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ORIGINAL PAPER

Consent Challenges and Psychosocial Distress in the Scale-up of Voluntary Medical Male Circumcision Among Adolescents in Western Kenya

Winnie K. Luseno[1] · Samuel H. Field[2] · Bonita J. Iritani[1] · Stuart Rennie[3] · Adam Gilbertson[1] · Fredrick S. Odongo[4] · Daniel Kwaro[4] · Barrack Ongili[4] · Denise D. Hallfors[1]

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Abstract

In priority sub-Saharan African countries, on the ground observations suggest that the success of voluntary medical male circumcision (VMMC) programs should not be based solely on numbers of males circumcised. We identify gaps in the consent process and poor psychosocial outcomes among a key target group: male adolescents. We assessed compliance with consent and assent requirements for VMMC in western Kenya among males aged 15–19 (N = 1939). We also examined differences in quality of life, depression, and anticipated HIV stigma between uncircumcised and circumcised adolescents. A substantial proportion reported receiving VMMC services as minors without parent/guardian consent. In addition, uncircumcised males were significantly more likely than their circumcised peers to have poor quality of life and symptoms of depression. Careful monitoring of male adolescents' well-being is needed in large-scale VMMC programs. There is also urgent need for research to identify effective strategies to address gaps in the delivery of VMMC services.

Keywords Voluntary medical male circumcision · Adolescent males · Adolescent well-being · Informed consent · Kenya

Introduction

In 2007, the World Health Organization (WHO) and Joint United Nations Program on HIV/AIDS (UNAIDS) recommended voluntary medical male circumcision (VMMC) as part of a combination HIV prevention intervention for males in 14 priority east and southern African (ESA) countries with high HIV infection and low circumcision prevalence [1]. This decision was based on results from three randomized controlled trials (RCTs) in Kenya, Uganda, and South Africa which found significant reductions in female-to-male HIV transmission among men randomly assigned to circumcision [2–4]. In addition to the surgical procedure, most VMMC programs offer HIV testing and counselling with linkage to care and treatment for those diagnosed with HIV, screening and treatment for other sexually transmitted infections, and promotion of condom use and safer sex practices [5, 6]. This approach is currently a key component of the WHO, UNAIDS, and U.S. President's Emergency Plan for AIDS Relief (PEPFAR) strategy for ending AIDS by 2030 [7, 8]. In this paper, we identify gaps in the consent process and poor psychosocial outcomes among a key VMMC target group: male adolescents aged 15–19 years.

An estimated 18.6 million VMMCs were performed between 2008 and 2017 among males aged 15–49 years in the 14 priority ESA countries [6]. Surveillance data indicate that males aged 10–19 constituted approximately two-thirds of VMMC clients [9]. An additional 27 million VMMCs are planned to take place through 2021, with an emphasis on males aged 10–29 years such that 90% of males in that age group will be circumcised [7]. Recent modelling studies suggest that targeting males aged 15–34 for VMMC is the

Denise D. Hallfors—Retired

✉ Winnie K. Luseno
wluseno@pire.org

[1] Pacific Institute for Research and Evaluation (PIRE), 101 Conner Dr., Suite 200, Chapel Hill, NC, USA

[2] Independent Statistical Consultant, Chapel Hill, NC, USA

[3] Department of Social Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

[4] Kenya Medical Research Institute (KEMRI), Centre for Global Health Research, Kisumu, Kenya

most cost-effective strategy for obtaining the greatest impact in terms of number of averted HIV infections [9, 10].

Kenya is among the ESA countries prioritized for scaled-up delivery of VMMC services and is often presented as a success story in terms of numbers of males circumcised [6, 9], although recent literature and media reports suggest problems in the form of overestimation of numbers circumcised [11, 12]. HIV prevalence and incidence in Kenya are estimated at 5% and 1.95 per 1000 population, respectively [13, 14]. An estimated 1.6 million VMMCs were performed in Kenya between 2008 and 2017 [6]. Of these, about 80% were in the western part of Kenya where HIV prevalence and incidence are highest in the country at 13% and 5.4 per 1000 population and male circumcision prevalence is lowest at 71% among individuals aged 15–49 (the national average is 93%) [5, 13, 15]. Surveillance data from this region and nationally consistently show that, among males, the number living with HIV increases substantially among those aged 20–24 compared to those aged 15–19, and peaks among those aged 35–39 [14]. According to the Centers for Disease Control and Prevention (CDC), of an estimated 623,773 CDC-supported VMMCs performed in Kenya between 2013 and 2016, about 57% were among adolescents under age 15 years and about 16% were among individuals aged 15–29 years [16].

