Male Circumcision and Risky Sexual Behavior in a High HIV prevalence Country: Evidence from a National Survey in Uganda

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Abstract

Safe Male Circumcision is a known intervention in prevention of heterosexual HIV acquisition. However, since the roll-out of the male circumcision policy in Uganda, concerns that circumcision may lead to behaviour disinhibition are rife. We assess association between male circumcision and risky sexual behaviour among Ugandan men. Data are from AIDS Indicator Survey 2011 with 7,969 ever sexually active men 15-59 years. Association between risky sexual behaviour and circumcision were determined using odds ratios. Adjusted logistic regression models controlled for individual characteristics. The prevalence of circumcision was 28% and most common risky sexual behaviours were; multiple life-time sexual partners, non marital sex and non-use of condoms during such sex. In the adjusted analyses, multiple life-time partners, adj.OR=1.47(95%CI 1.28-1.68), engagement in non marital sex, adj.OR=1.25(95%CI: 1.03-1.50), and non-use of condom at such sex were significantly higher among the circumcised. HIV prevalence was lower among the circumcised even with risky sexual behaviours.

Background

Male circumcision is the surgical removal of the intact foreskin of the human penis. Intact foreskin is one of the risk factors for HIV transmission from infected women to men (Wabwire-Mangen et al., 2009). Circumcision is undertaken worldwide for religious, cultural, social as well as medical reasons (Government of Uganda MOH, 2010). The randomized clinical trials (RCTs) conducted in sub-Saharan Africa; Uganda (Gray et al., 2007); Kenya (Bailey et al., 2007) and South Africa (Auvert et al., 2005), showed that male circumcision has a protective effect against HIV as well as reducing incidences of other sexually transmitted infections (STIs) like genital ulcers, human papilloma virus (HPV) and Chlamydia in female partners of men. These studies showed that circumcision reduced the risk of heterosexual HIV transmission from an infected woman to a circumcised man by more than 60%. Due to such evidence, WHO/UNAIDS (2007) recommended the adoption of male circumcision as part of the comprehensive strategy to reduce heterosexually acquired HIV infection in countries with high HIV prevalence and lower levels of male circumcision (WHO and UNAIDS, 2007).

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. Prior to the launch of this policy, male circumcision was mainly practiced for social cultural reasons as a rite of passage from childhood to manhood among the Bagisu and Bakonjo ethnic groups; and also as a religious ritual among the Moslems. The goal of this policy is to contribute to the reduction of HIV and other STIs through safe male circumcision services (Government of Uganda MOH, 2010). In addition, one of the key objectives of this policy is to establish a research agenda focusing on male circumcision services towards HIV prevention. This policy also recommends the integration of safe male medical circumcision services in the HIV prevention and sexual and reproductive health care services. The target population for this policy is all males including neonates whose parents and guardians consent to the procedure (Government of Uganda MOH, 2010).

As a result of the policy, several strategies including limited offer of free circumcision at public health facilities, mobilization and sensitization of the population have been put in place to up-scale male medical circumcision in Uganda. Furthermore, in light of the research agenda of the policy, several studies (Galukande et al., 2012; Kitara et al., 2013) have also

been undertaken to provide evidence based information useful in future programming of circumcision programs or services in the country.

Although Uganda recorded a slight increase in the percentage of circumcised adult males aged 15 – 59 years from 25% in 2004 to 27% in 2011, the HIV prevalence rate increased from 6.4% to 7.3% with male HIV prevalence increasing from 5.4% to 6.1% in the same period (MOH and ICF International, 2012). The possible reasons for the increased HIV prevalence in the population are twofold; first, as a result of the introduction of antiretroviral treatment leading to higher life expectancy among those infected and the second reason can be attributed to complacency in the HIV prevention strategies leading to behavior disinhibition especially among married exhibiting risky sexual behavior especially concurrent multiple partnerships, non-consistent condom use with non-marital and non-cohabiting partners and transactional sex (MOH and ICF International, 2012).

This sexual behavior disinhibition which undermines the great strides Uganda has achieved in reducing its HIV prevalence may be explained by the behavior risk compensation theory. Behavior risk compensation is an observed effect in behavior where people tend to adjust their behavior 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. In the context where circumcision is viewed as a natural condom (Bonner, 2001) in the fight against HIV transmission, there is a possibility of the behavior risk compensation (Hedlund, 2000; Adams and Hillman, 2001; Riess et al., 2010) among circumcised men, driving them to engage in risky sexual behavior including non marital sex, non-condom use and high number of sexual partners (Cassell et al., 2006; Eaton and Kalichman, 2009) as compared to their counterparts. To date, there are still unanswered questions as to what difference circumcision will make in terms of risky sexual behavior and HIV infection.

