2014

Acceptability, Knowledge, Beliefs, and Partners as Determinants of Zambian Men's Readiness to Undergo Medical Male Circumcision

Deborah Jones

Ryan Cook

See next page for additional authors

Follow this and additional works at: https://digitalcommons.uri.edu/cprc_facpubs

Authors

Deborah Jones, Ryan Cook, Kris Arheart, Colleen A. Redding, Robert Zulu, Jose Castro, and Stephen M. Weiss

Acceptability, Knowledge, Beliefs, and Partners as Determinants of Zambian Men's Readiness to Undergo Medical Male Circumcision

Deborah Jones[a], **Ryan Cook**[a], **Kris Arheart**[a], **Colleen A. Redding**[b], **Robert Zulu**[c], **Jose Castro**[a], and **Stephen M. Weiss**[a]

[a]University of Miami Miller School of Medicine, Miami, FL

[b]Cancer Prevention Research Center, University of Rhode Island, Kingston, Rhode Island, USA

[c]University of Zambia Teaching Hospital, Lusaka, Zambia

Abstract

There is limited information about the influence of partners on medical male circumcision (MMC) uptake. This study aimed to evaluate attitudes, knowledge, and preferences about MMC among men and their partners, and their relative impact on male readiness to undergo the MMC procedure. Male participants (n = 354) and their partners (n = 273) were recruited from community health centers in Lusaka, Zambia. Men reported their readiness to undergo MMC, and both men and women were assessed regarding their attitudes and knowledge regarding MMC. Men who had discussed MMC with their partners, those who endorsed MMC for HIV risk reduction, and those viewing MMC as culturally acceptable reported increased readiness to undergo MMC. Additionally, endorsement of MMC by female partners was associated with increased men's readiness. Results support promotion of cultural acceptability of MMC, and efforts to increase MMC uptake may benefit from incorporating partners in the decision making process.

Keywords

Male circumcision; HIV; Zambia; partners

Introduction

Substantial scientific evidence from sub-Saharan Africa indicates that medical male circumcision (MMC) reduces the risk of HIV acquisition among males [1–5]. In addition, the long-term protective effects of MMC have been established [6] and, although MMC has not been found to directly protect women from HIV infection, mathematical models estimate a 46% long-term reduction in male-to-female transmission due to reduced male susceptibility to sexually transmitted infections [7]. It has been projected that widespread MMC in Africa could avert up to 2 million HIV cases and 300,000 deaths over the next 10 years [8–9]. In response to these findings, the World Health Organization recommended rapid scale-up of medical male circumcision programs in countries with high rates of HIV and low prevalence of MMC, which includes most countries in Eastern, Southern and Central sub-Saharan Africa [10–11].

Corresponding Author: Deborah L Jones, PhD, University of Miami Miller School of Medicine, Dept. of Psychiatry & Behavioral Sciences, 1400 NW 10th Ave. Suite 404A, Miami, FL 33136, (305) 243-2041, djones@med.miami.edu.

Zambia, a sub-Saharan African nation with a population of 12 million, has a high prevalence of HIV/AIDS (19.7% in urban areas, 21% in Lusaka) and a low rate of MMC (12%) among those aged 15–49 [12]. Based upon WHO recommendations, the Zambian Ministry of Health set an ambitious goal of rapidly scaling up the availability of MMC, with the goal of performing 2.5 million MMCs by 2020, which would require about 300,000 MMCs annually and represents approximately 50% prevalence [13]. However, the 2010 nationwide Zambian Sexual Behavior Survey indicated that over 80% of uncircumcised men surveyed expressed no interest in undergoing MMC [14]. Studies have found several factors to negatively influence men's willingness to undergo MMC in traditionally non-circumcising populations, e.g., fear of pain, fear of surgical complications, fear of reduced sexual functioning [15–16], perceptions of MMC as providing only "partial protection" requiring continued condom use [17], confusion regarding risk reduction [18], and concerns regarding cultural acceptability [19].

