Factors associated with acquisition of HIV during 2005-2014 among men and women in 5 African cohorts

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ALPHA NETWORK
Analysing Longitudinal Population-based HIV/AIDS data on Africa

Introduction

- Correlates of incident HIV infection may change as epidemics mature, treatment becomes widespread and behaviour changes.
- We examined factors associated with HIV incidence during 2005-2014 among men and women aged 15 to 49 years.
- We used longitudinal data from 5 African population-based observational cohorts from Malawi, South Africa, Tanzania, Uganda and Zimbabwe.
- Comparable, contemporary data on partnerships and marital/cohabitation status and history, first sex, relationship to partners and residential mobility available from all studies.

Methods

- Analysis time begins at the first negative HIV test and ends at seroconversion or is right censored by death, out migration or at the last HIV test.
- Multiple imputation of seroconversion dates used to overcome the limitations of interval censored data. 50 imputations assuming an uniform probability of seroconversion throughout the interval.
- Piecewise exponential models fitted to survival time to estimate hazard ratios (HR) for HIV incidence.
- Time varying covariates used to describe marital status and transition periods between different statuses, partnership characteristics, residential mobility, circumcision status and time sexually active.
- Fixed effects of study were included in each model. The effect of a binary variable identifying a five-calendar year period was allowed to vary by study.
- Prevalence of untreated HIV infection in people of the opposite sex and in the age range of likely sexual partners estimated and included as a continuous variable to account for the difference in incidence rates due to background prevalence of infection and reduction in infectivity due to treatment.

Results

- 81,787 people contributed data to the analysis and there were 6,067seroconversions.
- Effects of key variables differed by sex and age therefore analysis was stratified by sex and age group.
- Marital status was important but effects varied:
  - In crude analysis, the period surrounding marriage was a risk for young people. In adjusted models the HR remained similar but the p-values increased.
  - Current marriage was associated with an elevated hazard for young men, but a reduced hazard for older women.
  - Ending a marriage was a risk for older men and young women.
- Men's circumcision status not associated with seroconversion.
- Increased number of current partners was associated with seroconversion in all sex and age groups

Results

- Seroconversion was not associated with having a regular or casual partner.
- Having a new partner increased women's hazard of seroconversion.
- Young women's hazard of seroconversion increased with time since first sex.

Factor		Men 15-24 yrs	Men 25-49 yrs	Women 15-24 yrs	Women 25-49 yrs
Within 6 months of change of residence	No				1
	Yes				1.50 *
Marital status					
	Never married	1	1	1	1
	Married/cohabiting	1.94 '	0.93	0.70	0.52 ***
	Formerly married	0.05	1.86 *	2.61 *	1.15
	Never married to married	2.44	1.42	1.38	0.89
	Married to Separated	-	1.33	0.14	1.56
	Separated to married	0.00	1.63	0.01	1.09
New partner this year					
	No		1	1	1
	Yes		1.21	1.23 '	1.53 *
Number of partners this year					
	0	1	1	1	1
	1	2.48 *	1.58	1.15	1.03
	2	3.90 ***	1.87	2.09 *	2.29 *
	3	5.02 **	2.20	0.17	2.01
	4+	7.09 ***	3.61 **	-	2.18
Casual partner this year					
	No		1	1	1
	Yes		1.23	1.12	1.35
Regular partner this year					
	No		1		1
	Yes		1.30		1.26
Years since first sex					
	0			0.49 **	
	1			1	
	2			1.06	
	3			1.33 '	
	4			1.38 '	
	5+			1.72 **	
Untreated HIV prevalence in partners		1.06 ***	1.02	1	1.03
Also adjusted for:		study	study and calendar year; age group	study and calendar year	study and calendar year; age group

Table 1 HIV IR by selected factors and results from exponential regression models for men and women. *** p<0.001 ** p<0.01 *p<0.05 ‘p<0.1

Conclusions

- Direction and magnitude of associations with seroconversion vary between men and women and by age.
- Risk factor effects were not modified by study site.
- Risk factors remain similar to those identified earlier in the epidemic in these populations (1-5).
- Young women are not at highest risk of seroconversion immediately after sexual debut.
- Marriage results illustrate the difficulty in trying to reduce complex and dynamic factors to independent effects. Risk is lowered by seroconcordant negative, monogamous marriage but may be raised by the acquisition of a new partner and frequent unprotected sex around the time of the marriage.
- Data on condom use, coital frequency and partner characteristics are being collated for future analysis.

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This study was made possible with support from:
The Wellcome Trust (085477/Z/08/Z)
The Bill and Melinda Gates Foundation (OPP1082114).