Survival following HIV infection in the pre-ART era in a rural Tanzanian cohort

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Introduction

Survival patterns following HIV infection in African populations in the pre-ART era form an important baseline for measuring the future success of treatment programmes. Only two African cohort studies have followed sero-converters for 10 or more years to allow such patterns to be described: the Kisesa open cohort study by NIMR in North West Tanzania, and the Masaka general population cohort study by MRC/UVRI in Southern Uganda[1].

Methods

- The Kisesa open cohort study conducted 4 rounds of village clinic-based HIV testing and 19 rounds of household-based demographic surveillance between 1994 and 2005, prior to local availability of ART
- Approximate infection dates were established for individual sero-converters by randomly allocating a date between last negative and first positive test if tests were less than 3 years apart
- Person-years lived post infection were computed, allowing for left and right censoring, and Kaplan-Meier survival functions constructed
- Weibull models were fitted to estimate median survival time, and parametric regression methods used to investigate the influence of sex and infection age on survival

Results

- 229 sero-converters were identified, providing 752 person-years of follow-up during which 37 deaths were observed
- The proportion surviving 10 years post infection was 0.66, with a 95% confidence interval of 0.52 – 0.76 (fig. 1)
- Fitting a Weibull curve to observed survival patterns generated an overall predicted median survival time of 11.2 years (fig 1)

Figure 1: Kaplan-Meier survival estimates, with fitted Weibull model for out of sample prediction

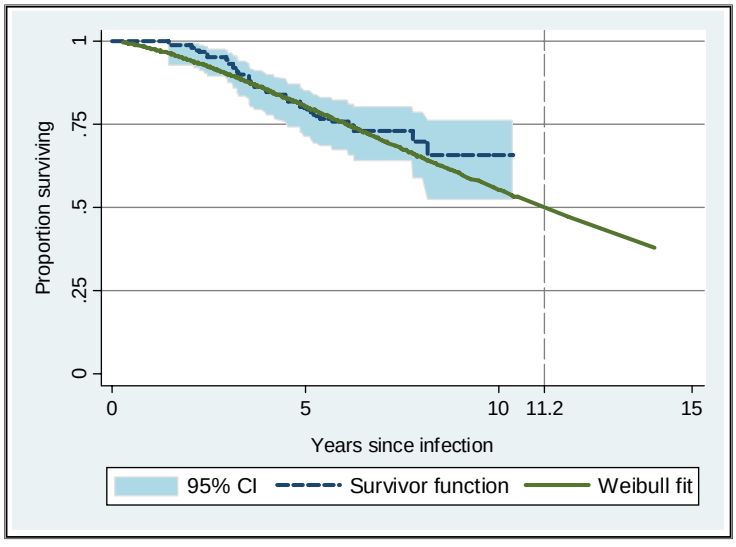
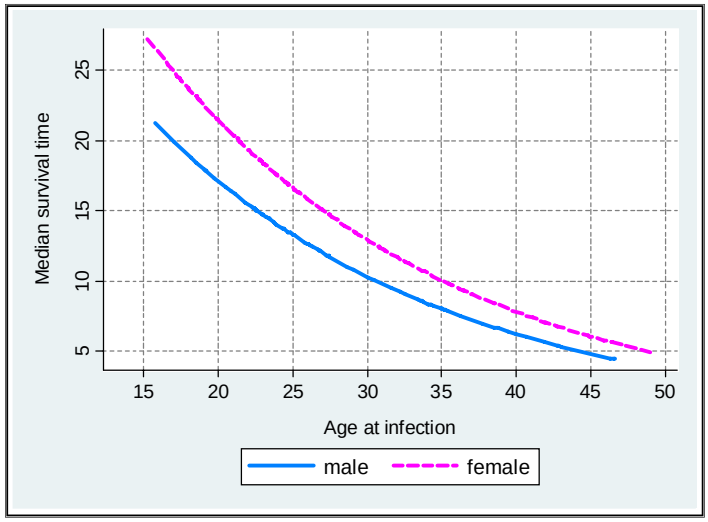


Figure 2: Predicted median survival by sex and age at infection



- Adult mortality for the uninfected, ${}_{45}q_{15}$, was 0.28 [0.24 – 0.32]
- Among uninfected controls matched for sex and age, the proportion surviving for 10 years was 0.97 [0.96 – 0.98]
- Survival was strongly related to age at infection, with an increase in the hazard ratio of 1.08 per year [1.05-1.12] (fig 2)
- Females had a slight advantage over males, with a hazard ratio of 0.7 [0.4 – 1.4] (fig 2)

Discussion and conclusion

Longer survival in Kisesa, median 11.2 years compared to the median of 9.5 years previously reported in Masaka[1], may be partly explained by a younger age at infection in Kisesa (28% sero-converters under 20 compared to 21% in Masaka[1]). Differences in non-HIV related mortality may also be important, as adult mortality in the pre-AIDS era (before 1980) was almost twice as high in Uganda (${}_{45}q_{15}$ = 0.61) as in Tanzania (${}_{45}q_{15}$ = 0.37)[2].

1. Morgan D, Mahe C, Mayanja B, et al. HIV infection in rural Africa: is there a difference in median survival compared to industrialised countries? AIDS 2002;16:597-603
2. UN Population Division. Sex and Age Quinquennial 1950-2050, 1998 revision, Dept. of Economic and Social Affairs, New York, 1998

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