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Male Circumcision, HIV and Hepatitis B: Results from the Tanzania HIV Impact Survey

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BACKGROUND

Voluntary medical male circumcision (VMMC) has been widely recognized for its role in protection against HIV infection and other sexually transmitted infections. We used data from the Tanzania HIV Impact Survey (THIS) 2022-2023 to assess association between male circumcision (MC) status and HIV and hepatitis B virus (HBV) infection among sexually active men aged ≥15 years.

METHODS

- **Survey design:** THIS 2022-2023 was a nationally representative, cross-sectional household survey with a multistage sampling design, conducted in Tanzania between November 2022 and March 2023 among persons aged ≥15 years.
- **Measures:** Consenting participants (n=35,957) responded to interviewer-administered questionnaires containing items on sociodemographics, sexual risk behavior, and HIV knowledge; males also self-reported MC status. Participants provided venous blood for point-of-care and laboratory-based biomarker testing.
  - "Circumcised" was defined as self-report of history of medical or traditional circumcision.
  - "Sexually active" was defined as ever having had sex.
  - "HIV knowledge" was analyzed as a dichotomous variable; good knowledge (agreed with both HIV statements in the questionnaire) and poor knowledge (disagreed with either statement or with both).
  - HIV infection was determined though a national rapid two-test rapid algorithm with laboratory confirmation.
  - HBV infection was determined through a core HBV antibody test with confirmatory HBV surface antigen test.
- **Analysis:** We included sexually active males aged ≥15 years with non-missing biomarker results and non-missing MC status in this analysis. We reported population proportion of HIV and HBV infection with 95% confidence intervals (CI). To assess association of MC status with each outcome, we used modified Poisson regression to calculate unadjusted and adjusted prevalence ratios (PR / aPR) with 95% CIs. Analyses employed jackknife survey weights and accounted for complex survey design.

In Tanzania, uncircumcised men had ***twice*** the HIV prevalence compared to circumcised men, highlighting the protective role of ***voluntary medical male circumcision*** in HIV prevention.

There was no significant difference in hepatitis B virus prevalence between the two groups.

RESULTS

Table 1a and 1b. Prevalence of HIV and hepatitis B virus infection among sexually active men aged ≥15 years, overall and by circumcision status – Tanzania, THIS 2022-2023

(a) HIV Infection

	Prevalence (95% CI)	PR (95% CI)	aPR[1] (95% CI)
Overall (n=532)	3.4% (3.1-3.8%)	--	--
Circumcised (n=351)	2.9% (2.5-3.3%)	Ref	Ref
Uncircumcised (n=181)	7.0% (5.7-8.6%)	2.5 (1.9-3.1)	2.1 (1.7-2.8)

(b) Hepatitis B Virus Infection

	Prevalence (95% CI)	PR (95% CI)	aPR[1] (95% CI)
Overall (n=632)	5.0% (4.5-5.6%)	--	--
Circumcised (n=501)	4.9% (4.3-5.4%)	Ref	Ref
Uncircumcised (n=131)	6.0% (4.8-7.5%)	1.3 (0.9-1.6)	1.2 (0.9-1.5)

Abbreviations: CI: Confidence interval PR: Prevalence ratio aPR: Adjusted prevalence ratio
[1]Adjusted Prevalence Ratio is adjusted for age, residence, marital status, education, wealth quintile, and HIV knowledge

RESULTS

- Our analysis included 12,406 men, median (IQR) age 37 (26-51) years, of whom 13.6% (CI: 12.4-15.0%) were circumcised.
- HIV prevalence overall was 3.4% (CI: 3.1-3.8%); 2.9% (CI: 2.5-3.3%) among circumcised men and 7.0% (CI: 5.7-8.6%) among uncircumcised men. HIV prevalence in uncircumcised men was twice the prevalence of circumcised men (aPR: 2.1; CI: 1.7-2.8).
- HBV prevalence overall was 5.0% (CI: 4.5-5.6%); 4.9% (CI: 4.3-5.4%) among circumcised men and 6.0% (CI: 4.8-7.5%) among uncircumcised men. There was no statistical difference in HBV prevalence between uncircumcised and circumcised men (aPR: 1.2; CI: 0.9-1.6).

CONCLUSIONS

In a large, population-based survey in Tanzania, male circumcision status was associated with HIV infection but not with HBV infection in sexually active men. VMMC remains an important strategy for HIV prevention, while complementary public health strategies such as vaccination and education programs may be considered for HBV prevention.

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