

HIV Risk Perception and Behaviours Among Circumcised and Uncircumcised Adult Males in Mbarara District, Uganda

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ABSTRACT

Background: Male circumcision has since 2010 been implemented in Mbarara and Uganda at large to reduce the continued Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome epidemic among the general population. However, there is some concern that male circumcision may lead to low-risk perception and more risky sexual behaviour. This study, therefore, investigated Human Immunodeficiency Virus risk perception and risk behaviours among adult males who have undergone male circumcision compared to those that had not been circumcised in Mbarara District, Uganda.

Methods: A household-based cross-sectional study was conducted among an adult male population of diverse circumcision status. A total of 384 adult males were enrolled in the study. Questionnaires were used to obtain the data. Data were analyzed using STATA 15. Descriptive statistics followed by chi-square tests and binary logistic regression were used.

Results: Adult males with high HIV risk perception were less likely to be circumcised (aOR=0.3, 95%CI: 0.14-0.80, $p<0.05$) compared to their circumcised adult male counterparts. Male adults that reported engagement in transaction sex in the past 12 months were 3.8 times more likely to be circumcised (aOR=3.8, 95% CI: 1.04-13.56, $p<0.05$). Male adults with 1-3 sexual partners were 4.9 times more likely to be circumcised (aOR=4.9, 95% CI: 1.05-22.23, $p<0.05$) while those with 4 or more sexual partners were 5.5 times more likely to be circumcised (aOR=5.5, 95% CI: 1.79-40.05, $p<0.01$) compared to those male adults who reported no sexual partner in the past 12 months.

Conclusions: Circumcised adult males showed a low indication of high HIV risk perception, more transactional sex and more multiple sexual partners compared to uncircumcised males.

Keywords: HIV risk; Adult; HIV risk perception; HIV risk behaviour; Male circumcision

INTRODUCTION

The Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) is a public health burden with an estimated 36.9 million people (31.1-43.9 million) globally living with the virus by end of the year 2017 [1]. Over 70% of the estimated global 36.9 million HIV positive people live in sub-Saharan Africa and more than 64% of the annual new infections also occur in this region [2]. According to the Uganda Population-Based HIV Impact Assessment Report 2017, an estimated 1.3 million Ugandans are infected with HIV with 7.7% of these being in the south Western region under which Mbarara district lies.

While HIV can spread through many channels, most HIV infections in Uganda occur through heterosexual contact [3]. The country implements a combination prevention approach to contribute to reductions in new infections [3-5]. In 2010, Uganda launched the

Safe Male Circumcision (SMC) policy as part of the comprehensive strategy on HIV prevention in addition to the existing abstinence, being faithful to one partner and condom use (ABC) strategy [3].

Male circumcision is the process of removing the fold of skin that covers the head of the penis [6]. Medical male circumcision became a significant dimension of HIV prevention interventions after the results of three Randomized Controlled Trials (RCTs) in Uganda, South Africa and Kenya demonstrated that circumcision has a protective effect against contracting HIV of up to 60 per cent for men having sex with women [7-9]. According to these trials, male circumcision provides additional protection from HIV because it reduces the probability of tear and injury to the penis during sex and removes cells that are vulnerable to HIV infection. Noticeable developments suggest that a circumcised penis also dries more quickly after sex, and this may reduce the life-span of HIV present after sex [9].

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According to these findings, the World Health Organization (WHO) and UNAIDS recommended that Voluntary Male Medical Circumcision (VMMC) be implemented immediately as an additional HIV prevention strategy in countries with high HIV prevalence rates but low male circumcision rates [10]. In Uganda, the campaign for scaling up VMMC for HIV prevention focuses on males from the age of 10 who are HIV-negative [11].

The promotion of male circumcision in general and VMMC in particular as an HIV prevention strategy may lead to the perception of circumcision as a 'natural condom' [12-14]. There is a possibility of low-risk perception among circumcised adult males leading them to engage in risky sexual behaviour [15].

This sexual behaviour disinhibiting undermines the great strides Uganda has achieved in reducing its HIV prevalence and may be explained by the behaviour risk compensation theory. Behaviour risk compensation is an observed effect in behaviour where people tend to adjust their behaviour in response to the perceived level of risk, usually behaving less cautiously where they feel more protected and more cautiously where they feel a higher level of risk [16].

