Risk factors for new HIV infections in the general population in sub-Saharan Africa

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

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BACKGROUND

- Previously identified risk factors for new HIV infections in sub-Saharan African not consistent across studies.
- Different risk factor definitions and low study power may explain some of these inconsistencies.

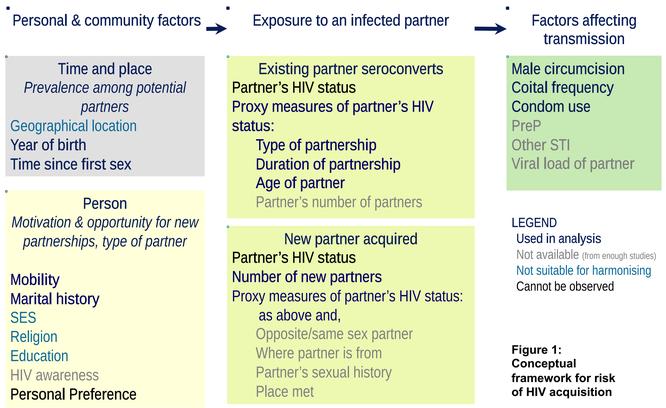

Figure 1: Conceptual framework for risk of HIV acquisition

- Conceptual framework (Figure 1) used to identify data for harmonisation and inclusion in analysis.
- Proxy measure of HIV status of partner: proportion of potential opposite sex partners living with HIV and untreated; constructed using HIV prevalence, treatment coverage and age mixing data

METHODS

- Harmonised longitudinal data from 8 African population-based observational cohorts for 2005-2016 (Figure 4)
- Analysis time starts: first negative HIV test; ends: seroconversion or right-censoring (death, out migration, last HIV test)
- Multiple imputation (n=70) of seroconversion dates used to overcome the limitations of interval censored data.
- Piecewise exponential models fitted to survival time to estimate study-specific hazard ratios (HR) for HIV incidence among men aged 15-24, men 25-49, women 15-24 & women 25-49.
- Factors showing consistent associations across studies included in models for all studies combined
- Population attributable fractions (PAF) calculated based on adjusted HR estimated from pooled models and observed distribution of risks in pooled and study-specific data

RESULTS

- Consistent risks: residential mobility, number of partners in last year, new partners.
- Age/sex dependent risks: marital status, circumcision and types of partner.
- Attributable fractions largest for circumcision (men 15-24) and not being married (women and men 25-49) (Figure 3).

Group	People	Person years	Sero-conversions
Men 15-24	27 247	71 791	444
Men 25-49	18 831	71 317	767
Women 15-24	30 682	74 838	1662
Women 25-29	30 350	123 845	1493

Table 1: Number of people, person years and seroconversions used in incidence analyses

