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Male Circumcision for HIV Prevention: Clinical Practices and Attitudes among Healthcare Providers in South Africa and Zimbabwe

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Abstract

Background—This study aimed to document the clinical practices and attitudes of healthcare providers in South Africa and Zimbabwe on male circumcision for HIV prevention.

Methods—We conducted national surveys of physicians and nurses in both countries in 2008–2009 (N=1,444). Data on male circumcision for HIV prevention was analyzed; outcomes were patient counseling, provision of services, and desire for training. We used multivariable logistic regression to examine associations between these outcomes and clinician, practice and attitudinal variables.

Results—Overall, 57% of clinicians reported counseling male patients on male circumcision, 17% were offering services (49% referrals), and 61% desired training. In the multivariable analyses, provision of services was more common in South Africa (P .001), but desire for training higher in Zimbabwe (P .01). Provision of services was highest among physicians (p .01) and in hospital settings (P .001). However, nurses had greater desire for training (P .05) as did younger clinicians (P .001). Clinicians in rural and clinic settings were just as likely to express training interest. Clinician attitudes that patients would be upset due to cultural beliefs and would increase risky behaviors were associated with less counseling and service provision (P .05).

Conclusions—Many clinicians in South Africa and Zimbabwe showed willingness to integrate new HIV prevention evidence into practice and to become trained to offer the procedure to patients. Results suggest that both countries should consider involving nurses in male circumcision

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for HIV prevention, including those in rural areas, and should help clinicians to address cultural concerns.

Keywords

Male circumcision; HIV prevention; Clinician practices; Zimbabwe; South Africa

Introduction

Evidence from several high-quality studies shows that male circumcision protects against human immunodeficiency virus (HIV), as well as other sexually transmitted infections (STIs). Between 2005 and 2007, results from randomized controlled trials held in South Africa, Uganda and Kenya indicated that male circumcision reduces the risk of heterosexually-acquired HIV among men by 50-60%.^{1,2,3} The South Africa and Uganda trials also found that male circumcision reduces men's risk of human papillomavirus (HPV) and herpes simplex virus type 2 (HSV-2).^{4,5} Emerging evidence indicates that male circumcision may benefit the female partners of circumcised men as well, offering partial protection against acquisition of genital ulcers, trichomonas, bacterial vaginosis, cervical cancer and HPV.^{6,7,8}

In response to this evidence, the World Health Organization and the United Nations Joint Programme on HIV/AIDS issued a joint statement recommending that male circumcision be integrated into existing HIV prevention programs.⁹ A total of 13 Southern and Eastern African countries with generalized heterosexual epidemics, including Zimbabwe and South Africa, have since been designated priority settings for the scale-up of services, and are now planning or implementing the roll-out of services.¹⁰ In Zimbabwe an estimated 14% of the population is infected with HIV and only 10% of adult males have been circumcised. In South Africa HIV prevalence is estimated to be 18% and male circumcision prevalence 35%, although there is substantial regional and ethnic variation in circumcision practices.¹⁰

Both countries have made recent progress in policy formulation and planning for implementation of male circumcision services. In Zimbabwe, a five-year national strategy and implementation plan was completed in 2010 with the overall goal of circumcising 80% of adult men (ages 15-45) and newborn males by 2015. In South Africa, draft strategy and implementation guidelines have been developed and two clinician training centers established, with training about to begin.¹⁰ In both settings, however, service delivery progress has been slow. At the end of 2010, South Africa was just 3.4% of the way towards its goal of circumcising 80% of males ages 15-49, having provided 145,475 of the 4.3 million procedures needed. Zimbabwe was less than 1% of the way towards this same goal, having provided 13,977 of the 1.9 million procedures needed. In order to increase the pace of progress, there are important financial, cultural and human resource constraints that will need to be addressed.¹¹

Among these, the challenge of finding and training clinicians for provision of male circumcision has been identified as the most formidable barrier to implementation of services.^{12,13} This task is complicated by the general dearth of clinicians throughout the developing world.¹⁴ In sub-Saharan Africa there is an estimated need for an additional one million health workers.^{15,16} As a consequence, the successful implementation of male circumcision services will require the involvement of as many medical providers as possible, including non-physician clinicians such as nurses and clinical officers. Well-trained non-physician clinicians in developing countries have proven capable of carrying out many complex medical procedures, including a long list of reproductive health services such as caesarian sections, obstetric fistula repair, minilaparotomy for female sterilization, no-

scalpel vasectomy, IUDs and implants, manual vacuum aspiration abortion, and cryotherapy for cervical pre-cancer.^{17,18,19} There is now emerging consensus within the international health community that male circumcision should be added to this list.^{20,21,22,23}