Perception of risk of HIV infection has been suggested to be an important area of study as it can be assumed to be an indicator of one's understanding of susceptibility to HIV infection and a precursor to behavioural change, which could determine future decision making regarding risk-taking. Risk perception has been used previously to measure individuals' understanding of HIV infection [17]. Risk perception also has been applied in studies and used in various health intervention theories, such as the Health Belief Model (HBM). Risk perception has been identified as a precursor to the adoption of protective sexual behaviours [17]. Adolescents and young adult males have a high natural tendency for risk-taking behaviour that makes them vulnerable to sexually transmitted diseases including HIV [18]. The vulnerability of these people to HIV infection and the impact of the disease on the nation requires more understanding of how these males perceive themselves to be at risk of HIV infection and how this perception influences their sexual risk behaviour are necessary for the development of appropriate interventions to fight the disease.

In the context where circumcision is viewed as a natural condom [12] in the fight against HIV transmission, there is a possibility of the behaviour risk compensation [19-21] among circumcised men, driving them to engage in risky sexual behaviour as compared to their counterparts. The CDC defines HIV sex risk behaviours as actions that can increase HIV transmission rates. Examples of sex risk behaviours include: having multiple sexual partners, transactional sex (payment or receipt of money/gifts in exchange for sex), having had sex with a non-marital partner, and non-use of condoms at the last non-marital sex [22].

For a high HIV prevalence country like Uganda, stakeholders fighting to eliminate the infection should consider renewed efforts to handle HIV infection in the country. The way people receive and process information on HIV and AIDS, how they perceive themselves on the risk of HIV infection and what actions they take afterwards, maybe a key element to the effectiveness of the programmes that can be designed or improved to reduce the spread of the disease in the different sub-groups of populations in Uganda. This background formed a basis for investigating the differences in HIV risk perception and risk behaviours among adult males who have undergone circumcision compared to those that have not been circumcised in Mbarara district.

METHODS

The study was a household-based cross-sectional study.

Study setting

The study was conducted in Mbarara district. The district is in western Uganda and is part of the Ankole sub-region. It is made up of two counties and one municipality. It is further subdivided into six municipal divisions, 11 sub-counties, 83 parishes and 757 villages.

The district was selected owing to the fact that it has populations from diverse backgrounds that can offer social, economic and cultural diversity necessary for identifying the salient factors that play an important role in influencing risk perceptions and sexual behaviours. The study area is large enough to provide a sizable population.

Data collection and variables

Data were collected by interviews using questionnaires with both open-ended and closed-ended questions. To improve the quality of data, consistency checks and skip patterns were designed into the questionnaires. In addition, the principal investigator monitored data collection in the field and conducted back checks for 10% of all interviews.

The data included respondents' self-reported circumcision status, self-perceived risk of HIV, sexual behaviours, and socio-demographic characteristics. Two languages were used to conduct the interviews; Runyankore (the main local language of the district) and English.

The study variables were categorized into dependent and independent variables. There were two dependent variables (HIV risk perception and sexual behaviour). HIV risk perception was categorized as no risk, low risk and high risk.

The risky sexual behaviours considered for this study included having higher-risk sex in the last 12 months, transactional sex in the last 12 months, non-condom use at last higher-risk sexual encounter, and the number of lifetime partners. In this study, higher-risk sex refers to sex with a non-marital or non-cohabiting partner in the 12 months immediately preceding the study. Transactional sex means payment for sex or exchange of any gift items for sex in the last 12 months before the study. Non-condom use at last higher-risk sex refers to not using a condom the last time a respondent engaged in higher-risk sex. Each of these three variables (high-risk sex, transactional sex and non-condom use at last higher-risk sex) were categorised as no and yes. The variable on the number of lifetime partners was organized into two categories: 1-3 lifetime partners and 4+ partners.

The key independent variable that was considered in the analysis was circumcision status. Circumcision was categorized as circumcised and uncircumcised. Others were the men's demographic and socioeconomic characteristics. These included residence, marital status, religion, education, region, age, and ethnicity.

Residence was categorized as rural and urban; marital status as never-married, currently married/cohabiting, and formerly married; religion as Moslem, Catholic, Anglican, Pentecostal, Seventh Day Adventist, other Christians, and other. Education was categorized as no education, primary, secondary, and higher education. Age was categorized by five-year age groups, from age 18 to oldest. Ethnicity was categorized according to similarities in

cultures among the different tribes.

