**Table 1:** Studies addressing the association between male circumcision and HIV transmission in SSA countries.

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| **Author/s, Year** | **Study design, population** | **Title** | **Key findings** |
| Grund, et al. [[7](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(17)30369-8/fulltext)] | Systematic reviews; 60 publication (sub-Saharan Africa-studies up to April 2016) | Association between male circumcision and women’s biomedical health outcomes: a systematic review | Although the evidence shows a protective association with HIV, it was categorised as low consistency, because one trial showed an increased risk to female partners of HIV-infected men resuming sex early after male circumcision. |
| Makatjane, et al. [[27](https://dhsprogram.com/pubs/pdf/WP125/WP125.pdf)] | Cross-sectional Sample (n = 2283 sexually active males), Lesotho | MC and HIV in Lesotho: Is the Relationship Real or Spurious? Analysis of the 2009 DHS | Medically circumcised men have lower odds of HIV infection than uncircumcised men. Odds of HIV infection among traditionally circumcised men were similar to those of uncircumcised. |
| Ediau, et al. [[22](https://www.ncbi.nlm.nih.gov/pubmed/25556374)] | Case-control study (HIV Infected = 155 vs. Controlled group HIV infected = 155), Uganda | Risk factors for HIV infection among circumcised men in Uganda: a case-control study | Being circumcised at adulthood >18 years (AOR = 5.0, 95% CI = 2.4-10.2), resumption of sexual intercourse before would healing (AOR = 3.4, 95% CI = 1.6-7.3), inconsistent condom use (AOR = 2.7, 95% CI = 1.5-5.1) were significantly associated with HIV infection post-circumcision. |
| Ombere, et al. [[23](https://www.ncbi.nlm.nih.gov/pubmed/25774858)] | Qualitative study Semi-structured interviews (n = 101) IDI (n = 10), Kenya | Wimbo: implications for risk of HIV infection among circumcised fishermen in Western Kenya | Men develop false belief that circumcision provides protection against HIV infection post-circumcision. The prevalence of condom use reported very low among migrant fishermen and that risky sexual behaviour was very high post circumcision. |
| Mauughan-Brown, et al. [[8](https://www.ncbi.nlm.nih.gov/pubmed/25155700)] | Randomised control trial Treatment group (n = 609), Control group (n = 619), Malawi | What Do people Actually Learn from public Health Campaigns? Incorrect Inferences about male circumcision and Female HIV infection Risk Among men and Women in Malawi | Men randomly assigned to receive information about the protective benefits of circumcision were more likely to adopt the erroneous beliefs that MC reduces HIV risk for men. |
| Kim and Poulin, et al. [[28](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3706459/)] | Cross-sectional (N = 3400), Malawi | Ethnic identity, region, and attitudes toward male circumcision in a high HIV–prevalence country | Attitudes toward circumcision varied by ethnicity and region. Acceptance of circumcision as a tool for HIV prevention divided by ethnoregional identities that also shape the practice of circumcision. |
| Greely, et al. [[16](https://www.ncbi.nlm.nih.gov/pubmed/23140158)] | Qualitative (FGD = 15), South Africa | Traditional male circumcision for reducing the risk of HIV infection: perspectives of young people in South Africa | Concerns raised post MC included: effects of botched traditional circumcision, risky sexual  behaviour involving multiple sexual partners and non-condom use exhibited by some men after circumcision. |
| Sakutukwa, et al. [[26](https://www.ncbi.nlm.nih.gov/pubmed/23815101)] | Qualitative FGD in Zimbabwe (n = 4) FGD in South Africa (n = 4) | Understanding and addressing socio-cultural barriers to medical male circumcision in traditionally non-circumcising rural communities in sub-Saharan Africa | Concerns about the impact of HIV on communities resulted in willingness to consider adult male circumcision. Adult MC-promotional messages that create a synergy between understandings of both traditional and medical circumcision will be more successful in these  communities. |
