



Pregnancy as a risk factor for HIV infection in a rural Tanzanian cohort



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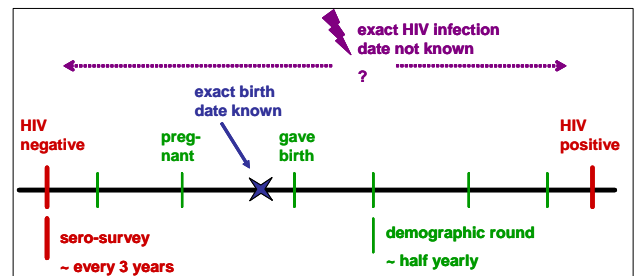
Introduction

HIV prevalence is usually lower in pregnant women, affecting interpretation of ANC surveillance data. In the ART era new laboratory tests are proposed to measure incidence directly. We investigate whether pregnant women experience lower HIV incidence.

Methods

- The Kisesa cohort study conducted 4 rounds of village-based HIV testing (at ~three year intervals) and 19 rounds of demographic surveillance (at ~half year intervals) between 1994 and 2005
- Person-years of HIV negative exposure were calculated for women in each survey interval, classified by pregnancy status, allowing half an inter-test interval of exposure for sero-convertors
- Poisson regression was used to study sero-conversion rates in women experiencing pregnancy in the inter-survey intervals, adjusting for known demographic and behavioural risk factors.
- Mantel-Haenszel tests were used to detect effect modification.

Figure 1: Survey schedule allows precise dating of births, but only approximate dating of sero-conversion



Results

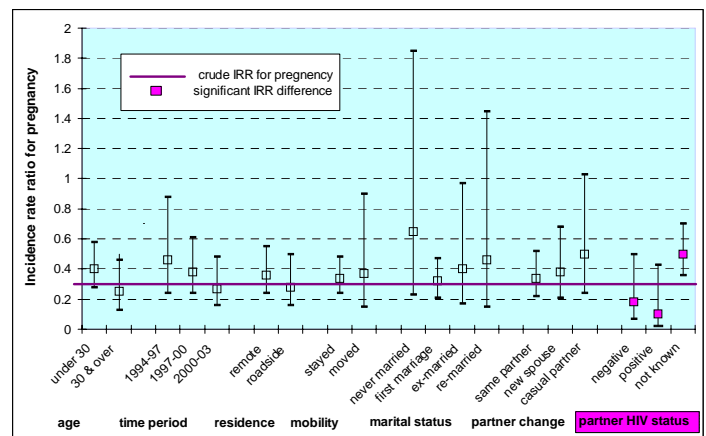
- Women in child-bearing ages (15-44) contributed 17,928 person-years of observation experiencing 5,755 pregnancies
- The crude HIV incidence rate was 1.15% per year for all women [95% CI 1.0-1.3], increasing over time, from 0.8% [0.6-1.1] before 1997, to 1.2% [1.0-1.4] after

- Incidence was lower in inter-survey intervals which included a viable pregnancy: 0.5% [0.4-0.7] compared to intervals which included pregnancies ending in fetal loss: 1.4% [0.8-2.7] or intervals in which no pregnancy occurred: 1.7% [1.4-2.0]
- The pregnancy effect was strengthened after adjusting for possible confounders: crude IRR=0.31 [0.22-0.44], adjusted IRR=0.25 [0.17-0.37] (table 1)
- The only factor significantly modifying this relationship was partner HIV status: pregnancy IRR=0.6 [0.4-0.8] if partner HIV status not known (fig 2)

Table 1: Regression analysis

| Variable | Comparison groups | PY | Crude IRR | [95% CI] | Adjusted IRR | [95% CI] |
|--------------------|-------------------|--------|-----------|---------------|--------------|---------------|
| Age group | under 30 | 10,118 | 1.00 | | 1.00 | |
| | 30 & over | 7,810 | 0.66 | [0.50 - 0.88] | 0.48 | [0.34 - 0.68] |
| Time period | 1994-1997 | 5,068 | 1.00 | | 1.00 | |
| | 1997-2000 | 6,493 | 1.58 | [1.09 - 2.29] | 1.76 | [1.18 - 2.62] |
| | 2000-2003 | 6,367 | 1.52 | [1.04 - 2.20] | 1.58 | [1.05 - 2.37] |
| Residence | remote | 12,726 | 1.00 | | 1.00 | |
| | roadside | 5,202 | 1.38 | [1.04 - 1.83] | 1.24 | [0.93 - 1.65] |
| Mobility | stayed | 14,250 | 1.00 | | 1.00 | |
| | moved | 3,678 | 0.63 | [0.43 - 0.93] | 0.35 | [0.23 - 0.54] |
| Marital status | never married | 2,316 | 1.00 | | 1.00 | |
| | first marriage | 11,883 | 0.59 | [0.40 - 0.86] | 1.75 | [1.11 - 2.76] |
| | ex-married | 1,491 | 1.42 | [0.89 - 2.28] | 2.03 | [1.16 - 3.55] |
| | re-married | 806 | 1.20 | [0.66 - 2.19] | 1.61 | [0.76 - 3.40] |
| Partner change | no change | 12,539 | 1.00 | | 1.00 | |
| | new spouse | 3,308 | 1.97 | [1.42 - 2.71] | 2.03 | [1.33 - 3.11] |
| | casual partner | 2,081 | 2.40 | [1.68 - 3.42] | 2.01 | [1.31 - 3.06] |
| Partner HIV status | negative | 5,364 | 1.00 | | 1.00 | |
| | positive | 346 | 11.8 | [6.2 - 22.6] | 12.9 | [6.6 - 25.5] |
| | not known | 12,218 | 3.55 | [2.26 - 5.59] | 2.58 | [1.54 - 4.33] |
| Pregnancy outcome | not pregnant | 9,213 | 1.00 | | 1.00 | |
| | live birth | 8,020 | 0.31 | [0.22 - 0.44] | 0.25 | [0.17 - 0.37] |
| | fetal loss | 695 | 0.86 | [0.45 - 1.62] | 1.12 | [0.58 - 2.17] |

Figure 2: Comparing incidence rate ratios to detect effect modification



Discussion and conclusion

The strength and consistency of the relationship of incidence with intervals in which pregnancy occurred, leads us to postulate that pregnancy is associated with lower HIV incidence, even though it was not possible to determine whether sero-conversion co-occurred with pregnancy.