

Co-infection of human immunodeficiency virus and sexually transmitted infections in circumcised and uncircumcised cases in India

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Abstract

Background: Acquired Immunodeficiency Syndrome (AIDS), is now one of the greatest challenges facing the world. Sexual transmission is the primary route of human immunodeficiency virus infection worldwide. Male circumcision is being considered as strategy to reduce the burden of HIV/AIDS. **Material and Methods:** The present study was conducted on 200 HIV positive clients. They were screened for bacterial causes of STIs (*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum* and *Gardnerella vaginalis*). **Results:** There were 138 males and 62 females. The males were examined and the circumcision status was observed. In the females, circumcision status of their male partners was observed. The coinfection of HIV and STIs in circumcised and uncircumcised cases was found out. Diagnosis was made using standard tests. A total of 23% cases were diagnosed to have HIV –STI coinfection. Most common diagnosed diseases were Chlamydia (10%), Gonorrhoea (9%), Bacterial Vaginosis (4.8%) and Syphilis (2.5%). The coinfection rate in uncircumcised cases was found to be higher (29.2% in males and 39.2% in females) as compared to the circumcised cases (14.2% in males and 13.6% in females). **Conclusion:** The present study suggests that circumcision is a protective factor for acquisition of STIs in HIV positive clients but other factors like sexual behaviours, use of barrier contraceptives, drug abuse etc also play a role.

Key words: Bacterial vaginosis, circumcision, human immunodeficiency virus, sexually transmitted infections, syphilis

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS), is now one of the greatest challenges facing the world. Since the detection of the first case in 1981, this epidemic has been the most devastating. As of 2011, it is estimated that there are 34 million people worldwide living with human immunodeficiency virus (HIV)/AIDS, with 2.5 million new HIV infections per year and 1.7 million annual deaths due to AIDS.^[1]

Sexual transmission is the primary route of HIV infection worldwide. Women comprise a large number of the newly diagnosed AIDS patients in the United States. About 75% of the 13 million HIV-infected women in the world are infected through heterosexual transmission and most are of reproductive age.^[2] Sexually transmitted co-infections pose considerable health threats to people living with HIV/AIDS. Sexually transmitted infections (STIs) (namely *gonorrhea*, *Chlamydia*, herpes, syphilis) seem to contribute significantly to HIV burden.^[3]

Male circumcision reduces the risk of acquiring HIV in a man from an infected female partner. It also lowers the risk of other STIs, penile cancer and infant urinary tract infection.^[4] Aaron Fink, an American Urologist, in 1986 first claimed that the penile foreskin increases the risk of HIV infection

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since it is less keratinized. This led to a debate over the role of circumcision in prevention of HIV.^[5,6] Several studies have been conducted all over the world to prove this hypothesis, but the results have been inconsistent.

Aims and objectives

1. To screen the new HIV positive clients for bacterial causes of STIs (*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum* and *Gardnerella vaginalis*)
2. To determine the co-infection of HIV and bacterial STIs in circumcised and uncircumcised sexually active males, and in females having circumcised or uncircumcised male partners.

MATERIALS AND METHODS

The study was conducted in the ICTC, Department of Microbiology, LHMC, from November 2011 to March 2013. A total of 200 cases of the age group 15-49 years were included in the study. The study was ethically approved.

Specimens collected were blood, urethral swab, vaginal, endocervical and rectal swab (in cases with recent anal intercourse).

NACO guidelines (strategy III) were used for diagnosis of HIV. Pre- and post-test counseling was provided to all patients. *Chlamydia* was diagnosed using commercially available one step rapid antigen detection kit (Standard Diagnostics, Inc., Korea) and antibody detection kit (IgM and IgG) (DRG Diagnostics, Germany), according to the manufacturer's guidelines. For diagnosis of *gonorrhoea*, Gram stain was made, and culture was done on chocolate agar. Syphilis was diagnosed using RPR (Span Diagnostics, India). A Gram stain was made for diagnosis of bacterial vaginosis using Nugent's criteria.

The circumcision status of males was observed and recorded in the proforma. For females, circumcision status of their male partner was recorded.

Statistical analysis of data was performed using SPSS Software (version 20, IBM). $P < 0.05$ was considered as significant.

