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Circumcision preference among women and uncircumcised men prior to scale-up of male circumcision for HIV prevention in Kisumu, Kenya

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Abstract

Following the endorsement by the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) of male circumcision as an additional strategy to HIV prevention, initiatives to introduce safe, voluntary medical male circumcision (VMMC) services commenced in 2008 in several sub-Saharan African communities. Information regarding perceptions of circumcision as a method of HIV prevention, however, is largely limited to data collected before this important endorsement and the associated increase in the availability of VMMC services. To address this, we completed a community-based survey of male circumcision (MC) perceptions in the major non-circumcising community in Kenya, which is the current focus of VMMC programs in the country. Data was collected between November 2008 and April 2009, immediately before VMMC program scale-up commenced. Here we present results limited to women (n = 1088) and uncircumcised males (n = 460) to provide insight into factors contributing to the acceptability and preference for MC in those targeted by VMMC programs. Separate multivariable models examining preference for circumcision were defined for married men, unmarried men, and women. Belief in the protective effect of circumcision on HIV risk was strongly associated with preference for MC in all models. Other important factors included education, perceived improvement in sexual pleasure, and perceptions of impact on condom utilization. Identified barriers to circumcision were the belief that circumcision was not part of the local culture, the perception of a long healing period following the procedure, the lack of a specific impetus to seek out services, and the general fear of pain associated with becoming circumcised. A minority of participants expressed beliefs suggesting that behavioral risk compensation with increased MC prevalence and awareness is a possibility. This work describes the early impact of a large-scale VMMC program on beliefs and behaviors regarding MC and HIV risk. It is hoped that our findings may offer guidance into anticipating potential impacts that similar programs may observe in populations throughout Eastern Africa.

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Keywords

HIV/AIDS; circumcision; sexual behavior; Africa

Introduction

In 1986 ecological evidence was first noted to suggest that the removal of the prepuce of the penis, male circumcision (MC), was protective for heterosexually acquired HIV infection (Fink, 1986). Over the next 15 years observational studies consistently supported this hypothesis, culminating in three randomized controlled trials (RCT) in Orange Farm, South Africa; Kisumu, Kenya; and Rakai, Uganda (Auvert et al., 2005; Bailey et al., 2007; Gray et al., 2007). The three RCT showed a consistent 60% protective effect of MC prompting the endorsement by the World Health Organization (WHO) and Joint United Nations Programme on HIV/AIDS (UNAIDS) of male circumcision as an additional strategy for HIV prevention (WHO/UNAIDS Technical Consultation, 2007). Since that time, initiatives to introduce safe, voluntary medical male circumcision (VMMC) services have commenced in several sub-Saharan African communities (The AIDS Vaccine Advocacy Coalition [AVAC] & Family Health International [FHI], 2010). To clarify, the term VMMC is used to denote MC within a clinical context that is voluntarily undergone as part of a concerted program to prevent HIV infection.

While studies have shown MC is both socially and personally acceptable to a majority of men and women in many traditionally non-circumcising African populations (Westercamp & Bailey, 2007), the fluid perceptions of circumcision as a method of HIV prevention is not yet widely recognized. In addition, what information is available is largely based on data collected before the impact from the RCT results release and the associated increase in availability of VMMC services. To address this gap, we designed a community-based survey of MC perceptions in the major traditionally non-circumcising community in Kenya, which is currently the focus of the country's program to scale up VMMC.

This work includes information from the first of three planned cross sectional surveys designed to represent middle to low-income urban and peri-urban populations of the municipality of Kisumu. The goal of the series is to assess changes in circumcision related knowledge and beliefs and to determine how these are associated with sexual risk behaviors and HIV prevalence before and throughout the first five years of the coordinated provision of VMMC service into the community. This paper is based on the initial survey conducted two years after the release of trial results and just prior to roll-out of VMMC services. Results are limited to women and uncircumcised men to provide insights into factors contributing to the acceptability and preference for MC in those most likely targeted by VMMC programs.

Methods

Study design

Study instruments were developed in English based on previous research addressing male circumcision in the same general population (Auvert et al., 2001; Bailey et al., 2007; Cohen et al., 2009; Mattson, Bailey, Agot, Ndinya-Achola, & Moses, 2007; Mattson, Bailey, Muga, Poulussen, & Onyango, 2005), and approved by the ethical committees of the Kenyatta National Hospital and the University of Illinois at Chicago. Study materials were translated into the dominant local languages, Dholuo and Kiswahili, by two independent translators and pretested by study staff. Methods from the Four African Cities Study conducted in Kisumu in 1998 (Buve et al., 2001) and the Antiretroviral Therapy Impact Study (ARTIS)

conducted in Kisumu in 2006 (Cohen et al., 2009) were replicated to the extent possible to allow comparison of findings.

