

Voluntary medical male circumcision among adolescents: a missed opportunity for HIV behavioral interventions

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Objective: Voluntary medical male circumcision (VMMC) is one of the first opportunities for adolescent males in African countries to interact with the healthcare system. This study explored the approaches used during adolescent VMMC counseling and whether these strategies maximize broader HIV prevention opportunities.

Methods: Qualitative interviews were conducted with 92 VMMC clients ages 10–19 years in South Africa ($n = 36$), Tanzania ($n = 36$), and Zimbabwe ($n = 20$) and 33 VMMC providers across the three countries. Discussions explored HIV prevention counseling, testing, and disclosure of results. Audio recordings were transcribed, translated into English, and coded thematically by two individuals.

Results: Male adolescents in all three countries reported that limited information was provided about HIV prevention and care, and adolescents were rarely provided condoms. Although VMMC protocols require opt-out HIV testing, adolescents recounted having blood taken without knowing the purpose, not receiving results, nor completely understanding the link between VMMC and HIV. Most males interviewed assumed they had tested negative because they were subsequently circumcised without knowing test results. Providers reported spending little time talking about HIV prevention, including condom use. They admitted that younger adolescent clients often receive little information if assumed they are not sexually active or too young to understand and instead discussed nonsexually transmitted routes of HIV.

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Received: 7 February 2017; revised: 15 March 2017; accepted: 17 March 2017.

DOI:10.1097/QAD.0000000000001484

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Conclusion: In the sites of the three countries studied, HIV prevention and care messages were inconsistent and sometimes totally absent from VMMC counseling sessions. VMMC appears to be a missed opportunity to engage in further HIV prevention and care with adolescents.

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AIDS 2017, **31** (Suppl 3):S233–S241

Keywords: adolescents, HIV prevention, HIV testing and counseling, sub-Saharan Africa, voluntary medical male circumcision

Introduction

Greater than two-thirds of the world's new HIV infections occur in sub-Saharan Africa [1]. Three randomized trials and numerous observational studies demonstrated that voluntary medical male circumcision (VMMC) effectively reduces HIV acquisition by up to 60% and decreases the risk of several other sexually transmitted infections (STIs) in men and their female partners [2–13]. However, evidence of risk reduction as a result of VMMC among men who have sex with men (MSM) is limited [14–16]. In response to the HIV epidemic, the WHO and Joint United Nations Programme on HIV/AIDS launched the Joint Strategic Action Framework to scale up VMMC for HIV prevention [17]. Scale-up prioritization is focused on reaching both adolescent and adult men. Adolescents, ages 10–19 years, make up approximately half of the total population reached by VMMC efforts in the priority countries, providing a timely opportunity to further understand the adolescent experience in VMMC and sexual and reproductive health (SRH) services [18,19].

WHO recommends a comprehensive package of services for VMMC that includes HIV testing, safer sex education, STI management, and condom distribution and promotion [17]. Also included are linkages to other male reproductive health services and HIV care and treatment. The guidelines emphasize that VMMC services should be integrated into the planning of comprehensive HIV prevention and SRH programs. In particular, the Strategic Action Framework notes that reaching new cohorts of adolescent males will require refining the service delivery package and providing youth-friendly SRH services [17]. Given resource constraints, to reach the goals of VMMC coverage and reduction in HIV incidence, the engagement of adolescents during VMMC and the sustainability of their link to healthcare are critical for high HIV prevention impact.

Studies have shown that adolescent males are not socially encouraged to engage with healthcare, and SRH care settings are often not youth-centered [20–22]. A recent systematic review of adolescent SRH and VMMC service provision in sub-Saharan Africa highlights several barriers to male adolescents seeking such services: structural factors (e.g., limited clinic hours that fall during school or

work), lack of privacy, shame, prior negative experiences with healthcare providers, limited sexual health education, and fear of pain from the procedure itself and/or related injections, and HIV testing [23].