RESULTS

There were 138 males (69%) and 62 (31% females). The co-infection of HIV and bacterial STIs was found in 23% cases. The most common were *Chlamydia* 10% followed by *gonorrhoea* 9%, bacterial vaginosis

4.8%, and syphilis 2.5%. In males, *gonorrhoea* (11.5%) was most frequently diagnosed followed by *Chlamydia* (8.6%) and syphilis (2.8%). Among the females, *Chlamydia* (12.9%) was the most common disease followed by bacterial vaginosis (4.8%), *gonorrhoea* (3.2%) and syphilis (1.6%) [Figure 1].

The co-infection of HIV and STI in circumcised males was found to be 14.2% as against 29.2% in uncircumcised males. The co-infection in females with circumcised male partners was 13.6% when compared to 39.2% in females with uncircumcised partners.

Co-infection of *Chlamydia* was found in 5.3% of circumcised males against 10.9% in uncircumcised males. In females, *Chlamydia* disease was present in 9% of females with circumcised male partners and 21.4% in those with uncircumcised male partners. *Gonorrhoea* was diagnosed in 7.1% of circumcised males when compared to 14.6% in uncircumcised males, 0% in females with circumcised male partners and 7.1% in females with uncircumcised male partners. Syphilis was diagnosed in 1.7% circumcised males and 3.6% in uncircumcised males. None of females with circumcised male partners had syphilis, whereas 3.5% with uncircumcised male partner had syphilis. Among females with circumcised male partners 4.5% had bacterial vaginosis as compared to 7.1% in females with uncircumcised male partners [Table 1 and Figure 2].

DISCUSSION

There is a strong evidence of association between HIV and STI infection.^[7-10] Male circumcision has been considered as a measure to reduce the burden of STI and HIV acquisition.^[5,6] Several studies have reported varied results.

In our study, co-infection of HIV and bacterial STIs was found in 23% cases. This was higher than that

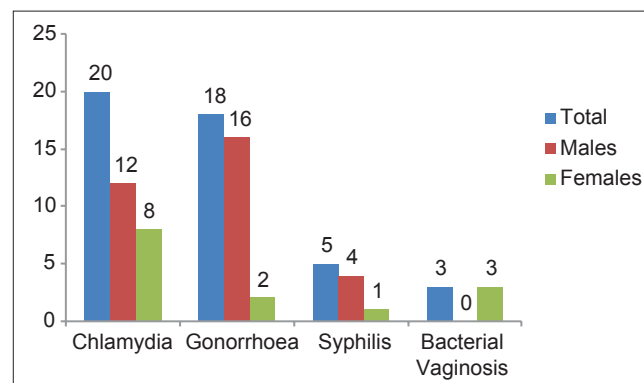


Figure 1: Co-infection of human immunodeficiency virus and sexually transmitted infections

Table 1: Co-infection of HIV and STIs in circumcised and uncircumcised cases

Diseases and cases	<i>Chlamydia</i> (%)	<i>Gonorrhoea</i> (%)	Syphilis (%)	Bacterial vaginosis (%)	Total (%)
Males					
Circumcised	3 (5.3)	4 (7.1)	1 (1.7)	-	8 (14.2)
Uncircumcised	9 (10.9)	12 (14.6)	3 (3.6)	-	24 (29.2)
Females					
Circumcised partner	2 (9)	0 (0)	0 (0)	1 (4.5)	3 (13.8)
Uncircumcised partner	6 (21.4)	2 (7.1)	1 (3.5)	2 (7.1)	11 (39.2)

STIs=Sexually transmitted infections; HIV=Human immunodeficiency virus

reported by Kalichman *et al.*, who found that mean point prevalence of STI and HIV co-infection in the world lies between 10% and 16%. He also reported that the prevalence varies in different regions of the world; in Africa 11.3%, Asia 17.4%, Europe 14.7%, and North America 16.1%.^[13]

Machekano *et al.* proved that the greatest prevalence of HIV and STI co-infections occur among individuals newly diagnosed with HIV. Studies of people who tested HIV positive at the time of STI testing found an average STI prevalence of 19.6%. The prevalence in our study was higher probably because we had included only new HIV diagnosed cases.^[11]

In our study, the most common co-infections were *Chlamydia* 10% followed by *gonorrhoea* 9%, bacterial vaginosis 4.8% and syphilis 2.5%.