Despite the achievements in meeting global targets in ESA countries, the reality on the ground may be more complicated and suggests that the success of VMMC programs should not be based solely on the numbers of individuals who receive VMMC services. Indicators of success typically reported by these programs include the numbers of males who have been circumcised, counseled, tested for HIV and other sexually transmitted infections, and referred for additional treatment services. Additional measures include numbers of VMMC-associated adverse events and how many individuals receive post-operative follow-up care [17, 18]. Inaccuracies in the reporting of these indicators may exaggerate implementation safety, progress, and success [11]. Moreover, a focus on numbers served may obscure important gaps in the quality of services delivered, especially pertaining to minors.

In Kenya, consent from parents or guardians and assent from minors is required for medical male circumcision for individuals under 18 years [19]. Requiring assent from minors ensures that their sexual and reproductive (SRH) rights are not ignored. A recent position statement by the Society for Adolescent Health and Medicine highlights the importance of parent/guardian involvement in ensuring that the SRH needs of adolescent and young males are addressed [20]. We believe that the purpose of parent/guardian consent is both protective and supportive in nature and consists of four components. First, it ensures that a parent/guardian is adequately informed about VMMC, including its purpose, procedures (i.e., HIV testing, STI assessment, and surgery), risks, benefits, and post-operative care needs. Second, it ensures that a parent/guardian is aware that their adolescent child will undergo the procedure, as well as when and where it will occur. Third, it ensures they (or a designee) will be involved in post-operative care for their child and watch for adverse effects such as infection, bleeding, and pain. Fourth, parents/guardians serve an important role in decision-making by making sure their child understands the risks and benefits of VMMC.

Although Kenya's guidelines stipulate that parents/guardians must be informed and give permission for VMMC for minors, they lack clarity on how to obtain consent [19]. Thus, VMMC program implementors use different approaches to inform parents/guardians and obtain consent for their adolescent to receive services. For example, information about VMMC may be provided to day-scholars (i.e., students who do not board at their school but live at home) at their schools and consent forms distributed to minors interested in the service for their parents/guardians to sign. The minors are responsible for relaying VMMC-related information to their parents/guardians and returning signed consent forms, with parent/guardian contact information provided for verification purposes, either to an assigned teacher at their school or a VMMC provider. Alternatively, VMMC providers may collect parent/guardian details and contact information from interested minors. Providers use this information to meet individual parents/guardians, inform them about the program, and obtain signed consent for their child to receive VMMC services.

Regardless of the approach used, emerging research shows gaps in parent/guardian involvement, information, and communication regarding young adolescent VMMC in some of the ESA countries, including Kenya [21]. Media and anecdotal reports also suggest that Kenya's consent/assent policy is not implemented consistently [22, 23] and, as a result, adolescent minors are getting circumcised without parent/guardian consent. Furthermore, although research has been conducted that has monitored adverse surgical events and assessed for unintended effects such as sexual risk behavior compensation [24–26], few studies have examined the potential impact of this large-scale public health intervention on the psychosocial outcomes experienced among young males. The limited number of studies that are available have reported that peer pressure, fear of pain, and stigma associated with HIV testing are important psychosocial concerns and major barriers to VMMC uptake among adolescents [21, 27].

Given the continued implementation of large-scale VMMC programs, it is important to examine whether guidelines [28] to ensure the protection and safety of minors are followed consistently and to assess whether program activities have adverse effects on the well-being of male

adolescents. Our work in Kenya has revealed several unintended consequences connected to VMMC programs. For instance, the drive to meet funder-set targets for the number of circumcisions to be carried out, together with periodic ebbs and flows in the availability of school-going adolescent males due to educational commitments, may result in overburdened clinics, long waits for care, ethically questionable recruitment practices, circumcision of children under the approved age of 10 years, and deviations from the clinical standard of care [29].