Preliminary reports suggest that improved genital hygiene, HIV prevention and low cost may facilitate MMC acceptability among Zambian men and women [19]. Though there is a consensus that better understanding of partners' attitudes and behaviors could strengthen HIV prevention efforts [20], there is limited information about the opinions of female partners regarding MMC [21]. Disagreement as to the importance of women's opinions regarding MMC in Africa has been identified in earlier studies; women's beliefs have been found to strongly impact MMC acceptability among men [22], but also to have limited effect on men's decisions due to cultural male dominance in sexual decision making [23–24]. However, as willingness and acceptability may be part of the continuum towards readiness to undergo MMC, women's influence may be an important component in the decision making process. More recently, women informed about the potentially HIV-protective effects of MMC reported subsequently discussing the procedure with their partners, engaging in a joint decision-making process regarding MMC uptake [25]. Thus, the involvement of women in public health campaigns to enhance MMC uptake has been recommended [25] as a strategy to promote cultural acceptability among both men and their partners. Despite these recommendations, few campaigns (e.g., Republic of Kenya Ministry of Public Health and Sanitation) have actively involved women in the process [26].

Building on previous studies that found MMC to be acceptable as a method of HIV risk reduction, this study aimed to evaluate MMC attitudes, knowledge and preferences among both men and their partners, and to quantify their relative impact on male readiness to actually undergo the MMC procedure. It was hypothesized that men with more accurate knowledge regarding MMC would be more prepared to undergo the procedure. It was also hypothesized that men with a partner engaged in the MMC decision making process and those with a partner who viewed MMC positively would be more prepared to undergo the procedure.

Methods

Prior to study initiation, ethical approval was obtained from the University of Miami Institutional Review Board and the University of Zambia Research Ethics Committee. All participants provided written informed consent prior to study enrollment.

Participants

This manuscript presents preliminary data from the Spear & Shield project, an ongoing HIV prevention study in Lusaka, Zambia. Male participants were recruited between January and September 2012 from community health centers in Lusaka District following completion of HIV voluntary counseling and testing (VCT). Participants were at least 18 years of age, HIV-negative, uncircumcised, and had not requested or planned for MMC services at the

time of enrollment. Sixty-nine percent of participants who were screened elected to enroll. The most common reason for non-enrollment was failure to meet study criteria (e.g., HIV-positive, circumcised). Additionally, men were invited, but not required, to enroll with their primary sexual partner. Participants were compensated K20,000 (Zambian Kwacha, ~$4 US dollars) for completing assessments.

Assessments

All assessments were conducting using audio computer-assisted self-interview (ACASI) in English, Nyanja or Bemba (primary local languages) in private carrels in the study offices and clinics. Study staff demonstrated how to use the ACASI and were available to assist participants and respond to queries throughout the assessment.

Knowledge & Attitudes about MMC

Knowledge and attitudes about MMC were assessed using a measure adapted from the Uganda National Serosurvey by Mugwanya et al. [27]. Participants indicated the methods they currently used to prevent HIV infection and the methods they believed to be effective. Additionally, participants answered a series of questions about the ability of MMC to reduce and to completely negate the chance of HIV infection. Finally, participants indicated how culturally acceptable they perceived MMC to be, whether or not a circumcised man still needed to use a condom for HIV prevention, and whether or not they had discussed undergoing MMC with their female partner. Female partners also indicated how strongly they endorsed MMC (e.g., how strongly they preferred a circumcised or uncircumcised partner).