VMMC may be one of the first occasions for adolescent males in many African countries to interact with the health system and offers a unique opportunity for providers to engage them in broader SRH and HIV messaging. United Nations International Children's Emergency Fund, WHO, and the United Nations Population Fund recommend age-appropriate methods to introduce SRH services to male adolescents during VMMC [24]. However, little is known as to what type of messages male adolescents are receiving and retaining during their VMMC experience. This study explored the messages and approaches used during adolescent VMMC counseling in three countries to determine whether such strategies maximize opportunities for broader HIV prevention, male adolescent SRH, and linkages to HIV care.

Methods

Setting and participants

The Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB No. 6074), Human Sciences Research Council in South Africa (Ref: REC 4/18/02/15), Tanzania National Institute for Medical Research (Ref: NIMR/HQ/R.8a/Vol.IX/1948), and Medical Research Council of Zimbabwe (Ref: MRCZ/A/1919) all approved the study prior to data collection.

In-depth interviews were conducted in South Africa, Tanzania, and Zimbabwe with adolescent males seeking VMMC and providers who conducted VMMC counseling with adolescents. Interviews were the preferred research methodology in order to gather narratives on the VMMC counseling experience from both the adolescent patient and provider perspectives. Adolescents were interviewed within 6–10 weeks of the procedure. This timeframe was selected to allow for the full healing period to occur and for the completion of any VMMC follow-up appointments. Data were collected from June to September 2015 in Tanzania, August to December 2015 in Zimbabwe, and February to June 2016 in South Africa.

Table 1. Sample interview guide questions.

Context	Sample questions
Adolescent client	
Preprocedure counseling experience	What did the counselor tell you about doing a blood test/testing for HIV before your circumcision?
Circumcision experience	Do you understand why the counselor told you not to have sex or masturbate/have self sex during the healing period? Explain to me why they told you this?
	Were you told about male circumcision and the reduction in HIV transmission during vaginal sex? What did the counselor tell you?
Postprocedure experience	How have you cared for your wound?
Provider	
Counseling process	Does a young male's previous sexual experience influence the information you provide? How? How do you approach the topic of HIV testing with males 10–12 years old? 13–14? 15–17? 18–19?
VMMC knowledge and training	Does this training specifically prepare providers to counsel young males ages 10–12? 13–14? 15–17? 18–19? How?
	Do you feel confident in your ability to provide counseling to adolescent males on sexual and reproductive health topics? Why or why not?
Provider's opinions	How do you feel about discussing sex and sexuality (various sexual behaviors, orientation, attraction, partner gender, etc.) with males ages 10–19?

VMMC, voluntary medical male circumcision.

Participants were recruited from facilities offering VMMC services to adolescents. Of the 12 total sites, four were in rural locations, three were periurban, and five were urban. Selection of study sites was guided by a stratification scheme of rural versus urban clinics and patient volume. Only 12 sites were selected because of limited resources.

Adolescent male participants were recruited to participate in a post-VMMC counseling interview either through mobilizers on the day of their VMMC or by service providers during the clients' follow-up visit to the clinic or follow-up phone call. Parent permission was obtained for men under age 18, and assent/consent was obtained for all adolescents. To recruit provider interview participants, field supervisors visited each site to inform the staff about the study and request participation from individuals providing VMMC counseling for adolescents. All providers completed an informed consent process before participating in an interview. Male adolescents were given the equivalent of US\$12 in South Africa and US\$5 in Tanzania and Zimbabwe in local currency, and providers were given the equivalent of approximately US\$10 in Tanzania and Zimbabwe. Providers in South Africa were not given an incentive, as requested by the local ethics review board.

Local field workers conducted interviews in the countries' local languages (Sesotho, isiZulu, or isiSwati in South Africa; kiSwahili in Tanzania; Shona or Ndebele in Zimbabwe) or in English if the participant preferred. All interviews were audio recorded, transcribed verbatim in the local language, and translated into English for coding and analysis.

