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SHORT COMMUNICATION

The cascade of HIV care among refugees and nationals in Nakivale Refugee Settlement in Uganda

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Objectives

Refugees living in Uganda come from HIV-endemic countries, and many remain in refugee settlements for over a decade. Our objective was to evaluate the HIV care cascade in Nakivale Refugee Settlement and to assess correlates of linkage to care.

Methods

We prospectively enrolled individuals accessing clinic-based HIV testing in Nakivale Refugee Settlement from March 2013 to July 2014. Newly HIV-diagnosed clients were followed for 3 months post-diagnosis. Clients underwent a baseline survey. The following outcomes were obtained from HIV clinic registers in Nakivale: clinic attendance ('linkage to HIV care'), CD4 testing, antiretroviral therapy (ART) eligibility, and ART initiation within 90 days of testing. Descriptive data were reported as frequency with 95% confidence interval (CI) or median with interquartile range (IQR). The impact of baseline variables on linkage to care was assessed with logistic regression models.

Results

Of 6850 adult clients tested for HIV, 276 (4%; CI: 3–5%) were diagnosed with HIV infection, 148 (54%; CI: 47–60%) of those were linked to HIV care, 54 (20%; CI: 15–25%) had a CD4 test, 22 (8%; CI: 5–12%) were eligible for ART, and 17 (6%; CI: 3–10%) initiated ART. The proportions of refugees and nationals at each step of the cascade were similar. We identified no significant predictors of linkage to care.

Conclusions

Less than a quarter of newly HIV-diagnosed clients completed ART assessment, considerably lower than in other reports from sub-Saharan Africa. Understanding which factors hinder linkage to and engagement in care in the settlement will be important to inform interventions specific for this environment.

Keywords: care continuum, cascade of care, HIV, refugee, sub-Saharan Africa

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Introduction

The HIV prevalence among the 2.9 million refugees and asylum-seekers in sub-Saharan Africa is largely unknown [1]. Refugees suffer numerous hardships unique to their history: they have difficulties meeting basic needs,

disrupted social networks, limited livelihood opportunities, frequent threats to their security, and prolonged displacement lasting on average 17 years [2–4]. These hardships may increase their vulnerability to HIV infection through more frequent sexual violence and transactional sex, and difficulty accessing condoms and treatment for sexually transmitted infections [2].

Studies in general populations demonstrate attrition along the HIV cascade of care from testing, to attending an HIV clinic ('linking to HIV care'), to assessment of antiretroviral therapy (ART) eligibility, to ART initiation, and ultimately to retention in HIV care and sustained virological suppression [5, 6]. A systematic review in sub-Saharan Africa estimated that 57% of HIV-diagnosed people completed ART-eligibility assessment, reflecting the step beyond linkage to care [7]. Two reviews in sub-Saharan Africa found that, among those who were linked to HIV care, retention in care at 24 months averaged 62 and 77%, respectively [8, 9].

The HIV care continuum has not been characterized in refugee settlements. However, given the hardships faced in this setting, it is likely that linkage to care is a problem and attrition along the HIV care cascade in this context is as high as it is in the surrounding areas of sub-Saharan Africa, if not higher. Additionally, reasons for poor engagement in HIV care in this setting are likely to be unique to the refugee settlement context, as has been shown in research on barriers to HIV testing [3]. We prospectively assessed the HIV care cascade for a cohort of newly HIV-diagnosed refugees and Ugandan nationals in Nakivale Refugee Settlement in southwestern Uganda.

Methods

Study site

Uganda has over 350 000 refugees from various countries in sub-Saharan Africa [10]. Nakivale Refugee Settlement, established in 1960, hosts 68 000 refugees from 11 countries and is 71 square miles in area [11]. The refugees are largely from the Democratic Republic of the Congo (52%), Somalia (17%), Burundi (15%) and Rwanda (15%) [11]. Additionally, Ugandan nationals live in and around Nakivale and access health services in the settlement.

