LONG-TERM EFFECTIVENESS OF VOLUNTARY MEDICAL MALE CIRCUMCISION FOR HIV PREVENTION

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BACKGROUND

• The efficacy of voluntary male medical circumcision (VMMC) for HIV prevention in men was demonstrated in three randomized trials. This led to the adoption of VMMC as an integral component of the United States President’s Emergency Plan for AIDS Relief (PEPFAR) combination HIV prevention program in sub-Saharan Africa. However, evidence on the individual-level effectiveness of VMMC programs in real-world, programmatic settings is limited.

• Our primary objective was to assess the impact of a PEPFAR-supported VMMC program on the risk of male HIV acquisition over time.

• We hypothesized that VMMC delivered through PEPFAR-supported programs would provide long-term protective effects against male HIV acquisition.

METHODS

• Our study included initially HIV-negative, uncircumcised, non-Muslim men in the Rakai Community Cohort Study (RCCS), a longitudinal population-based study of HIV incidence in south-central Uganda.

• This study included 30 agrarian and semi-urban trading communities continuously surveyed during five survey rounds between 2008 and 2016 (denoted as RCCS study visits 13-17) during which period PEPFAR VMMC programs were implemented and scaled-up.

• The analysis was restricted to non-Muslim men who were uncircumcised at entry into this study period (Figure 1).

• VMMC using the dorsal slit procedure was performed under local anesthesia by trained clinical officers in mobile camps and in five health facilities.

• VMMC status among male RCCS participants was assessed using self-report. Incident VMMCs were defined as those occurring among men who reported being uncircumcised at the prior study visit.

• Information on the exact date of surgery for newly circumcised RCCS participants was unavailable from the RCCS interview. In our primary analysis examining effectiveness of VMMC for HIV prevention, VMMC was assumed to have occurred at the start of the person-interval.

• Our primary study outcome was an incident HIV infection defined as cases in which a man was determined to be HIV-seropositive for the first time after an HIV-seronegative result at the prior visit, allowing for up to one missed study visit between consecutive tests.

• Multivariable Poisson regression with generalized estimating equations was used to estimate the incidence rate ratio (IRR) of HIV acquisition in newly circumcised versus uncircumcised men, adjusting for sociodemographic characteristics and sexual behaviors.

RESULTS

• Risk of HIV acquisition was 53% lower among men who were circumcised through a PEPFAR-supported VMMC program in southern Uganda compared to men who remained uncircumcised.

• The effectiveness of VMMC for HIV prevention was sustained with increasing time from surgery and was similar across age groups and calendar time.

Table 1. Circumcision and HIV incidence

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of incident HIV infections (95% CI)</th>
<th>Incidence Rate per 100 person-years (95% CI)</th>
<th>Crude IRR (95% CI)</th>
<th>Adjusted IRR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-24</td>
<td>118/1209.5 (0.93-1.17)</td>
<td>2.98 (2.50-3.62)</td>
<td>0.41 (0.25-0.64)</td>
<td>0.47 (0.28-0.78)</td>
</tr>
<tr>
<td>25-34</td>
<td>25/3934 (0.64-0.93)</td>
<td>0.64 (0.53-0.75)</td>
<td>1.00 (0.67-1.53)</td>
<td>1.00 (0.67-1.53)</td>
</tr>
<tr>
<td>35+</td>
<td>12/6031 (0.67)</td>
<td>0.67 (0.57-0.77)</td>
<td>0.98 (0.88-1.11)</td>
<td>0.98 (0.88-1.11)</td>
</tr>
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CONCLUSIONS

VMMC programs are highly effective in preventing male HIV acquisition. The observed effectiveness is consistent with efficacy in clinical trials and supports current recommendations that VMMC is a key component of programs to reduce HIV incidence.

ACKNOWLEDGEMENTS

This study was supported by NIAID, NIH, NICHD, PEPFAR through the US Centers for Disease Control, the World Bank, and the Doris Duke Charitable Foundation.