Interviews were conducted using semi-structured guides (refer to Table 1 for sample questions). Interviews with adolescent males focused on describing the counseling they received and perceptions of providers' attitudes

towards young males pursuing VMMC. Interviews with providers focused on the VMMC counseling process, the counseling content specific to the procedure itself, other forms of HIV prevention, and the HIV testing process. Interviews lasted approximately 1 h for adolescent males and 1.5 h for providers and were conducted onsite within a health facility, except for one provider interview in South Africa that was conducted by phone.

Analyses

Two coders independently coded the data using thematic analysis through a two-step process utilizing Atlas.ti software; Berlin, Germany. First, the coders read through all transcripts independently and developed a coding scheme. Discrepancies regarding the coding scheme and meanings of the codes were discussed until a consensus was met. The coders then applied this coding scheme to all transcripts. Within predetermined areas of inquiry that made up the semi-structured interview guides, the coders generated categories and subcategories, allowing for further content analysis and theme and subtheme development. All transcripts were double-coded by research staff. All applied codes were compared, and any discrepancies were discussed until an agreement was reached, and the individual code applied to a passage of text was resolved. In the rare event a discrepancy resulted in no agreement between the two coders, the Primary Investigator made the final decision. We present findings below in line with the areas of inquiry and describe substantive themes within each topic.

Findings

Participant characteristics

Table 2 shows participant demographic information by country. A total of 92 interviews were conducted with adolescent males (South Africa = 36, Tanzania = 36, and

Table 2. Study participant demographics by country.

	Total <i>n</i> (%) or M (SD)	South Africa <i>n</i> (%) or M (SD)	Tanzania <i>n</i> (%) or M (SD)	Zimbabwe <i>n</i> (%) or M (SD)
Adolescents	<i>n</i> = 92	<i>n</i> = 36	<i>n</i> = 36	<i>n</i> = 20
Age				
10–14	49 (53.3%)	28 (77.8%)	15 (41.7%)	6 (30.0%)
15–19	43 (46.7%)	8 (22.2%)	21 (58.3%)	14 (70.0%)
Mean	14.5 (2.88)	13.4 (2.25)	15.1 (3.41)	15.5 (2.33)
Setting				
Urban	55 (59.8%)	9 (25.0%)	31 (86.1%)	15 (75.0%)
Periurban	14 (15.2%)	9 (25.0%)	5 (13.9%)	0 (0.0%)
Rural	23 (25.0%)	18 (50.0%)	0 (0.0%)	5 (25.0%)
Religion				
Catholic	13 (14.1%)	1 (2.8%)	12 (33.3%)	0 (0.0%)
Christian	73 (79.4%)	33 (91.6%)	22 (61.1%)	18 (90.0%)
Traditional or Muslim	6 (6.5%)	2 (5.6%)	2 (5.6%)	2 (10.0%)
Providers	<i>n</i> = 33	<i>n</i> = 9	<i>n</i> = 12	<i>n</i> = 12
Female	26 (78.8%)	7 (77.8%)	12 (100%)	7 (58.3%)
Age (mean)	41.0 (9.85)	35.4 (9.06)	46.2 (9.31)	39.9 (8.95)
Years providing adolescent VMMC services (mean)	3.9 (1.96)	4.6 (3.40)	3.9 (0.80)	3.4 (1.49)
Number of clients daily (mean)	14.4 (10.72)	10.4 (5.95)	20.2 (14.37)	11.0 (5.20)
Proportion of adolescent clients daily (mean)	66.3 (17.24)	48.6 (16.55)	75.6 (15.51)	65.8 (12.40)

VMMC, voluntary medical male circumcision.

Zimbabwe = 20). An additional 33 interviews were conducted with VMMC providers (South Africa = 9, Tanzania = 12, and Zimbabwe = 12). The majority of the adolescents were 15–19 years old in Tanzania (58.3%) and Zimbabwe (70.0%). In South Africa, 77.8% of participants were younger ages (10–14 years). Although most participants resided in urban areas, 50% (*n* = 18) of the South African participants were from rural areas. Nearly all participants identified as Christian.