Households were selected by multi-stage sampling. From all Kisumu census enumeration areas, 40 study clusters were chosen by probability proportional to estimated population. Households were sampled systematically using an equal-probability method from within each study cluster. All selected households were offered study participation, and all men and women aged 15–49 years sleeping in the house the night before the first visit by the field team were eligible for study participation.

Field procedures

After giving written informed consent, participants were interviewed with responses entered in a preprogrammed questionnaire using the EpiSurveyor open-source software package (Datadyne.org, 2007) loaded on a Palm Tungsten™ E2 handheld. Following the interview male participants were asked to allow a visual confirmation of circumcision status by a male interviewer. Rapid HIV testing by whole blood sample was offered as part of the study to all participants. Individuals could accept or decline participation in individual study activities, and all study activities were done in private locations in or near the home.

Definition of variables

The main outcome of this analysis was preference for becoming or being circumcised in men, assessed by the question: “Would you prefer to be circumcised or uncircumcised,” and preference for circumcised sexual partners in women, assessed by the question: “Would you prefer your partner to be circumcised or uncircumcised.” Association with beliefs regarding the impact of circumcision on HIV risk was determined by asking participants, in their opinion, how likely a circumcised man was to get infected with HIV compared to an uncircumcised man (more likely, less likely, or about the same). Perceptions of the impact of circumcision on HIV risk were measured by asking participants to agree or disagree with a series of statements. Each statement considered one aspect of personal or community risk in the context of, “Now that MC is available.”

The primary reason for not being circumcised was requested from all male participants. Demographic information was collected for all participants regarding age, ethnic identification, religion, education, employment, and marital status.

Data management and analysis

Descriptive summaries were based on frequencies and proportions. Differences between groups were assessed with Rao-Scott chi-square goodness-of-fit tests, adjusted for the sample design. All factors were considered for logistic regression models examining association with preference and accounted for the sample design. Hierarchical backward elimination was used for model selection with a Wald statistical p-value for elimination set at > 0.10. Age, educational attainment, marital status, employment, and ethnic group were evaluated for potential interactive or confounding effects on circumcision preference. Because 97% of the uncircumcised male sample reported being Luo, the ability to account for ethnicity was limited. Separate models were fit for men and women. Data storage, cleaning, and analysis were performed using OpenOffice.org Calc (Version 3.0) and SAS (Version 9.2; SAS Institute, Cary, NC, USA).

Results

Description of sample

Out of the 1120 households selected, 1033 (92%) had inhabitants eligible for enrollment, resulting in the identification of 2563 eligible individuals ages 15–49 years. Of these, 1868 (72.9%) could be contacted and offered enrollment with 105 (5.6%) individuals refusing to participate. The final sample includes a total of 1763 individuals: 1088 (61.7%) women and 675 (38.3%) men. All 675 men interviewed provided self-reported circumcision status, with 460 (68%) men reportedly uncircumcised and 215 (32%) circumcised. A total of 351 men agreed to a visual exam to confirm circumcision status. By this exam, 234 (67%) men were circumcised and 117 (33%) were uncircumcised. One participant clinically assessed as uncircumcised reported being circumcised and eight clinically circumcised men reported as being uncircumcised (Sensitivity of self report = 93.2%; Specificity = 99.6%).

This report considers only eligible women (n = 1088) and men self-reporting as uncircumcised (n=460) giving a total sample size of 1548. The majority of participants, 1344 (87%), were Luo, 139 (9%) were Luhya, and a variety of other groups each represented < 1% of the sample. The median age and distribution were similar for both men and women (median age =24 years; IQR 20–31). Over half of participants, 896 (58%), described their religion as being “other Christian”; 366 (24%) were Catholic; 189 (12%) were Anglican, and 46 participants (3%) were Muslim. Over 56% of the sample was unemployed, and only 8% of those employed described their work as “regular.” Demographic characteristics, by sex, are given in Table 1.

