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BRIEF REPORT

Male Circumcision Coverage, Knowledge, and Attitudes After 4-Years of Program Scale-up in Rakai, Uganda

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Abstract We assessed medical male circumcision (MMC) coverage and knowledge and attitudes toward MMC adoption in men in Rakai, Uganda after 4 years of scale-up. MMC prevalence only reached 28 %, with an annual increase of 4 %. Prevalence was lower in men not using condoms or having never received HIV testing and counseling. Over 95 % of uncircumcised men knew the health benefits of and places offering MMC, but only 27 % were willing to adopt MMC. Main reasons for non-acceptance were fear of pain or injury. The data suggest MMC uptake in Rakai has been suboptimal and demand generation is key for scale-up.

Keywords Male circumcision · HIV prevention · Demand creation · Reproductive health service underutilization in men

Introduction

Medical male circumcision (MMC) is an important HIV prevention strategy in sub-Saharan Africa (S-SA), and population level impact on HIV incidence depends on MMC coverage and the age/risk profile of MMC acceptors. In 2007, WHO/UNAIDS recommended that MMC be promoted as an "additional, important strategy for the prevention of heterosexually-acquired HIV infection in men", and thirteen S-SA countries with generalized HIV epidemic and low prevalence of MMC, were identified as priority countries for MMC scale-up [1]. In late 2011, WHO/UNAIDS set the strategic goal of achieving "MMC prevalence of at least 80 % among 15–49 year old males" by 2016 in the priority countries [2]. Uganda as one of the priority countries launched its "Safe Male Circumcision" policy at the end of 2010, and the national target was to increase prevalence of MMC to 80 % by 2015 [3]. Reaching this goal requires monitoring and evaluation of MMC scale-up to assess program performance, identify subgroups with low MMC coverage, and investigate barriers to MMC uptake. Such knowledge will facilitate development of targeted strategies to increase MMC coverage.

Rakai district in southern Uganda has been historically an epicenter of the HIV epidemic. Before 2003, prevalence of MMC among non-Muslim men (who represent about 85 % of all Rakai men and traditionally do not practice MMC) was about 4 %, and men were mostly circumcised for medical indications [4]. During 2003–2006, the Rakai Health Sciences Program (RHSP) conducted two MMC trials (one in HIV-negative men and the other in HIV+ men) [5, 6], and MMC prevalence reached 12 % at trial completion [7]. The health benefit of MMC for prevention of HIV was then widely disseminated and free MMC services were provided and promoted in Rakai in early 2007. To evaluate MMC scale-up progress and inform subsequent scale-up effort, we assessed MMC coverage in the general population and by men's sociodemographic characteristics, risk profiles and HIV status after ~4 years of MMC scale-up in Rakai. For uncircumcised men, we also

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assessed their knowledge of and attitudes toward future MMC adoption, and self-perceived barriers to MMC uptake.

Methods

With PEPFAR funding, RHSP has been the primary provider of free MMC services for the general male population in Rakai district. MMC is performed by trained clinical officers at a central facility, four satellite facilities and mobile camps throughout Rakai, and is provided free to consenting males aged 13 and older. Population level data are available from the Rakai Community Cohort Study (RCCS) which conducts approximately annual surveillance in 50 rural Rakai communities [8]. In each survey round, RCCS first conducts a census of all households and identifies residents aged 15–49 years, who provide consent for interview by trained same-sex staff who collect detailed sociodemographic and behavioral information using structured questionnaires. Blood samples are collected for rapid HIV testing in the field, and positive results are confirmed with two EIAs and Western blot and/or PCR. Approximately 94 % of the age eligible RCCS residents present at time of the survey agree to be interviewed, and of these, over 96 % provide biologic samples. Men were asked whether they were circumcised and their knowledge about the benefits of MMC, including reduced risk of HIV/STIs and improved hygiene, and where they could obtain MMC. Circumcised men were also asked when (during infancy [age $\leq$2 years], adolescence/youth [13–20 years], or adulthood [>20 years]), and where they received the procedure. For uncircumcised men, questions were asked about their attitudes toward adopting free MMC in the future and reasons for not accepting MMC.