Providers included counselors, field recruiters, and nurses in South Africa; counselors, assistant nursing officers, clinical officers, and nurse midwives in Tanzania; and nurse/surgical counselors in Zimbabwe. Over three-quarters (78.8%) of the providers were female with a mean age of 41 years (range 23–59 years). They reported an average of 3.9 years of adolescent VMMC experience (ranging from 6 months to 10 years) and saw a range of 10–20 VMMC clients per day.

Adolescent client perspective

Table 3 shows the areas of inquiry and themes that arose from the adolescent client and VMMC provider perspectives.

HIV testing and counseling

Across sites, male adolescents reported that limited information was provided to them about the HIV-testing process. Furthermore, although guidelines state HIV testing is voluntary, adolescents reported rarely being given an opportunity to decline the test but still proceed with VMMC. In South Africa and Zimbabwe, all participants were tested for HIV. However, in Tanzania, some adolescents were not tested but still circumcised (*n* = 15), with reasons given that they were previously

tested, declined for other reasons, or were not offered a test. In one instance, the clinic was out of HIV test kits, and in another, providers were too busy. Explanations from adolescents regarding the HIV-testing process varied, with some reporting having their blood drawn without knowing why.

They [the providers] said they were checking if our blood is good . . . I was not [told that I was tested for HIV]. They just pricked me and ordered me to wait outside. (Mbeya, Tanzania, age 16)

Other adolescents reported agreeing to testing after the provider gave a clear explanation of the importance of HIV testing.

He [the provider] said that if you want to circumcise you must do the test first. And he told us that if you are HIV positive you are not allowed to circumcise. He told us that the reason they test us is to see if we are HIV negative and then circumcise us . . . He explained to us the importance of getting tested for HIV until we saw the need of doing it. (Umkhanyakude, South Africa, age 14)

It should be noted in this example, however, that the adolescent client believed he needed to have an HIV test to receive VMMC. This is against the WHO guidelines, which state that HIV testing is to be offered to all clients but is not mandatory.

How HIV test results were disclosed to adolescent clients varied. Most reported receiving results in a private setting either orally or written. In Zimbabwe, one man reported that his negative status was disclosed to him in front of others (nonfamily members). Younger adolescents in

Table 3. Identified themes by area of inquiry from the adolescent client and provider perspective.

Areas of inquiry	Themes
Adolescent client perspective	
HIV testing and counseling	Adolescent clients provided with limited HIV-testing information Adolescents rarely given opportunity to decline HIV test prior to VMMC No consistency in how HIV-test results disclosed to adolescent clients Implicit bias in HIV prevention and care counseling content, determined by age, in which older men are sexually active and can talk about sex
VMMC and HIV protection	Link between VMMC and partial HIV protection not well understood by younger adolescents (under 13 years) Older adolescents (13 years or older) understood VMMC provided partial HIV protection but misreported percentage of partial protection
Condoms	Younger adolescents either did not recall condom messages or reported condom messages briefly mentioned with emphasis on abstinence Emphasis on importance of condom use after VMMC varied by age and provider but not by men's sexual experience
Provider perspective	
HIV prevention counseling	Provider discussions about HIV prevention aside from VMMC less common with younger adolescents Providers-based counseling on their perceptions of adolescent readiness for sexual health
HIV testing and linkage to care	HIV disclosure and appropriate linkage to care for young men is challenging for many providers

VMMC, voluntary medical male circumcision.

Tanzania and Zimbabwe often reported parents receiving the results on their behalf, or the males did not receive their results at all and presumed they were negative because providers proceeded with VMMC.

They [the providers] pricked you, took some blood. After they were done with one pair [of clients], they told us, 'You can now go' . . . That is when they write on you with a mighty marker . . . [the provider] looked at the results and then looked at me and said nothing. He then started smiling such that . . . none of us had chirwere [HIV]. (Harare, Zimbabwe, age 13)

Adolescents' counseling experience related to HIV prevention and care was largely determined by age. Adolescents aged 10–12 years reported receiving minimal HIV prevention and care information, especially in regards to sex. Group counseling, in which ages of the clients assigned to a given group varied, allowed for younger adolescents to be exposed to some HIV prevention and care messages.