An understanding of the male circumcision-related practices and attitudes of clinicians in high HIV prevalence settings could provide critical guidance for the clinical changes needed, and help to maximize provider involvement in training and implementation efforts. The conceptual framework that guided our research was Diffusion of Innovation Theory, which notes that the rate of clinician adoption of healthcare innovations can be extremely slow, and may falter, if the innovations remain confined within a small group of “early adopters” in a given setting.²⁴ Information on how clinician characteristics are associated with adoption of new innovations can help facilitate their subsequent diffusion.²⁵ Consistent with this need, the aim of this research was to better understand clinician factors related to provision of male circumcision in two Southern African settings, South Africa and Zimbabwe.

Materials and Methods

We conducted national probability surveys of clinicians in South Africa and Zimbabwe as part of a larger, multi-country investigation of clinician practices in pregnancy and HIV/STIs prevention in Southern Africa and the United States. The surveys had core elements in all countries, as well as country-specific sections, and were developed from a review of the literature, formative qualitative research, and input from community advisory groups.^{26,27} The surveys were pilot-tested in both countries and the final instruments included questions on clinicians’ demographic and professional practice characteristics, patient population, and contraceptive and HIV/STI attitudes and practices. They also included a component on male circumcision for HIV prevention.

Sample selection consisted of a multistage, facility-based approach in which first districts were selected, then facilities from within those districts, and clinicians from within those facilities. We constructed a national listing of facilities in Zimbabwe and relied on government data for South African facilities. Districts were randomly selected with probability proportional to size, based on the estimated number of physicians and nurses. In Zimbabwe, 15 of the country’s 63 districts were randomly selected for study inclusion and in South Africa, 12 of 52 districts. Within the selected districts, a random sample, stratified by hospital and clinic facilities, proportional to size was selected. Facilities were eligible if they had at least one practitioner offering family planning or HIV/STI services. The final sample of eligible facilities consisted of 78 hospitals (48 from Zimbabwe, 30 from South Africa), and 187 clinics (87 from Zimbabwe, 100 from South Africa). Participating facilities included 75 hospitals (46 or 96% in Zimbabwe and 29 or 97% in South Africa) and 166 clinics (79 or 91% in Zimbabwe and 87 or 87% in South Africa). Principal reasons for non-participation were that the facility could not be contacted or refused, in most cases due to time constraints.

Following facility selection, research staff contacted each site to confirm eligibility and obtain permission to recruit providers. All clinicians who provided family planning or HIV/STI services were considered eligible and invited to participate in the survey. Clinicians were ineligible if they were retired, inactive, or out of the country at the time of the study. The final sample comprised 1,972 physicians and nurses (953 from Zimbabwe and 1,019 from South Africa).

Data were collected in 2008-2009 with a self-administered questionnaire that was distributed and retrieved in-person at facilities in Zimbabwe. In South Africa, a larger country, surveys

were primarily administered over the telephone due to the prohibitive cost of in-person visits. Respondents in Zimbabwe received a pen in appreciation for their time and respondents in South Africa chose a local charity for a donation of approximately \$10 (70,00 Rand), by advice from local advisors. The study was approved by the Medical Research Council of Zimbabwe, the University of KwaZulu-Natal Biomedical Research Ethics Committee, the Western Institutional Review Board, and the University of California, San Francisco Committee on Human Research.

Survey measures

There were three primary outcomes to measure clinician practice: counseling on male circumcision with male patients, provision of services (or referrals), and desire for training. To assess the frequency of counseling, we used a four-point scale (never, sometimes, usually, always). A separate item captured the frequency of counseling with female patients related to their male partners. For service provision the possible response categories were services, referrals, or no services/referrals. To assess desire for training we used a three-point scale (no, not sure, yes).

We examined the variation in each outcome variable (counseling, provision of services and desire for training) by clinician characteristics, practice setting and patient-related variables (see Table 1). We also assessed clinician attitudes about their patients by asking whether they agreed with a series of statements related to male circumcision (no, yes, not sure): Patients will be upset about male circumcision due to cultural beliefs; they will worry about what their partner thinks; they won't want the surgical procedure; they will increase risky behaviors; and they won't abstain from sex during post-operation recovery. For analysis, we re-coded these attitudinal variables no vs. yes/not sure. We examined two attitudinal measures of clinician HIV prevention practices (perceived effectiveness of condom counseling for male patients and perceived effectiveness of abstinence counseling for male patients). Both variables were re-coded for analysis from 10-point likert scales to variables with three response categories (low, medium, high) (Table 2).

