Published in final edited form as:

AIDS Behav. 2012 October ; 16(7): 1846–1852. doi:10.1007/s10461-012-0262-6.

Acceptability of Medical Male Circumcision and Improved Instrument Sanitation Among a Traditionally Circumcising Group in East Africa

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Abstract

By removing the foreskin, medical male circumcision (MMC) reduces female to male heterosexual HIV transmission by approximately 60 %. Traditional circumcision has higher rates of complications than MMC, and reports indicate unsanitized instruments are sometimes shared across groups of circumcision initiates. A geographically stratified, cluster survey of acceptability of MMC and improved instrument sanitation was conducted among 368 eligible Maasai participants in two Northern Districts of Tanzania. Most respondents had been circumcised in groups, with 56 % circumcised with a shared knife rinsed in water between initiates and 16 % circumcised with a knife not cleaned between initiates. Contrasting practice, 88 % preferred use of medical supplies for their sons' circumcisions. Willingness to provide MMC to sons was 28 %; however, provided the contingency of traditional leadership support for MMC, this rose to 84 %. Future interventions to address circumcision safety, including traditional circumciser training and expansion of access to MMC, are discussed.

Keywords

Male circumcision; Risk reduction; Acceptability; HIV prevention; Africa

Introduction

Three randomized, controlled trials demonstrate that voluntary medical male circumcision (MMC) reduces female to male HIV heterosexual transmission by approximately 60 % [1-3]. As a result of these dramatic effects, scale-up programs for MMC are underway in 13 high priority countries identified by WHO/UNAIDS, including Tanzania [4]. Two out of three Tanzanian males are circumcised [5]; of these, the best available estimate is that half (51 %) were circumcised by a traditional practitioner [6]. Recent studies elucidate the

desirable properties of MMC, including low risks for participants [1-3, 7], known HIV preventive properties [1-3] and sufficient demand [8-12] among traditionally non-circumcising communities.

Traditional practitioner male circumcision (TPC) has been less studied, but existing evidence indicates that, relative to MMC, recipients of TPC are at higher risk of infections, excessive bleeding, and permanent sequelae such as scarring and deformity [13-16]. For example, a study of Kenyan TPC found that 42 % of patients developed infections, as indicated by a 1-month post-procedure evaluation [13]. In contrast, a MMC scale-up program in South Africa found an overall complication rate of 1.8 % [7].

Poor instrument sanitation is a likely contributor to high rates of infection in TPC, although there is a dearth of information on this topic [17]. One study of TPC in Nigeria in 1997 found 23 % of circumcision instruments shared across initiates were not cleaned between uses, whereas 36 % were cleaned in water and 38 % were sterilized with boiling water or antiseptic solution [18]. Instrument sharing for group circumcision has been documented as a traditional practice among many groups, including the Xhosa [19], the Babukusu [20], and the Maasai [21], although current rates of sharing, and potential instrument sanitation, are unknown. Separate studies in South Africa, among the Xhosa and Ndebele groups, found heterogeneity of circumcision instrument sharing, with some traditional circumcisers properly using multiple single-use medical blades for group ceremonies, whereas other practitioners used a single, uncleaned blade for an entire group [15, 22]. These studies reveal that unsanitary blade sharing is currently practiced, but their designs did not allow for assessment of the prevalence of this practice.

Although numerous studies have assessed willingness to circumcise among non-circumcising communities [8-12], only one study has analyzed willingness to receive medical circumcision in TPC communities [23]. Among a population in Northern Tanzania in which 36 % had received MMC, there was nearly universal (96 %) support for providing sons with MMC. Yet a protracted struggle over circumcision practice between Xhosa leaders seeking to protect tradition and the South African government seeking to protect health of initiates [24] indicates traditionally circumcising communities may not be uniform in their readiness to alter circumcision practices. The present study seeks to broaden current understanding of TPC by focusing on the Maasai of Tanzania, assessing: (1) current instrument sanitation practices, (2) acceptability of medical male circumcision and improved instrument sanitation practices, and (3) determinants of acceptability of medical male circumcision in traditionally circumcising communities.