| Ayiga, et al. [[24](https://www.ncbi.nlm.nih.gov/pubmed/22649434)] | Cross-sectional (data from Botswana AIDS Impact Survey N = 1257 men), Botswana | Impact of male circumcision on HIV risky compensation through the impediment of condom use in Botswana | Circumcised males less likely to use Condom at the last sexual intercourse than uncircumcised males (AOR = 1.34, 95% CI: 0.82-2.15). |
| Gebremedhin S [[40](https://www.ncbi.nlm.nih.gov/pubmed/23237641)] | Cross-sectional Demographic Health Surveys (DHS) 18 countries (n = 70,554 males aged 15 - 59 years) | Male circumcision and its association with HIV infection and sexually transmitted diseases: evidence from 18 demographic and health surveys in sub-Saharan Africa | Uncircumcised status was significantly associated with risk of HIV, with odds ratio (OR) of 4.12 (95% CI: 3.85 - 4.42). The association was even more significant 4.95 (95% CI: 4.57-5.36) after adjustment for number of lifetime sexual partners and socio-demographic variables. |
| Bailey, et al. [[15](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1489185/)] | Qualitative study FGD | The acceptability of male circumcision to reduce HIV infections in Nyanza Province, Kenya | Barriers to acceptance of male circumcision included cultural identification, fear of pain and  excessive bleeding and cost. To be accepted, both men and women were eager for promotion of genital hygiene and male circumcision, and they prefer medical circumcision than traditional. But they believe clinicians lacked the knowledge and resources to offer safe circumcision counselling and services. |
| Obure, et al. [[25](https://nsuworks.nova.edu/tqr/vol14/iss4/)] | Qualitative study 24 FDG with Luo men, Kenya | Psychosocial Factors Influencing Promotion of MC for HIV Prevention in a Non-Circumcising Community in Rural Western Kenya. | Perceived barriers to circumcision were pain and healing complications, cultural identity, and reduced sexual satisfaction; perceived facilitators were hygiene, HIV/STI risk reduction, ease in condom use, cultural integration, and sexual satisfaction. |
| Wawer, et al. [[32](https://www.ncbi.nlm.nih.gov/pubmed/19616720)] | RCT Intervention; (n = 474) Control; (n = 448). | Circumcision in HIV-infected men and its effect on HIV transmission to female partners in Rakai, Uganda: a randomised controlled trial. | The trial was stopped early because of futility. 92 couples in the intervention group and 67 couples in the control group were included in the modified ITT analysis. 17 (18%) women in the intervention group and eight (12%) women in the control group acquired HIV during follow-up (p = 0.36). |
| Siegfried, et al. [[21](https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003362.pub2/information)] | Systematic reviews; 24 studies retrieved (Sub-Saharan Africa- studies up to June 2007) | Male circumcision for prevention of heterosexual acquisition of HIV in men | There was a strong epidemiological association between male circumcision and prevention of HIV (a relative risk reduction of acquiring HIV of 50%), especially among high-risk groups. |
| Bailey, et al. [[41](https://www.ncbi.nlm.nih.gov/pubmed/18797642)] | Prospective study (n = 1007 men interviewed post-circumcision season) | Male circumcision for HIV prevention: a prospective study of complications in clinical and traditional settings in Bungoma, Kenya | Of 443 circumcised traditional, 156 experienced an adverse event compared to 99 (559) circumcised clinically (OR, 2.53; 95% CI. 1.89-3.38) |
| Londish, et al. [[29](https://www.ncbi.nlm.nih.gov/pubmed/18316348)] | Mathematical model simulation | Significant reduction in HIV prevalence according to male circumcision intervention in Sub-  Saharan Africa | Complete coverage of MC could reduce HIV prevalence from 12 to 6% for an average population in SSA |
| Tussime [[42](https://www.ncbi.nlm.nih.gov/pubmed/18800244)] | Systematic review; 13 studies, from 1997-2007 (Sub-Saharan Africa) | Circumcision and HIV infection: Assessment of causality | 13 studies were included: Circumcised men had a reduced risk of HIV infection by (RR = 0.42, 95% CI 0.33-0.53) |