Analysis

To analyze the frequency of clinician counseling of male patients on circumcision for HIV prevention as well as interest in training, we used ordered logistic regression for ordinal response data.^{28,29} For the provision of male circumcision services or referrals, we used multinomial logistic regression for nominal response data. In these analyses the reference group was those not providing any male circumcision services or referrals, as compared with 1) those providing services and 2) those providing referrals.^{28,29} For all analyses, we present results from two final models: the first accounting for clinician, patient and practice characteristics, and the second assessing the contribution of clinician attitudes related to male circumcision and other HIV prevention practices. Gender was not included with clinician type in multivariable analyses due to overlap of female and the nursing profession.

The analysis population for each outcome includes participants with data on that outcome variable. To address missing data in 15 independent variables, we utilized multiple imputation with 20 imputation cycles. Multiple imputation is a simulation-based statistical technique that involves three steps: 1) imputation of missing data for a specified number of imputation cycles, 2) completed data analysis for each imputation cycle, and 3) pooling of results from the completed data analyses.³⁰ Use of multiple imputation requires less stringent assumptions about the random nature of missing data than are required for deletion of incomplete cases, and averts the problem of biased estimates that results from adding a "missing data" category for each variable included in the models.³¹ In our data, the rate of missing observations ranged from 1.0% to 5.4%. We used the data augmented by imputation

for our final analyses and compared these results with those using the original data. For all three outcomes, the results obtained using the augmented data were largely consistent with those from the original data.

All multivariable analyses adjust for the facility-based sampling scheme through accounting for the clustered data collection. We also conducted analyses separately by country to check results. Data were analyzed using Stata/SE 11.1 and reported differences are significant at the $P < 0.05$ level.

Results

Completed surveys were received from a total of 1,444 respondents, (830 in Zimbabwe and 614 in South Africa), yielding a clinician response rate of 73%. In Zimbabwe physicians were more likely to respond than nurses (100% v. 87%; $p = .05$) and so were those in hospital settings as compared with those in clinics (92% v. 81%; $p = .001$). In South Africa, there was no difference between hospitals and clinics (61% v. 60%; $p = .63$), although nurses were more likely to respond than physicians (66% v. 39%; $p = .001$).

Table 1 presents clinician, practice, and patient-related characteristics. The majority of respondents (72%) were advanced nurses with three or more years of nursing education and training. Eight percent (117) were physicians, reflecting the large share of healthcare provided by nurses. Most (80%) were trained in HIV/STI prevention. Just under one-half (45%) were practicing in urban locations, 37% in rural locations, and the remaining 19% in small town or peri-urban locations. Nearly all (99.5%) reported serving low-income populations. The vast majority (84%) reported provision of voluntary counseling and testing (VCT) services, which was slightly higher in Zimbabwe (88%) than South Africa (79%). Nearly all (>99%) reported serving HIV positive patients, as well as those at risk of acquiring HIV/STIs. Provision of universal condom counseling was higher in South Africa than Zimbabwe (69% versus 40%).

Table 2 presents male circumcision-related practices and attitudes. Provision of counseling was high given the recency of the evidence at the time of the survey. More than half of clinicians (57%) reported discussing male circumcision for HIV prevention with male patients, and for 18% it was a routine practice (usually or always). A slightly lower proportion (46%) reported discussing male circumcision with female patients related to their male partners. One-half of respondents (49%) were offering male circumcision referrals, but only 17% were offering services. Desire for training was high, however, with 61% of clinicians indicating they would like training (See Figure 1). Routine discussion (usually/always) about circumcision with male patients was nearly twice as high in South Africa (25%) as in Zimbabwe (13%). There were similar differences in service provision (22% in South Africa versus 14% in Zimbabwe). In contrast, clinician desire for training was higher in Zimbabwe (66%) than in South Africa (55%).

There were large differences in provision of male circumcision by professional training, practice location and setting. While 56% of physicians reported providing services, only 14% of nurses did. Provision was twice as high in urban areas (23%) as in rural (11%), and was predominantly offered in hospitals (30%), as compared to clinics (2%). Nurses had greater interest in training than physicians (62% versus 49%), while training interest in clinic settings (58%) and hospitals (63%) was similar, and interest in rural areas (59%) was almost as high as urban areas (63%).