This analysis used data from the completed survey conducted in late 2010–2011 which was about 4 years since general MMC services became available. The analysis population was confined to 5,606 non-Muslim men since all Muslim men (who represent $\sim$15 % of the Rakai population) are circumcised as infants and are not target for MMC scale-up. Using log-binomial models, we estimated the MMC prevalence risk ratios (PRR) by men's sociodemographic characteristics, sexual behaviors, self-perceived exposure to HIV, uptake of voluntary HIV counseling and testing (VCT), and HIV status. Multivariate analysis was also conducted to estimate the age-adjusted MMC PRRs. Additionally, for uncircumcised men, knowledge about the benefits of MMC and sources of MMC and attitudes toward MMC adoption were tabulated. Reasons for unwillingness of MMC adoption were further summarized.

Results

After $\sim$4 years scale-up, MMC prevalence among the non-Muslim men was 28.8 % (1,616/5,606), suggesting an annual increase of $\sim$4 % when compared to the 12 % prevalence at trial completion and before service scale-up.

Table 1 summarizes MMC prevalence by men's sociodemographic characteristics, sexual risk behaviors, self-perceived exposure to HIV infection, uptake of VCT and HIV infection status. MMC prevalence was higher among men aged 25–29 years and among men with no religious affiliation. MMC was lower in students, office clerks, teachers or medical workers in univariate analyses, but there were no statistically significant differences by occupation after controlling for age. MMC prevalence was also higher in men reporting multiple partnerships or having non-marital sexual relationships, but lower in men who did not use condoms in the past year. Higher self-perceived risk of exposure to HIV was also associated with higher MMC prevalence. VCT uptake was significantly associated with MMC prevalence where men who had never received HIV counseling and testing had significantly lower MMC prevalence. In addition, there was no association between MMC prevalence and HIV status.

We further examined knowledge about MMC and attitudes toward future MMC adoption among uncircumcised men ($N = 3{,}990$). 96.9 % of these men recognized that MMC conferred one or more health benefits. Specifically, 76.2 % men agreed that MMC reduces risk of HIV acquisition; 61.4 % men agreed that MMC prevents STIs, and 49.0 % thought MMC improved hygiene. Moreover, 95.2 % uncircumcised men indicated that they knew where to obtain circumcision services, and 82.6 % specified the Rakai Health Sciences Program.

Uncircumcised men were further asked about the acceptability of free MMC: 27.3 % men indicated their willingness to adopt the procedure in the future, 46.5 % were undecided/unsure (including 1.7 % men who left the decision to their parents) and 26.3 % men were unwilling to accept the procedure even it is offered free. Among the men who rejected MMC, the main reasons for non-acceptance (there may be multiple reasons) included fear of pain (66.3 %) and injury (45.8 %). 12.1 % of these men did not think they were at risk of HIV infection, and 5.5 % men thought it was against their traditional or religious beliefs. Additionally, $N = 130$ men reported non-acceptance with self-elected reasons such as that circumcised men may still get HIV, their partner objected to MMC, concern of reduced libido or sexual satisfaction, men were too busy for surgery, or they were already HIV infected.

Table 1 Male circumcision prevalence by men's sociodemographic characteristics, sexual risk behaviors, self-perceived exposure to HIV infection, uptake of HIV testing and HIV infection status after ~4 years of MMC scale-up in Rakai