Kalichman *et al.* reported that all over the world, the most common co-infections were found to be syphilis and *gonorrhoea* (9.5% each) followed by *Chlamydia* (5%).^[13] In our study the prevalence of *gonorrhoea* was 9%, which is close to that shown by Kalichman *et al.*, the prevalence of *Chlamydia* was 10% in our study, which was more than that shown by Kalichman *et al.*^[13] However, Kouri *et al.* had reported similar results in a study in Cuba where they found prevalence of *Chlamydia* in HIV positive people to be 10% which is close to that found in our study.^[12]

In our study, the prevalence of STI in uncircumcised cases was found to be higher (29.2% in males and 39.2% in females) when compared to the circumcised (14.2% in males, 13.6% in females) cases. The difference was found to be statistically significant ($P < 0.05$). this was in accordance with the study conducted by Diseker *et al.* who had reported that the uncircumcised men were significantly more likely than circumcised men to

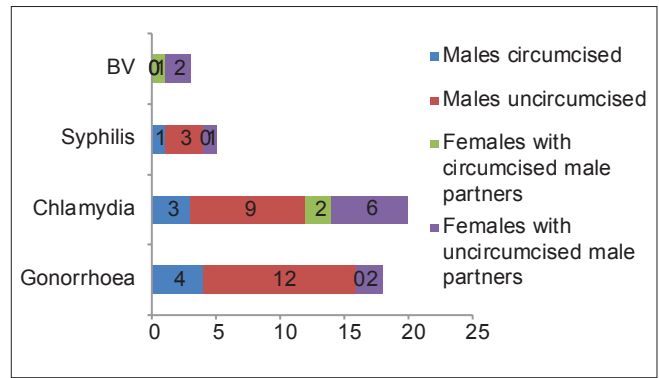


Figure 2: Co-infection of human immunodeficiency virus and sexually transmitted infections in circumcised and uncircumcised cases

have *gonorrhoea* (odds ratio [OR] 1.3, 95% confidence interval [CI], 0.9-1.7).^[13] However, they also reported that there was no association between lack of circumcision and *Chlamydia* infection (OR, 1.0, 95% CI, 0.7-1.4) The results of our study did not match that found by Cook *et al.* who reported that no significant differences between uncircumcised and circumcised men were observed for prevalence of nongonococcal urethritis, (30.2% vs. 32.7%), genital herpes (8.8% vs. 8.7%), or urethral infection with *C. trachomatis* (7.2% vs. 6.4%).^[14]

Several studies have been conducted to prove the role of circumcision in prevention of HIV. For example: Gray *et al.* who reported that the incidence of HIV was significantly lower in the circumcised men (1.1/100 person-years), compared with the uncircumcised men (1.8/100 person-years).^[15] Bailey *et al.* had also reported HIV incidence of 2.1% in the circumcised group and 4.2% in the control group.^[16] Rodrigues *et al.* had conducted a study in India and had reported that the prevalence of HIV in circumcised men was lesser (13.2%) as compared to that in uncircumcised men (20.8%).^[17] However, the role of circumcision in prevention of other STIs is still being evaluated. Our study suggests that circumcision is a protective factor for STIs, but more studies are required to establish its role.

Many other social, psychological and spiritual factors have an impact on quality of life in HIV infection. Hence, social support for patients with HIV/AIDS has a strong potential to influence the quality of life.^[18]

There were limitations to our study. As only bacterial STIs were included in the study, the results cannot be applied to all the other causes of STIs. Although circumcision was found to be associated with reduced burden of disease, it cannot be taken as the only factor responsible. All other factors play a role, like sexual behaviors, use of barrier

contraceptives, drug abuse etc., Therefore, a large study should be done including larger sample size to evaluate the effect of all the risk factors. This study does suggest that circumcision may have a role in reducing the disease burden.

CONCLUSIONS

From this study, we can conclude that circumcision is a protective factor for acquisition of STI in HIV positive cases and male circumcision may reduce the risk of STIs. However, simultaneously it is also important to promote education and awareness regarding HIV and STIs in high risk groups. Use of barrier contraception should be encouraged, and people should be made aware of risks associated with alcohol and drug abuse. Routine counseling of people not living with family is recommended regarding high risk of acquiring STI by contact with commercial sex workers or by having multiple partners. Social, psychological and spiritual support is also very important for HIV/AIDS infected patients.

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