We established a routine clinic-based HIV testing programme at the Nakivale Health Center that began on 14 March 2013 [12]. This site is operated by the nongovernmental organization Medical Teams International (MTI). HIV testing is free and uses serial rapid HIV tests as outlined in the Uganda HIV Rapid Test Algorithm [13]. Newly HIV-diagnosed participants are encouraged to attend an HIV clinic and, if they are willing to do so, are introduced to the HIV clinic counsellor immediately following their diagnosis. The Nakivale Health Center laboratory is equipped with two functioning Alere Pima CD4 Analyser machines. ART is free for eligible clients [initiated at a CD4 count $\leq$ 350 cells/μL or World Health Organization (WHO) stage III/IV based on 2010 WHO guidelines [14]]. Clients who are ART-ineligible are provided with co-trimoxazole prophylaxis [15]. Three satellite clinics throughout the settlement offer free HIV testing and HIV clinic services. As Nakivale Refugee Settlement is in a rural setting, at the time of this research, there were no other accessible HIV clinics within close proximity to the settlement.

Study design

We prospectively evaluated clients who were newly diagnosed with HIV infection from 14 March 2013 until 11 July 2014. Eligibility criteria included being $\geq$ 18 years old, able to provide informed consent (in English, Kinyarwanda, Kiswahili or Runyankore), and not known to be HIV-infected. We longitudinally followed this cohort, accessing laboratory and HIV clinic registers at Nakivale Health Center and the three satellite clinics in the settlement approximately twice monthly.

Data collection

Prior to receiving their HIV test result, clients underwent a baseline survey during HIV testing to gather demographic and socioeconomic data. Information obtained included refugee *vs.* national status, country of origin, years in the settlement, and time spent travelling to the clinic. Data collected during follow-up at the clinical sites included linkage to HIV care (at least one visit to the HIV clinic), CD4 results, ART eligibility, and ART initiation for eligible clients. For our primary analysis, we considered only those events that occurred within 90 days of HIV diagnosis. We performed a secondary analysis of 'ever linked' to care by eliminating the time constraint.

This study was approved by the Republic of Uganda Office of the Prime Minister. Ethics committee approvals included: the Makerere University College of Health Sciences Institutional Review Board (Kampala, Uganda, SHS REC Ref No. 2012-020), the Uganda National Council of Science and Technology (Kampala, Uganda; HS 1167), and the Partners Human Research Committee (Boston, MA, USA; 2012-P-000839).

Statistical analysis

Descriptive data are reported as frequency with an exact (Clopper–Pearson) 95% confidence interval (CI) or median

with interquartile range (IQR), as appropriate. For each step of the care cascade, we used Fisher's exact test to determine whether the proportion of refugees differed from the proportion of Ugandan nationals; we considered both the proportion among all HIV-diagnosed clients and among clients who met the criteria for the previous step in the cascade. To assess the impact of baseline variables on whether patients were linked to HIV care, we used logistic regression models. Variables were considered for inclusion in the multivariate model if the univariate screening P-value was < 0.25, and were ultimately included in the multivariate model if the adjusted P-value was < 0.05. Two-tailed P-values < 0.05 were considered statistically significant. All statistical analyses were performed in SAS 9.4 (SAS Institute, Cary, NC) and R version 3.1.1 (www.r-project.org).