Methods

Setting

This study was conducted in 2008 among the Maasai tribe in Northern Tanzania, a semi-nomadic tribe of over 1 million in Tanzania and Kenya [25]. Traditional circumcision procedures vary greatly, utilizing different cutting methods and thus removing different amounts of foreskin. The Maasai were selected in part due to their use of the buttonhole circumcision technique [26]. In buttonhole circumcision, the foreskin is partially removed, followed by a small slit cut transversely above the glans in the remaining attached foreskin [27]. The glans of the penis is inserted through this slit, leaving a flap of foreskin as a permanent appendage hanging below the penis. Given this procedure's incomplete removal of foreskin, the Maasai may be a target for future programs seeking to broaden access to the safety and HIV prevention efficacy of MMC.

Many societies have a seclusion period that follows traditional circumcision practice, during which initiates receive training that can generate new attitudes, practices, and behaviors [28]. The Maasai seclusion period involves training boys to be warriors, which includes instruction in cultural responsibilities, bravery, and self-discipline [29]. This training also addresses sexual roles, norms, and practices [29], making it particularly relevant to potential HIV prevention programs.

Survey Methodology

This cross-sectional study used a geographically stratified, cluster sample design to select 368 eligible participants who completed a survey on HIV-related behaviors. The survey response rate was 91 %. The population eligible for this study component was adults aged 18–50 self-identifying as Maasai. Random selection occurred at three levels: 37 area clusters, 11 households per area and 1 adult member per household. The survey instrument was team translated from English directly into the Maa language and back-translated by a second team of Maa speakers. Three rounds of cognitive interviews, a qualitative method suggested by Beatty and Willis [30] to assess respondent cognition of individual survey items, were conducted to improve survey validity. The final instrument was deployed with face-to-face interviews conducted by gender-matched, native Maa speaking interviewers.

Measures

All demographic measures were adapted from the Tanzanian DHS survey [31]. Based on qualitative interviews, we created a set of measures regarding traditional circumcision and HIV prevention practices: *age of circumcision* was assessed continuously, as was *length of training following circumcision* and *circumcision group size*. *Circumcision status* and *traditional training* were assessed with dichotomous items. *Circumcision instrument sanitation* was addressed with two items: “Were you circumcised with your own knife or with the circumciser’s knife?” If circumcised with the practitioner’s knife, the following was asked: “Was the knife used to circumcise you: (a) not used on anyone else at the circumcision ceremony, (b) used on others, and cleaned in medical solution between uses, (c) used on others, and cleaned in water between uses, or (d) used on others, and not cleaned between uses.”

Circumcision sanitation preferences and willingness to change circumcision technique were measured using dichotomous, agree or disagree, attitudinal statements. Cognitive interviews indicated that respondents in this population understood dichotomous items better than Likert Scales. We measured preference for *use of medical supplies*, *use of anesthesia*, *circumcision location*, and *belief in safety of hospital circumcision*. For instance, anesthesia preference was assessed with the statement, “If anesthesia were free, I would choose to use it for my son’s circumcision.” A *traditional beliefs scale* of three dichotomous statement items assessed support for Maasai tradition, such as, “Attending (a traditional dance) is an essential part of being a Maasai youth.” The scale had high average inter-item correlation, 0.49, but slightly low Kuder-Richardson’s coefficient, 0.67, which was expected as shorter scales have lower scores on this measure [32].

We assessed the acceptability of several variants of MMC. We measured *willingness to provide MMC*: “If male medical circumcision that leaves no appendage was proven to provide partial protection against HIV, I would bring my son to receive this kind of circumcision.” Two other acceptability items sought to decipher whether the greatest barrier to change would be (a) abandoning the traditional buttonhole penis morphology or (b) the violation of Maasai leader-regulated norms. Thus, one item assessed *willingness to provide MMC that maintains the buttonhole appendage*, “If male medical circumcision that still leaves an appendage was proven to provide partial protection against HIV, I would bring my

son to receive this kind of circumcision.” The second assessed *willingness to provide MMC given traditional leader support*, “If most traditional Maasai leaders agreed to change to male medical circumcision that leaves no appendage, and it was proven to provide partial protection against HIV, I would bring my son to receive this kind of circumcision.”