The purpose of the present research was to (i) assess compliance with parent/guardian permission and adolescent consent/assent requirements for VMMC among male adolescents aged 15–19 years in a traditionally non-circumcising region of Kenya, and (ii) examine differences in psychosocial outcomes between uncircumcised and circumcised male adolescents. Our findings in a companion qualitative study suggest that, while some adolescents report being glad about receiving VMMC services, some who are uncircumcised may experience social pressure to circumcise, including ridicule, shame, and stigma [29]. Based on these findings, we hypothesized that uncircumcised male adolescents would be more likely to be depressed, report lower quality of life, and report higher perceptions of HIV-related stigma than their circumcised counterparts.

Methods

Setting, Study Design, and Participants

The study was conducted in western Kenya as part of a larger study examining ethical issues pertaining to the involvement of adolescents in HIV-related research. We administered a screening questionnaire to determine eligibility for the larger study (i.e., 15–19 years old and never having tested positive for HIV nor having been tested in the past 6 months). Three sub-counties in this region comprised strata. Villages in two sub-counties and wards in one sub-county were randomly selected to participate. Staff conducted community awareness activities as well as recruitment and information meetings with potential youth participants and parent/guardians in selected villages/wards. We sought to enroll equal numbers of adolescents by gender, sub-county, and age group (15–17 vs. 18–19) and determined that a target baseline sample size of 4200 was needed to identify enough HIV-positive adolescents for the larger project. Staff conducted community awareness activities as well as recruitment and information meetings with potential youth participants and parent/guardians. Recruitment, enrollment, and baseline data collection activities occurred from June 2016 through December 2017. Of 6726 (49% male and 51% female) screened individuals, 4799 (51% male and 49% female) adolescents were eligible to participate in the larger study. We obtained baseline data from 4096 (50% male and 50% female) eligible adolescents.

We asked all males questions pertaining to circumcision in the screening questionnaire. Individuals found eligible for the larger study completed a baseline survey. Present cross-sectional analyses included male respondents with data from the screening questionnaire and baseline survey (N = 1939). Trained staff administered the screening questionnaire using computer-assisted interviewing. Adolescents completed the baseline survey using audio computer-assisted self-interviewing (ACASI).

Human Subjects Protection

All study participation was voluntary. Adolescents provided verbal consent to be screened. Written informed consent was obtained prior to baseline data collection consisting of parent/guardian consent and adolescent assent for adolescents under age 18 and adolescent consent for those age 18 and older or emancipated minors (e.g., married or a parent). All data collection tools and consent forms were translated into Luo and Kiswahili, and were administered in participants' choice of language, including English. Study protocols were approved by the ethics review boards of the Pacific Institute for Research and Evaluation (PIRE) and the Kenya Medical Research Institute (KEMRI). The study was conducted in accordance with the US Common Rule and the Guidelines for Ethical Conduct of Biomedical Research Involving Human Subjects in Kenya.

Measures

Primary Outcomes

Questions about well-being and stigma were asked in the baseline survey. Quality of life (QOL) was measured with the 26-item World Health Organization Quality of Life Questionnaire abbreviated version (WHOQOL-BREF) [30]. It has shown acceptability and feasibility with adolescents [31] and has been administered to adolescents in sub-Saharan Africa [32] and adults in rural Kenya [33, 34]. The measure was validated for use in the larger study with two resulting factors [35]. Internal consistency for the current sample was $\alpha = 0.84$ for the 10-item QOL social and physical health (sp-QOL) measure and 0.76 for the 9-item QOL psychological and environmental (pe-QOL) measure. Depressive symptoms were assessed with the 20-item Center for Epidemiological Studies Depression Scale Revised (CESD-R) [36]. Versions of the CESD have been used with youth in sub-Saharan Africa [37, 38]. At $\alpha = 0.91$, internal consistency for the scale in the current sample was high. HIV-related anticipated stigma was measured using items

from Macpherson et al. [39], which were validated for use in the larger study [35]. Internal consistency for the 5-item measure was $\alpha = 0.74$ for the current sample.

Primary Exposure

Circumcision status was asked in the screening questionnaire of male participants. Response options were having been circumcised by a medical staff person, having been circumcised by someone other than medical staff (e.g., traditional or religious circumcision), or not having been circumcised.