Results

During the 19-month study period, 6850 adult clients were tested for HIV. Of those tested, 3517 (51%; CI: 50–53%) were female; 4746 (70%; CI: 68–71%) were refugees; and the median age was 28 years (IQR 22–37 years). Of clients tested, 276 (4%; CI: 3–5%) were newly HIV-diagnosed. Ugandan nationals had an HIV-positivity rate of 9% (CI: 7–10%). Among refugees, proportions of HIV positivity varied by country of origin (see Supporting Information Table S1 for the number of clients tested for HIV and the proportion diagnosed with HIV infection by country of origin). Of the newly HIV-diagnosed participants, 175 (63%; CI: 57–70%) were female; 95 (35%; CI: 28–41%) were refugees; and the median age was 30 years (IQR 24–38 years). Of HIV-diagnosed participants, 62% said they lived within Nakivale Refugee Settlement and 32% reported that they had lived in the settlement for < 5 years. Additionally, of the HIV-diagnosed participants, 61% were married, 67% had not completed primary school, and 54% travelled > 1 h to the clinic.

Of the 276 newly HIV-diagnosed clients, 148 (54%; CI: 47–60%) linked to HIV clinic in the settlement and 54 (20% of HIV-diagnosed; CI: 15–25%) had a CD4 test performed, both within 90 days. The median CD4 count was 442 cells/μL (IQR 273–621 cells/μL) for all clients tested within 90 days. Median CD4 counts for refugees (465 cells/μL; $n = 21$) and Ugandan nationals (350 cells/μL; $n = 32$) were not significantly different ($P = 0.13$). Based on guidelines recommending ART eligibility with a CD4 count of ≤ 350 cells/μL [14], 22 individuals [8% of those diagnosed with HIV infection (CI: 5–12%); 41% of those with a CD4 test (CI: 27–55%)] were eligible for ART. Seventeen (6% of those diagnosed with HIV infection; CI: 3–10%) initiated ART within 90 days of diagnosis; three were refugees, 13 were Ugandans, and one did not report a nationality (Fig. 1). The proportions of nationals and refugees at each step of the cascade of care were not significantly different (all P-values > 0.05).

No potential predictors of linkage to care were found to be statistically significant in the logistic regression model (Table 1). Although age category was marginally significant ($P = 0.07$), further assessment using several different models (e.g. age as a categorical, continuous, or ordinal variable) did not result in a statistically significant association of age with linkage to care.

Removing the 90-day time cut-off and evaluating whether the 276 newly HIV-diagnosed clients were 'ever linked' to HIV care resulted in 28 additional patients being linked to care, bringing the total to 176 (64% CI: 57–70%). Among the 28 who were linked to care after 90 days, the median time to link to care was 151 days (maximum 429 days).

Discussion

Among people accessing HIV testing services at Nakivale Health Center, only half were linked to HIV care and less than a quarter had a CD4 test within 90 days of their initial test. We were unable to determine predictors of linkage, and thus the best interventions to improve linkage remain an important area of research. As thousands of refugees and millions of nationals access HIV services in similar settings in sub-Saharan Africa, these data reflect a much larger problem across the region.

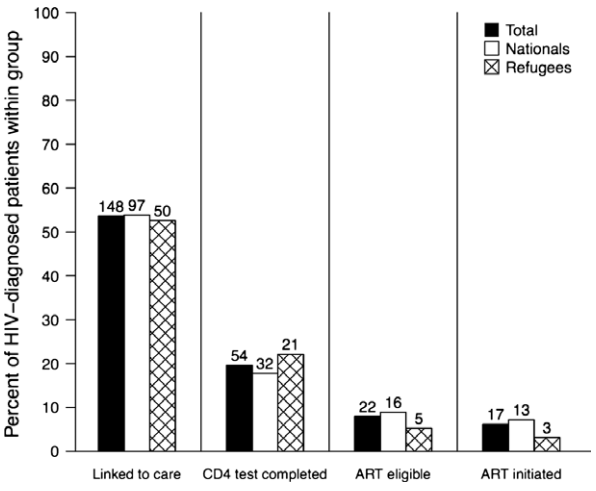

Fig. 1 Cascade of care within 90 days of routine HIV testing at Nakivale Health Center. Note that one HIV-diagnosed patient did not report refugee status. ART, antiretroviral therapy.