Although the internal consistency of the study instrument was found to be acceptable (Cronbach's $\alpha = 0.70$ [27]), similarity between many items on the questionnaire was observed, and principal component analysis was used to investigate the validity of combining similar items into subscales. Items related to HIV prevention methods believed to be effective were separated into material (e.g., ARV medication, condoms) and behavioral (e.g., faithfulness to partner, withdrawal before ejaculation) 5-item subsets, and 8 items related to current use of HIV prevention methods (e.g., condoms, withdrawal) were summed to create a separate scale. Items indicating the strength of endorsement that MMC could help prevent HIV infection or completely negate the chance of HIV infection were combined into separate subscales representing knowledge (4 items) and misinformation (2 items). Four female partner-only items were combined into a subscale regarding the strength of endorsement for MMC. Items related to methods currently used or believed to be effective for HIV prevention were answered with "Yes" or "No," and items related to knowledge, misinformation, and female partner endorsement of MMC were answered with Likert-type scales. All subscales were coded such that higher values indicated stronger support for MMC (e.g., that MMC can prevent HIV infection) or preferences (e.g., for a circumcised partner). Table I presents the numbers of items and range for each subscale as well as the mean, standard deviation, and Cronbach's α for men and women. Perceived cultural acceptability, discussion with partner, and the need to use condoms after undergoing MMC were retained as individual items.

Readiness to Undergo MMC

Men's readiness to undergo MMC was assessed within the Stages of Change framework [28–30]. Men indicated whether they had "never thought about undergoing MMC" or had "thought about it but were not considering undergoing it within the next 6 months" (Precontemplation), were "considering undergoing MMC sometime within the next 6 months" (Contemplation), or were "considering undergoing MMC sometime within the next 30 days" (Preparation). Timeframes were consistent with existing Stages of Change

assessments [29]. As this study recruited only uncircumcised men, by definition, no participants had requested or undergone MMC services at the time of enrollment and no participants were in the Action or Maintenance stages.

Statistical Analyses

Univariate statistics (mean, standard deviation, frequency) are reported for demographic information. Potential associations between demographics and readiness to undergo MMC were examined using Spearman's correlation for continuous demographic variables and Wilcoxon's test for categorical variables. If any demographic variables were related to men's readiness to undergo MMC, they were tested as confounders in multivariable analyses. Readiness to undergo MMC was examined using ordinal logistic regression because of the ordinal nature of the outcome variable (i.e., stage). The knowledge and attitudes subscales, as well as the items indicating perceived cultural acceptability, discussion with partner, and use of condoms after circumcision, were tested as predictors. Subsequently, for those men who had an enrolled partner, both their own and their partner's predictor variables were added to an ordinal logistic regression model predicting men's readiness to undergo MMC.

Regression models were constructed using backwards elimination, in which main effects of all predictor variables were added to a multivariable model and then removed one at a time, beginning from the least significant, until all remaining variables were significant at the $p < .$ 05 level. Using the resulting main effects model, two-way interaction terms between all predictors were added and then removed until a final model was determined. All statistical analyses were conducted using SAS v.9.3 (2011, SAS Corporation, Cary, NC).

Results

Demographics

Male participants (n = 354) ranged from 18 to 57 years old (mean = 28, sd = 8) with 11 ± 3 years of education. Forty eight percent (n = 171) reported an annual income less than 500,000 Zambian Kwacha (~US$100) and just under half reported being unemployed (n = 168, 47%). Thirty five percent (n = 123) were married, and 38% (n = 136) had children. Fifteen percent of men (n = 48) indicated that their partner was trying to get pregnant. Most (65%, n = 229) indicated that their wife or girlfriend had been tested for HIV, and 6% of those (n = 21) reported that their partner was HIV seropositive. Seventy-seven percent of men enrolled with their female partner (n = 273 females enrolled). Of those who did not enroll with a partner, 20% indicated they were married, and no other data on relationship status was collected.

Men with an enrolled partner were slightly older than those without a partner (mean (partner) = 28 ± 8, mean (no partner) = 25 ± 7; $t = 2.99$, $p = .003$) and trended towards more likely to be employed (55% employment (partner) vs. 43% employment (no partner); $X^2 = 3.67$, $p = .06$). Also, men who enrolled with their partners reported increased readiness to undergo MMC at baseline compared to those who enrolled without a partner (χ^2(2 df) = 8.03, $p = .02$).