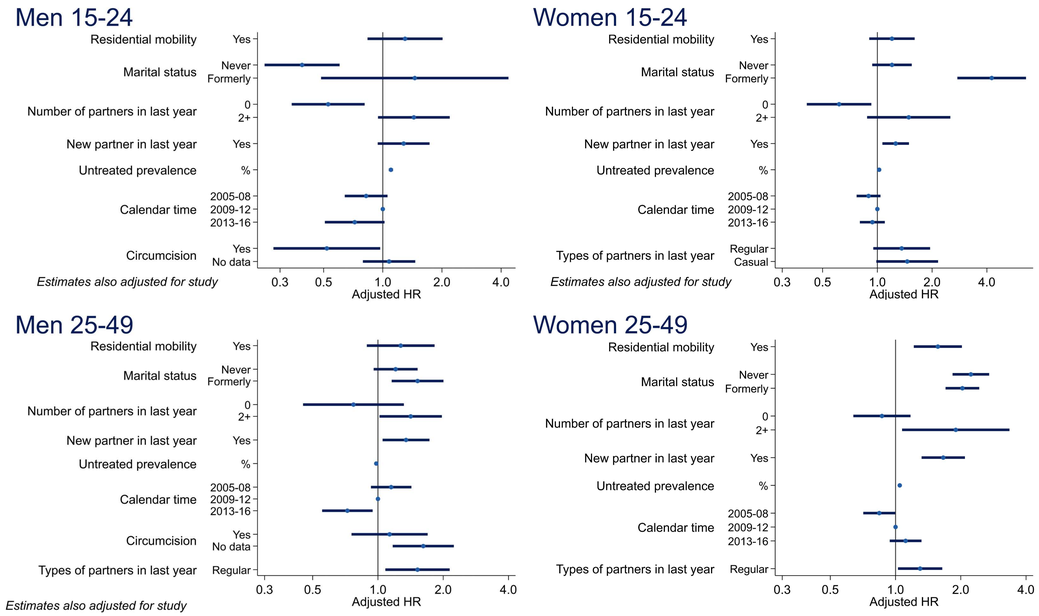

Figure 2: Adjusted HR for HIV incidence for men aged 15-24, men aged 25-29, women aged 15-24 and women aged 25-49

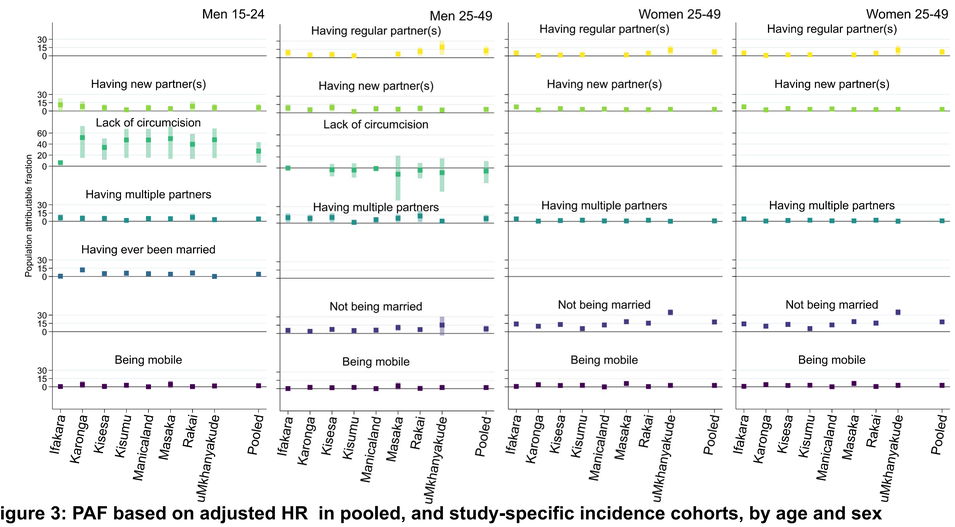

Figure 3: PAF based on adjusted HR in pooled, and study-specific incidence cohorts, by age and sex

Risks differ by age and sex. Largest PAF for circumcision (men 15-24) and being single (men 25-49 & women)

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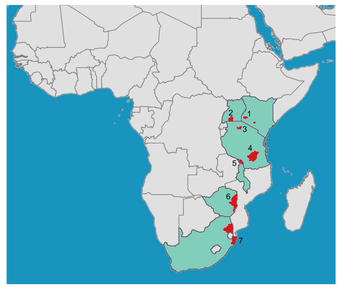

Studies used:
Kenya
(1) Kisumu: CDC/KEMRI (Gem)
Uganda
(2) Rakai: Rakai Community Cohort study
(2) Masaka: Kyamulibwa GPC
Tanzania
(3) Kisesa: Kisesa Cohort study
(4) Ifakara: Ifakara urban DSS
Malawi
(5) Karonga: Karonga DSS
Zimbabwe
(6) Manicaland: Manicaland GPC
South Africa
(7) uMkhanyakude: Population Intervention Platform, AHRI

GPC: General Population Cohort
(H)DSS: (Health and) Demographic Surveillance Study

Figure 4: Map showing location of studies participating in ALPHA and contributing data to this analysis

CONCLUSIONS

- Using harmonised data, risk factors varied by sex and age group.
- PAF shows circumcision most important factor for young men; lack of effect in older men may be because older men were traditionally circumcised or because low-risk men are more likely to be circumcised.
- HR and PAF show that not being married, especially being formerly married is an important risk factor. This mainly affects populations not typically targeted by prevention programmes.
- Heterogeneity in attributable fractions between studies, and age and sex, suggests generic approaches to prevention will have variable impact.

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