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Predictors of retention in care of HIV-infected adults in Tigray, Ethiopia: a prospective cohort study

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BACKGROUND AND RATIONALE

HIV/AIDS represents one of the major health challenges of Ethiopia, despite a proven record of universal access to HIV care and treatment long term antiretroviral therapy (ART) retention is a key factor for personal and public health benefits. Identification of determinants of attrition are needed to design appropriate interventions. The aim of this study is to determine the rates of retention in care and its associated factors among patients initiating ART in seven public health facilities (HFs) located in Tigray, northern Ethiopia.

Baseline Characteristics	
Health Facilities, n (%)	Value at Baseline
Mehoni health center	297 (24.8)
Michew hospital	75 (6.3)
Ayder hospital	191 (15.9)
Mekelle health center	239 (19.9)
Mekelle hospital	114 (9.5)
Alamata health center	183 (15.3)
Alamata hospital	99 (8.3)
Sex, n (%)	
Female	760 (63.4)
Male	438 (36.6)
Age at start of ART (years), mean±SD (n, range), median	34±9.6 (1198,16-82),32
≤50 n (%)	1119 (93.4)
>50	79 (6.6)
Religion, n (%)	
Orthodox	1068 (89.1)
Muslim	126 (10.5)
Protestant	4 (0.3)
Educational status, n (%)	
No education	533 (44.5)
Primary	360 (30.1)
Secondary	200 (16.7)
Tertiary	105 (8.8)
BMI (kg/m²), n (%)	
≤18.5	476 (39.7)
18.6-25	652 (54.4)
>25	70 (5.8)
Clinical stage, n (%)	
WHO I-II	581 (48.5)
WHO III-IV	617 (51.5)
CD4+ count (cells/μL), mean ±SD (n, range), median	240±171 (1173, 2-1777), 221
<200 n (%)	515 (43.0)
≥200	658 (54.9)
Missing data: 15 (2.1)	
Hemoglobin (g/dL), n (%)	
≤10	112 (9.3)
>10	1075 (89.7)
Missing data: 11 (0.9)	
Active TB, n (%)	
Yes	104 (8.7)
No	1094 (91.3)
Initial treatment regimen, n (%)	
Efavirenz based	1073 (89.6)
Nevirapin based	125 (10.4)

DATA COLLECTION

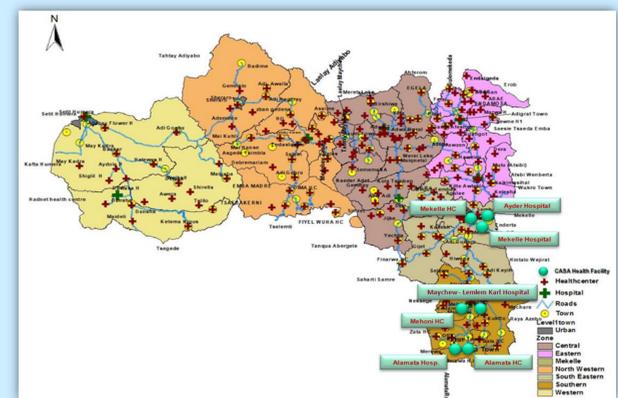
- Baseline data: demographic and clinical information, such as gender, age, religion, educational status, WHO clinical stage, haemoglobin level, body mass index, initial ART regimen, presence of active tuberculosis and CD4+ cell counts.
- Follow-up data included the following events: death, transferred-out, lost to follow-up and ART discontinuation.

ROLE OF THE COMMUNITY HEALTH WORKERS

This study has been run with the active participation of local trained community health workers (CHWs), whose role was to trace patients who failed to return for their scheduled visits. CHWs also had the task of trying to persuade the patient to return to the HF and resume antiretroviral treatment.

METHODS

We used data from the **CASA project**, a prospective, ongoing, multi-site study of a cohort of HIV-infected patients who started ART in seven urban and rural HFs located in Tigray (Ethiopia).