Table 1 Predictors of linkage to care within 90 days of routine HIV testing among HIV-diagnosed clients

Variable	All HIV-diagnosed (*N* = 276) % (*n*/*N*)	Not linked to care (*N* = 128) % (*n*/*N*)	Linked to care (*N* = 148) % (*n*/*N*)	*P*-value*
Female gender	63 (175/276)	67 (86/128)	60 (89/148)	0.23
Age				
< 30 years	49 (134/276)	50 (64/128)	47 (70/148)	0.07
30 to < 40 years	30 (82/276)	35 (44/128)	26 (38/148)	
40 to < 50 years	15 (42/276)	9 (12/128)	20 (30/148)	
≥ 50 years	6 (18/276)	6 (8/128)	7 (10/148)	
Refugee	35 (95/275)	35 (45/128)	34 (50/147)	0.84
Country of origin				
Uganda (national)	66 (177/268)	65 (83/127)	67 (94/141)	0.75
Rwanda	17 (46/268)	17 (21/127)	18 (25/141)	
DRC	9 (23/268)	8 (10/127)	9 (13/141)	
Burundi	4 (12/268)	6 (8/127)	3 (4/141)	
Other[†]	4 (10/268)	4 (5/127)	3 (5/141)	
Live in Nakivale	62 (168/269)	62 (79/127)	63 (89/142)	0.94
Years living in Nakivale				
< 5 years	32 (74/234)	30 (34/113)	33 (40/121)	0.74
≥ 5 years	25 (59/234)	27 (31/113)	23 (28/121)	
Do not live in Nakivale	43 (101/234)	43 (48/113)	44 (53/121)	
Relationship status				
Currently married	61 (164/269)	59 (75/127)	63 (89/142)	0.67
Single (never married)	14 (36/269)	17 (21/127)	11 (15/142)	
Divorced/separated	18 (49/269)	18 (23/127)	18 (26/142)	
Widowed	6 (17/269)	5 (7/127)	7 (10/142)	
Not married, living with partner	1 (3/269)	1 (1/127)	1 (2/142)	
Education				
No school	19 (53/269)	20 (26/127)	19 (27/142)	0.78
Some primary school	47 (126/269)	45 (57/127)	48 (69/142)	
Completed primary school	17 (45/269)	16 (20/127)	18 (25/142)	
Higher than primary school[‡]	17 (45/269)	19 (24/127)	15 (21/142)	
Knowledge questionnaire all correct[§]	39 (106/269)	40 (51/127)	39 (55/142)	0.81
Previous test for HIV	66 (178/268)	70 (88/126)	63 (90/142)	0.26
More than 1 h to clinic	54 (144/269)	54 (69/127)	53 (75/142)	0.80

DRC, Democratic Republic of the Congo.
**P*-value based on univariate logistic regression.
[†]Other includes Tanzania (*n* = 5), Ethiopia (*n* = 3), Senegal (*n* = 1) and Sudan (*n* = 1).
[‡]Includes some/completed secondary school, vocational school, certificate programme, bachelor's, and post graduate.
[§]The questionnaire included four questions [correct answer]: [1] Do you think that a healthy-looking person can be infected with HIV, the virus that causes AIDS? [Yes]; [2] Can a person get HIV by sharing a meal with someone who is infected? [No]; [3] Can a pregnant woman infected with HIV or AIDS transmit the virus to her unborn child? [Yes]; [4] Can a woman with HIV or AIDS transmit the virus to her newborn child through breastfeeding? [Yes].

We found greater attrition along the HIV care cascade in Nakivale compared with previous reports for sub-Saharan Africa [7]. While more individuals were linked to care at the HIV clinic when linkage was assessed without a time cut-off, there remained considerable attrition. There was a particularly steep drop-off between those who linked to care and those who had a CD4 test. Clinicians in the settlement might have been using WHO clinical classifications rather than CD4 test results to determine ART eligibility [14]. It is also possible that the CD4 machines were not functioning or there could have been a lack of CD4 machine supplies, resulting in less testing. However, given the surprisingly low number of clients initiated on ART, it is more likely that a large proportion of clients did not complete the ART eligibility assessment.