Knowledge attitudes and beliefs about MC

Table 2 presents differences by sex in attitudes and beliefs about MC. The majority of men (68%) and women (65%) reported the belief that a circumcised man is less likely than an uncircumcised man to become infected with HIV. A greater proportion of women (22%) than men (15%) reported that they were less worried about infection now that VMMC is available (p <0.001). However, more men (8%) than women (4%) agreed that they were willing to take a chance of actually becoming infected or infecting someone else (p < 0.001). A greater proportion of women (26%) than men (19%) said that condom use during sex is less necessary (p < 0.001), but equal proportions of men (10%) and women (12%) said that they were likely to have unprotected sex (p =0.48)

The overwhelming majority (99%) of both men and women surveyed believed circumcision to be a safe procedure when carried out by a medical practitioner. In terms of impact on sexual satisfaction, the majority of men (86%) and women (85%) believed that circumcised men have at least the same degree of sexual pleasure as those uncircumcised. Likewise, the partners of circumcised men were overwhelmingly thought to have similar or increased pleasure when compared to the partners of uncircumcised men (men = 92%; women = 86%).

Circumcision preference among women and uncircumcised men

Bivariate analysis—Almost 60% of men reported that they would prefer to be circumcised and 76% of women stated a preference for circumcised sexual partners. In men, the only demographic characteristic independently associated with circumcision preference was being in the youngest, 15–21 year, age group (odds ratio [OR] = 1.76; 95% confidence interval [CI] = 1.1–2.9). In women, older age (OR = 1.52; 95% CI = 1.1–2.0), being non-Luo (OR =2.33; 95% CI = 1.4–3.3), and having more education were associated with a preference for circumcised partners. Table 3 presents the results of bivariate analysis on circumcision preference.

Men and women expressing the belief that a circumcised man is less likely to become HIV infected were more likely to prefer to be circumcised or to have circumcised partners (Men OR = 3.71; 95% CI = 2.0–6.8. Women OR = 3.32; 95% CI =2.1– 5.2). In addition, men expressing less worry about HIV infection (OR = 2.39; 95% CI = 1.4–4.1); viewing HIV as a less serious threat (OR =2.21; 95% CI = 1.2–4.2); and considering condom use less necessary (OR =2.35; 95% CI = 1.4–3.8), with increased circumcision availability, were significantly more likely to have a positive view of being circumcised. Beliefs regarding increased sexual pleasure when circumcised were important predictors of preference in both men (OR = 2.44; 95% CI = 1.6– 3.9) and women (OR = 1.70; 95% CI = 1.2–2.5). Men preferring circumcision were also more likely to believe penis sensitivity increases following the procedure (OR =2.31; 95% CI = 1.4–3.9), and that there is a pleasure benefit to the sexual partners of circumcised men (OR = 2.95; 95% CI = 2.1–4.2).

Table 4 presents barriers to accepting MCcomparing uncircumcised men who state a preference to remain uncircumcised to those expressing the desire to be circumcised. In circumcised men who prefer to remain uncircumcised, the most important “main” barrier to acceptance was the belief that MC is not a part their culture (OR = 4.98; 95% CI = 2.8–8.9). In comparison, those preferring to be circumcised were more likely to identify length of recovery (OR = 2.23; 95% CI = 1.3–3.8) and “no specific reason” (OR = 1.73; 95% CI = 1.1–2.7) as the most significant barriers to their agreeing to undergo the procedure. Concern that the process would be painful was of equal concern to both those who preferred to remain uncircumcised and those who preferred to be circumcised. Perceived risks of the procedure, cost, lack of transportation, and opposition by friends and family were mentioned infrequently as primary reasons for not seeking circumcision.

Multivariable analysis—Men’s circumcision preference showed significant effect modification by marriage status (single vs. married or living as married). Accordingly, separate models were defined for married and unmarried men. Table 5 presents results from multivariable logistic regression analysis adjusted for all significant factors associated with preference for circumcision.

In all models, the belief that circumcised men are less likely to be infected by HIV was significantly associated with preference for circumcision. The education attainment of men showed inverse relationships with circumcision preference: the least educated married men but the most educated single men were more likely to prefer circumcision. Aspects of sexual pleasure were important in all three groups: married men and women considered the pleasure of their partners, while in single men the perceived impact on their own personal experience was significant. The belief that circumcision decreased the need to use a condom was a significant factor in single men only. Women who believed that they are more likely to have sex without a condom now that MC is available were less likely to prefer circumcision (OR =0.51; CI = 0.29, 0.91).