In developing countries, being circumcised is primarily influenced by religious and ethnic/ cultural reasons in addition to other socio-demographic and economic factors (Shaffer et al., 2007; WHO and UNAIDS, 2007; Connolly et al., 2009). The circumcision status for a man can influence his sexual behaviors. Circumcised men may behave sexually differently from their non-circumcised counterparts. Circumcised men tend to engage in risky sexual behaviors including but not limited to: engaging in non marital sex, concurrent partners, non-condom use during non marital sex, transactional sex, and high number of lifetime partners.

With the general belief that circumcision is 'an HIV vaccine', circumcised men tend to have unprotected sexual intercourse (Differding, 2007). Such changes in sexual behavior are postulated in the behavioral risk compensation theory as observed in other studies (Differding, 2007; Kalichman et al., 2007).

Uganda is facing challenges and setbacks in its implementation of the traditional HIV control and prevention strategies (the ABC). With the recent addition of circumcision as part of the HIV prevention strategies, there is need for research based evidence on the relationship between circumcision status, sexual behavior and HIV status in Uganda. This paper specifically compares sexual behavior between circumcised and uncircumcised men; establishes the association between: circumcision, sexual behavior and HIV status.

Methods

Data source

Data are drawn from the 2011 Uganda AIDS Indicator Survey (AIS2011). This is a nationally representative sample obtained from a stratified two-stage cluster sampling strategy. Clusters are selected from each stratum at the first stage, while the second stage involves selecting households for interview. The strata were defined as Urban/ rural and sub-regions while the clusters were enumeration areas (EAs) as of the 2010 Uganda National Household Survey updates. This survey dataset has appropriate information on the key variables including male circumcision status, sexual behaviors, HIV sero-status and respondents' social-demographic characteristics that are relevant for answering the research question.

Permission to access and use the data was sought from Measure DHS. Individual interview and HIV test results data were linked and merged using unique identifier, resulting in a total of 9,524 men with both complete interviews and valid HIV sero-status. For this analysis, 7969/9524 (83.7%) who had ever been sexually active were considered because risky sexual behaviors were more relevant to this category.

Variables and Analysis

The primary analysis considered sexual behavior as the dependent variable. In the secondary analysis, HIV-sero status categorized as 1: HIV positive (code 1) or 0: HIV negative was used.

Risky sexual behavior was made of four categories, namely; i) transactional sex (*payment or receipt of money/gift in exchange sex*) in the preceding 12 months, ii) multiple (*4 or more*) life-time sexual partners, iii) non-marital sexual relations (*include non-cohabiting partners*) and iv) non-use of condoms last non-marital partner in the last 12 months. . All the risk sexual behaviors were coded either as 0: when behavior was not reported and 1: when behavior was reported 1–3 lifetime partners and 4+ partners. The key independent variable was the self-reported circumcision status.

Exploratory data analysis was conducted to describe all the variables of interest. In the bivariate analysis, cross tabulations were done to determine unadjusted associations between outcomes (sexual behaviors, and HIV status), and circumcision status as well as social-demographic characteristics. Chi-square tests were computed with statistical association considered significant at the 5% level. Odds ratios (OR) as a measure of association with their 95% confidence intervals (CI) were obtained from the logistic regression model. For the adjusted analyses, all variables in the bivariate analysis that were significant or known confounders in the association were included in the multivariable logistic regression model that had circumcision status as the key independent variable. Social-demographic characteristics included in these analyses were residence, marital status, religion, education, wealth status, region, age, and ethnicity. In order to account for the complex survey methodology and non-response, HIV sample weights were adjusted for.

Results

Description of the Respondents

Table 1 shows respondents' characteristics. Overall, 1 in 5 (81%) were residents in rural areas, more than a half (57%) had primary education, nearly three quarters (72%) were either married/cohabiting, and majority were aged 25-34 years (31%), and the largest tribal grouping was Baganda (17%), but Muslims were only 13% of the sample.

More than one quarter (28%) of all men were circumcised. Almost one third (32%) of circumcised men were aged between 25–34 years and over two-thirds (69%) were married or living together at the time of the survey. Twenty nine percent of the circumcised were Bagisu/ Sabiny or Bakonjo ethnic groups; the ethnic groups that practice cultural circumcision in Uganda while a considerable percentage were either Baganda (18%) or Basoga (14%). Almost half of the circumcised men were Moslem for whom male circumcision is a religious requirement.

