Gendered Patterns of Mobility Predict HIV Prevalence in Uganda/Kenya in SEARCH Study

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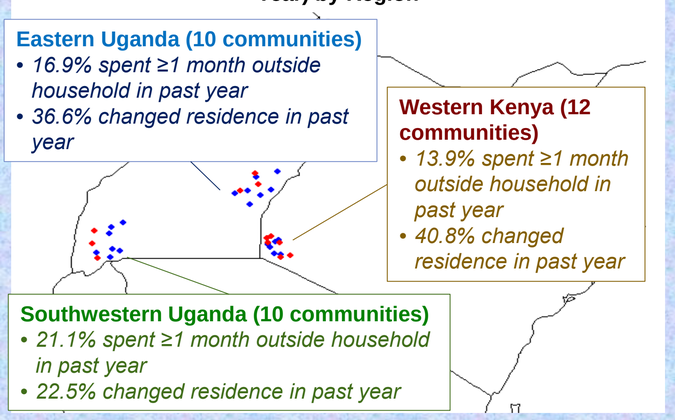
Background

Geographic mobility is highly prevalent in Sub-Saharan Africa and challenges HIV prevention and treatment goals: it is known to break bonds between individuals and care systems,[1] thus leading to care disengagement, treatment interruption and poor health outcomes at all steps of the cascade. Mobility can also link geographically separate epidemics, and intensify transmission by enabling higher risk sexual behavior.[2,3] However, research on links between mobility and HIV has yielded discordant findings, due in part to suboptimal measures[4] that do not capture full dimensions of mobility, including its gender-specific forms.[5,6] We therefore sought to characterize the relationship between HIV prevalence and mobility in an ongoing HIV "test and treat"/ combination prevention study.

Methods

We examined associations between mobility and HIV prevalence among 135,849 census-enumerated adults aged ≥15 years residing in 32 rural communities in Uganda and Kenya participating in the Sustainable East Africa Research in Community Health (SEARCH) study, a community-cluster randomized trial (NCT 01864603). Data were collected April 2013-June 2014. Multilevel logistic regression analyses, containing random intercepts for community, were conducted using Stata v.14, and stratified by sex.

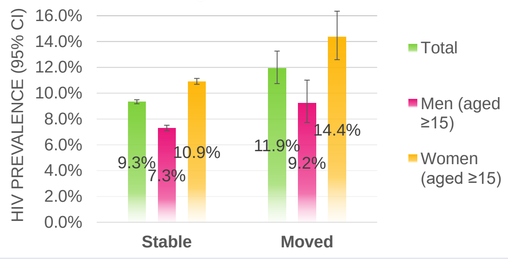
Figure 1: Baseline Mobility (Any Residence Change in Past Year) by Region



Results

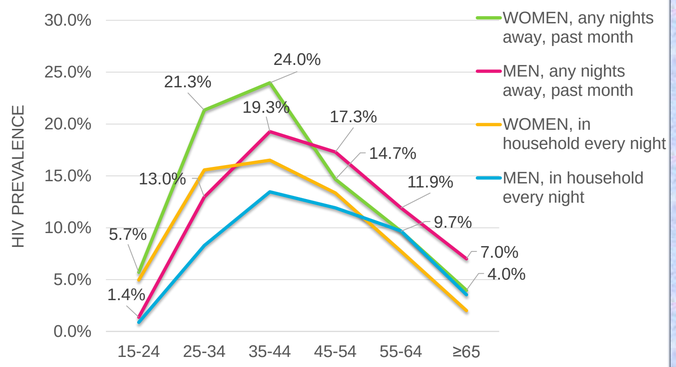
Population. The population of n=168,660 census-enumerated adult (aged ≥15) residents of households in the 32 communities was 46.9% male, and 53.1% female. For this population, data on household presence pattern in the past 12 months and past 1 month were available for n= 168,636; HIV serostatus, for n=135,849 adults. Among these adults, 17.2% (n= 28,936) spent ≥ 1 months living outside the household in the past year, among whom 56.5% were male. N= 156,741 (92.9%) of adults were defined as "stable residents", having lived in the community for at least 6 months in the past year. Among these "stable residents", many were mobile: 25.6% had spent nights away from their household in the past month (compared to 42.5% of "non-stable" residents.)

Figure 2: HIV Prevalence (95% CI) in 2013-14, by Residence Change in Past 12 Months and Sex



Regional Heterogeneity in Mobility and HIV Prevalence. HIV prevalence was 9.6% (95% CI, 9.4-9.7%) overall, 11.2% (95% CI, 10.9-11.4% in women, and 7.5% (95% CI, 7.3-7.7%) in men. Levels varied across region: E Uganda, 3.4% (95% CI, 3.2-3.5%); SW Uganda, 6.5% (95% CI, 6.3-6.7%); and W Kenya, 18.4% (95% CI, 18.1-18.8%). Mobility also varied by region (Figure 1). Communities with a higher proportion of migrants tended to also have higher HIV prevalence.

Figure 3: HIV Prevalence in 2013-14, by Past Month Absence from Household, 10-Year Age Band and Sex



Sex Differences in Mobility and HIV Prevalence. Although men composed a higher proportion of migrants than did women, age-adjusted probabilities of HIV infection were higher in mobile women compared to non-mobile women, to mobile men, and to non-mobile men, in models using various measures of mobility. HIV prevalence levels were higher in women than men who had moved in past year (Figure 2). Examined by 10-year age band and sex, HIV prevalence was highest (24% [95% CI 22.4-25.6%]) among women aged 35-44 who spent nights away in the past month (Figure 3).

Mobility Patterns Predictive of HIV Prevalence. HIV prevalence was significantly associated with having spent nights away in past month and changed residence in past year in both men and women in multilevel logistic regression models (adjusting for community-level clustering) (Table 1):

HIV PREVALENCE	WOMEN				MEN			
	OR	*p*	95% CI		OR	*p*	95% CI	
Residence change (past year)	**1.71**	**0.000**	**1.41**	**2.07**	**1.41**	**0.000**	**1.21**	**1.64**
Region (ref.: SW Uganda)								
E. Uganda	0.53	0.000	0.40	0.69	0.49	0.000	0.37	0.65
W. Kenya	3.51	0.000	2.66	4.63	3.51	0.000	2.53	4.87
Household Wealth Index	0.89	0.000	0.87	0.91	0.93	0.000	0.91	0.96
Age ≥25 (ref.: <25)	2.07	0.000	1.84	2.32	6.36	0.000	5.08	7.96
Education level (ref.: None)								
Primary or Secondary	2.77	0.000	2.29	3.36	1.36	0.000	1.16	1.60
Post-secondary	2.13	0.000	1.74	2.60	0.96	0.656	0.78	1.17
Marital status (ref.: Single)								
Married	2.09	0.000	1.67	2.63	2.41	0.000	1.92	3.03
Widowed	4.19	0.000	3.32	5.29	3.72	0.000	2.61	5.31
Divorced or Separated	5.10	0.000	4.11	6.33	5.87	0.000	4.44	7.76

Conclusions

Among adults in SEARCH, past year and even very recent (past month) mobility were associated with higher HIV prevalence. Some measures of mobility conferred higher prevalent HIV infection probabilities for women than for men. In multivariate models, absence from households in past year and past month had similar effects in men and women, but residence change (moved in past year) had stronger effects for women.

Mobility may challenge community-level HIV prevention interventions in high HIV prevalence areas, if mobile populations are spending time exposed to HIV outside of their communities. However, causal pathways may be complex and bidirectional, and require further investigation with longitudinal data.

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