

Abstract

TUAC0401 - Four cities modelling: #2 the dynamic impact of male circumcision and curable STIs on the heterogeneity of HIV epidemics in sub-Saharan Africa - simulation results

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Background: The heterogeneity of HIV epidemics within sub-Saharan Africa may be explained by differences in the distribution of biological cofactors such as STIs and male circumcision. Unobserved sexual risk behaviours could also be an important determinant.

Methods: The STDSIM model was fitted to the Four Cities Study data for Cotonou, Benin, Yaoundé, Cameroon (low HIV prevalence) Kisumu, Kenya, and Ndola, Zambia (high HIV prevalence). STIs were assumed to increase the per-act probability of HIV transmission by factors ranging from 3 (gonorrhoea and chlamydia) to 25 (chancroid and primary HSV-2). Lack of male circumcision doubled male susceptibility to HIV, syphilis and chancroid. The proportions circumcised in the default scenarios were 100% in Cotonou and Yaounde, 25% in Kisumu and 10% in Ndola. HIV cofactor effects for STIs were removed and the proportions circumcised were varied to determine the simulated impact on HIV spread.

Results: In line with data, the simulated adult HIV prevalences in 1997 for the default scenarios were 3.1%, 7.8%, 28.9% and 27.1% in Cotonou, Yaoundé, Kisumu and Ndola, respectively, but after removing the cofactor effect of chancroid, HIV prevalences in 1997 decreased to 2.9%, 2.0%, 1.8% and 1.9%. Increasing the proportion circumcised in Ndola from 10% to 100% reduced HIV prevalence in 1997 to 7%. If the proportion circumcised in Yaoundé was 0%, HIV prevalence was projected to be 28%. The impact of circumcision on HIV in Ndola was mediated largely through its effect on chancroid. Removing the circumcision cofactor effects for HIV, syphilis and chancroid resulted in HIV prevalences of 25.9%, 24.8% and 6.4%, respectively.

Conclusions: Lack of male circumcision in East Africa may help explain the development of heterogeneous HIV epidemics in SSA. Model simulations suggest this may be due to higher historical chancroid prevalence in uncircumcised populations, although caution is required given the lack of empirical data on chancroid.