Voluntary medical male circumcision and HIV protection

The link between VMMC and partial HIV protection was not well understood by younger adolescents, especially 10–12 year olds. Most young adolescents reported they were not told that male circumcision could reduce HIV transmission during vaginal sex. These younger men reported HIV prevention messages focused largely on nonsexual transmission, with the provider often emphasizing abstinence rather than explaining how VMMC can provide some protection once sexually active. Younger adolescents reported that they were also told to prevent HIV by avoiding certain objects (e.g., razor blades, needles), sharing of hygiene products (e.g., toothbrushes), and touching of wounds.

Most older adolescents (13 years or older) understood that VMMC offers only partial protection, and additional precautions are necessary after VMMC. However, the degree of partial protection was sometimes unknown or misreported, ranging from 40% to full protection. Younger adolescents in Tanzania (under age 14) also reported being told that VMMC prevents nonsexually transmitted diseases such as skin cancer, cholera, dysentery, schistosomiasis, and diarrhea. It is not clear whether this was, in fact, relayed by the providers or whether the adolescent clients were misreporting information or misunderstood what was said to them.

Condoms

Messages regarding condoms were most frequently reported in Zimbabwe, followed by South Africa. Few adolescents interviewed in Tanzania, regardless of age, reported receiving counseling on condoms. Across countries, for those who did receive condom-related messages, this occurred most frequently among older adolescents (above 13 years). Younger adolescents, however, either did not recall this information at all, or they reported condoms were discussed briefly with an emphasis on abstinence.

She [the provider] said we must not have sex with females especially as we are still young, and she said there is no need for condoms. (KwaMashu, South Africa, age 13)

Messages regarding the importance of condom use after VMMC varied by age and provider but not by a man's sexual experience. In some instances, older adolescents also reported receiving messages related to abstinence.

She [the provider] said we were still young, and so we were not supposed to use condoms nor have sex. . .we

have to wait until we are 18 years old. (Mutare, Zimbabwe, age 15)

When condoms were emphasized, adolescents understood the importance of using additional protection due to the partial protection offered by VMMC. Of all the men interviewed, however, only six reported receiving condoms to take with them.

Provider perspective

From the providers' point of view, counseling content related to HIV testing and additional HIV prevention and care behaviors varied with clients' age. This was consistent with what was reported by the clients themselves, in that younger adolescents tended to receive less information.

HIV prevention counseling

Providers were generally less likely to discuss other forms of HIV prevention aside from VMMC with younger adolescents because it was often assumed that they were not yet sexually active. In Tanzania, providers talked about letting the knowledge and sexual experience of the client guide the discussion of HIV and its relationship to VMMC. Although providers admitted that the guidelines for HIV testing as part of the VMMC package are the same regardless of age – to define HIV, how it is transmitted, how VMMC and other behaviors can prevent it – they allowed the discussion to be shaped more by provider perceptions of adolescent readiness when counseling younger adolescents. For instance, if they asked a client questions that revealed he did not know much about sexual transmission, providers tended to avoid going into detail. Instead, they would tell the young client to get tested for HIV again when he was ready to get married. In fact, a number of providers in Tanzania talked about focusing on other forms of HIV transmission, such as cuts from razor blades.

I tell them [10–14 year olds] about the partial protection [from HIV] from circumcision, but I don't put emphasis on sex. I tell them that they already have a 60% protection from circumcision, but if they do things such as picking up used razor blades or sharp objects, they could still be infected. (Mbeya, Tanzania)

If adolescent clients stated false information about HIV transmission, however, the providers did correct them. But for younger clients, if they did not bring up a given topic (e.g., sexual transmission, condoms), providers often did not broach it. Providers in South Africa seemed less hesitant to discuss HIV prevention, as children are learning about HIV at a young age in schools. However, this openness about HIV was tempered when parents sat in on counseling sessions, as they often do with younger males.