Table 1: Respondents' characteristics

	All men		**Circumcised**	
	n	**Percent**	**n**	**Percent**
Overall	**7,969**	**100**	**2,228**	**100**
Characteristics				
Age group				
15-24	1941	24.3	610	27.4
25-34	2460	30.9	708	31.8
35-44	2000	25.1	508	22.8
45-59	1568	19.7	402	18.0
Residence				
Urban	1,520	19.1	604	27.1
Rural	6,449	80.9	1,624	72.9
Survey region				
Central	1,784	22.4	491	22.0
Kampala	568	7.1	215	9.6
Eastern	1,701	21.3	882	39.6
Northern	1,999	25.1	201	9.0
Western	1,916	24.0	439	19.7
Highest education level				
No education	570	7.2	143	6.4
Primary	4,526	56.8	1,166	52.3
Secondary	2,155	27.0	697	31.3
Post secondary	718	9.0	222	10.0

Marital status				
Never married	1,649	20.7	523	23.5
Currently married	5,710	71.7	1,534	68.9
Divorced/seperated	609	7.6	171	7.7
Ethnicity				
Baganda	1,321	16.6	400	18.0
Banyakore	794	10.0	109	4.9
Iteso/Karimojong	730	9.2	64	2.9
Lugbara/Madi/ Alur/Japadhola	783	9.8	186	8.4
Basoga	716	9.0	314	14.1
Langi/Acholi	896	11.2	19	0.9
Bakiga	427	5.4	42	1.9
Bagisu/Sabiny/ Bakonzo/Bakonjo	680	8.5	646	29.0
Banyoro/Batooro	680	8.5	164	7.4
Bafumbira	165	2.1	24	1.1
Bagwere/Samia	280	3.5	99	4.4
Others	497	6.2	163	7.3
Religion				
Moslem	1038	13.0	1026	46.1
Non Moslem	6931	87.0	1202	53.9
Circumcision status				
No	5,741	72.0		
Yes	2,228	27.9		

Comparison of Sexual Behavior between Circumcised and Uncircumcised Men

Table 2 shows the comparison of the prevalence of RSBs among circumcised and non circumcised men. Overall, one third of men had non marital sex in the last 12 months before the survey and more than half (55%) of these did not use condoms the last time they had such sex. Transactional sex was the lowest RSB among all men (3%). All four RSBs were higher among the circumcised. Two-thirds of the circumcised men had 4 or more life time sexual partners compared with 56% of the uncircumcised. Thirty eight percent of circumcised men engaged non marital sex in the last 12 months before the survey while 58% did not use a condom the last time they had non marital sex.

Table 2: Comparison of RSBs between circumcised and uncircumcised men

	Circumcised n (%)	uncircumcised n (%)	Overall n (%)
Risky sexual behavior			
Non-marital partners	766 (38.4)	1547 (30.2)	2314 (32.5)
Non-use of condoms	319 (58.4)	728 (52.9)	1267 (54.7)
Transactional sex	74 (3.7)	139 (2.7)	214 (3.0)
4+ lifetime partners	1466 (65.8)	3239 (56.4)	4706 (59.1)

Associations between Circumcision Status and Sexual Behaviors

Table 3 also shows both unadjusted and adjusted association between the different RSBs and circumcision status. Each sexual behavior was run as a different model with circumcision. In the adjusted models, several key background characteristics including age, ethnicity, residence, wealth status, marital status, region and education were controlled for.

Three of the four RSBs; having non marital sex, non use of condoms at the last such sex and 4 or more lifetime partners were significant before adjusting for background characteristics. Transactional sex was not significant at this level.

Even after adjusting for these background characteristics, circumcision status remained significantly associated with number of life time sexual partners, non marital sex and non condom use at last non marital sex. Model 1 shows that circumcision status is significantly associated with number of lifetime sexual partners ($p< 0.01$). The odds of having had 4 or more life time partners were 1.47 times higher among the circumcised compared with the uncircumcised. In models 2 and 3, having non marital sex and non use of a condom at the last such sex were also significantly associated with circumcision status ($p<0 .05$). The odds of circumcised men having had non marital sex in the last 12 months were 1.25 times higher compared with the uncircumcised while the odds of having used a condom during the last non marital sex were 20% lower among circumcised men.