Other Variables

Medically circumcised males were asked their age at circumcision and whether HIV testing had been done. Those circumcised while under age 18 were asked if an adult had given consent for the circumcision and, if so, the relationship of the adult to the adolescent (i.e., parent/guardian, other adult family member/relative, teacher, clinic staff, community mobilizer, or another person). Based on Kenyan law and our knowledge of the cultural context that other adult family members (e.g., aunts, uncles, older siblings, and older cousins) sometimes take the role of guardian in the absence of or if requested by a parent or legal guardian [40], we combined responses indicating that a parent/guardian or another adult family member/relative had given consent (N = 1398). We concluded that these participants had appropriate adult consent. Of these, 95% (N = 1329) indicated they obtained consent from a parent/guardian and 5% (N = 69) from another adult family member/relative. For ease of presentation, we refer to our variable as "parent/guardian consent" in this paper. Of those who did not obtain parent/guardian consent (N = 159), 57% (N = 90) reported that an adult did not give permission for their circumcision and 43% (N = 69) indicated that a teacher, clinic staff, community mobilizer, or other adult (not a family member) gave consent. Participants were also asked if they had given their own permission to be circumcised (i.e., adolescent assent).

Uncircumcised males were asked if they would like to be circumcised and if anyone had talked to them about circumcision. Covariates included in analyses were current age, orphan status (both parents alive or not), currently in school or completed secondary school (yes or no), geographic region (three sub-counties: A, B, and C), attends religious service once a week or more often (yes or no), and religious affiliation (1 = Roman Catholic, 2 = Protestant or other Christian, 3 = Muslim, no religion, or other).

Statistical Analyses

We examined frequency distributions of HIV testing during circumcision, age at circumcision, parent/guardian consent, and adolescent assent among medically circumcised males; and circumcision preferences and whether anyone had talked to them about circumcision among uncircumcised males. Composite scores for the HIV-related stigma and QOL measures were constructed by taking the mean across the valid responses to the appropriate items. We only computed mean scores for subjects with non-missing values on at least half the items associated with a particular factor. Subjects that did not meet this criterion were assigned missing values. An overall depression score (ranging from 0 to 60) was created from a composite (sum) of the CESD-R items which were coded 0 (lowest symptom frequency) to 3 (highest symptom frequency) [41]. We substituted the mean score of a respondent's non-missing items for individuals missing up to 10 items; respondents missing more than 10 items were assigned a missing composite score. To create a dichotomous CESD-R variable, cases with scores 16 or above (versus below 16) were classified as depressed—a criteria that has been found in an African setting to have good sensitivity and utility in identifying depression [41].

The test of our hypotheses was based on a comparison of sample means among males of the primary outcomes across two levels of the primary exposure (medically circumcised versus uncircumcised). Males who were circumcised by someone other than a medical staff person were excluded from analyses. To reduce confounder bias, all comparisons were adjusted for differences across samples in current age, orphan status, current school attendance, geographic region (sub-county), religious service attendance, and religious affiliation. Adjusted comparisons were carried out using an exact matching procedure and only included subjects who had non-missing values on all the covariates involved in the matching procedure (the percentage of males with circumcision data who were dropped was less than 1%). We first categorized all continuous covariates (e.g. current age) and formed a multi-way contingency table that included all covariates and the primary exposure. The cross-classification of covariates resulted in a table with 144 cells—129 (89.5%) of which were occupied by at least one subject from either sample. However, the final analytic sample used in hypothesis testing only contained subjects from cells that contained at least one subject from each sample—i.e. subjects for whom there was at least one exact match. The number of cells that met this criterion was 88 (61.1%), and the number of subjects excluded from the final analytic sample was 115 (7% of sample) circumcised subjects and 9 (3% of sample) uncircumcised subjects.

For the subjects that remained in the analytic sample, we constructed sample weights so that the circumcised subjects matched the uncircumcised subjects exactly on the joint distribution of the covariates involved in the matching procedures. Uncircumcised subjects received a sample weight of 1 while the weight for circumcised

subjects was based on a ratio of the number of uncircumcised to circumcised subjects observed in each subjects' cell, allowing comparisons across levels of circumcision status. There were 1815 males with baseline survey data and a non-missing matching weight. We compared sample characteristics by circumcision status for the unweighted and weighted samples.