Children who are 10–13 come with their parents, and immediately you talk to them about HIV. They know about HIV because they study about such at school. They know lots of things, but when there is a parent involved, if you ask a child: do you know how HIV is transmitted? He would say no because he's afraid of the parent, and he would give you the obvious one, the safe one that is: through sleeping with someone. And when you ask which way of sleeping with a girl that transmits HIV? They cannot say that because there is a parent involved. So we end up getting incomplete information because of the parents. But the 15 year olds are on their own, and they get to one on one [counseling], and they will speak freely. But the young ones – you don't speak much with them. You just teach them basics. (Orange Farm, South Africa)

HIV testing and linkage to care

Providers in Tanzania and Zimbabwe expressed feeling uncomfortable counseling adolescents who tested positive for HIV, because they felt that they had inadequate training to do so. Providers described receiving training in HIV testing, especially those who were working in HIV prior to offering VMMC services. But possessing the skills to reveal a positive status to a young male and then connect him to the appropriate services seemed to be a challenge. In Zimbabwe, providers described the ways in which they explained the HIV test to younger adolescents:

Except when the child is positive, that is when we involve the parent. But when we are giving out results, we say, 'Your blood is clean,' which means a lot to many. So he will go and say, 'Mummy, my blood is clean.' . . . If you say 'clean' they will understand that they are negative. (Bulawayo, Zimbabwe)

For older adolescents (ages 15 and over), more details on HIV testing and linkage to care were explained because providers believed that they would be able to understand more. For men who tested positive, providers expressed feeling conflicted about how to disclose this – to wait for the parents to come often meant holding off on disclosure for several days, if the parent could travel to the site at all. For some sites, the schools brought the adolescents; while parents provided consent for VMMC, they were not necessarily there for the procedure itself. Waiting for the parents to be present also meant a delay in treatment, which the providers wanted to avoid. One provider in Zimbabwe said that they called the parents if this was the case, but giving such news by phone was not considered ideal. Sometimes, in these instances, the adolescent still did not return for treatment because the clinic was too far away.

In Tanzania, regardless of age, the consensus among providers was to relay the HIV test results directly to the

adolescent if the client was sexually active. For younger adolescents and those with unknown sexual experience, they preferred to do the HIV testing with the parent/guardian present. This also presented an opportunity to test the parent, given a high likelihood the HIV was transmitted prenatally. In South Africa, providers included parents in the HIV testing for very young adolescents (10–12 years); for older adolescents, the providers left it up to the clients' preferences.

Discussion

VMMC represents a potential opportunity to engage adolescent males in positive interactions with the healthcare system and instill HIV preventive behaviors. Results from this study, however, suggest the HIV counseling young adolescent males receive as part of the VMMC service is suboptimal, especially for younger adolescents (under age 15). In some instances, adolescents thought that they were required to receive HIV testing to proceed with VMMC, which is counter to the opt-out testing stressed in the VMMC guidelines. In addition, although guidelines state that all clients should be given messages about VMMC's partial protection, ways to further protect oneself from HIV, demonstration and distribution of condoms, and referral to treatment, adolescents are often not receiving the full package of information or are not sufficiently remembering it long term after the procedure. This presents a missed opportunity to fully inform a generation of young men about engaging in HIV risk reduction and build their behavioral intentions for the future. The data also suggest that providers need better training on how to relay this information in a way that is well understood by all age groups and that is memorable for young clients undergoing what may be a frightening medical procedure. Furthermore, there should be adherence to recommendations that all VMMC clients receive the complete package of services, regardless of age. This may have to be considered in tandem with national policies that sometimes restrict sexual education for young adolescents (ages 10–12) in primary schools.

These findings are consistent with a recent observational study in Tanzania, which showed that compared with adults, older adolescents were less likely to be exposed to messages regarding partner faithfulness, partner reduction, or condom demonstrations in group education sessions. Although these messages were more common in individual counseling sessions, delivering such content in a group was suspected to be tempered when the groups had a mix of adolescent ages [25]. A qualitative study among South African youth (12–24 years) revealed that they felt clinic staff provided inappropriate HIV-testing services for youth [26]. A systematic review of effective approaches to reducing HIV risk among adolescents

suggested making health services more youth oriented (including accessible hours, privacy, and staff trained specifically to work with adolescents) [27]. In addition, youth-friendly services may link adolescents to a variety of other adolescent health services [28,29]. The timely prevention and treatment of STIs and HIV for adolescents is especially critical when considering the potential health and cost implications of delayed care or treatment [30].