	No. of uncircumcised men/total	MMC prevalence (%)	PRR	95 % CI	Age adjusted PRR	95 % CI
Age						
15–19	244/1,246	19.6	Ref			
20–24	249/866	28.8	1.47	(1.26–1.71)		
25–29	319/906	35.2	1.80	(1.56–2.07)		
30–39	529/1,675	31.6	1.61	(1.41–1.84)		
40–49	275/913	30.1	1.54	(1.32–1.79)		
Education						
No education	46/178	25.8	Ref			
Primary	1,000/3,559	28.1	1.09	(0.84–1.40)	1.16	(0.90–1.50)
Secondary and higher	570/1,869	30.5	1.18	(0.91–1.53)	1.26	(0.97–1.63)
Marital status						
Never married	498/2,118	23.6	Ref			
Currently married	1,004/3,077	32.6	1.39	(1.27–1.52)	1.11	(0.97–1.28)
Divorced/Widowed	114/411	27.7	1.18	(0.99–1.40)	0.96	(0.79–1.18)
Occupation (categorized by risk of HIV infection)						
Agriculture for home use or sale	631/2,107	30.0	Ref			
Students, office clerks, teachers medical workers, housekeeper	307/1,303	23.6	0.79	(0.70–0.88)	0.98	(0.86–1.11)
Trading/vending, bar workers, construction workers, truckers	487/1,569	31.0	1.04	(0.94–1.14)	1.03	(0.93–1.13)
Unemployed or casual labor	191/627	30.5	1.02	(0.89–1.16)	1.00	(0.88–1.15)
Religion						
Catholic	1,096/3,953	27.7	Ref			
Non-Catholic (Protestant, Pentecostal or none)	520/1,653	31.5	1.13	(1.04–1.24)	1.12	(1.02–1.22)
Number of sex partners in the past year						
0	239/1,292	18.5	Ref			
1	777/2,573	30.2	1.63	(1.44–1.86)	1.43	(1.23–1.67)
≥2	600/1,741	34.5	1.86	(1.63–2.12)	1.61	(1.37–1.90)
Currently having a non-marital sex relationship						
No	1,121/4,126	27.2	Ref			
Yes	495/1,480	33.5	1.23	(1.13–1.34)	1.18	(1.08–1.29)
Condom use in the past year[a]						
Always	189/566	33.4	Ref			
Sometimes	535/1,562	34.3	1.03	(0.90–1.17)	0.97	(0.83–1.11)
Never	653/2,185	29.9	0.90	(0.78–1.02)	0.85	(0.74–0.98)
Self-perceived risk of HIV exposure						
Unlikely	600/2,409	24.9	Ref			
Likely	849/2,139	28.4	1.14	(1.04–1.25)	1.05	(0.96–1.16)
Ever received HIV counseling and testing						
Yes	1,424/3,913	36.4	Ref			
No	192/1,693	11.3	0.31	(0.27–0.36)	0.31	(0.27–0.36)
Received HIV test result in the past year						
Yes	726/1,876	38.7	Ref			
No	890/3,730	23.9	0.62	(0.57–0.67)	0.65	(0.59–0.70)
HIV infection status						
Negative	1,301/4,840	26.9	Ref			
Positive	145/528	27.5	1.02	(0.88–1.18)	0.94	(0.81–1.09)

PRR prevalence risk ratio, *CI* confidence interval, *Ref* reference group

[a] Among sexually active men

Discussion

Prior to the Rakai MMC trials, ~4 % of non-Muslims in Rakai were circumcised and surveys suggested 59 % of non-Muslim men would be willing to accept MMC [9]. During the MMC trials, enrollment was rapid and compliance was high: 94 % men randomized to the immediate circumcision arm received the procedure as scheduled [5]. Moreover, after trial closure, 81 % of the control arm men accepted MMC within 3 years [10]. However, in the general RCCS communities where most men did not participate in the trials, our current data suggest MMC uptake after 4 years of scale-up has been slow, despite the wide dissemination of the proven health benefits through community mobilization and provision of free services through multiple outlets in the district. With the current rate of uptake, the program is unlikely to reach UNAIDS/WHO's goal of 80 % coverage. Similar slow uptake has been observed by MMC programs in other priority countries where MMC was not traditionally practiced [11].