Discussion

As governments and international agencies begin introducing VMMC programs, it is crucial to understand the changing factors that present barriers and facilitators to the uptake of VMMC services. This study begins exploring this question through the knowledge and beliefs of men and women associated with preference for circumcision as VMMC services were being introduced in a predominantly non-circumcising community experiencing a generalized HIV epidemic.

The high acceptability of circumcision in this study corresponds with previous findings. In a cross-sectional study conducted in the same general population in 1999, Mattson et al. found

60% of uncircumcised men and 69% of women with uncircumcised partners reported a preference for circumcision, similar to the 59% in men and 76% in women found here. However, while the proportion preferring circumcision has little changed in eight years, the reasons for the preference have shifted markedly.

Despite the lack of coordinated education or mobilization campaigns to promote VMMC services prior to this study, in men and women favoring circumcision the proportion aware of the protective effect of MC exceeded 80%. Even controlling for other important factors, this belief proved one of the strongest predictors of circumcision preference in both men and women. This differs from the conclusions of Mattson and colleagues who found that concern about cost and the fear of pain were highly predictive of circumcision preference while health related factors (e.g., STD/HIV protection) had little association (Mattson et al., 2005). This change is likely the result of the secular trends in the community driven by increased communication of MC-trial results, the planned provision of free VMMC services, and an increasing appreciation of the distinction between MC for health reasons and MC as traditional rite.

A frequently voiced concern of MC for HIV prevention is the fear that understanding the protective effect of MC for HIV acquisition will lead to increases in high risk sexual behaviors (i.e., risk compensation), possibly overcoming the biological protection (Cassell, Halperin, Shelton, & Stanton, 2006; Eaton & Kalichman, 2007). Approximately 20% of women and a similar proportion of uncircumcised men stated that condom use is less necessary and that HIV is a less serious threat now that MC is available, suggesting that behavioral risk compensation is a possibility as VMMC programs scale up. Further, the finding that women who believe they are less likely to use a condom now that MC is available prefer uncircumcised partners may reflect a fear that they will be less able to successfully negotiate condom use with circumcised men. Educational and counseling messages should continue to reinforce the concept of partial protection, highlight the continued need for safe sex practices, and include sexual partners in the promotion and counseling surrounding VMMC services.

The belief that circumcision does not negatively impact sexual pleasure in men and their female partners was evident in our sample. Approximately 40% of participants believed that sexual pleasure actually increases in men who are circumcised, and over 85% reported that sexual satisfaction is at least unchanged. Likewise, the pleasure of female partners was believed to be enhanced by about 40% of men and women and was considered “about the same” by another 40% of the sample. These findings agree with previous observational studies in traditionally non-circumcising populations around Kisumu and throughout sub-Saharan Africa (Lagarde, Dirk, Puren, Reathe, & Bertran, 2003; Mattson et al., 2005; Ngalande, Levy, Kapondo, & Bailey, 2006; Nnko, Washija, Urassa, & Boerma, 2001; USAID/AIDSMark, 2003), and with experiences of men from the two MCtrials, from which sexual satisfaction information is available (Kigozi et al., 2008, 2009; Krieger et al., 2008). Objectively, there is little evidence concerning the role of the foreskin in sexual satisfaction; this remains a topic for further study.

The most significant barrier to circumcision in men with no current desire to be circumcised was the view that circumcision is not part of Luo heritage. After initially rejecting MC on cultural grounds, the Luo Council of Elders, the body that is considered the keepers of Luo culture, has endorsed and been active in VMMC coordination and planning activities. This endorsement, as well as support from Luo political leaders, has helped in reducing this barrier (BBC, 2008; Butunyi, 2010). For men amenable to becoming circumcised, the most significant impediments were healing time and a lack of specific impetus. Communication

campaigns with consistent evidenced-based messages regarding healing time and time to resumption of normal activities may be effective in increasing uptake.

There are a number of study limitations that should be considered. A potential selection bias may have resulted from the lower than expected response rate, due to a failure to locate eligible male participants. Efforts including multiple visits to selected households, visits outside standard working hours, and active tracing throughout the region were utilized to increase sample representativeness. Additionally, our reliance on self-report allow for a number of information biases, minimized through trained interviewers and pretesting the questionnaire instrument. Findings from this study may not be generalizable to other non-circumcising populations, although the general trends in beliefs about the benefits of circumcision that we have documented from 1999 to 2008 in Kisumu may offer some guidance to what other communities in East and southern Africa may experience as VMMC programs get scaled up.