Data Analysis Plan

All data analyses were adjusted to correct for the clustered, hierarchical nature of the data. Descriptive summaries of circumcision instrument sanitation, ritual, and opinion were based on adjusted proportions and unadjusted frequencies. Gendered differences in circumcision opinions were evaluated with Pearson’s χ^2 statistics that were converted into F statistics to correct for the survey design, based on a procedure recommended by Rao and Scott [33]. Differences in proportions of respondents willing to provide MMC to their sons were assessed with corrected Wald tests and F statistics. Associations between medical/ritual beliefs and willingness to provide MMC were assessed with odds ratios from univariate and multivariate logistic regressions, controlling for significant demographic variables. All analyses were conducted in STATA 11.2 [34]. Ethical clearance was provided by the Tanzanian National Institute for Medical Research and Emory University’s Institutional Review Board, and permission to conduct the study was gained from the National Council of Maasai (MARIA/Oreteti Loongaek).

Results

All Maasai males in the study who were eligible by Maasai law (having entered the warrior age-group) had previously been circumcised in a ritual TPC ceremony. From this group, 82 % were circumcised between the ages of 15 and 20 (Table 1). Most initiates (84 %) had attended a training period following circumcision; the training usually lasted 1 month or more.

Circumcision instrument sanitation was minimal, with the majority of TPC ceremonies conducted with shared knives that were inadequately cleaned. Group TPC ceremonies were normative, with 91 % circumcised in a group of two or more. For 76 % of all respondents, a single traditional practitioner’s knife was used on their circumcision group. Disaggregating this figure, 56 % reported a single knife rinsed in water between participants, 16 % reported a knife that was not cleaned in any way between initiates, and 4 % reported a knife that was rinsed in sanitizing solution. Thus, 72 % of all respondents were circumcised with a group-shared blade that was inadequately sterilized between initiates. Other respondents had either faced a previously unused knife of the circumciser (20 %) or supplied their own knife (5 %). We assessed whether TPC sanitation practices have changed over time, comparing circumcisions conducted from 2000–2008 to those from 1970 to 1999, and did not find a significant difference (corrected χ^2 : $F(3, 111) = 1.32, p = .27$).

In contrast to current sanitation practices, most Maasai were favorably disposed to provide more sanitized TPC for their children (Table 2). Use of medical supplies, such as gloves and clean surgical blades, was favored by 88 %. Half preferred their son’s TPC be conducted in a hospital, and the same number believed hospitals are safer than traditional venues. Use of anesthesia was favored by 72 %. Males had significantly more favorable beliefs about hospitalized circumcision (corrected χ^2 : $F(1, 36) = 13.86, p = .001$), but were less likely to support use of anesthesia (corrected χ^2 : $F(1, 36) = 17.70, p < .001$), than women.

Acceptability of providing sons with MMC varied from 28 to 84 %, depending on hypothetical contingencies. Without any contingencies, only 28 % of respondents were willing to provide MMC, despite stated benefits of partial protection against HIV. Given a MMC procedure that would maintain the appearance of Maasai TPC (appendage below the

glans of the penis), 56 % stated willingness to provide MMC. If the contingency was Maasai traditional leadership support for MMC, 84 % indicated willingness to provide MMC. Willingness contingent on traditional leadership support was higher (corrected Wald: $F(1,36) = 32.36, p < .001$) than the cosmetic contingency, which was in turn higher than willingness to provide MMC in the absence of any contingencies (corrected Wald: $F(1,36) = 67.18, p < .001$). This indicated that although traditional custom was important, current doctrine of traditional leaders had more impact on acceptability of changing circumcision procedures.