| Mattson, et al. [33] | Qualitative study in-depth interviews about sexual behavior post circumcision. | Risk compensation, male circumcision, and HIV prevention in Kisumu, Kenya. | No evidence of differential risk reduction between circumcised and uncircumcised men 6 or 12 months post-enrolment. Thus, there was no evidence of risk compensation |
| Lukobo, et al. [[36](https://www.ncbi.nlm.nih.gov/pubmed/17453585)] | Qualitative study 24 FGD in four districts, Zambia | Acceptability of male circumcision for prevention of HIV infection in Zambia. | In communities where circumcision is little practiced, the main facilitators for acceptance were improved genital hygiene, HIV/STI prevention, and low cost. The main barriers were cultural tradition, high cost, pain, and concerns for safety. Acceptability of male circumcision for STI and HIV prevention appears to be high in Zambia. |
| Bailey, et al. [[9](https://www.ncbi.nlm.nih.gov/pubmed/17321310)] | RCT Intervention group (circumcision; n = 1391) Control group (circumcision, 1393), Kenya | Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. | The protective effect of circumcision was 60% (32-77). No behavioural risk compensation after circumcision was observed. |
| Brewer, et al. [[17](https://www.ncbi.nlm.nih.gov/pubmed/17320788)] | Cross-national DHS Sample, (n = not known) adolescence, Kenya, Tanzania, Lesotho | Male and Female Circumcision Associated with Prevalent HIV infection in Virgins and adolescents in Kenya, Lesotho, and Tanzania | Among adolescents, regardless of sexual experience, circumcised males and females were substantially more likely to be infected than uncircumcised virgins. HIV transmission may occur through circumcision-related blood exposures in eastern and Southern Africa |
| Agot, et al. [[18](https://www.ncbi.nlm.nih.gov/pubmed/15127907)] | Prospective cohort study- comparison of sexual behaviours of (n = 324 circumcised) (n = 324 uncircumcised men), Kenya | Male Circumcision in Siaya and Bondo Districts, Kenya: Prospective Cohort Study to Assess Behavioural Disinhibition Following Circumcision | No difference in risky sex behaviours between circumcised and uncircumcised men |
| Drain and Halperin [[43](https://www.ncbi.nlm.nih.gov/pubmed/10577659)] | Cross-sectional study (Data from 118 DHS) | Male circumcision, religion, and infectious diseases: an ecologic analysis of 118 developing countries | Male circumcision was strongly associated with lower HIV prevalence among countries with primarily heterosexual transmission |
| Dowsetter, et al. [[44](https://www.ncbi.nlm.nih.gov/pubmed/17512372)] | Systematic reviews (Sub-Saharan Africa) | MC and HIV prevention: is there really enough of the right kind of evidence? | No much evidence found of the association between male circumcision and reduced HIV infection |
| Williams, et al. [[15](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1489185/)] | Dynamic simulation models National data | The potential impact of male circumcision on HIV in sub- Saharan Africa | Male circumcision was associated with decreased HIV infection among circumcised compared with uncircumcised males, MC may increase the proportion of infected people among women. |
| Auvert, et al. [[11](https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0020298)] | RCT with three follow-up visits (n = 3274 uncircumcised men) N = 1582 control group N = 1546 intervention group, South Africa | Randomised Controlled Intervention Trial of Male Circumcision for Reduction of HIV Infection Risk: The ANRS 1265 Trial | Male circumcision offers some protection against HIV infection, by 61% (95% CI: 34-77%) after controlling for risk sexual behaviour and non-condom use. Other findings: complications reported in the trial were pain, excessive bleeding, and infection, damage to penis, excessive skin removal, insufficient skin removal, delayed healing, and problems with urination. |