When carrying out statistical tests on the differences between sample means, we used the SURVEYREG procedure in SAS in order to accurately estimate sampling variance under our weighting scheme. This procedure was used for all primary outcomes except the dichotomous depression measure (for which we used SURVEYFREQ). The effect sizes for each comparison were calculated as the difference between group means divided by the root mean square error (i.e. Cohen's D). Effect sizes were not calculated for the dichotomous depression measure. For all analyses, statistical significance was based on a two-sided, 0.05 type I error rate threshold ($\alpha = 0.05$).

Results

Primary Exposure

About 18% of our sample of males were uncircumcised, 77% were circumcised by medical personnel, and 5% were circumcised traditionally or for religious reasons. Thus, after dropping those who were traditionally circumcised from the sample, 81% were medically circumcised and 19% were uncircumcised. Table 1 provides details about the experiences of circumcised and uncircumcised males. Among those medically circumcised, 69% reported being circumcised between age 10–14 and 22% between age 15 and 17; about 28% reported not having been tested for HIV at the time of the circumcision. Among those who were circumcised under age 18, about 10% did not have parent/guardian consent. Of these, about two-thirds (66.7%) reported they were circumcised between age 10–14 and over one quarter (28.3%) were circumcised at age 15–17.

Larger proportions of those who were circumcised without parent/guardian consent were orphans (47.8%) and not currently enrolled in school or completed secondary

Table 1 Experiences of circumcised and uncircumcised males in sample

Experience	Overall sample (N = 1939)	Subsample of circumcised males who lacked parent/guardian consent[a] (N = 159)
Medically circumcised males (N = 1579, 81.4%)		
Adolescent received HIV testing at circumcision		
No	28.4	28.3
Yes	71.6	71.7
Age at circumcision		
< 10 years	7.2	5.0
10–14	69.0	66.7
15–17	22.4	28.3
18–19	1.4	–
Had parent/guardian consent[a] for VMMC (among those circumcised under 18)		
No	10.2	–
Yes	89.8	–
Adolescent gave assent for VMMC (among those circumcised under 18)		
No	2.1	3.8
Yes	97.9	96.2
Uncircumcised males (N = 360, 18.6%)		
Adolescent wants to be circumcised		
No	34.4	–
Yes	65.6	–
Someone has talked to adolescent about circumcision		
No	17.7	–
Yes	82.3	–

[a]Parent/guardian consent includes consent from a parent, guardian or another adult family member

school (21.4%) compared to those who were circumcised with parent/guardian consent (42% and 14.8%, respectively; see Table 2). Those who were circumcised without parent/guardian consent were also more likely to be classified as depressed (38.8%) and to report poorer quality of life (mean sp-QOL = 3.66 and mean pe-QOL = 3.07) compared to those circumcised with parent/guardian consent (34.9% depressed, mean sp-QOL = 3.80 and mean pe-QOL = 3.13, respectively).

Tests of Study Hypotheses

Table 3 reports the frequencies and percentages for each level of the covariates in the study by circumcision status—before and after weighting. Before weighting, the largest differences between the two samples were in their distributions across the three sub-counties with uncircumcised subjects more concentrated in sub-county B (46.1% of uncircumcised participants vs. 23.9% and 30% uncircumcised participants in sub-counties A and B, respectively). Circumcised participants were slightly more likely to be in school (84.4%) compared to uncircumcised participants (79.2%). The last two columns of Table 3 reveal that the exact matching procedure resulted in perfect equivalence between samples (as designed)—not only in the proportions from the marginal distributions reported in the table, but in the cell proportions from the multi-way contingency table (not shown). As shown in the table, the characteristics of the circumcised and uncircumcised samples did not change substantially after dropping the subjects with missing weights.