In this analysis we have presented results from a large community based cross-sectional survey examining preference for circumcision in women and uncircumcised men in Kisumu, Kenya. As active promotion of comprehensive VMMC services progresses and as more men become circumcised, levels of knowledge and specific beliefs are likely to change further and in unanticipated directions. This work serves as the baseline for subsequent study investigating the impact of the large-scale VMMC program in Kenya, over time. We intend to follow up this survey in order to monitor such changes and to be able to develop interventions targeted to address specific challenges or sub-populations.

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Table 1

Demographic characteristics of 1548 uncircumcised men and women interviewed in Kisumu, Kenya.

Characteristic	Men *n* (%) *n*= 460	Women *n* (%) *n*= 1088	*p*-Value*
Age at interview			
15–21	164 (36)	355 (33)	0.19
22–49	296 (64)	733 (67)	
Ethnicity			
Luo	447 (97)	897 (82)	< 0.001
Non-Luo	13 (3)	191 (18)	
Religion			
Catholic	121 (26)	245 (23)	0.02
Other Christian	314 (68)	771 (71)	
Muslim	6 (1)	40 (4)	
Other	19 (4)	31 (3)	
Marital status			
Single	248 (54)	406 (37)	< 0.001
Married (living with partner)	212 (46)	682 (63)	
Employment status			
Employed	242 (53)	432 (40)	< 0.001
Unemployed	218 (47)	655 (60)	
Education			
Primary or less (8th grade or less)	207 (45)	676 (62)	< 0.001
Secondary (9–12th grade)	198 (43)	327 (30)	
Post-secondary (past 12th grade)	54 (12)	81 (8)	

*Significance by Rao-Scott chi-square test – accounting for two-stage sampling design.

Table 2

Knowledge, attitudes and beliefs of male circumcision in uncircumcised men versus women in Kisumu, Kenya.

Characteristic	Men *n* (%) *n* =460	Women *n* (%) *n*= 1088	*p*-Value*
Circumcision preference in self (men) or in sexual partners (women)			
Prefer circumcised	272 (59)	823 (76)	< 0.001
Prefer uncircumcised	188 (41)	265 (24)	
In your opinion, how likely are circumcised men to get infected with HIV compared to uncircumcised men?			
More likely	21(5)	91(8)	< 0.001
Less likely	308 (68)	703 (65)	
About the same	87(19)	119 (11)	
Do not know	38(8)	174 (16)	
Personal perception of risk and Individual behavior			
Now that MC is available, you are less worried about HIV infection			
Agree	67(15)	231 (22)	< 0.001
Disagree	385 (84)	816 (76)	
Do not know	4(1)	27(2)	
Now that MC is available, you are somewhat more willing to take a chance of getting infected or infecting someone else with HIV			
Agree	34(8)	41(4)	< 0.001
Disagree	419 (92)	1013 (94)	
Do not know	2(< 1)	26(2)	
Now that MC is available, you are more likely to have sex without a condom			
Agree	45(10)	125 (12)	0.48
Disagree	398 (87)	923 (86)	
Do not know	13(3)	22(2)	
General perception of risk			
Now that MC is available, condom use during sex is less necessary			
Agree	88(19)	277 (26)	< 0.001
Disagree	348 (76)	710 (66)	
Do not know	20(4)	84(8)	
Now that MC is available, HIV is a less serious threat than it used to be			
Agree	82(18)	240 (22)	0.12
Disagree	363 (79)	810 (74)	
Do not know	13(3)	29(3)	
Perception of sexual pleasure			
Circumcised men have more, less, about the same sexual pleasure than uncircumcised men			
More	159 (41)	323 (43)	0.68
Less	54(14)	107 (14)	
About the same	172 (45)	315 (42)	
The partners of circumcised men get more, less, about the same sexual pleasure than the partners of uncircumcised men			
More	187 (43)	289 (38)	0.002
Less	33(8)	106 (14)	

Characteristic	Men *n* (%) *n* =460	Women *n* (%) *n*= 1088	*p*-Value*
About the same	213 (49)	358 (48)	
Circumcision changes the sensitivity of a man's penis. Sensitivity…			
Decreases	138 (35)	188 (25)	< 0.001
Increases	115 (29)	206 (28)	
Remains about the same	139 (36)	351 (47)	
Circumcised men have more, less, or about the same number of sexual partners than uncircumcised men			
More	110 (28)	230 (28)	0.13
Less	51(13)	140 (17)	
About the same	237 (59)	452 (55)	

*Significance by two-sided Fisher's exact test.

