**aHR (95% CI)**	**n (%)**	**HR (95% CI)**	**aHR (95% CI)**
Sex									
Male	14 (11%)	1.0	1.0	44 (28%)	1.0	1.0	226 (47%)	1.0	1.0
Female	110 (89%)	0.88 (0.18 – 4.34)	0.56 (0.12 – 2.44)	113 (72%)	2.22 (0.83 – 6.25)	2.63 (0.86 – 8.33)	253 (53%)	1.09 (0.52 – 2.27)	1.19 (0.54 – 2.63)
Education									
≤ Primary	118 (95%)	1.0		147 (93%)	1.0		433 (90%)	1.0	
Any secondary or greater	6 (5%)	0.35 (0.11 – 1.12)		10 (6%)	0.44 (0.09 – 2.13)		46 (10%)	3.33 (0.45 – 25.0)	
Occupation									
Employed	97 (78%)	1.0		148 (93%)	1.0	1.0	453 (95%)	1.0	
Student or unemployed	27 (22%)	0.76 (0.27 – 2.22)		11 (7%)	0.14 (0.04 – 0.45)	0.13 (0.04 – 0.45)	23 (5%)	0.98 (0.64 – 1.83)	
Marital Status									
Married	96 (77%)	1.0		131 (83%)	1.0		345 (72%)	1.0	
Unmarried	28 (23%)	1.01 (0.35 – 2.94)		26 (17%)	0.15 (0.05 – 0.44)		134 (28%)	0.77 (0.34 – 1.72)	
Other household member HIV +									
No/Unknown	80 (65%)	1.0	1.0	114 (73%)	1.0		396 (83%)	1.0	
Yes	44 (36%)	2.70 (1.15 – 6.25)	2.94 (1.35 – 6.25)	43 (27%)	1.04 (0.36 – 3.13)		83 (17%)	0.75 (0.31 – 1.82)	
Pre-ART CD4									
<350 cells/mm^3	60 (48%)	1.0		69 (44%)	1.0		255 (53%)	1.0	1.0
≥ 350 cells/mm^3	64 (52%)	1.81 (0.74 – 4.35)		88 (54%)	1.72 (0.60 – 5.00)		224 (47%)	4.34 (1.59 – 12.5)	4.17 (1.56 – 11.1)
Testing Location									
CHC	81 (65%)	1.0		94 (60%)	1.0		285 (60%)	1.0	1.0
HBT	43 (35%)	1.56 (0.61 – 4.00)		63 (40%)	0.82 (0.28 – 2.44)		194 (40%)	3.23 (1.23 – 8.33)	3.23 (1.22 – 10.0)
Time to link									
< 30 days	68 (55%)	1.0		95 (60%)	1.0		279 (58%)	1.0	
≥30 days	56 (45%)	0.52 (0.21 – 1.27)		62 (40%)	0.57 (0.20 – 1.64)		200 (42%)	0.51 (0.22 – 1.20)	
Access to mobile phone									
Yes	77 (62%)	1.0		112 (71%)	1.0		333 (70%)	1.0	
No	47 (38%)	0.74 (0.30 – 1.82)		45 (29%)	0.60 (0.22 – 1.64)		146 (30%)	0.68 (0.30 – 1.52)	