Data management and analysis

Data were checked for completeness, entered into Epi data Version 3.1; (Odense, Denmark) and analyzed using Stata software version 15 (Stata Corp, College Station, TX, USA). Variables were recorded and new variables computed. Descriptive statistics were used to summarize demographic characteristics stratified by circumcision status. Frequencies and percentages were presented in a table.

To determine the association between HIV perception and circumcision status, chi-square test followed by binary logistic regression were conducted. Frequencies, percentages, odds ratios, 95% confidence intervals and p-values were presented in a table.

In order to determine the associations between risky sexual behaviours and circumcision status, chi-square test followed by binary logistic regression were conducted. Variables with p-values <0.05 were entered into a multivariate logistic model to control for confounding using a forward stepwise method. Frequencies, percentages, relative risks, 95% confidence intervals and p-values were presented in a table. Risky sexual behaviours were considered to be significantly associated with circumcision status if their p-values were <0.05.

Ethical considerations

This study dealt with sensitive and personal issues involving sex and circumcision. Therefore, it involved a number of ethical issues. In this respect, permission was first sought from the Faculty Research Committee and then approval from the MUST Research and Ethics Committee before conducting the study. We also sought clearance from the Ethics Committee of the Uganda National Council for Science and Technology.

Before data collection, we also obtained written permission from the district health office of Mbarara district and from the respective local council offices where the selected households are located. Village Health Teams (VHTs) were involved as an entry point to the community and helped in randomisation of households in their respective villages and leading the interviewers to these

households. At the beginning of each interview in the field, written informed consent was obtained from all the study participants.

RESULTS

Demographic characteristics of study participants

Out of the 384 study participants, the uncircumcised male adults (Median=35, IQR=18-72) were slightly older than the circumcised male adults (Median=33, IQR=19-70). It was also indicated that circumcised male adults and uncircumcised male adults differed by ethnicity and the highest level of education ($p<0.05$). Table 1 shows the details of the socio-demographic characteristics of the study participants (Table 1).

Association between HIV risk perception and circumcision status among adult males

Results in Table 2 show that 35 out of the 102 adult males (34.3%) reported high HIV risk perception compared to 17 out of the 28 with no HIV risk perception (60.7%) and there was a significant difference in HIV risk perception across circumcision status among adult males in Mbarara District. Specifically, adult males with high HIV risk perception were less likely to be circumcised (aOR=0.3, 95% CI: 0.14-0.80, $p<0.05$) compared to their circumcised adult male counterparts (Table 2).

Association between risky sexual behaviours and circumcision status among adult males

Results in Table 3 show that transactional sex and multiple sexual partners in the last 12 months were the risky sexual behaviours associated with circumcision status among male adults in Mbarara District ($p<0.05$). After controlling for confounding, results showed that involvement in transactional sex in the last 12 months (aOR=3.8, 95% CI: 1.04-13.56, $p<0.05$) and a high number of sexual partners in the last 12 months i.e. 1-3 sexual partners; (aOR=4.9, 95% CI: 1.05-22.23, $p<0.05$) and 4 or more sexual partners; (aOR=5.5, 95% CI: 1.79-40.05, $p<0.01$) were the independent risk sexual behaviours associated with circumcision status among male adults in Mbarara District (Table 3).

Table 1: Sociodemographic characteristics of study participants (N=384).

Characteristics	Circumcision status, n (%)		N	p	
	Circumcised (n=192)	Uncircumcised (n=192)			
	Median=34, IQR=18-76	Median=33, IQR=19-70	Median=35, IQR=18-72	72	
Age (years)	24-34 years	70 (55.12)	57 (44.88)	127	0.158
	35-44 years	46 (54.12)	39 (45.88)	85	
	45 years+	41 (41.00)	59 (59.00)	100	
Marital status	Never married	60 (48.00)	65 (52.00)	125	0.075
	Currently married	131 (52.19)	120 (47.81)	251	
	Formerly married	1 (12.5)	7 (87.5)	8	
Ethnicity	Baganda	50 (80.65)	12 (19.35)	62	0.001*
	Banyankole	124 (43.06)	164 (56.94)	288	
	Bakiga/Bafumbira	17 (53.13)	15 (46.87)	32	
	Iteso	1 (50.00)	1 (50.00)	2	
Education level	No formal	6 (15.38)	33 (84.62)	39	0.001*
	Primary	55 (49.55)	56 (50.45)	111	
	Secondary	70 (56.91)	53 (43.09)	123	
	Tertiary	61 (54.95)	50 (45.05)	111	
Residence	Urban	90 (47.62)	99 (52.38)	189	0.358
	Rural	102 (52.31)	93 (47.69)	195	

Table 2: Association between HIV risk perception and circumcision status among adult males (N=384).

