

The Protective Effect of Circumcision in the Transmission of HIV: A New Perspective on an Old Procedure

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In this paper, we set out to address the topic of adult male circumcision as it is used in the prevention of HIV transmission. As with most issues related to circumcision, arguments on both sides of the debate can be quite compelling. We hope to infuse the discussion with some of the relevant published data on circumcision in southern Africa. In this way, we hope to raise the level of understanding of the subject generally, and in the process new ideas and concerns might be brought to light on this new application of an historically dynamic and controversial procedure. Since early in the epidemic of HIV/AIDS, large discrepancies in HIV prevalence within and between countries on the continent of Africa have been noted, and these disparities cannot be readily explained by differences in sexual behavior patterns or the differential presence of sexually transmitted infections (STI's). Neither can the age of the epidemic in the country, nor differences in circulating strains of the virus explain this variation.¹ There is an area of the African continent that has been widely described as the "AIDS Belt", meaning that the highest prevalence of HIV infection can be found in this area. What has been demonstrated in many cases is that this area of the continent is comprised of societies that do not practice male circumcision.

Male circumcision is widely practiced in West Africa, where HIV prevalence tends to be lower. The exceptions are ethnic groups centering on Abidjan and Cote d'Ivoire, where HIV prevalence is highest in West Africa. Thirty percent of major sub-Saharan African societies do not traditionally practice male circumcision. Most of these tribes are clustered in eastern and southern Africa, where it appears that HIV prevalence is the highest. In Botswana, for example, male circumcision was once universally practiced, but was abandoned during colonial rule, and now the country has one of the highest rates of HIV in the world.²

This kind of association between male circumcision and HIV transmission is not seen in Europe, where most men are not circumcised, or in North America, where most men are circumcised. This is presumed to be in part because in these areas, HIV transmission is primarily related to intravenous drug use (IVDU) or receptive anal sex, most commonly seen in homosexual relationships. In Africa and parts of Asia, however, the epidemic is driven by heterosexual sex. Countries with less than twenty percent of men

circumcised have HIV prevalence rates several times higher than countries in which more than eighty percent of men get circumcised.³

There is biological evidence that circumcision may be protective. In the mid-nineteenth century, the removal of foreskin was shown to decrease susceptibility of men to STI's.⁴ The foreskin is a moist, warm area that can harbor bacteria and viruses. It is an area that is vulnerable to micro abrasions during intercourse. Moreover, the foreskin area contains high concentrations of CD4+ T-Lymphocytes, Langerhan cells, and macrophages. These types of cells are particularly receptive to the uptake of HIV particles⁵. Rates of sexually transmitted diseases such as genital herpes, syphilis, human papilloma, and chancroid are higher in uncircumcised men.⁶

It has long been understood that the presence of an STI greatly increases the risk of HIV transmission. This is why the treatment of STI's has been adopted as part of the global strategy to prevent HIV.¹ The positive effect of circumcision in the protection against HIV is especially strong among groups that have high rates of STI's, reinforcing the relationship between HIV and STI's, and establishing a possible rationale for the protective power of male circumcision. A study of transport workers in Kenya found a significantly lower incidence of genital ulcer disease in circumcised men (6.5/1000) than in uncircumcised men (15.2/1000), after adjusting for confounders. The primary demonstrated cause for elevated rates of HIV transmission through sexual contact is the presence of genital ulcer diseases and this seems to be the backdrop in southern Africa and a raging heterosexual epidemic not duplicated in other parts of the continent and, for instance, in poor people in wealthier nations.⁷

The Orange Farm study, a randomized controlled trial assessing the effectiveness of male circumcision in preventing HIV transmission, was conducted in a semiurban region near Johannesburg, South Africa. The dramatic results of this study showed that circumcision conferred a high level of protection against HIV transmission on heterosexual men. The level of protection was equal to that of a highly effective vaccine.⁸ Indeed, the protective effect was so high that the study was halted early and the control group was offered the procedure.

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The international health community felt it was prudent to wait for the results of two other active randomized, controlled studies to publish their results before they made recommendations.¹ Those two studies, one in Uganda and one in Kenya, have now published their results. It would seem that the relationship between male circumcision and transmission of HIV from females to males was confirmed in these studies.^{4,9} These three randomized controlled trials demonstrated that male circumcision decreased the incidence of HIV acquisition by 48 to 60% over the mean follow-up of 18 months.¹⁰

There has recently been a study looking into the feasibility of cheap and easy (and safe) circumcision. A group of urologists developed a procedure that they were able to utilize effectively in an African medical setting, in Kisumu District, Kenya.¹¹ The surgeons developed a single-use, disposable device, with no electrocautery. All of the instruments and supplies were purchased locally. They used, widely available technology. Very little training was necessary to teach local clinicians how to perform this procedure. Their infection rate was 1.3% and their excess bleeding rate was 0.8%, which is comparable to the rates in the developed world. Circumcision may be one of the keys to reducing the number of HIV infections in a population that is experiencing a generalized epidemic. Indeed, mathematical modeling of future HIV prevalence rates assumes that 100% of men get circumcised, but it does not assume that anyone changes behavior. This amounts to a public health measure that is not carried out for the benefit of the person who undergoes the procedure as much as it is done for future generations.

Male circumcision MC could avert 2.0 (1.1–3.8) million new HIV infections and 0.3 (0.1–0.5) million deaths over the next ten years in sub-Saharan Africa. In the ten years after that, it could avert a further 3.7 (1.9–7.5) million new HIV infections and 2.7 (1.5–5.3) million deaths, with about one quarter of all the incident cases prevented and the deaths averted occurring in South Africa.¹²

Male circumcision can prevent between 2 to 8 million new HIV infection, producing savings of \$2 billion over the next 20 years.^{8,14} In their publications recommending the addition of adult male circumcision to the list of strategies used against the spread of HIV, the Joint United Nation Programme on HIV/AIDS (UNAIDS) emphasizes that this procedure is not meant to replace any existing prevention programs. They stress that circumcision must only be carried out with the knowledge that the protection is partial. The policies advocating the correct and consistent use of condoms, delayed sexual debut, limited of number of sexual partners, avoidance of penetrative sex, and voluntary counseling and testing are meant to continue unabated.¹⁵ The procedure is to be incorporated into

prevention programs where appropriate and safe medical care can be carried out. The institution, and in many cases the reinstitution, of circumcision into the lives of millions of African men will not be brought about without first surmounting enormous cultural, economic, and logistical challenges. Healthcare in many resource poor areas of the world is disturbingly under funded, understaffed, and unsafe. As a result, circumcisions carried out in medical facilities can in some parts of Africa have similar rates of complications as those procedures done in the community by a traditional healer.⁴

Additionally, circumcision has historically occurred as part of lengthy and involved event that plays an important role in the ritual transition from boys to responsible, respectful men, though this rite of passage has been eroded by changes brought about by globalization.^{17,18} Medical circumcision, as opposed to traditional circumcision, does not incorporate the aspects of social development, and thus does not in itself influence sexual behavior.

Despite the myriad challenges, many men in areas of historically low rates of circumcision are willing to be circumcised.³ It may be that the specter of a continuing or worsening epidemic in many communities is enough to bring about a fundamental transformation in the current understanding of circumcision.

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