

BACKGROUND:

A lack of male circumcision has been associated with increased risk of human immunodeficiency virus type 1 (HIV-1) acquisition in a number of studies, but questions remain as to whether confounding by behavioral practices explains these results. The objective of the present study was to model per-sex act probabilities of female-to-male HIV-1 transmission (i.e., infectivity) for circumcised and uncircumcised men, by use of detailed accounts of sexual behavior in a population with multiple partnerships.

METHODS:

Data were collected as part of a prospective cohort study of HIV-1 acquisition among 745 Kenyan truck drivers. Sexual behavior with wives, casual partners, and prostitutes was recorded at quarterly follow-up visits. Published HIV-1 seroprevalence estimates among Kenyan women were used to model HIV-1 per-sex act transmission probabilities.

RESULTS:

The overall probability of HIV-1 acquisition per sex act was 0.0063 (95% confidence interval, 0.0035-0.0091). Female-to-male infectivity was significantly higher for uncircumcised men than for circumcised men (0.0128 vs. 0.0051; $P=.04$). The effect of circumcision was robust in subgroup analyses and across a wide range of HIV-1 prevalence estimates for sex partners.

CONCLUSIONS:

After accounting for sexual behavior, we found that uncircumcised men were at a >2-fold increased risk of acquiring HIV-1 per sex act, compared with circumcised men. Moreover, female-to-male infectivity of HIV-1 in the context of multiple partnerships may be considerably higher than that estimated from studies of HIV-1-serodiscordant couples. These results may explain the rapid spread of the HIV-1 epidemic in settings, found throughout much of Africa, in which multiple partnerships and a lack of male circumcision are common.