A series of three logistic regression analyses predicted the willingness items above; together, the models indicated that contingent environmental changes accounted for the association between willingness and cultural variables (Table 3). In the first model, overall willingness to provide MMC was predicted by cultural items, including a traditional beliefs scale (AOR 0.62, 95 % CI 0.45, 0.85) and Christian religion (AOR 2.10, 95 % CI 1.2, 3.6), and by medical concerns, including believing hospital circumcisions are safer (AOR 2.68, 95 % CI 1.2, 5.8). In the second and third models, contingent willingness to provide MMC was not predicted by cultural variables, but instead was solely predicted by medical concerns. Given the traditional appendage remaining present, willingness was predicted by preference for medical supplies (AOR 2.37, 95 % CI 1.04, 5.4); given leadership support for change, willingness was predicted by believing in the safety of circumcisions conducted in hospitals (AOR 2.62, 95 % CI 1.4, 4.9).

Discussion

This study found that most (72 %) Maasai circumcisions were both conducted in group settings and with a shared blade that was not sanitized between initiates. Despite current practices, there was high demand for proper sanitation, and high willingness to completely alter the circumcision procedure and location if traditional leaders supported such a change.

Non-sanitized, shared circumcision instruments pose a risk for transmission of blood-borne pathogens such as HIV, hepatitis B and C, and syphilis. In addition to these risks, several studies have found traditional circumcision to result in higher rates of complication than MMC [13, 15]. As MMC programs are scaled up in non-circumcising communities, efforts should be made to increase access to safe circumcision among traditionally circumcising groups.

One path to achieve safer circumcision is to provide medical supplies, instruments and training to traditional practitioners. Given the high demand among our study population for improved sanitation, this strategy has a good chance of being effective. Yet even if training is effective and prevents blood-borne transmissions, this intervention would not resolve higher rates of TPC complication or the less certain Maasai TPC HIV prevention efficacy. One research team has had limited success in producing a sufficiently efficacious training intervention [15, 16], indicating that circumcising customs of traditional practitioners may be difficult to change.

Another option to achieve safer circumcision is to perform MMC in hospitals. This approach would allow for optimal safety and certain HIV prevention efficacy. In a separate study conducted in Tarime District, Tanzania, 96 % of respondents supported MMC for their children [23]. Participants in the present study were less supportive, with only 28 % supporting MMC unconditionally. However, the contingency of traditional leaders endorsing MMC increased support to 84 %.

Together, these studies indicate potentially high variation in demand for MMC among traditionally circumcising communities. Future MMC programs may need to be tailored to

reflect cultural differences between traditionally circumcising groups. Moreover, our finding that traditional leader support produced the highest levels of willingness may indicate that traditionally circumcising communities' recognition of the benefits of MMC could substantially impact individual willingness to use MMC. We suggest further research be conducted to more directly assess this issue.

This study had several limitations. The sample contained males up to age 50, and circumcision practices have likely shifted to some degree over the last 35 years. In comparing circumcisions conducted between 2000 and 2008 to those conducted from 1975 to 1999, however, we did not find a significant difference in instrument sanitation practices. Another limitation was reliance on self-report of initiates; direct observation of circumcisions would yield more accurate and timely recording of circumcision practices. Studies using contingent valuation methods (such as willingness) often over-estimate real world levels of action [35], although whether this would be the case for our study population is unclear, as contingency over-estimation does not apply to all cultures [36]. Also, our study did not measure participant perceptions of the relative HIV prevention efficacy of MMC versus TPC, a factor that might influence adoption of MMC. We suggest that future research look into traditionally circumcising groups' perceptions of circumcision as a tool for HIV prevention.

The level of circumcision instrument sanitation found in this study indicates severe and unacceptable risk to initiates. Ministries of Health in countries with large groups performing traditional circumcisions should further investigate this problem, and how it can be mitigated. Until MMC programs can be brought to scale throughout traditionally circumcising communities like the Maasai, a stop-gap measure of providing traditional circumcisers with training, sanitary blades, antiseptic solution and medical supplies to more safely circumcise initiates could prevent transmission of blood-borne pathogens. In the long-term, however, epidemiological studies assessing the efficacy of different traditional circumcision methods should be conducted.