Readiness to undergo MMC

Forty seven percent of participants (n = 168) indicated that they never thought about undergoing MMC or were not considering undergoing MMC within the next 6 months (Precontemplation), 41% (n = 145) were considering undergoing MMC sometime within the next six months (Contemplation), and 12% (n = 41) reported that they were considering undergoing the procedure within the next 30 days (Preparation). Age was negatively

correlated with men's readiness to undergo MMC (Spearman's rho = −.11, p =.042), however, readiness to undergo MMC was not related to employment, income, education, marital status, having children, or desire to have children. Among participants who had a partner of known HIV serostatus, those with HIV positive partners (n = 21) showed a trend towards increased readiness to undergo MMC (Wilcoxon test, t approximation = 1.7, p = .083).

Knowledge and Attitudes about MMC

Fifty seven percent of men perceived MMC as culturally acceptable (n = 201) and 57% reported having discussed undergoing MMC with their partner (n = 200); 134 men (38%) endorsed both cultural acceptability and having discussed MMC with their partners. Ten percent of men (n = 34) indicated that circumcised men no longer needed to use a condom for HIV prevention. Ranges, means, and standard deviations of the MMC knowledge and attitudes subscales are presented in table I.

Ordinal logistic regression was used to evaluate the contribution of men's knowledge and attitudes on readiness to undergo MMC. The final model (see table 2) was significant (Wald χ^2(4 df) = 62.36, p < .001) and accounted for approximately 24% of the variance in readiness to undergo MMC. The proportional odds assumption was not violated (χ^2(4 df) = 5.50, p = .24). As can be seen in table II, perception that MMC was culturally acceptable was associated with 2.08 greater odds of increased readiness to undergo MMC (95% CI = [1.32, 3.28]) and discussion of MMC with partner was associated with 3.94 greater odds (95% CI = [2.47, 6.27]). An interaction between endorsement of MMC for HIV prevention and discussion with partner also emerged, such that for those who had not discussed undergoing MMC with their partner, increased endorsement of MMC as a strategy to reduce the risk of HIV infection was associated with increased readiness to undergo MMC (OR = 1.35, 95% CI = [1.15, 1.58]). Among those who had discussed MMC with their partner, endorsement of MMC to help prevent infection had no effect (OR = 1.03, 95% CI = [0.92, 1.16]). Age did not affect men's readiness to undergo MMC, nor did methods of HIV prevention participants currently used or believed to be effective for HIV prevention. Neither misinformation about MMC (endorsement that MMC could completely negate one's chances of HIV infection) nor the belief that circumcised men no longer had to wear condoms influenced men's readiness to undergo MMC.

Partner opinions about MMC

To determine the effect of the partner's opinion on men's readiness to undergo MMC, a sub-analysis was performed on the 273 men who enrolled with their female partner. Ordinal logistic regression was again performed to determine which factors influenced men's readiness to undergo MMC, this time using both the man's and his partner's knowledge and attitude predictors. Generally, women felt that MMC was culturally acceptable (n = 177, 65%). Fifty seven percent of men with an enrolled partner reported discussion about undergoing MMC with their partner (n = 155). Ten percent of women (n = 28) indicated that circumcised men no longer had to wear condoms.

The results of this analysis can be seen in table III. In summary, the model was significant (Wald χ^2(4 df) = 49.39, p < .001) and accounted for approximately 25% of the variance in readiness to undergo MMC. The proportional odds assumption was not violated (χ^2(5 df) = 2.98, p = .56). Men's discussion about undergoing MMC with their partner (OR = 3.50, 95% CI = [2.07, 5.93]), and men's perception of cultural acceptability remained associated with increased readiness to undergo MMC (OR = 2.00, 95% CI = [1.20, 3.35]). Additionally, increased endorsement of MMC as an HIV prevention strategy by the male (OR = 1.16, 95% CI = [1.04, 1.28]) and increased endorsement for MMC by his partner (OR = 1.13, 95% CI =

[1.00, 1.28]) were associated with increased readiness to undergo MMC. Women's reported discussion about undergoing MMC did not contribute to men's readiness to undergo MMC, nor did women's opinions of cultural acceptability or endorsement of MMC as an HIV prevention strategy. As in the previous analysis, neither men's nor their partner's misinformation about MMC, nor age, nor their beliefs that circumcised men could discontinue condom use affected men's readiness to undergo MMC.

Discussion

This study sought to examine the effect of attitudes, knowledge and preferences regarding MMC on men's readiness to actually undergo the procedure. Having discussed MMC with a female sexual partner was the greatest predictor of readiness to undergo MMC. Among men who had not discussed MMC with their partner, the belief that MMC could reduce the risk of HIV infection was associated with increased readiness. The perception that MMC was culturally acceptable was important to all men. In addition, among those men with a female partner enrolled in the study, more positive endorsement for MMC by their partner was associated with increased readiness to undergo the procedure.

Similar to recent research [21, 31–32], this study found that men were positively influenced by both knowledge of the benefits and perceived cultural acceptability of MMC. In sub-Saharan African countries in which MMC is not conventionally practiced, such as Zambia, these findings provide support for country-wide initiatives and media campaigns promoting cultural acceptability. It is interesting to note that while behavioral disinhibition has been postulated to follow MMC, misconceptions that MMC would provide comprehensive protection against HIV did not appear to influence readiness to undergo MMC. Similarly, knowledge that circumcision would still require the use of condoms during sex did not impact readiness.

As hypothesized, joint discussions about MMC between men and their partners had a strong positive impact on men's reported readiness to undergo MMC. Although those female partners who chose to participate in the study may represent a biased sample of women who viewed MMC more positively, analysis of the full sample, including those who did not enroll with their partners, indicated that discussion of MMC with partners remained a strong predictor of increased readiness to undergo MMC. Thus, though those partners who were not enrolled cannot be directly assessed, it can be inferred that their attitude towards MMC positively influenced men's preparedness to undergo the procedure. Additionally, men's knowledge about MMC interacted with partner discussion, such that for those who had discussed undergoing MMC with their partner, increased knowledge did not impact their readiness. As the study presents cross sectional data, it is not possible to ascertain whether men made a decision about the potential value of the procedure before discussing it with their partners, or whether the process of inviting partners to participate in the study had triggered discussion on MMC. Furthermore, women's positive endorsement of MMC appeared to positively influence readiness to undergo MMC among men who enrolled with their partners. Therefore, results of this study support initiatives to include both partners in programs to enhance the uptake of MMC.

As in other studies of hypothetical acceptability, this study was limited by self-report regarding readiness to undergo MMC. Behavioral intentions do not necessarily predict behavior [33–34], although increased readiness and the stages of change framework have been predictive of a range of future behavior changes [29, 35]. Longitudinal assessment of MMC uptake is needed to conclude whether reported readiness to undergo MMC resulted in MMC in this population. Additionally, this study recruited men undergoing VCT, which

may represent a subset of Zambian men who are more conscious of positive health behaviors.

This study's outcomes support recent reports that have stressed the importance of targeting positive components of MMC and positive responses by female partners to their partners' MMC, in addition to clarifying points of confusion regarding the process and protection afforded by MMC [36]. Results are similar to previous studies that identified confusion regarding MMC and HIV risk reduction, although in this study only 10% of both men and women incorrectly predicted the impact of MMC on HIV risk. Public health initiatives should continue to clarify the limits of risk reduction associated with MMC, as well as risk associated with early resumption of sex in the immediate post-MMC period [18, 37].

In conclusion, earlier studies concluded that MMC was an acceptable HIV risk reduction strategy [22, 38], but failed to examine factors related to readiness to undergo the procedure. This study examined the factors influencing men's readiness to undergo MMC, including the opinions of their partners. Men's readiness was influenced by discussing MMC with their partner, their own belief in the ability of MMC to reduce the risk of HIV, and the cultural acceptability of MMC. In addition, among those who enrolled with their partners, women's endorsement for male circumcision positively influenced men's readiness to undergo MMC. Results support programs to increase MMC cultural acceptability and awareness of risk reduction, as well as more active involvement of partners in programs to increase the uptake of medical male circumcision.

Acknowledgments

References

2. Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. PLoS Med. 2005; 2(11):e298. [PubMed: 16231970]

3. Bailey RC, Moses S, Parker CB, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. Lancet. 2007; 369:643–656. [PubMed: 17321310]

4. Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. Lancet. 2005; 369:657–666. [PubMed: 17321311]

5. Siegfried N, Muller M, Deeks JJ, Volmink J. Male circumcision for prevention of heterosexual acquisition of HIV in men. Cochrane Database Syst Rev. 2009; 2:CD003362. [PubMed: 19370585]

6. Weiss HA, Quigley MA, Hayes RJ. Male circumcision and risk of HIV infection in sub-Saharan Africa: a systematic review and meta-analysis. J Acquir Immune Defic Syndr. 2000; 14:2361–2370.

7. Bailey, RC.; Moses, S.; Parker, CB., et al. The protective effect of adult male circumcision against HIV acquisition is sustained for at least 54 months: results from the Kisumu, Kenya trial. International AIDS Conference; Vienna, Austria. 2010. [abstract FRLBC101].

8. Hallett TB, Alsallaq RA, Baeten JM, et al. Will circumcision provide even more protection from HIV to women and men? New estimates of the population impact of circumcision interventions. Sex Transm Infect. 2011; 87:88–93. [PubMed: 20966458]

9. Moses S. Male circumcision: a new approach to reducing HIV transmission. CMAJ. 2009; 181(8):E134–E135. [PubMed: 19786481]

10. Williams BG, Lloyd-Smith JO, Gouws E, et al. The potential impact of male circumcision on HIV in sub-Saharan Africa. PLoS Med. 2006; 3(7):e262. [PubMed: 16822094]

11. WHO/UNAIDS. Geneva: World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS); 2007. Press Release: WHO and UNAIDS announce Recommendations from Expert Meeting on Male Circumcision for HIV Prevention. Available at:

http://www.who.int/mediacentre/news/releases/2007/pr10/en/index.html. [Accessed March 7, 2013]

12. USAID. Health policy initiative. The potential cost and impact of expanding male circumcision in Zambia. 2009 Available at: http://www.aidstarone.com/sites/default/files/resources/external/health_policy_initiative/Zambia11309.pdf.

13. Zambia Demographic and Health Survey, 2007. Central Statistics Office, Ministry of Health, Lusaka, Zambia. 2009 Available at: http://www.measuredhs.com/pubs/pdf/FR211/FR211[revised-05-12-2009].pdf.

14. Kalaluka M, Mwanaleza E. Zambia targets 2.5m males for circumcision. 2010 Oct Sun 31. Available at: http://www.postzambia.com/post-read_article.php?articleId=14984.

15. Zambia Sexual Behaviour Survey, 2009. Central Statistical Office, Ministry of Health, Lusaka, Zambia. 2010 Available at: http://www.cpc.unc.edu/measure/publications/tr-10-73.

16. Herman-Roloff A, Otieno N, Agot K, Ndinya-Achola J, Bailey RC. Acceptability of medical male circumcision among uncircumcised men in Kenya one year after the launch of the national male circumcision program. PLoS One. 2011; 6(5):e19814. [PubMed: 21603622]

17. Westercamp N, Bailey RC. Acceptability of male circumcision for prevention of HIV/AIDS in sub-Saharan Africa: a review. AIDS Behav. 2007; 11:341–355. [PubMed: 17053855]

18. Rain-Taljaard RC, Lagarde E, Taljaard DJ, et al. Potential for an intervention based on male circumcision in a South African town with high levels of HIV infection. AIDS Care. 2003; 15:315–327. [PubMed: 12828151]

19. Friedland BA, Apicella L, Schenk KD, Sheehy M, Hewett PC. How Informed are Clients Who Consent? A Mixed-Method Evaluation of Comprehension Among Clients of Male Circumcision Services in Zambia and Swaziland. AIDS Behav. 2013 [Epub ahead of print].

20. Lukobo MD, Bailey RC. Acceptability of male circumcision for prevention of HIV infection in Zambia. AIDS Care. 2007; 19:471–477. [PubMed: 17453585]

21. Karney BT, Hops H, Redding CA, Reis HT, Rothman AJ, Simpson JA. A framework for incorporating dyads in models of HIV-prevention. AIDS Behav. 2010; 14(Supp. 2):S189–S203.

22. Westercamp M, Agot KE, Ndinya-Achola J, Bailey RC. Circumcision preference among women and uncircumcised men prior to scale-up of male circumcision for HIV prevention in Kisumu, Kenya. AIDS Care. 2012; 24:157–166. [PubMed: 21854351]

23. Bailey RC, Muga R, Poulussen R, Abicht H. The acceptability of male circumcision to reduce HIV infections in Nyanza Province, Kenya. AIDS Care. 2002; 14:27–40. [PubMed: 11798403]

24. Scott BE, Weiss HA, Viljoen JI. The acceptability of male circumcision as an HIV intervention among a rural Zulu population, Kwazulu-Natal, South Africa. AIDS Care. 2005; 17:304–313. [PubMed: 15832878]

25. Varga CA. Sexual decision making and negotiation in the midst of AIDS: youth in KwaZulu-Natal, South Africa. Health Transition Review. 1998; 7(Suppl. 3):45–67.

26. Lanham M, L'engle KL, Loolpapit M, Oguma IO. Women's Roles in Voluntary Medical Male Circumcision in Nyanza Province, Kenya. PLoS One. 2012; 7(9):e44825. [PubMed: 23028634]

27. Republic of Kenya, Ministry of Public Health and Sanitation. Kenya National Strategy for Voluntary Medical Male Circumcision. 2009 Available at: http://nascop.or.ke/library/VMMC/VMMC%20Strategy.pdf.

28. Mugwanya KK, Baeten JM, Nakku-Joloba E. Knowledge and attitudes about male circumcision for HIV-1 prevention among heterosexual HIV-1 serodiscordant partnerships in Kampala, Uganda. AIDS Behav. 2010; 14:1190–1197. [PubMed: 20387112]

29. Prochaska JO, DiClemente CC. Stages and processes of self-change in smoking: Towards an integrative model of change. J Consult Clin Psychol. 1983; 51:390–395. [PubMed: 6863699]

30. Prochaska, JO.; Redding, CA.; Evers, K. The transtheoretical model and stages of change. In: Glanz, K.; Rimer, BK.; Viswanath, KV., editors. Health Behavior and Health Education: Theory, Research and Practice. 4th ed.. San Francisco, CA: Jossey-Bass; 2008. p. 170-222.

31. Prochaska JO, Velicer WF, Rossi JS. Stages of change and decisional balance for twelve problem behaviors. Health Psychol. 1994; 13:39–46. [PubMed: 8168470]

32. Kelly A, Kupul M, Fitzgerald L, et al. Male Circumcision Acceptability and Impact Study (MCAIS) team. "Now we are in a different time; various bad diseases have come." Understanding

men's acceptability of male circumcision for HIV prevention in a moderate prevalence setting. BMC Pub Health. 2012; 12:67. [PubMed: 22264256]

33. Wambura M, Mwanga JR, Mosha JF, Mshana G, Mosha F, Changalucha J. Acceptability of medical male circumcision in the traditionally circumcising communities in Northern Tanzania. BMC Pub Health. 2011; 11:373. [PubMed: 21605433]

34. Schwarzer R. Modeling Health Behavior Change: How to Predict and Modify the Adoption and Maintenance of Health Behaviors. Applied Psychology. 2008; 57:1–29.