Table 3: Unadjusted and Adjusted Odds ratios for risky sexual behaviors comparing circumcised and uncircumcised

	(1) Number of lifetime partners ORs (95% CI)	(2) Had non marital sex the last 12 months ORs (95% CI)	(3) Condom use at last non marital sex ORs (95% CI)	(4) Transactional sex in last 12 months ORs (95% CI)
Circumcision status				
Unadjusted				
Uncircumcised	1	1	1	1
Circumcised	1.48**	1.43*	0.80*	1.37
	(1.31-1.68)	(1.24-1.65)	(0.65-0.98)	(0.98-1.94)
Adjusted[+]				
Uncircumcised	1	1	1	1
Circumcised	1.47**	1.25*	0.80*	1.22
	(1.28-1.68)	(1.03-1.50)	(0.63-1.00)	(0.83-1.80)
Number of men	**7,969**	**7,114**	**2,313**	**7,109**

** p<0.05, ** p<0.01, [+]Adjusted for Background characteristics in all models.*

Associations between Circumcision Status and HIV Status

Table 3 (Model 1) shows the adjusted association between HIV status and circumcision status, controlling for background characteristics including age, ethnicity, residence, wealth status, marital status, region and education. In model 2 we controlled for both background characteristics and two of the RSBs. Results show in model 1, that the odds of being HIV positive among circumcised men were 32% lower compared with uncircumcised men after controlling for background characteristics while in model 2, the odds of being HIV positive among circumcised men were 35% lower compared with uncircumcised men after controlling for both background characteristics and RSBs.

Table 3: Adjusted Odds ratios for Circumcision status and HIV^{+} status

	(1) HIV status, Adjusted for background characteristics	(2) HIV status, Adjusted for background characteristics & risky
Circumcision status		
Uncircumcised	1	1
Circumcised	0.68* (0.48-0.95)	0.65* (0.46-0.92)
Number of lifetime partners		
Less than 4		1
4 or more		1.68** (1.33-2.12)
Transactional Sex in last 12		
Did not pay for sex		1
Paid for sex		2.17** (1.26-3.74)
Number of men	**7,969**	**7,969**

** p<0.05, ** p<0.01, ¥ Non marital sex and condom use at non marital sex were omitted because of collinearity.*

Discussion

Our analysis showed that circumcised men had higher odds of having 4 or more life time partners, engaging in non marital sex and non-condom use at last non marital sex than uncircumcised men. This is consistent with findings from other studies outside Uganda (Bailey et al., 1999; Differding, 2007), which have shown that circumcised men tend to have unprotected sexual intercourse and more sexual partners. This is often in cases where men view circumcision as an HIV "vaccine" and thus believe that they are protected from acquiring the virus. Some studies attribute such unexpected differences in sexual behavior to the behavior risk compensation where men change their sexual behaviors for the worse with the knowledge that their risk of infection is reduced (Kalichman, Eaton et al., 2007; Eaton and Kalichman, 2009; Riess, Achieng et al., 2010). In the study by Riess et al, 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. In the 3 Randomized Clinical Trials that gave rise to the recommendation by UNAIDS, the South African study showed risk compensation at play. In that trial, circumcised men reported more sexual partners than uncircumcised men at the 4– 12 month and in the 13 to 21 month recall periods (Auvert, Taljaard et al., 2005). Given this evidence, promotion of SMC without increased education and counseling of the men may hinder progress in further HIV reduction (Sidler et al., 2008) as circumcised men engage in risky sexual behaviors. This may

undermine the efforts in the fight against HIV/AIDS or even reverse in the gains made in the HIV incidence reduction. The other possible explanation could be the men who already have risky sexual behaviors and decide to undergo circumcision to reduce their chances of HIV infection. These may not change behaviors post circumcision.

In relation to circumcision and HIV status, multivariate results showed that circumcised men were more likely to be HIV negative compared with the uncircumcised. These findings are consistent with some randomized controlled (Auvert, Taljaard et al., 2005; Bailey, Moses et al., 2007; Gray, Kigozi et al., 2007) that have shown a protective effect of circumcision against heterosexual HIV infection from infected women to men. These results were observed even though the odds of risky sexual behaviors were higher among the circumcised men. This could mean that the effect of risk compensation in the Ugandan context may be small compared to the fundamental benefits of the SMC interventions in this population.

Conclusions

Circumcision is strongly associated with higher uptake of risky sexual behavior. However, the risk of HIV prevalence is significantly lower among the circumcised. Findings from this cross-sectional study suggest behavior risk compensation, or potential complacency among circumcised men.

Re-package the circumcision messages to cater for the observed risky sexual behaviors among circumcised men. Intensified individual tailored counseling pre and post SMC procedures may play a role in reducing these behaviors.

More sensitizations both at population level and at health facilities on the advantages of circumcision need to be done so as to encourage more men to get circumcised given the protective effect observed even with risky sexual behaviors.

There is need for more qualitative studies to explore in-depth the motives for circumcision among men who are willing to circumcise and those who are already circumcised after the SMC policy came into effect. Furthermore there is need for more in-depth explanations as to why there are more prevalent risky sexual behaviors among circumcised men than the uncircumcised. A comparison of the surveys from the period before the RCTs results and the roll out of the SMC policy in the Country and the post period would fill some of the gaps.

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