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Table 3

Select demographic characteristics and knowledge, attitudes, and beliefs about male circumcision by preference for circumcision in uncircumcised men and partner preference in women.

	Men's circumcision preference			Women's circumcision preference		
	Circ *n* (%) *n* =272	Uncirc *n* (%) *n*= 188	OR (95% CI)	Circ *n* (%) *n* =823	Uncirc *n* (%) *n* =265	OR (95% CI)
Demographic characteristics						
Age at interview						
15–21	111 (41)	53 (28)	1.76 (1.1–2.9)*	250 (30)	105 (40)	0.66 (0.5–0.9)*
22–49	161 (59)	135 (72)		573 (70)	160 (60)	
Ethnicity						
Luo	261 (96)	186 (99)	0.26 (0.1–1.0)	658 (80)	239 (90)	0.43 (0.3–0.7)*
Non-Luo	11 (4)	2 (1)		165 (20)	26 (10)	
Religion						
Catholic	76 (30)	45 (25)	1.24 (0.8–1.9)	179 (23)	66 (26)	0.86 (0.6–1.2)
Other Christian	181 (70)	133 (75)		586 (77)	185 (74)	
Marital status						
Single	111 (41)	101 (54)	0.59 (0.4–0.9)	518 (63)	164 (62)	1.05 (0.8–1.4)
Married (living with partner)	161 (59)	87 (46)		305 (37)	101 (38)	
Employment status						
Employed	142 (52)	100 (53)	0.96 (0.6–1.4)	335 (41)	97 (37)	1.19 (0.9–1.6)
Unemployed	130 (48)	88 (47)		487 (59)	168 (63)	
Education						
Primary or less (8th grade or less)	127 (47)	80 (43)	1.17 (0.8–1.7)	497 (61)	179 (68)	0.72 (0.5–0.95)*
Secondary or more (9th grade or more)	145 (53)	107 (57)		324 (39)	84 (32)	
In your opinion, how likely are circumcised men to get infected with HIV compared to uncircumcised men?						
Less likely	218 (83)	90 (57)	3.71 (2.0–6.8)	594 (82)	109 (58)	3.32 (2.1–5.2)
More likely or likelihood about the same	45 (17)	69 (43)		131 (18)	80 (42)	
Personal perception of risk and Individual behavior						
Now that MC is available, you are less worried about HIV infection						
Agree	51 (19)	16 (9)	2.39 (1.4–4.1)*	187 (23)	44 (18)	1.42 (1.0–2.0)
Disagree	220 (81)	165 (91)		612 (77)	204 (82)	