Table 2 Characteristics of males who underwent VMMC as a minor (N = 1557) by receipt of appropriate adult consent for the VMMC

Characteristic	Had parent/guardian consent[a] n = 1398 (89.8%)	Did not have parent/guardian consent[a] N = 159 (10.2%)
	% (n)	*% (n)*
Age (in years)		
15–17	59.9 (837)	44.7 (71)
18–19	40.1 (561)	55.4 (88)
Orphan status		
Not orphan	58.0 (810)	52.2 (83)
Orphan	42.0 (587)	47.8 (76)
Currently in school or completed secondary		
No	14.8 (207)	21.4 (34)
Yes	85.2 (1191)	78.6 (125)
Attends religious service once a week or more often		
No	51.7 (723)	56.6 (90)
Yes	48.3 (675)	43.4 (69)
Religious affiliation		
Roman Catholic	25.0 (350)	23.9 (38)
Protestant or other Christian	66.8 (934)	66.0 (105)
Muslim, no religion, other	8.2 (114)	10.1 (16)
Sub county		
A	26.8 (374)	30.2 (48)
B	34.9 (488)	30.2 (48)
C	38.3 (536)	39.6 (63)
CESD-R dichotomous		
No	65.1 (881)	61.2 (93)
Yes	34.9 (472)	38.8 (59)
	Mean (SD)	*Mean (SD)*
Quality of life—social and physical health factor (sp-QOL)	3.80 (.76)	3.66 (.79)
Quality of life—mental/psychological and environmental factor (pe-QOL)	3.13 (.69)	3.07 (.75)
HIV anticipated stigma	0.77 (.54)	0.82 (.54)
CESD-R continuous	13.5 (11.7)	14.0 (12.9)

[a]Parent/guardian consent includes consent from a parent, guardian or another adult family member

Table 3 Characteristics of sample (percentages) by circumcision status

Characteristic	Unweighted (N = 1939)		Weighted[a] (N = 1815)	
	Uncircumcised %	Circumcised by medical staff %	Uncircumcised %	Circumcised by medical staff %
Age (in years)	N = 360	N = 1579		
15–17	54.4	57.5	54.4	54.4
18–19	45.6	42.5	45.6	45.6
Orphan status	N = 360	N = 1578		
Not orphan	58.3	57.5	59.0	59.0
Orphan	41.7	42.5	41.0	41.0
Currently in school or completed secondary	N = 360	N = 1579		
No	20.8	15.6	19.4	19.4
Yes	79.2	84.4	80.6	80.6
Attends religious service once a week or more often	N = 360	N = 1579		
No	52.8	52.4	52.4	52.4
Yes	47.2	47.6	47.6	47.6
Religious affiliation	N = 359	N = 1579		
Roman Catholic	22.6	25.0	22.5	22.5
Protestant or other Christian	68.5	66.8	70.1	70.1
Muslim, no religion, other	8.9	8.2	7.4	7.4
Sub county	N = 360	N = 1579		
A	23.9	27.0	23.4	23.4
B	46.1	34.5	46.4	46.4
C	30.0	38.5	30.2	30.2
Total sample	N = 360 (18.6%)	N = 1579 (81.4%)	N = 351 (50.0%)	1464 (50.0%)

[a]Uncircumcised males have a weight of 1.0

Table 4 presents the results of the adjusted and unadjusted comparisons of outcome means (percentages for the dichotomous depression measure) across the circumcised and uncircumcised samples. The unadjusted comparisons reveal statistically significant differences across circumcision status for pe-QOL (3.02 uncircumcised versus 3.12 circumcised; $t = -2.62$, $p < 0.01$) and the continuous (15.15 uncircumcised versus 13.52 circumcised; $t = 2.09$, $p < 0.05$) and dichotomous depression measures (41.8% uncircumcised versus 35.2% circumcised; chi-square = 5.24, $p < 0.05$). The effect size for the pe_QOL measure (Cohen's D effect size = −0.15) would be considered small and corresponds to a 0.11 decrease in pe_QOL on a 5-point Likert scale.

After adjusting for observed differences in the two samples on the covariates, the difference on the pe_QOL measure across levels of the primary exposure increases slightly (Difference in means = −0.109 in weighted analysis versus −0.107 in unweighted analysis) and remains statistically significant (3.01 uncircumcised versus 3.12 circumcised; $t = -2.57$, $p = 0.01$). The difference in the dichotomous depression measure also remains significant (40.8% uncircumcised versus 34.5% circumcised; Chi square = 4.40, $p < 0.05$). On the other hand, the small statistically significant difference observed in the unadjusted comparison of the continuous depression measures is no longer statistically significant in the adjusted comparisons (14.96 uncircumcised versus 13.47 circumcised; $t = 1.85$, $p = 0.065$).