Higher MMC coverage in RCCS was observed in the age group 25–29 after 4 years of scale-up. This however may not suggest men of sexually active ages were more likely to be the early adopters compared to younger adolescent boys. As observed by MMC programs in other parts of S-SA, younger adolescent boys are disproportionately overrepresented among MMC clients in Rakai service programs [3]. Similarly, higher MMC coverage in men with multiple partnerships does not suggest that higher risk men were more likely to adopt MMC, as the possibility of risk compensation associated with MMC could not be ruled out with the cross-sectional data [12]. Because MMC coverage is still suboptimal for this risk group, scale-up needs to target these higher risk men.

Men who remained uncircumcised had good knowledge about the health benefits of MMC and were aware of the free services. Only a minority were unwilling to accept MMC in the future. These data suggest the existence of the KAP gap, i.e. the situation where good knowledge (K) and positive attitudes (A) do not necessarily translate to innovation adopting practice (P) [13]. Therefore, men need to be motivated to adopt MMC, and demand generation is critical. While MMC scale-up involves a myriad of political, cultural and financial considerations and attention has been mainly focused on supply and accessibility of the service [1], our data and experiences from other MMC programs indicate that demand creation in men should also be a key component in MMC scale-up [14]. The data showed that fear of pain and injury were major barriers to MMC adoption in Rakai, thus information campaigns emphasizing the low adverse event risk and using MMC adopters with satisfactory experience as peer mobilizers may be of value.

Promoting MMC is not recommended in HIV-infected men, and there was a concern that HIV + men may seek for MMC to conceal their infection status [1]. However, acceptance of MMC did not differ between the HIV infected and uninfected, and some men reported unwillingness to accept MMC because they were already infected, suggesting that MMC was not used by HIV-infected men to mask their infection status in Rakai.

Higher MMC prevalence was observed among men who had received voluntary HIV counseling and testing (VCT). This is expected since all men who came for MMC were offered VCT. Additionally we observed that MMC prevalence was higher among men reporting use of condoms, suggesting that health conscious men may be more likely to adopt multiple HIV preventive measures, or because men with low self-perceived HIV infection risk did not feel the need for MMC. A limitation of this study was that MMC status was self-reported and thus may be subject to reporting bias. However, our earlier study reported high accuracy of self-reported MC status [15].

Men's involvement in HIV prevention plays a pivotal role in curtailing the epidemic [16], yet earlier evidence from Rakai and other parts of Africa have repeatedly shown under-utilization of HIV preventive or care services in men [17–19]. There has been increasing recognition of the importance of targeting men in prevention and treatment [16]. The association between the under utilization of multiple HIV preventive services in men here suggests that MMC scale-up programs may provide an efficient entry point to engage men in adoption of other HIV preventive services including HIV testing and counseling, condom use, family planning, and HIV care and treatment for HIV-positive men. Interventions for MMC demand creation thus may induce use of other HIV prevention services in men. Modeling studies have shown the potential high cost-effectiveness of successful MMC scale-up in S-SA [20]. Integrating promotion of other HIV preventive services into MMC scale-up programs may further facilitate implementation of combination HIV preventions, maximizing the public health and economic impact of MMC scale-up.

In summary, we assessed MMC coverage in non-Muslim men in Rakai after ~4 years of scale-up. Our data indicate that MMC uptake was suboptimal in Rakai, and demand creation, particularly targeting high risk men is key for subsequent scale-up. The positive association between low use of multiple HIV prevention services in men suggest MMC programs may serve as a core component in implementation of combination HIV preventions in Rakai and other similar settings in priority countries.

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M. Serwadda D and Gray R designed and lead the field work in data collection. Lutalo T and Ssekasanvu J coordinated the data cleaning and management. This research is based on funding from the Bill and Melinda Gates Foundation, the National Institute of Allergy and Infectious Diseases, and a faculty grant from the Johns Hopkins University Center for Global Health for Kong X.

Conflict of interest The authors claim no conflict of interests.

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