While we intended our routine HIV testing programme to reach refugees, there were unanticipated benefits for Ugandan nationals [3]. Although refugees accounted for 70% of the HIV testing participants, they only accounted for 35% of those diagnosed with HIV infection. Refugees had a lower risk of HIV infection than nationals, a finding previously demonstrated among other refugee populations [16]. Further, HIV-diagnosed refugee participants had a trend towards presenting with less advanced disease, with the median CD4 count being higher than that of Ugandan nationals (465 cells/μL compared to 350 cells/μL, respectively; $P = 0.13$). It may be that nationals at high risk for infection travel further to test for HIV to minimize stigma in their community. Intimate contact with Ugandan nationals testing in Nakivale could put refugees at a higher baseline risk of HIV infection.

Although the factors assessed in the baseline survey did not correlate with linkage to HIV care, more nuanced factors specific to this unique setting could have a measurable impact. For instance, the languages and cultures of the refugees are different from those of the Ugandan health staff. This may cause refugees to mistrust the health care system [17]. Additionally, severe poverty and limited land access may impact choices related to health care engagement. It may also be that refugees and Ugandan nationals accessing services in the refugee settlement moved away from their community because of stigma and discrimination. Lack of social support could hinder their successful engagement in HIV care [18, 19]. Alternatively, the nationals could be a mobile population, a lifestyle that may interfere with long-term medical care and may result in higher risk sexual behaviour and higher rates of HIV transmission [20].

These data should be considered in view of some limitations. Data on country of origin were provided by the participants and were not verifiable. Given the political implications refugees face based on their country of origin, some may have falsified information. As our follow-up procedure was to abstract data from clinics in Nakivale, we could not discern if clients enrolled in care outside the settlement. However, given the distance to clinics outside the settlement, we think this was unlikely. Further, our methods did not enable us to track the deaths of participants. Additionally, refugee populations differ from one another based on the country of origin, the distribution of the population in terms of age and gender, and the size of the population. Therefore, these findings must be interpreted with caution when extrapolating to other settings.

We found poor linkage to HIV care and considerable attrition along the HIV care continuum for refugees and Ugandan nationals in Nakivale Refugee Settlement. We did not find an association between any of the factors assessed in this study and poor linkage to care. We must therefore expand our evaluation and assess factors specific to the refugee settlement context. Future research on linkage to HIV clinical care among refugee populations should assess potential individual factors (i.e. mental health, substance abuse, migration patterns and competing needs), social environment factors (i.e. HIV stigma and social support), physical environment factors (i.e. location of the settlement, transportation availability and food distribution sites), and policies and regulations (i.e. land use policies and security environment); all of these complex issues may influence health service utilization in this unique population. This assessment may help in designing interventions to improve health service utilization in this setting. Enhancing linkage to HIV care and minimizing attrition for refugees and nationals accessing services in refugee settlements will improve the health of this multinational population and may help us move closer to achieving the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 goal in this population [21].

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Author contributions

KNO, IVB, RPW and RAP conceived and designed the study. JK, SD, ZMF and EM helped ensure the study was appropriate for the local context and for the refugee settlement environment. JK and EM advised on study implementation. KNO and ZMF supervised data collection and management of data. KEG assisted with evaluating ongoing data collection processes at the study site. DJR analysed the data with RAP serving as senior advisor, providing guidance and supervision of the analysis. KNO drafted the manuscript. KNO, DJR and RAP worked together to create the figure and table. IVB and RPW assisted with in-depth revisions of the manuscript. All authors reviewed the manuscript and offered additional edits. All authors approved the final manuscript.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Table S1. Clients HIV-tested and proportion HIV-diagnosed by country of origin.