HIV risk perception	Circumcision status, n (%)		N	OR (95%CI)	p
	Circumcised	Uncircumcised			
None	17 (60.7)	11 (39.3)	28	Reference	
Low	140 (55.1)	114 (44.9)	254	0.8 (0.34-1.70)	0.513
High	35 (34.3)	67 (65.7)	102	0.3 (0.14-0.80)	0.014*

*p<0.05

Table 3: Logistic Regression results of Association between risky sexual behaviours and circumcision status among adult males in Mbarara District (N=384).

Risky sexual behaviors		Circumcised, n (%)		UOR (95%CI)	p	AOR (95%CI)	p
		Yes	No				
Condom use with a non-marital/non-cohabiting partner in the 12 months	No	186 (49.7)	188 (50.3)		Reference		
	Yes	6 (60.0)	4 (40.0)	1.5 (0.42- 5.46)	0.524	-	-
Sex with non-marital/non cohabiting partners in the past 12 months	No	128 (48.3)	137 (51.7)		Reference		
	Yes	64 (53.8)	55 (46.2)	1.2 (0.81- 1.92)	0.321	-	-
Non-condom use at last non marital/non cohabiting sex encounter	No	141 (47.5)	156 (52.5)		Reference		
	Yes	51 (58.6)	36 (41.4)	1.6 (0.97- 2.54)	0.069	-	-
Transactional sex in the last 12 months	No	175 (48.2)	188 (51.8)		Reference		
	Yes	17 (81.0)	4 (19.1)	4.6 (1.51-13.83)	0.007*	3.8 (1.04-13.56)	0.042*
Lifetime partners	None	14 (36.8)	24 (63.2)		Reference		
	1-3	162 (50.3)	160 (49.7)	1.7 (0.87-3.48)	0.120	1.2 (0.53-2.50)	0.615
	4+	16 (66.7)	8 (33.3)	3.4 (1.17-10.04)	0.025*	1.0 (0.28-3.71)	0.283
Sexual partners in the last 12 months	None	2 (14.3)	12 (85.7)		Reference		
	1-3	82 (43.4)	107 (56.6)	4.6 (1.00-21.12)	0.050*	4.9 (1.05-22.23)	0.043*
	4+	108 (59.7)	73 (40.3)	8.9 (1.93-40.84)	0.005*	5.5 (1.79-40.05)	0.007*

DISCUSSION

In this community-based study conducted among adult males in Mbarara district, the study established that circumcised adult males showed a lower HIV risk perception relative to the uncircumcised males. This finding is in line with that of Burmen, Mutai [23] in Kenya where over 90% of all men interviewed believed that circumcised men are less likely to get HIV compared to uncircumcised men with a significantly higher proportion of all circumcised men believing that male circumcision reduces the risk of HIV acquisition (95% vs. 91%, p<0.01), respectively.

According to the study by Burmen and colleagues, all circumcised men were more likely to perceive themselves at reduced risk of HIV acquisition, because of male circumcision availability in their community than uncircumcised men (36% vs. 30%, p<0.01) [23]. A similar low HIV risk perception was noted among men following male circumcision in South Africa where circumcised males were more likely to have more than one sexual partner [24].

Contrary, a longitudinal assessment of risk perception that compared circumcised males to uncircumcised from the same community in Kenya reported high HIV risk perception among circumcised men [25]. This could be attributed to the health education that accompanies male circumcision that may influence these males to continue perceiving themselves to be at risk of HIV infection and therefore engage in healthy behavioural choices and safer sexual behaviour [21].

This finding is in line with that of Zamawe and Kusamula [26] in Malawi where Medical Male Circumcision (MMC) was perceived to decrease transmission of HIV in that male adults who chose MMC perceived themselves as still more vulnerable to HIV (AOR=1.60;

95% CI: 1.19-2.15). Maakamedi [27] in a study conducted among sexually active men in South Africa also reported that circumcised men indicated a false sense of protection and therefore continued to have high HIV perception in that they used condoms consistently.