	Men's circumcision preference			Women's circumcision preference		
	Circ *n* (%) *n* =272	Uncirc *n* (%) *n*= 188	OR (95% CI)	Circ *n* (%) *n* =823	Uncirc *n* (%) *n* =265	OR (95% CI)
Now that MC is available, you are somewhat more willing to take a chance of getting infected or infecting someone else with HIV						
Agree	22 (8)	12 (7)	1.24 (0.6–2.5)	31 (4)	10 (4)	0.96 (0.5–2.0)
Disagree	250 (92)	169 (93)		774 (96)	239 (96)	
Now that MC is available, you are more likely to have sex without a condom						
Agree	32 (12)	13 (7)	1.78 (0.9–3.4)	92 (11)	33 (13)	0.84 (0.6–1.2)
Disagree	231 (88)	167 (93)		710 (89)	213 (87)	
General/Community perception of risk						
Now that MC is available, condom use during sex is less necessary						
Agree	66 (25)	22 (13)	2.35 (1.4–3.8)*	209 (27)	68 (31)	0.82 (0.6–1.2)
Disagree	195 (75)	153 (87)		560 (73)	150 (69)	
Now that MC is available, HIV is a less serious threat than it used to be						
Agree	61 (23)	21 (12)	2.21 (1.2–4.2)*	191 (24)	49 (20)	1.30 (0.9–1.9)
Disagree	206 (77)	157 (88)		608 (76)	202 (80)	
Perception of sexual pleasure						
Circumcised men have more, less, about the same sexual pleasure than uncircumcised men						
More	115 (49)	44 (29)	2.44 (1.6–3.6)*	275 (46)	48 (32)	1.70 (1.2–2.5)*
Less	30 (13)	24 (16)	1.17 (0.6–2.1)	77 (13)	30 (20)	0.76 (0.5–1.2)
About the same	89 (38)	83 (55)	REF	243 (41)	72 (48)	REF
The partners of circumcised men get more, less, about the same sexual pleasure than the partners of uncircumcised men						
More	138 (54)	49 (28)	2.95 (2.1–4.2)*	245 (41)	44 (30)	1.5 (1.0–2.3)
Less	16 (6)	17 (10)	0.99 (0.5–2.1)	77 (13)	29 (19)	0.72 (0.4–1.4)
About the same	104 (40)	109 (62)	REF	282 (47)	76 (51)	REF
Circumcision changes the sensitivity of a man's penis. Sensitivity…						
Decreases	81 (34)	57 (36)	1.32 (0.8–2.2)	140 (24)	48 (32)	0.71 (0.5–1.1)
Increases	82 (35)	33 (21)	2.31 (1.4–3.9)*	171 (29)	35 (23)	1.20 (0.7–2.0)
Remains about the same	72(31)	67 (43)	REF	282 (48)	69 (45)	REF
Circumcised men have more, less, or about the same number of sexual partners than uncircumcised men						
More	71 (30)	39 (24)	1.47 (0.9–2.5)	176 (27)	54 (30)	0.89 (0.6–1.3)
Less	35 (15)	16 (10)	1.77 (0.9–3.5)	111 (17)	29 (16)	1.05 (0.6–1.8)
About the same	131 (55)	106 (66)	REF	355 (55)	97 (54)	REF

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Table 4

Identified most important “main” single barriers to becoming circumcised by circumcision preference in uncircumcised men.

Barrier	Preference to be circumcised *n* (%) reporting	Preference to remain uncircumcised *n* (%) reporting	OR (95% CI)	p-Value
Pain	53 (20)	28 (15)	1.38 (0.8–2.3)	0.22
Cost	4 (2)	2 (1)	1.39 (0.3–7.7)	1.00
Risk of the procedure	5 (2)	7 (4)	0.48 (0.2–1.5)	0.24
Family or partner opposed	6 (2)	6 (3)	0.68 (0.2–2.2)	0.56
Friends opposed	2 (1)	0 (0)	–	0.52
Not my culture	18 (7)	49 (26)	0.20 (0.1–0.4)	<0.001
The process takes too long	62 (23)	22 (12)	2.23 (1.3–3.8)	0.003
Too expensive	2 (1)	0 (0)	–	0.51
No transportation	6 (2)	2 (1)	2.10 (0.4–10.5)	0.48
No specific reason	79 (29)	36 (19)	1.73 (1.1–2.7)	0.02
Other	30 (11)	35 (19)	0.54 (0.3–0.9)	0.03

Table 5

Significant factors (from multivariable logistic regression) associated with preference for circumcision among married men, single men, and women.

Factor	OR (95% CI)	*p*-Value
Married men		
Having attained less than a secondary school education	1.92 (0.95–3.9)	0.07
The belief that circumcised males are less likely to become infected with HIV	3.32 (1.5–7.2)	0.003
Agreement with the statement: now that MC is available, HIV is less serious threat	7.32 (2.0–26.2)	0.002
The belief that the sexual partners of circumcised men experience more pleasure	2.88 (1.3–6.2)	0.007
Single men		
Having attained a secondary school or higher level of education	2.04 (1.0–4.2)	0.05
The belief that circumcised males are less likely to become infected with HIV	7.38 (3.3–16.4)	<0.001
Agreement with the statement: now that MC is available, condom use during sex is less necessary	10.25 (2.7–38.6)	<0.001
The belief that circumcised men experience less sexual pleasure	0.38 (0.15–0.96)	0.04
Women		
Self identification as Luo	0.26 (0.13–0.54)	<0.001
The belief that circumcised males are less likely to become infected with HIV	5.09 (3.3–7.9)	<0.001
Agreement with the statement: now that MC is available, you are more likely to have sex without a condom	0.51 (0.29–0.91)	0.02
The belief that circumcised men experience more sexual pleasure	1.75 (1.1–2.7)	0.01