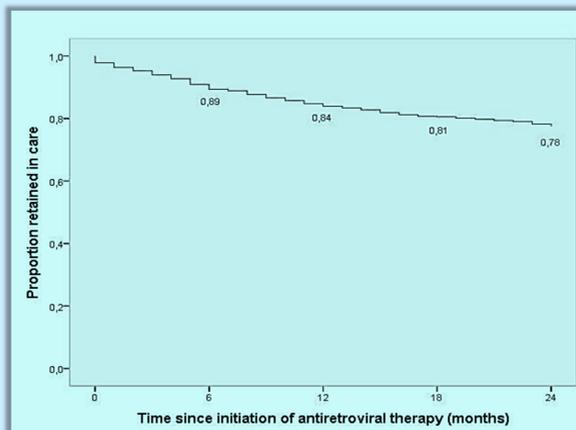


We analyzed the retention in care and its associated determinants in over 1000 patients followed for two years. The main outcome measure was the retention in care, between January 2013 and December 2015, defined as the proportion of patients alive and receiving ART at the same HF after ART initiation. Kaplan-Meier method was used to estimate the probability of retention at different time-points. Cox Proportional Hazards model with robust sandwich estimates to account for within HF correlation was used to identify factors associated with retention.

RESULTS

Kaplan–Meier estimates of retention in care was 83.9%, 80.6% and 77.6% at 12, 18 and 24 months of followup, respectively. Attrition was mainly due to lost to follow-up and transferred-out patients. Multivariate Cox proportional hazard model showed that being male (HR 1.35, 95% CI: 1.04-1.75), CD4 count < 200 μL (HR 1.49, 95% CI: 1.13-1.96), hemoglobin level ≤10 (HR 1.40, 95% CI: 1.11 – 1.76), the presence of active TB coinfection at ART initiation (HR 1.47, 95% CI: 1.04 – 2.08) and the type of HF were significantly associated with attrition.

Kaplan-Meier estimate of retention in care at different months of follow-up on ART



Cox proportional hazards model of association between baseline characteristics and retention in care

Baseline characteristics	Univariate analysis *Hazard ratio of attrition (95% CI)	Multivariate analysis *Hazard ratio of attrition (95% CI)
Health Facility		
Ayder hospital	Reference	Reference
Alamata health center	2.33 (2.27 - 2.39)	2.16 (2.09 - 2.22)
Alamata hospital	3.42 (3.17 - 3.70)	3.23 (2.80 - 3.72)
Mekelle health center	2.14 (2.11 - 2.18)	2.10 (2.00 - 2.20)
Mehoni health center	1.95 (1.93 - 1.96)	2.00 (1.95 - 2.07)
Mekelle hospital	2.58 (2.39 - 2.78)	2.53 (2.27 - 2.81)
Michew hospital	2.71 (2.51 - 2.94)	2.30 (1.98 - 2.68)
Gender		
Female	Reference	Reference
Male	1.51 (1.19 - 1.94)	1.35 (1.04 - 1.75)
Age		
≤50	Reference	-
>50	1.18 (0.87 - 1.61)	-
Educational status		
No education	Reference	-
Primary	1.01 (0.73 - 1.39)	-
Secondary	1.12 (0.76 - 1.65)	-
Tertiary	0.98 (0.70 - 1.37)	-
BMI (kg/m²)		
18.6-25 (normal)	Reference	-
≤18.5 (underweight)	1.70 (1.22 - 2.38)	-
>25 (overweight)	0.69 (0.27 - 1.78)	-
Clinical stage		
WHO I-II	Reference	-
WHO III-IV	1.29 (0.94 - 1.77)	-
CD4 count (cells/μL)		
≥200	Reference	Reference
<200	1.67 (1.34 - 2.08)	1.49 (1.13 - 1.96)
Hemoglobin (g/dL)		
>10	Reference	Reference
≤10	1.43 (1.11 - 1.83)	1.40 (1.11 - 1.76)
Active TB		
No	Reference	Reference
Yes	1.96 (1.32 - 2.94)	1.47 (1.04 - 2.08)
Initial treatment regimen		
Efavirenz based	Reference	-
Nevirapin based	1.06 (0.70 - 1.61)	-

*Hazard ratios estimated using robust sandwich estimators for variance to account for within HF correlation.

CONCLUSIONS

According to our prospective data, combined interventions aimed to improve ART retention shall include earlier initiation of therapy, nutrition supplementation, early detection and treatment of TB. Observed retention differences among HFs and according to gender suggest that innovative models of HIV care shall also be explored. Ethiopia has already experienced task shifting, decentralization of HIV care and the involvement of community based organization (CBOs) programmes, but they should be further strengthened. The 2016 WHO guidelines suggest that the involvement of communities in ART care is a key element of success. It is our hypothesis that full community-based, client--centered models of care shall be the way forward, especially for stable patients. The active involvement of CBOs models could reduce congestion of health facilities, which could then allow the shifting of resources on patients with more advanced HIV infection and complex clinical problems.