This study established that engagement in transactional sex in the last 12 months was an independent risk sexual behaviour associated with circumcision status among male adults in Mbarara District. Male adults that reported engagement in transaction sex in the past 12 months were 3.8 times more likely to be circumcised (aOR=3.8, 95% CI: 1.04-13.56, p<0.05). This finding is consistent with the finding by Kankaka, Ssekasanvu [28] in a study conducted among newly circumcised and uncircumcised HIV-positive men in the Rakai Community Cohort Study in which transactional sex was associated with circumcision in unadjusted analyses (PR=1.58, 95% CI=1.01,2.48; p=0.045, p=0.05) and adjusted analyses (adj. PR=1.54, 95% CI=1.06,2.23; p=0.022). Another study in Botswana to assess and compare risky sexual behaviours of circumcised and uncircumcised men before and after the launch of the safe male circumcision programme, being circumcised was significantly associated with transactional sex (before launch adjusted PR=1.98, CI=1.26-3.11; after launch adjusted PR=1.60, CI=1.09-1.22) [29].

Another finding in this study is that circumcised adult males showed higher odds of having a higher number of sexual partners in the last 12 months. Male adults with 1-3 sexual partners were 4.9 times more likely to be circumcised (aOR=4.9, 95% CI: 1.05-22.23, p<0.05) while those with 4 or more sexual partners were 5.5 times more likely to be circumcised (aOR=5.5, 95% CI: 1.79-40.05, p<0.01) compared to those male adults who reported no sexual partner in the past 12 months. Our results are consistent with findings from another study in a lower HIV prevalence setting

of the Dominican Republic where participants in a cohort study reported an increased number of sexual partners after circumcision [30]. In another study in Uganda, circumcised men reported a significantly higher prevalence of sexual risk behaviours including non-use of condoms at the last non-marital sex and having multiple sexual partners than the uncircumcised [31]. However in a Zimbabwe study [32], circumcision was not associated with risky sexual behaviours, but instead, uncircumcised men who were willing to be circumcised had more risky behaviours, while in a more recent study from a combined analysis of national surveys in 10 SMC prioritized African countries (Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe) conducted before and after the SMC intervention periods, concluded that SMC campaigns were associated with little or no sexual behavioural risk compensation, although there were differences between countries [33]. A study in Rakai-Uganda [34], there was no evidence of risk compensation as well.

A study by Riess, Achieng [21] attributes such unexpected differences in sexual behaviour to the behaviour risk compensation where men change their sexual behaviours with the knowledge that their risk of infection is reduced. In the study, some men stopped using condoms temporarily after undergoing male circumcision as part of the new program in Kisumu (Kenya) while others increased the number of sexual partners, but the study overall reported no sexual behavioural disinhibition.

The promotion of SMC without increased education and counselling of the men may hinder progress in further HIV reduction in Mbarara district as circumcised men in this study had risk sexual behaviours. Even though there is no empirical evidence in this study to ascertain that the risk sexual behaviours observed among the circumcised men were a result of risk compensation, it may be one of the possible explanations. Another possibility could be that men that already have risk sexual behaviours decide to undergo circumcision to reduce their chances of HIV infection. These may not change behaviours post circumcision, but this needs more exploration.

The major limitation of this study was that the measures of both HIV risk perception and HIV risk behaviours are based on participants self-reports and these may be affected by the recall and social desirability bias. Also, the cross-sectional nature of the study was limited to assessing associations and would not infer causality. Also, the study results cannot be generalized to other communities since the study sample was specifically drawn from Mbarara district communities.

CONCLUSION

In Mbarara District, circumcised male adults have a relatively low HIV risk perception compared to their uncircumcised male counterparts. Transactional sex and multiple sexual partners were the risky sexual behaviours associated with circumcised male adults in Mbarara District.

Considering these findings, there is a need for the health authorities in health facilities in Mbarara District to continuously sensitize the male adults that being circumcised does not totally eliminate their HIV contraction risk. Circumcised male adults should be encouraged to stop transactional sex and avoid multiple sexual partners. Further study needs to be done to investigate the association between HIV status and circumcision status among male adults in Mbarara District.

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COMPETING INTEREST

The authors declare that they have no competing interests.

AUTHORS CONTRIBUTIONS

Prosper Kamukama conceived the idea designed the study, analyzed, interpreted the data and drafted the manuscript. Moses Ntaro and Fred Bagenda contributed to writing and revising the manuscript. All authors read and approved the final manuscript.

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