

Male circumcision reduces HIV risk in men - No further evidence needed

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Rituals and theories

Male circumcision can be conducted as part of a religious ritual (after birth or in childhood) or traditional ritual (initiation into manhood); or as a medical procedure (as treatment or prevention of infections, injury or anomalies of the foreskin) (1). According to biological theories, circumcision removes the potential entry site for HIV, by removing the inner surface of the human foreskin which contains cells that attract HIV (2).

Two decades of non-randomised studies and epidemiological association

Prior to 2003, six reviews (3-7) and one meta-analysis (6) had been published, reaching different conclusions on the relationship between male circumcision and HIV infection. In 2003 we published a Cochrane review of 35 observational studies and concluded that insufficient evidence existed to support an interventional effect of male circumcision on HIV acquisition in heterosexual men (8). The review supported previous review findings that the results from existing observational studies showed a strong epidemiological association (relationship) between male circumcision and prevention of HIV, especially among high-risk groups, e.g. STI (sexually-transmitted infections) clinic patients, truck drivers. However, unlike a previous review by Weiss (6), no meta-analysis was performed due to many differences in patient care, research methods and results among studies. In particular, we noted study quality to be very different among studies. No studies included the same combination of potential confounding variables (e.g. age, education, socio-economic status, marital status, number of sexual partners, contact with sex workers, alcohol use, condom use) in their adjusted analyses. We recommended that the results of ongoing randomised controlled trials (RCTs) be awaited before circumcision be implemented as a public health intervention for prevention of sexually transmitted HIV. The Cochrane review was updated in 2005 with two additional observational studies, but the inclusion of these studies did not alter the review conclusions (9).

Trials - from Africa

In 2005 the results of a South African RCT of male circumcision for preventing HIV acquisition in heterosexual men was published (10), followed in early 2007 by the publication of Kenyan (11) and Ugandan (12) RCT results.

Male circumcision as an intervention

In the light of these RCT results, we are now able to assess the efficacy (beneficial result of the intervention under ideal conditions) and safety of male circumcision as an intervention to prevent heterosexual acquisition of HIV infection by men through heterosexual intercourse in the update of our Cochrane review (13).

The three large RCTs, including a total of 11054 men, were conducted in South Africa (3 274 men), Uganda (4 996 men) and Kenya (2 784 men) between 2002 and 2006. All RCTs were conducted on men from the general population and participants were 18 to 24 years old (in two trials) and 15 to 49 years old (in one trial). Circumcision was performed using commonly-used surgical techniques under local anaesthesia. All three trials were stopped early due to significant results from interim analysis (analysis done before the completion of the trial). Although the reported study quality (methodological strength) differed across the three trials, overall the potential for bias (systematic error, or deviation from the truth, in results or inferences) in the trial results was considered to be low to moderate.

Meta-analysis shows reduced risk of HIV

The results from the meta-analysis show that circumcision in heterosexual men significantly reduces their risk of acquiring HIV by 54% over a two year period, compared with uncircumcised men. This reduced risk is the best estimate of the average effect and the true risk will be reduced by between 38 to 66%. The risk of acquiring HIV is reduced by 50% over a one year period, in circumcised compared with uncircumcised men. The true risk will be reduced by between 28 to 66% for this period.

The small amount of variability among trial results is solely due to the play of chance and not due to differences in trial design or methods. Meta-analysis of secondary outcomes (used to estimate additional effects) measuring sexual behaviour (e.g. sexually active, two or more partners, non-marital partner, casual last contact, inconsistent or no condom use, any unprotected sex, alcohol with sex, transactional - in exchange for gifts or services - sex) for the Kenyan and Ugandan trials found no significant differences between circumcised and uncircumcised men. For the South African trial the mean number of sexual contacts at the 12-month visit was significantly higher in the circumcision group (5.9) compared to the control group (5.0) and this difference remained significant at the 21-month visit (7.5 versus 6.4).

Evidence of efficacy and safety

There is strong evidence that medical male circumcision reduces the acquisition of HIV by heterosexual men by between 38% and 66% over the two years following circumcision. The occurrence of complications following the surgical circumcision procedure was very low in all trials, indicating that male circumcision conducted under these conditions is a safe procedure. Current evidence is lacking for whether it also offers protection for women.

Implementation and further research

Policy makers can consider implementing male circumcision as an additional measure in prevention programmes. Policy makers also need to consider the local culture and environment in which circumcision is carried out. In many countries, male circumcision forms part of the rites of initiation by traditional circumcisers who are not trained in aseptic surgical techniques. After traditional circumcisions the number of complications can be high.

Research on the effectiveness of male circumcision for preventing HIV acquisition in heterosexual men is conclusive. No further trials are required. Future research must focus on the effects of male circumcision on the women partners of circumcised men and whether it is protective, neutral or harmful for women partners. Other studies should focus on the feasibility of implementing the procedure into different contexts, the social and cultural issues regarding implementation and the cost-effectiveness of such implementation. The effects of male circumcision on HIV transmission during anal intercourse, both in men who have sex with men and between men and women, remain unclear.

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Glossary of terms

Green S, Higgins J, editors. Glossary. Cochrane Handbook for Systematic Reviews of Interventions 4.2.5 [updated May 2005].

<http://www.cochrane.org/resources/handbook..> Accessed May 28, 2009.

Adjusted analysis: An analysis that controls (adjusts) for baseline imbalances in important patient characteristics. See also confounder.

Cochrane Reviews: Systematic summaries of evidence of the effects of healthcare interventions. They are intended to help people make practical decisions. For a review to be called a 'Cochrane Review' it must be in Cochrane Database of Systematic Reviews or Cochrane Methodology Register. The specific methods used in a Review are described in the text of the review. Cochrane Reviews adhere to a structured format that is described in the Cochrane Handbook for Systematic Reviews of Interventions.

Confounding variable / Confounder: A factor that is associated with both an intervention (or exposure) and the outcome of interest. Randomisation is used to minimise imbalances in confounding variables between experimental and control groups. Confounding is a major concern in non-randomised studies. See also adjusted analysis.

Cost-effectiveness analysis: An economic analysis that views effects in terms of overall health specific to the problem, and describes the costs for some additional health gain (e.g. cost per additional stroke prevented).

Meta-analysis: The use of statistical techniques in a systematic review to integrate the results of included studies.

Observational study: A study in which the investigators do not seek to intervene, and simply observe the course of events. Changes or differences in one characteristic (e.g. whether or not people received the intervention of interest) are studied in relation to changes or differences in other characteristic(s) (e.g. whether or not they died), without action by the investigator.

Review: 1. A systematic review. 2. A review article in the medical literature which summarises a number of different studies and may draw conclusions about a particular intervention. Review articles are often not systematic.

Systematic Review: A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies.