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Factors Associated with the Early Resumption of Sexual Activity Following Medical Male Circumcision in Nyanza Province, Kenya

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Abstract

Research has established that voluntary medical male circumcision (VMMC) reduces HIV acquisition in heterosexual men by approximately 60%; however, engaging in sexual activity before the wound is healed may attenuate this protective effect. This prospective study included VMMC clients who were circumcised in Kenya between November, 2008 and March, 2010, aged 18 years, and randomly selected for an interview and genital examination 28–45 days post-VMMC ($N=1,344$). At the time of the interview, 91.3% participants were healed. Overall, 30.7% reported engaging in early sexual activity, usually 3–4 weeks post-VMMC. In a multivariable analysis, being married or cohabitating was the strongest predictor of engaging in early sexual activity. Strategies to reduce engaging in sexual activity during the recommended 42-day abstinence period following VMMC should be explored including re-energizing the effort to include female partners in counseling, mass education campaigns, and targeted text messaging programs for VMMC clients.

Keywords

HIV; Voluntary medical male circumcision; Sexual intercourse; Wound healing; Kenya

Introduction

Approximately one-third of adult men in the world are circumcised for medical, religious, or cultural reasons [1]. More than 40 observational studies and three randomized controlled trials (RCTs) have established that voluntary medical male circumcision (VMMC) reduces the risk of HIV Type-1 acquisition in heterosexual men by approximately 60% [2–5]. As a result, the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) have recommended VMMC as one component of a comprehensive HIV-prevention strategy in regions with low male circumcision prevalence, high HIV

prevalence, and where heterosexual sex is the primary mode of transmission [6]. The implementation of large-scale VMMC services has the potential to impact significantly the HIV epidemic. Modeling, based on male circumcision conferring a 60% protective effect, estimated that one HIV infection may be averted for every 5–15 circumcisions performed over a 10-year period. Additionally, modeling indicated that HIV incidence could be reduced by as much as 30–50% over the same period [7].

Despite these encouraging findings, there are several factors that could attenuate the protective effect of VMMC once large-scale programs are implemented outside of a clinical trial setting. Among them is that VMMC may temporarily increase HIV transmission and acquisition if recently circumcised men engage in sexual activity before the surgical site is healed (i.e., there may be increased inflammation, bleeding and/or tearing along the suture line) [8–11]. Current guidelines recommend that recently circumcised men abstain from sexual activity for at least 42 days, or 6 weeks, to promote and ensure complete healing [6]. The RCTs each promoted an abstinence period among participants, but of slightly different durations. The Orange Farm RCT advised participants to abstain from sexual activity for 6 weeks; the Rakai RCT advised participants to abstain until the wound was confirmed as healed based on visual examination by a clinician; and the Kisumu RCT advised participants to abstain for at least 30 days following VMMC. All the RCTs reported that some participants engaged in early sexual activity. In a review of the RCTs, in which early sexual activity was defined as a participant engaging in sexual activity less than 42 days post-circumcision, 22.5% of Orange Farm, 5.4% of Rakai, and 3.9% of Kisumu participants reported engaging in early sex [10]. In this meta-analysis, while non-significant, there was a trend toward increased risk of HIV infection among men who resumed sex early compared to those who did not engage in early sex [10].

While the RCT findings from Rakai and Kisumu were encouraging, it remained unclear whether these results would be maintained in the context of a large-scale VMMC program implemented outside of a clinical trial setting. In order to understand the behaviors and outcomes of participants who were circumcised in a non-RCT, resource-limited setting, we prospectively assessed the time post-VMMC to sexual activity and wound healing among males who sought VMMC services in three districts in Nyanza Province, Kenya.

Methods

Study Context

Nyanza Province is the geographic home to the Luo ethnic group. Luo men do not traditionally practice male circumcision, and they have a high prevalence of HIV compared to the rest of the country: 21.5% of Luo men are circumcised and 17.1% are HIV-positive; by comparison, among all Kenyan males 15–49 years of age, 85.9% are circumcised and 4.6% are HIV-positive. Additionally, 2.8% of circumcised men in Kenya tested HIV-positive, while 12.9% of uncircumcised men tested HIV-positive in the same survey [12]. In response to the HIV epidemic in Kenya, the Government of Kenya (GoK) launched the VMMC program in Nyanza Province in November 2008. Since then, the GoK has introduced VMMC services in additional provinces, and plans to circumcise 860,000 males by 2013 [13]. At the time of this study, the national VMMC program was providing services throughout the Luo districts in Nyanza Province at no cost to clients, and all procedures were performed by trained doctors, clinical officers, and nurses.

VMMC Service Provision

VMMC clients are circumcised according to the national clinical guidelines using the forceps guided method [13]. The provision of VMMC services in Kenya includes voluntary

HIV testing and counseling (offered on an opt-out basis), risk-reduction counseling, condom education and distribution (the day of the surgery), information about the risks and benefits of VMMC, directions about wound care, sexually transmitted infection (STI) screening and treatment, and counseling regarding the importance of sexual abstinence for at least 42 days post-surgery. In addition to verbal counseling, clients receive written instructions on how to remove the bandage, how to care for the wound, and why they should abstain from intercourse for 6 weeks. Clients are scheduled to return to the facility for one follow-up visit 7 days post-VMMC and they are encouraged to return any time they have a question/concern. During every interaction with a VMMC client, providers highlight the importance of the post-surgical abstinence period.

Participants and Data Collection

This prospective study monitored VMMC clients from pre-surgery through all follow-up care. Study participants included males who sought VMMC services at a study facility between November 2008 and March 2010. All study participants were 12 years of age or older and provided signed assent/consent forms prior to participation in the study in the language of their choice (English, Dholuo, or Kiswahili). Participants were enrolled in three districts of Nyanza Province: Kisumu East, Kisumu West, and Nyando; these districts were chosen because they had an active VMMC program, were contiguous, and represented typical urban and rural populations in Nyanza Province. Participants were informed of their right to refuse to answer any question or to terminate their enrollment at any time; however, no participant terminated his participation prematurely.

Data were collected using two monitoring systems:

- A passive, *clinic system* collected and managed routine clinical data on 4,010 participants who sought and received VMMC services at one of 16 health facilities. No compensation was offered to participants in the clinic system since research staff were managing routine, clinical-care data. While passive systems have benefits, such as being low cost, they also have known limitations such as incomplete data, lack of timeliness, and underreporting of events [14–16].
- In order to address some of the limitations of the clinic system, an *active system* was implemented to monitor a random sub-sample of all circumcised participants in the clinic system via a home-based, in-depth interview that was scheduled 30–40 days post-VMMC. Research staff attempted to establish contact with each selected participant before the 30–40-day window, but it occasionally took more time to establish contact. For this reason, some participants were interviewed outside of the recommended window, resulting in interviews being completed 28–45 days post-VMMC. For the active system, a target sample size of 1,449 was set to detect a 2% difference in the adverse event (AE) rates recorded between the two systems with an overall type I error rate of $\alpha = 0.05$ and 80% power; this sample size was achieved. Each week, VMMC participants who had been circumcised were randomly selected based on a unique, participant identification number. In addition, the selected sample was proportional in size to the number of VMMCs provided in a given week; as a result, more participants were selected during a busy week than a less busy week. If research staff were unable to locate and/or interview a participant after three attempts, he was replaced with the next participant of similar age listed on the same health facility's weekly circumcision register (divided into the following categories based on age: 18–24, 25–30, 31–35, 36–40, and more than 40 years of age). Data collected by the active system focused on the participant's circumcision experience, AE history, and sexual behavior following VMMC. The data collected were a mixture of self-report (e.g., demographic information, care-

seeking behavior, satisfaction, AE history, and sexual activity) and genital examination to assess healing status as well as specific AEs (e.g., problems with appearance). Participants were compensated 200 Kenya Shillings (\$2.50 USD), less than the average daily wage in Kenya, for participating in the interview for the active system.

Data Collection and Statistical Analysis

The results presented in this analysis include only participants who were part of the active system ($n = 1,449$) since we only collected sexual activity information from these participants. We further limited the analysis to males ≥ 18 years of age ($n = 1,346$) since those participants were more likely to be sexually active; the median age at first sex among Kenyan males 20–54 years of age is 17.6 years [12]. Additionally, two participants refused to report whether they had engaged in sexual activity; as a result, they were excluded from the analysis. Therefore, the number of participants included in this analysis was 1,344.

Data for the active system were collected using Dell Axim personal digital assistants (PDAs), programmed using Visual CE. Participants were asked questions about the following: demographic information; satisfaction with circumcision; how protected participants felt against HIV and STIs after VMMC; sex partner's opinions about VMMC; erections following VMMC; sexual activity and behaviors following VMMC (vaginal intercourse only); and sexual satisfaction for participant and partner (see Table 1 for questions included in this analysis).

Reported sexual activity was measured at 28–45 days post-VMMC; participants who reported engaging in sexual activity before 42 days were considered to have engaged in early sexual activity post-VMMC. Wound healing was assessed by direct observation of the wound. A wound was considered healed when it met all seven of the following criteria: wound completely closed with the suture line intact; no sutures visible; no bleeding or signs of bleeding; no tenderness on gentle palpation; no obvious features of inflammation; no form of discharge from the incision line; and no pain reported on erection.

Data were analyzed using SAS software version 9.1 (SAS Institute Inc., Cary, North Carolina, USA). Differences between participants who engaged in early sexual activity and those who did not were assessed using Pearson's χ^2 for independence. The time to onset of sexual activity following VMMC was assessed using SAS software's LIFETEST procedure, which accounted for censoring. The magnitude of the association between independent variables that had a significant χ^2 and the outcome were assessed using bivariate logistic regression analysis and characterized with odds ratios (ORs), 95% confidence intervals (CIs), and P values. A multivariable logistic regression model, considering demographic variables and all significant variables in the univariate analysis, was developed to estimate adjusted ORs (AORs), CIs, and P values using automated forward, backward, and score techniques. The following factors were included in the adjusted model where they were assessed for confounding, effect modification, and collinearity: age, marital status, employment status, HIV status, penile sensitivity, and attractiveness to women. Age was identified as modifying the relationship between several covariates and the outcome; therefore, adjusted model results are presented separately for younger participants (18–24 years of age) and older participants (25 years of age and older).

Ethical Considerations

All research staff completed the online Collaborative Institutional Training Initiative training course on human subject protection. The study was approved by the UIC IRB

(protocol: 2007-0913), and the Kenyatta National Hospital Ethics and Research Committee in Nairobi, Kenya (protocol: P338/11/2007).

Results

Among the 1,344 participants included in the analysis, the mean age was 23.2 years ($SD = 6.7$ years), and the median age was 21 years (inter-quartile range [IQR]: 19–25 years). Most participants were from the Luo ethnic group (97.2%); 41.7% had completed secondary school; 24.5% were married; and 76.1% were unemployed.

In this study, 30.7% of participants engaged in early sexual activity. In a bivariate analysis, participants who engaged in early sexual activity were more likely to be older, employed, and married; 65.7% of married participants and 19.4% of unmarried participants reported having sexual intercourse during the recommended abstinence period. Being HIV-positive was associated with early sexual activity (Pearson's $\chi^2 = 5.9$, $P = 0.05$). Less than half of the participants attended a follow-up visit at the clinic (47.5%). At the time of the interview and genital exam, 1,227 (91.3%) participants were classified as completely healed. There was no association between wound healing status and early sexual activity (Pearson's $\chi^2 = 0.38$, $P = 0.53$). Perceptions of protection against HIV and other STIs were not significantly associated with early sexual activity (Table 1).

Participants who engaged in early sexual activity were more likely to report that women were more attracted to them after VMMC compared to before the procedure (Pearson's $\chi^2 = 61.5$, $P < 0.0001$), and that their sex partners were pleased with the circumcision (Pearson's $\chi^2 = 196.4$, $P < 0.0001$) (Table 1). Participants reported several reasons to explain why their female partners were pleased with their circumcision; the most common reasons included improved penile hygiene (26.9%), protection against HIV (24.3%), protection against STIs (22.4%), improved sexual satisfaction for male partners (9.3%), and improved sexual satisfaction for themselves (7.4%) (results not shown).

The majority of participants who engaged in early sexual activity did so between weeks three and four following the surgery (Fig. 1). This analysis accounts for participants who were censored given the differences in the timing of the data collection (28–45 days post-VMMC) and the definition of engaging in early sexual activity (sex less than 42 days post-VMMC). When limiting the analysis only to participants who engaged in early sexual activity ($n = 413$), 90 out of 413 (21.8%) reported doing so by week three and 378 out of 413 (91.5%) by week four. Married participants were more likely to engage in early sex than unmarried participants (Wilcoxon $\chi^2 = 266.86$, $P < 0.0001$) (Fig. 1). Among participants who had sexual intercourse during the recommended abstinence period, 4.4% of unmarried participants and 32.2% of married participants reported having sexual intercourse three or more times in the period between the surgery and the follow-up interview. When participants who had engaged in sexual activity were asked, “since the circumcision, how often have you used a condom during sexual intercourse?” 45.3% reported that they always used a condom, 10.7% reported sometimes using a condom, and 44.1% reported never using a condom. Among the participants who reported never using a condom, 79.7% were married; and among participants who reported always using a condom, 75.9% of participants were unmarried (results not shown).

The percent of participants who were classified as healed increased significantly with time post-VMMC (Fig. 2); 84.9% of participants interviewed at 28–29 days; 88.5% at 30–35 days; 92.1% at 36–40 days; and 96.1% at 41–45 days were healed (Nonzero Correlation $\chi^2 = 10.8$, $P = 0.001$).

Among younger men (18–24 years of age), after adjusting for other variables included in the model, being married or having a live-in partner was most associated with engaging in early sexual activity (AOR = 7.5, Wald χ^2 $P < 0.05$). Being employed (AOR = 1.9, Wald χ^2 $P < 0.05$), reporting increased penile sensitivity (AOR = 1.7, Wald χ^2 $P < 0.05$), and reporting being “more attractive” to females (AOR = 2.8, Wald χ^2 $P < 0.05$) were also significant risk factors for engaging in early sexual activity; HIV-status was not associated with the outcome (Table 2).

Among older men (25 years of age or older), after adjusting for other variables included in the model, being married or having a live-in partner was most associated with engaging in early sexual activity (AOR = 6.4, Wald χ^2 $P < 0.05$). Reporting increased penile sensitivity post-VMMC was also a significant risk factor for engaging in early sexual activity (AOR = 1.8, Wald χ^2 $P < 0.05$). Employment status, HIV-status, and reporting being “more attractive” to women were not associated with engaging in early sexual activity (Table 2).

Discussion

This study explored the time to sexual activity and wound healing following VMMC among participants who were circumcised in a non-RCT, resource-limited setting. Participants were interviewed and underwent a genital exam 28–45 days after their circumcision procedure. At the time of interview and genital exam, 91.3% of participants were completely healed. Additionally, 30.7% of participants reported engaging in early sexual activity following VMMC. Several factors were associated with engaging in early sexual activity following VMMC, including older age, being married or having a live-in partner, being employed, perception of increased penile sensitivity post-VMMC, and perceptions about how women respond to recently circumcised men.

While the RCTs provided ongoing interaction with participants, during which medical providers highlighted risk-reduction strategies and the post-VMMC abstinence period, this level of regular contact could not be duplicated in settings where VMMC is implemented on a large-scale. Although VMMC providers stressed the importance of the post-VMMC abstinence period via verbal counseling and written instructions, the majority of participants in this study (52.5%) interacted with providers only one time (the day of the surgery) since only 47.5% of participants attended a follow-up visit as recommended by the VMMC program. In the Kisumu RCT, early sex was reported by only 3.9% of participants [10]. Although the RCT was conducted in the same geographic region as our study, we recorded nearly eight times more participants who reported engaging in early sexual activity (30.7%). In the Kisumu RCT, early sexual activity was defined as sex occurring during the first 30 days post-VMMC, and in this study it was defined as sex occurring before 42 days post-VMMC. While the variance in the definition of early sex may account for some of the observed difference, most of the participants in this study who reported resuming sex early did so 3–4 weeks post-VMMC (or 21–28 days), a period that is within the window of measurement for the RCT. A major difference between this study and the Kisumu RCT is the demographic profile of the study population. In this study, participants ranged in were 18–76 years and 24.5% of participants were married or had a live-in partner compared to only 6% in the Kisumu RCT, which included only males aged 18–24 years [3]. The results from this study differ from Orange Farm, South Africa, where in the RCT, 1.8% of participants were married [2] and 22.5% reported engaging in early sexual activity following VMMC [10]. Recently, a large-scale VMMC program was implemented in the former Orange Farm RCT site, in which 6.5% of participants were married or cohabitating and 12.5% of participants reported engaging in early sexual activity (less than 42 days) following VMMC [17].

The results from multivariable modeling illuminated the driving impact of being married or having a live-in partner as a risk factor for engaging in early sexual activity. Similar to findings reported from all the RCTs, being married (or cohabitating) was strongly associated with engaging in early sexual activity [10]. In this study, after adjusting for covariates, older married men were 6.4 times (95% CI: 3.7–11.1; Wald χ^2 $P < 0.05$) at increased odds to engage in early sexual activity compared to unmarried men in the same age group; this strong association between marital status and the early resumption of sex was also observed among younger men (AOR = 7.5; 95% CI: 4.2–13.2; Wald χ^2 $P < 0.05$). These findings highlight the need for innovative strategies to encourage men who seek VMMC services, and who are already involved in a sexual partnership, to abstain from sexual activity during the post-VMMC healing time. For example, it may be useful to connect with participants when sexual activity post-VMMC peaks (3–4 weeks). Initiatives, such as sending text messages that encourage men to abstain during this critical time, are currently being implemented and evaluated in the study area. Alternatively, strategies that encourage additional client-provider interaction, such as adding a follow-up appointment 2–3 days after VMMC, may also be useful. Further, it is essential to reinforce the importance of female partner involvement in the VMMC counseling process—especially for married men. Because many couples do not get counseled together during the VMMC process, increased engagement with women is essential—perhaps through community groups—to inform women about how VMMC may impact them. Additionally, mass communication should include messages about the importance of the abstinence period since female partners may be at increased risk of acquiring HIV or STIs when healing is incomplete. This is especially important since 3.1% of all participants and 8.5% of married participants in this study were HIV-positive (results not shown). Strategies that promote the abstinence period—such as counseling married men and their partners to sleep in different beds following VMMC—may also be useful.

In the Kisumu RCT, 1.3% of men were not completely healed at the day-30 visit, and wound healing was defined as “no scab, open wound, swelling or redness.” In the Rakai RCT, 13.9% were not healed by day 30, and wound healing was defined as “healthy scar formation; no scab or open wound” [10]. Based on a genital exam, 8.7% of participants in this study did not meet all seven wound healing criteria at the time of the interview. Although differences in procedure-type and wound healing definitions complicate direct comparisons between this study and each RCT, it appears that participants circumcised in this study, as part of a large-scale VMMC program implementation, take approximately the same amount of time to heal as Rakai RCT participants, but perhaps slightly longer than Kisumu RCT participants. Studies to understand better the wound healing process are underway; however, findings from this study indicate that approximately 95% of clients are healed by day 42, and these results support the recommendation for a 42-day abstinence period following VMMC.

Among participants who engaged in early sexual activity, 45.3% reported always using a condom, 10.7% reported sometimes using a condom, and 44.1% reported never using a condom. Condom use was related to marital status: 79.7% of participants who reported never using a condom were married, whereas 75.9% of participants who reported always using a condom were unmarried (results not shown). These results are consistent with the most recent national survey: among unmarried men, 15–24 years of age, 72.3% used a condom at last sex, and among high-risk married men (who reported two or more partners in the past 12 months), 13.9% reported using a condom at last sex [12]. In the Kisumu RCT, control participants were significantly more likely to use condoms consistently than circumcised participants; however, among circumcised participants, there was a significant increase in consistent condom use from baseline (22%) through follow-up (36%) [3]. In the Rakai RCT, approximately 19% of participants used condoms consistently by the end of the

study [4]. Since participants in this study report using condoms consistently more frequently than participants in the RCT, there may be a secular trend in the population toward increased condom use.

These findings should be considered along with the following limitations. Participants were recruited among all males who sought VMMC services at a study facility; these males, who were early-adopters of VMMC services, may be different from the males in the general population in ways that are not quantifiable. Questions pertaining to sexual behavior are based on self-report; for this reason, it is possible that behaviors may be misreported or under-reported. Due to the purpose of this study, we collected no information on baseline sexual behaviors. Perceptions about the reactions of female sex partners to a participant's circumcision were secondary and not collected from women. At the time that this study was conceived, there was no clear guidance regarding a 42-day abstinence period; therefore, this study evaluated participants 28–45 days post-VMMC, and the results presented here likely underestimate the true percent of participants engaging in early sexual activity in that the majority of participants were interviewed less than 42 days post-VMMC and may have engaged in early sexual activity after the interview but before completing the recommended abstinence period. Finally, while we assessed wound healing from a clinical perspective, client's perception of their wound healing was not recorded—this is an opportunity for future research.

While less than 6% of participants in the Kisumu and Rakai RCTs reported engaging in early sexual activity after VMMC, it was unclear before this study whether these results could be replicated in a non-trial setting. The findings from this study indicate that more men engaged in early sexual activity after being circumcised as part of a large-scale program than during any of the RCTs. This result is likely due in large part to the low proportion of married RCT participants. In addition, the higher frequency of counseling provided during the RCTs may have also contributed to this result. Nevertheless, our findings indicate that approximately 95% of males are healed by 42 days post-VMMC, so it remains important for large-scale programs to promote the abstinence period following surgery and to explore ways to involve female partners and reduce the number of men engaging in early sexual activity before they are healed. Several strategies to reduce this behavior have been proposed in this paper, including re-energizing the effort to provide couple's counseling, implementing mass communication campaigns that target both men and women, educating women through women's groups, and text messaging programs. Future efforts should implement and evaluate strategies such as these.

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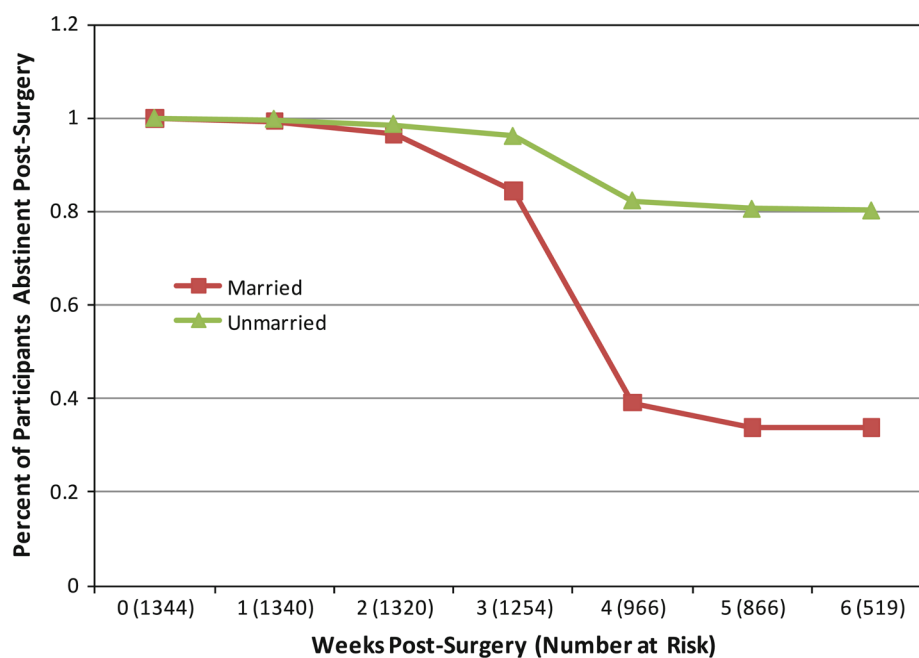


Fig. 1. Percent of participants remaining abstinent post-surgery stratified by marital status ($n = 1,344$)

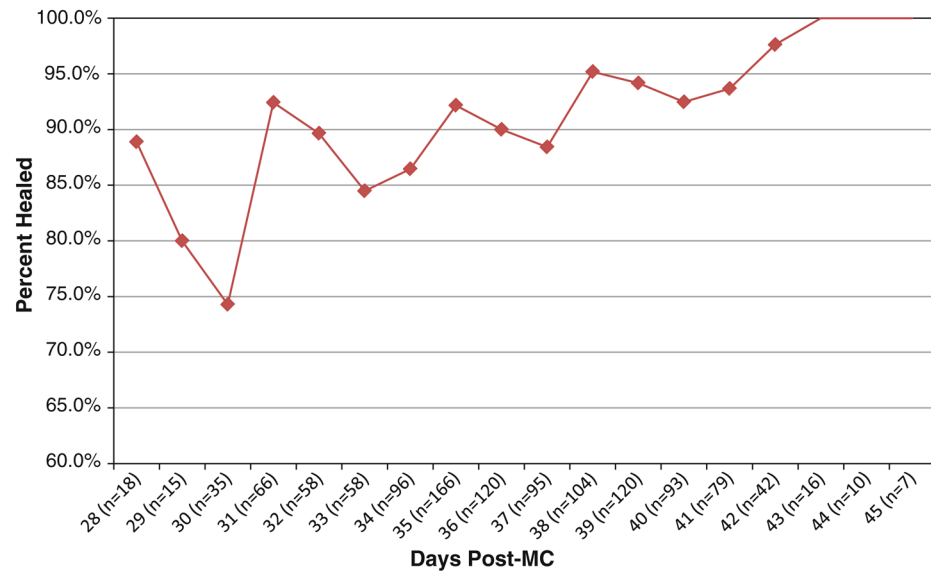


Fig. 2.

Percent of wounds healed 28–42 days after male circumcision ($n = 1,198^a$). ^aSome participants had an incorrect interview date recorded automatically by the PDA ($n = 146$); as a result, we were unable to calculate the relationship between lapsed time post-MC and wound healing for them

Table 1

Study sample characteristics by early sexual activity

	Early ^a sexual activity (N = 413) n (%)	No early sexual activity (N = 931) n (%)	Pearson χ^2 (P value)
Age (years)			$\chi^2 = 126.6$ ($P < 0.0001$)
18–24	216 (52.3)	760 (81.6)	
25–29	90 (21.8)	92 (9.9)	
30–34	62 (15.0)	45 (4.8)	
35	45 (10.9)	34 (3.7)	
Secondary school completed			$\chi^2 = 0.6$ ($P = 0.44$)
No	247 (59.8)	536 (57.6)	
Yes	166 (40.2)	395 (42.4)	
Marital status			$\chi^2 = 249.6$ ($P < 0.0001$)
Married/live-in partner	216 (52.3)	113 (12.0)	
Not married/no live-in partner	197 (47.7)	818 (88.0)	
Employment status			$\chi^2 = 65.5$ ($P < 0.0001$)
Unemployed	256 (62.0)	767 (82.4)	
Employed	157 (38.0)	164 (17.6)	
HIV-status			$\chi^2 = 5.9$ ($P = 0.05$)
HIV-positive (onsite test/self-report)	20 (4.8)	22 (2.4)	
HIV-negative (onsite test)	146 (35.4)	331 (35.5)	
Unknown (no onsite test)	247 (59.8)	578 (62.1)	
Attended 1 Follow-up appointments			$\chi^2 = 0.01$ ($P = 0.92$)
No	219 (53.0)	491 (52.7)	
Yes	194 (47.0)	440 (47.3)	
Wound healed at interview			$\chi^2 = 0.38$ ($P = 0.53$)
No	33 (8.0)	84 (9.0)	
Yes	380 (92.0)	847 (91.0)	
Compared to before you were circumcised, how protected do you feel now against HIV?			$\chi^2 = 3.2$ ($P = 0.66$)
More	385 (93.3)	863 (92.7)	
About the same	20 (4.8)	43 (4.6)	
Less	1 (0.2)	10 (1.1)	
Don't Know	7 (1.7)	15 (1.6)	
Compared to before you were circumcised, how protected do you feel now against sexually transmitted diseases, other than HIV?			$\chi^2 = 5.2$ ($P = 0.40$)
More	393 (95.2)	872 (93.7)	
About the same	16 (3.9)	35 (3.7)	
Less	0 (0.0)	10 (1.1)	
Don't Know	4 (0.9)	14 (1.5)	

	Early ^a sexual activity (N = 413) n (%)	No early sexual activity (N = 931) n (%)	Pearson χ^2 (P value)
Compared to the time before you were circumcised, how sensitive would you say your penis is now?			$\chi^2 = 30.1$ (P < 0.0001)
More	315 (76.3)	612 (65.7)	
About the same	52 (12.6)	154 (16.5)	
Less	41 (9.9)	101 (10.9)	
Don't Know	5 (1.2)	64 (6.9)	
Compared to before you were circumcised, how attracted are women to you?			$\chi^2 = 61.5$ (P < 0.0001)
More	215 (52.1)	280 (30.1)	
About the same	100 (24.2)	310 (33.3)	
Less	3 (0.7)	21 (2.2)	
Don't Know	95 (23.0)	320 (34.4)	
How did your sex partners react to your circumcision?			$\chi^2 = 196.4$ (P < 0.0001)
Pleased	372 (90.1)	482 (51.8)	
Neutral or expressed no opinion	15 (3.6)	43 (4.6)	
Displeased	7 (1.7)	12 (1.3)	
No sex partners/don't Know	19 (4.6)	394 (42.3)	

(N = 1,344)

^aEarly sexual activity is defined as engaging in sexual activity < 42 days post-MC

Table 2Factors associated with the resumption of early sex ($N = 1,344$)

Factor	Age 18–24 years ($N = 976$)		Age 25 years ($N = 368$)	
	UOR (95% CI)	AOR (95% CI)	UOR (95% CI)	AOR (95% CI)
Marital status				
Married/live-in partner	8.1 (4.7–13.9) ^a	7.5 (4.2–13.2) ^a	6.7 (3.9–11.3) ^a	6.4 (3.7–11.1) ^a
Not married/no live-in partner	ref	ref	ref	ref
Employment status				
Employed	2.3 (1.6–3.3) ^a	1.9 (1.2–2.8) ^a	1.7 (1.1–2.6) ^a	1.3 (0.8–2.0)
Unemployed	ref	ref	ref	ref
HIV-status				
HIV-positive	2.7 (0.6–12.0)	2.3 (0.4–11.8)	0.8 (0.4–1.6)	0.8 (0.4–1.7)
HIV-negative or unknown	ref	ref	ref	ref
Penile Sensitivity				
Penis “more sensitive” after MC	1.8 (1.3–2.6) ^a	1.7 (1.1–2.5) ^a	1.7 (1.1–2.7) ^a	1.8 (1.1–2.9) ^a
Same, less, or “don’t know”	ref	ref	ref	ref
Female attraction to participant				
“More attractive” to women after MC	2.8 (2.1–3.9) ^a	2.8 (2.0–3.9) ^a	1.9 (1.2–2.8) ^a	1.6 (1.0–2.5)
Same, less, or “don’t know”	ref	ref	ref	ref

^aWald χ^2 significant at $P < 0.05$