Discussion

Our hypothesis that uncircumcised male adolescents would have poorer psychosocial outcomes than their circumcised peers was partially confirmed. After adjustment for age, orphan status, school enrollment, religious service attendance, religious affiliation, and sub-county, significant differences remained between the two groups in our QOL measure of psychological and environmental attributes. In addition, our dichotomous measure indicated that uncircumcised males were significantly more likely than those who were circumcised to have symptoms of clinical depression. Also, a substantial proportion (~ 10%) of male adolescents reported being circumcised as minors without parental consent.

Table 4 Mental health outcomes (mean or percent) by circumcision status[a]

Unweighted (Ns ranged from 1874 to 1929)				
Characteristic	Uncircumcised	Circumcised by medical staff	Difference in means (effect size)	Test statistic (p-value)
Quality of life—social and physical health factor (sp-QOL)	3.77	3.79	−0.019 (−.02)	−0.40 (0.687)
Quality of life—mental/psychological and environmental factor (pe-QOL)	3.02	3.12	−0.107 (−.15)	−2.62 (0.009)
HIV stigma	0.82	0.77	0.049 (.09)	1.53 (0.125)
CESD-R continuous	15.15	13.52	1.619 (.13)	2.09 (0.037)
CESD-R dichotomous	41.8%	35.2%	6.6%	5.24 (0.022)
Weighted[b] (Ns ranged from 1755 to 1805)				
Characteristic	Uncircumcised	Circumcised by medical staff	Difference in means (effect size)	Test statistic (p-value)
Quality of life—social and physical health factor (sp-QOL)	3.77	3.78	−0.006 (−.01)	−0.11 (0.909)
Quality of life—mental/psychological and environmental factor (pe-QOL)	3.01	3.12	−0.109 (−.16)	−2.57 (0.010)
HIV stigma	0.81	0.77	0.047 (.09)	1.44 (0.151)
CESD-R continuous	14.96	13.47	1.492 (.12)	1.85 (0.065)
CESD-R dichotomous	40.8%	34.5%	6.3%	4.40 (0.036)

[a]Means, Cohen's D, and t-values are reported for all variables except the dichotomous CESD-R. For that variable, the percent depressed and the Chi square value (Rao-Scott Chi square for the weighted analysis) are reported

[b]Uncircumcised males were assigned a weight of 1.0

Limited research has examined psychosocial outcomes among adolescent males exposed to VMMC activities. In the present study, we found uncircumcised male adolescents were more likely to be psychosocially distressed than their circumcised counterparts. A possible explanation for this finding is that undergoing VMMC may have positive benefits on the psychosocial outcomes of circumcised adolescent males. An alternative explanation is that VMMC-related activities may have a deleterious effect on the mental health and QOL of uncircumcised adolescents. We did not find evidence in support of either premise in the published literature. This highlights an important knowledge gap that warrants further study.

As noted earlier, epidemiological modelling studies determine the number of individuals per age group and region to be circumcised each year to ensure that the intended population-level impacts in terms of averted HIV infections can be achieved [9, 10]. The success of VMMC programs therefore depends on meeting or exceeding these targets. To do so, VMMC implementation organizations rely on recruitment strategies comprised of both demand creation and community mobilization activities [42–44]. However, recruitment efforts may create social pressure to undergo circumcision. For example, some VMMC recruiters may use abusive and/or stigmatizing language to refer to uncircumcised males to promote VMMC during mobilization activities [29]. In turn, this may inadvertently result in social environments that encourage stigmatization, ridicule, and shaming of uncircumcised boys by their circumcised peers [29]. Thus, it is possible that negative experiences associated with being uncircumcised in a high VMMC-uptake community and/or some VMMC recruitment strategies may have contributed to the depressive symptoms and poor quality of life reported by some adolescents in our study. Further study is warranted among male adolescents in VMMC priority countries to examine the extent of these negative experiences, whether they are causally related to poor psychosocial outcomes, and their importance relative to other known determinants of psychosocial distress among youth, e.g., poverty [45].