35. Chandon P, Morwitz VG, Reinartz WJ. Do Intentions Really Predict Behavior? Self-Generated Validity Effects in Survey Research. Journal of Marketing. 2005; 69:1–14.

36. Redding CA, Brown-Peterside P, Noar SM, Rossi JS, Koblin BA. One session of TTM-tailored condom use feedback: A pilot study among at risk women in the Bronx. AIDS Care. 2011; 23:10–15. [PubMed: 21218272]

37. Lundsby K, Dræbel T, Wolf Meyrowitsch D. 'It brought joy in my home as in the area of my wife.' How recently circumcised adult men ascribe value to and make sense of male circumcision. Glob Public Health. 2012; 7:352–366. [PubMed: 22087766]

38. Hewett PC, Hallett TB, Mensch BS, et al. Sex with stitches: assessing the resumption of sexual activity during the postcircumcision wound-healing period. AIDS. 2012; 26:749–756. [PubMed: 22269970]

39. Kebaabetswe P, Lockman S, Mogwe S, et al. Male circumcision: an acceptable strategy for HIV prevention in Botswana. Sex Transm Infect. 2003; 79:214–219. [PubMed: 12794204]

Table I

Medical male circumcision knowledge and attitudes subscales

Domain	Number of items	Response	Range	Men Mean(sd)	Women Mean(sd)	Men α	Women α
Potentially effective HIV prevention methods							
Material (e.g., condoms)	5	Yes/No	0–5	0.40(0.81)	0.34(0.74)	.71	.74
Behavioral (e.g., withdrawal)	5	Yes/No	0–5	0.94(1.19)	0.82(1.00)	.67	.55
Use of HIV prevention methods	8	Yes/No	0–8	0.56(1.27)	0.43(0.82)	.82	.50
MMC HIV prevention knowledge	4	Likert	2–14	9.84(2.51)	9.84(2.37)	.61	.47
MMC HIV prevention misinformation	2	Likert	1–9	4.33(2.01)	4.74(2.10)	.71	.68
Preference for a circumcised partner (female only)	4	Likert	2–12	N/A	9.42(2.22)	N/A	.58

Table II

Knowledge and attitudes about MMC and readiness to undergo MMC among 354 men in Lusaka, Zambia

	b (se)	Wald χ²	OR (95% CI)
Intercept	−3.51 (.29)		
Intercept	−1.08 (.22)		
MMC Knowledge (Discussed undergoing MMC with partner)	0.03 (.06)	0.32	1.03 (0.92, 1.16)
MMC Knowledge (Did not discuss undergoing MMC with partner)	0.30 (.08)	14.43	1.35 (1.16, 1.58)
Discussion of undergoing MMC with partner	1.37 (.24)	33.38	3.94 (2.47, 6.27)
Cultural acceptability	0.73 (.23)	10.06	2.08 (1.32, 3.28)

Table III

Knowledge, attitudes, and preferences regarding MMC and men's readiness to undergo MMC among 273 men and female partners in Lusaka, Zambia

	b (se)	Wald χ^2	OR (95% CI)
Intercept	−4.54 (.67)		
Intercept	−2.33 (.62)		
Man's discussion of undergoing MMC with partner	1.25(0.27)	21.79	3.50(2.07, 5.93)
Man's endorsement of MMC as a prevention strategy	0.14(.05)	7.30	1.16 (1.04, 1.28)
Man's perception of cultural acceptability	0.69 (.26)	6.97	2.00 (1.20, 3.35)
Woman's endorsement of MMC	0.12 (.06)	4.10	1.13 (1.00, 1.28)