| Kiwanuka, et al. [39] | Randomized control trial Sample (n = 136 men), Uganda | Circumcision for HIV of a pilot study in Rakai, Uganda. | No male circumcision complications reported |
| Auvert, et al. [[19](https://journals.lww.com/aidsonline/Fulltext/2001/08004/Male_circumcision_and_HIV_infection_in_four_cities.4.aspx)] | Cross-sectional population based study in Cotonou (Benin) and in Yaoundé (Cameroon), Kisumu (Kenya) and in Ndola (Zambia) | Male circumcision and HIV infection in four cities in sub-Saharan Africa | In Cotonou and in Yaoundé, the two low HIV prevalence cities, 99% of men were circumcised. In Kisumu 27.5% of men were circumcised, and in Ndola this proportion was 9%. In Kisumu, the prevalence of HIV infection was 9.9% among circumcised men and 26.6% among uncircumcised men. |
| Gray, et al. [[31](https://www.ncbi.nlm.nih.gov/pubmed/11089626)] | Cohort study Sample (n = 5507), Uganda | Male circumcision and HIV acquisition and transmission: cohort studies in Rakai, Uganda. Rakai Project Team. | Circumcision significantly associated with reduced HIV acquisition (RR 0.53, CI 0.33-0.87). Prepubertal circumcision significantly reduced HIV acquisition (RR 0.49, CI 0.26-0.82), but post pubertal circumcision did not. In discordant couples with HIV-negative men, no seroconversion occurred in 50 circumcised men. In couples with HIV-positive men, HIV  transmission was significantly reduced in circumcised men. |
| Weiss, et al. [[4](https://www.ncbi.nlm.nih.gov/pubmed/11089625)] | Systematically review of studies published up to April 1999 sub-Saharan Africa (n = 27 studies) | Male circumcision and risk of HIV infection in sub-Saharan Africa: a systematic review and meta-analysis. | 27 studies were included. Of these 21 showed a reduced risk of HIV infection among circumcised men (RR = 0.55, 95% CI 0.40-0.68). The strongest association is seen among men at high risk of HIV (RR = 0.27, 95% CI 0.20-0.41). |
| O’Farrell, et al. [[35](https://www.ncbi.nlm.nih.gov/pubmed/10726934)] | Systematic review- 33 diverse studies (Sub-Saharan Africa) | Circumcision in men and the prevention of HIV infection: a `meta analysis’ revisited | This re-analysis support the contention that male circumcision offer protection against HIV infection- particularly in high-risk groups where genital ulcers and other STDs `drive’ the HIV epidemic. |
| Van Howe, et al. [[45](https://www.ncbi.nlm.nih.gov/pubmed/10215123)] | Systematic review (Sub-Saharan Africa) | Circumcision and HIV infection: review of the literature and meta- analysis | A meta-analysis was performed on the 29 published articles where data were available. When the raw data are combined, a man with a circumcised penis is at greater risk of acquiring and transmitting HIV than a man with a non-circumcised penis OR =1.06, 95% CI, (1.01-1.12). Based on the reviewed studies, recommending male circumcision as prevention  strategy of HIV is unfounded. |
| Moses, et al. [[3](https://www.ncbi.nlm.nih.gov/pubmed/2262266)] | Cross-sectional DHS, 41 countries | Geographical patterns of male circumcision practices in Africa: association with HIV sero-prevalence. | In locations where male circumcision is practised, HIV sero-prevalence was considerably lower than in areas where it is not practised. This study supports the hypothesis that lack of circumcision in males is a risk factor for HIV transmission. |
| Kelly, et al. [[30](https://www.ncbi.nlm.nih.gov/pubmed/10199231)] | Cross-sectional (n = 6821) | Age of male circumcision and risk of prevalent HIV infection in rural Uganda. | Prepubertal circumcision is associated with reduced HIV risk, whereas circumcision after age 20 years is not significantly protective against HIV-1 infection. |
| Bongaarts, et al. [[46](https://www.ncbi.nlm.nih.gov/pubmed/2502151)] | Literature review (Sub-Saharan Africa) | The relationship between male circumcision and HIV infection in African populations | In 5 countries where more than 3 quarters of males were estimated to be uncircumcised, the average HIV prevalence was 16.4%. Among the 20 countries where more than 90% of males were circumcised, the average sero-prevalence was 0.9% |