Compliance with informed parent/guardian consent and adolescent assent procedures in the implementation of VMMC programs in priority ESA countries has also not been previously examined. In our study, it is encouraging that almost all male adolescents who reported undergoing circumcision under age 18 had assented to the process. It is worrisome, however, that about 10% reported that consent for the procedure was not obtained from a parent, guardian, or other adult family member. By extrapolation, if our finding held true for the estimated 623,773 CDC-supported VMMCs performed in Kenya between 2013 and 2016, then more than 35,000 minors may have been circumcised

without parent/guardian consent, with the majority of these under age 15.

For some adolescents, a parent/guardian may be able to help them think through their decision-making process including issues pertaining to risks and benefits of male circumcision and how to cope with social pressure [46]. Indeed, studies have found that parent/guardian involvement helps to facilitate receipt of SRH services among adolescents [47]. Additionally, in a study in the same region, we found that adolescents were overwhelmingly in favor of parent/guardian involvement during HIV testing and disclosure of results [48]. Moreover, VMMC implementation guidelines acknowledge the importance of involving parents and guardians, including during demand creation activities such as community awareness and mobilization campaigns [49]. Others have found, however, that requiring parent/guardian consent and notification may be a barrier to adolescent use of SRH services [50].

It is possible that for some uncircumcised adolescents who want VMMC, not being able to obtain parent/guardian consent may lead to poorer psychosocial outcomes. Of note, though, is that our study found that adolescents who were circumcised without appropriate parent/guardian consent had poorer psychosocial outcomes than those who had appropriate consent. Given that the study region is traditionally non-circumcising and some parents/guardians do not subscribe to the idea of male circumcision, it is possible that some adolescent minors wish to receive VMMC services with parent/guardian consent, but fear rejection and hostility at home if they broach the subject; others may neglect to obtain parent/guardian consent for VMMC in their bid to avoid negative social experiences among peers associated with being uncircumcised. Our findings, as well as those of other studies, suggest more research is needed to identify culturally-appropriate strategies for shared decision-making where parents and adolescents work together towards a mutually acceptable decision. Identifying and implementing effective strategies to involve parents/guardians, including informing them about the benefits and risks of male circumcision and facilitating shared decision-making may address a key gap in VMMC implementation among male adolescents.

Limitations of our study include that it was observational. In addition, some of the differences observed in the outcome measures may be due to differences in factors (e.g., having an older brother who is circumcised or having health problems) that we did not adjust for in the analysis. Nonetheless, we employed a rigorous exact matching procedure to condition on those potentially confounding factors that we did observe. We also did not measure perceived stigma towards uncircumcised males or social pressure to get circumcised which may be a mediator to uncircumcised boys experiencing psychological distress. From the standpoint of making causal inferences about the impact of VMMC-related activities on depression and quality of life, there are two important limitations to the current study design to keep in mind. First, because our data are cross-sectional we are unable to establish when the outcome differences between the two groups emerged. Specifically, we can't rule out the possibility that the better mental health outcomes observed among boys who had received VMMC existed prior to them having received the procedure and, consequently, might have been observed in the absence of variation in exposure to the procedure. Second, because this study is observational our ability to adjust our estimates for potential confounding is limited by the data we collected. For example, although we adjusted for school attendance and orphan status, we acknowledge that the adjusted comparison that we report may not capture all the important differences across the two groups in socioeconomic status (e.g., parent/guardian education and economic resources) and social support and that alternative (non-causal) explanations for the differences in the outcomes we observe may still exist. Despite these two important limitations, we believe that the evidence presented here does provide tentative confirmation of the hypotheses investigated in this study.

Although VMMC initiatives have great promise for preventing HIV infection, findings from this study suggest that careful monitoring of these large-scale programs pertaining to male adolescents' well-being and consenting procedures may be warranted. There is also need for more research in Kenya and other ESA countries to understand the impact of these programs on adolescents' experiences and psychosocial outcomes, the origins of perpetuating factors, and whether VMMC programs should be adjusted to lessen the likelihood of unintended negative outcomes. This type of evaluation is particularly urgent given the focus of global targets on males aged 10–29 years.

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