Of further concern is the inconsistency with which HIV test results are shared with adolescent clients as well as the incomplete information provided through counseling, which is an essential part of the testing experience. Equally troublesome is the variation in linkage to care and potential delays in treatment initiation for HIV positive adolescents. The loss of HIV positive adolescent clients from the healthcare system is unknown in cases in which a parent is not reachable or present when a positive diagnosis is shared. In such circumstances, it is unclear if or when the adolescent may seek care again or begin treatment. This is an area that requires further exploration.

There are limitations to this study. Qualitative data, by nature, are not generalizable beyond the included participants, who were located using convenience sampling. This study also did not account for cultural differences between countries or sites within countries but rather focused on the counseling as prescribed by WHO for adolescent VMMC clients. Additional quantitative data on the experiences of a larger number of adolescents are needed to determine the frequency of these findings; this study was not designed or intended to quantify the extent or magnitude of between-country differences. Furthermore, the adolescent participants were interviewed several weeks after the procedure to allow for the full healing time and any follow-up appointments to pass. However, this could have affected recall of counseling content, especially given the fact that they are young, and the counseling occurred just before what could have been an anxiety-provoking medical procedure. It is unclear if the content they recalled (or neglected to recall) was actually in line with what was presented by the providers. The providers also may have experienced difficulties in recall or presented themselves in a positive light during the interviews, which could have resulted in bias regarding the content they reported relaying to adolescent clients. Regardless, we still saw gaps in the full counseling package as reported by the counselors themselves. This study highlighted inconsistencies in messages and approaches used during VMMC counseling for the sampled adolescents, information that can be used to improve services for this group of men.

In conclusion, VMMC is an effective HIV prevention strategy, and complete and consistent HIV counseling and testing practices that accompany it are vital for reaching a

generation of young men with a full package of HIV prevention and treatment services. This study suggests that VMMC is an opportunity that has yet to be taken full advantage of in the quest to protect the current generation of young men and their female partners from HIV.

Acknowledgements

The authors would like to acknowledge the contributions of the Technical Advisory Group for the adolescent voluntary medical male circumcision (VMMC) assessment. We are privileged to work with this group of dedicated professionals from the U.S. President's Emergency Plan for AIDS Relief, Centers for Disease Control and Prevention, Department of Defense, WHO, United Nations Children Fund, and the Bill and Melinda Gates Foundation.

Conceived and designed the study: M.R.K., L.M.V.L., K.H., A.V.M., M.E.F., E.N., K.S.A., G.N., G.L., C.B., and A.A.R.T. Contributed to coding: M.R.K and K.H.D. Analyzed the data: M.R.K., K.H.D., L.M.V.L., and A.A.R.T. Contributed materials: M.R.K., K.H.D., L.M.V.L., K.H., W.M., C.K., L.M., E.U.P., and A.A.R.T. Contributed to writing the article: M.R.K., K.H.D., L.M.V.L., and A.A.R.T. Contributed editorial comments: K.H., W.M., C.K., L.M., A.V.M., E.U.P., M.E.F., E.N., K.S.A., G.N., G.L., and C.B. Agree with manuscript results and conclusions: M.R.K., K.H.D., L.M.V.L., K.H., W.M., C.K., L.M., A.V.M., E.U.P., M.E.F., E.N., K.S.A., G.N., G.L., C.B., and A.A.R.T.

The preparation of this article was facilitated by United States Agency for International Development Cooperative Agreement no. AID-OAA-A-12-00058 to the Johns Hopkins Center for Communication Programs. The findings and conclusions in this article are those of the authors and do not necessarily represent the official positions of the United States Government or any other affiliate organizations or institutions.

Conflicts of interest

There are no conflicts of interest.

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