MMC provides the best combination of safety and certain HIV prevention efficacy. However, because circumcision is an important rite of passage in many cultures, changing current practices will require balancing tradition and the benefits of MMC. Our results indicate that support from traditional leaders can be more important than adherence to tradition itself. Thus, persuading traditional leaders of the value of MMC, and involving them in program design and implementation, seems likely to increase the effectiveness of interventions intended to promote MMC procedures in societies that practice traditional circumcision.

Acknowledgments

This study was supported by Grant Number 1F31MH082647-01A1 from the National Institute for Mental Health. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Mental Health or the National Institutes of Health.

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Table 1

Circumcision instrument sanitation and ritual

	% ^a	n ^a
<i>Circumcision details</i>		
Circumcised	89	156
Age of circumcision		
< 15	6	6
15–17	35	39
18–20	47	53
>20	12	13
Received traditional training after circumcision	84	131
Length of training		
1 month or less	19	24
2–3 months	46	56
4 or more months	35	40
Circumcision group size		
1 (circumcised alone)	9	18
2–3	54	80
4–5	19	31
6 or more	18	26
<i>Circumcision instrument sanitation</i>		
Circumciser's knife used on group, uncleaned	16	26
Circumciser's knife used on group, rinsed in water	56	75
Circumciser's knife used on group, medical solution	4	5
Circumciser's knife not used on group	20	28
Own knife used	5	9

^aWeighted %, unweighted *n*

Table 2

Circumcision practices and opinions by gender

	All	Males	Females	Corrected χ^2 test ^b	Sig
	% (n) ^a	% (n) ^a	% (n) ^a	F(1, 36)	p
<i>Preferences for circumcision sanitation for son</i>					
Prefer traditional practitioner use medical supplies	88 (322)	90 (159)	86 (163)	0.32	.58
Prefer circumcision in hospital	51 (182)	69 (115)	35 (67)	13.86	<.01
Use anesthesia if no cost	72 (262)	61 (106)	81 (156)	17.70	<.01
Believe hospitals safer than traditional circumcision	51 (182)	58 (100)	46 (82)	2.86	.10
<i>Willingness to change circumcision technique for son</i>					
Willing to provide medical circumcision	28 (99)	38 (63)	19 (36)	6.55	.01
Willing to provide medical circumcision if it produces a buttonhole appendage	56 (199)	61 (99)	53 (100)	1.16	.29
Willing to provide medical circumcision if traditional Maasai leaders support change	84 (307)	83 (144)	86 (163)	0.97	.33

^aWeighted %, unweighted n

^bThe Pearson χ^2 statistic was converted into an F statistic F(1, 36) to correct for the survey design

Table 3
Logistic regressions predicting contingent willingness to provide sons with male medical circumcision (MMC)

	Predicting willingness to provide MMC		Predicting willingness to provide MMC with traditional appendage		Predicting willingness to provide MMC with traditional leader support	
	Univariate OR (95 % CI)	Multivariate AOR (95 % CI)	Univariate OR (95 % CI)	Multivariate AOR (95 % CI)	Univariate OR (95 % CI)	Multivariate AOR (95 % CI)
Traditional beliefs scale	0.58 (.42, .79)**	0.62 (.45, .85)**	0.93 (.59, 1.5)	–	1.00 (.58, 1.7)	–
Christian religion	2.22 (1.5, 3.3)**	2.10 (1.2, 3.6)**	1.35 (.87, 2.1)	–	1.79 (.92, 3.5)	–
Believe hospital circumcision is safer	4.26 (2.6, 7.1)**	2.68 (1.2, 5.8)*	1.08 (.65, 1.8)	–	2.50 (1.4, 4.6)**	2.62 (1.4, 4.9)**
Prefer use of medical supplies	13.3 (1.6, 113)*	–	2.42 (1.1, 5.5)*	2.37 (1.0, 5.4)*	1.76 (.85, 3.6)	–

Multivariate analyses are adjusted for significant demographic variables

* $p < .05$,

** $p < .01$