Responses to the male circumcision attitudinal variables reflect considerable uncertainty about whether patients would seek male circumcision services if they were to become available (Table 2). About one-third of respondents (31%) agreed with the statement that

patients will be upset about male circumcision due to cultural beliefs, 44% agreed that patients will worry about what their partner thinks, and 35% agreed that patients won't want the surgical procedure. Furthermore, results suggest that clinicians have concerns about possible increased exposure to HIV/STIs as a result of the procedure. Forty-three percent agreed that circumcision patients will increase risky behaviors, and 27% agreed that patients won't abstain from sex during post-operation recovery. Clinicians in Zimbabwe expressed higher levels of concern about partners, the surgical procedure, and increase in risky behaviors.

Counseling on male circumcision with male patients

Table 3 presents results from ordered logistic regression analyses of factors associated with the frequency of male circumcision counseling with male patients. Interestingly, professional training and practice-related factors were not associated with variations in patient counseling, although clinician attitudes about their patients were. The model with clinician attitudes shows associations between less counseling and attitudes that patients will be upset about circumcision due to cultural beliefs (OR=0.53, CI 0.41-0.67), patients won't want the procedure (OR=0.53, 95% CI 0.41-0.70), patients will increase risky behaviors (OR=0.60, 95% CI 0.46-0.78), and patients won't abstain from sex during post-operation recovery (OR=0.73, 95% CI 0.56-0.95). In addition, greater counseling was associated with other HIV prevention attitudes and practices: high perceived effectiveness of abstinence counseling with males (OR=2.0, 95% CI 1.40-2.87) and provision of condom counseling for most/all patients (OR=1.4, 95% CI 1.09-1.94).

Provision of services

Table 4 presents results from multinomial logistic regression analyses of the factors associated with provision of male circumcision services or referrals. Results represent the relative probability of providing male circumcision services (or referrals) as compared with the reference category of no services or referrals. Clinician factors that were insignificant for provision of patient referrals were highly significant for provision of services. Service provision was higher among physicians as compared with mid-level nurses (Relative risk ratios, RRRs, close to 4), among clinicians with a high proportion of patients at risk of HIV (RRRs=2) and in South Africa as compared with Zimbabwe (RRR close to 7). Service provision was still far lower in clinics than in hospitals (RRR=0.06). Attitudes, however, were significant for both referrals and services. Clinician perceptions that patients would be upset about circumcision due to cultural beliefs (RRR=0.51), or that they would increase risky behaviors as a result of the procedure (RRR=0.49), were associated with lower provision, as was the belief that condom counseling for male patients was highly effective (RRR=0.69).

Similar to the results for provision of services, the relative probability of providing referrals was about seven times as high in South Africa as in Zimbabwe. However, it was similar among physicians and nurses, about twice as high among those who worked in clinics as compared with hospitals, and about 1.6 times as high among those providing VCT services. The likelihood of providing referrals was lower among clinicians who thought that patients would be upset about male circumcision due to cultural beliefs (RRR=0.67), and those who thought that patients wouldn't abstain from sex during post-operation recovery (RRR=0.71).

Interest in male circumcision training

Table 5 presents results from ordered logistic regression analyses of factors associated with the frequency of clinician communication with male patients about male circumcision for HIV prevention. The adjusted odds of training interest were higher in Zimbabwe, among mid-level nurses as compared with physicians, and for younger clinicians. Lastly, the odds

of desiring training were about 30% lower among clinicians who thought that patients would be upset about male circumcision due to cultural beliefs (Table 5).

For all three outcomes, we tested country-level interactions between training in HIV/STIs and provider types. The interactions were insignificant in all models with two exceptions, both of which were multinomial models comparing provision of services to no services/ referrals. In the first, the relative probability of service provision was lower among clinicians trained in HIV/STIs from South Africa as compared with those from Zimbabwe; and in the second, it was lower among physicians from South Africa as compared with those from Zimbabwe.

Discussion

To our knowledge, this is the first study to examine factors associated with the male circumcision practices and attitudes of clinicians in the Southern Africa Region, and to assess training interest among national samples of clinicians. It is encouraging that more than half (57%) of clinicians were counseling male patients on male circumcision and half (49%) were providing referrals at the time of the survey, since both countries were still planning for the roll-out of services and national strategies and guidelines were not yet in place. While this method of HIV/STI prevention is already beyond the stage of “early adopters”, service provision remains limited and concentrated in the highly specialized services delivered at hospitals and by physicians. These results show great potential for the diffusion of innovation to nurses and those in clinic settings, as well as outside of urban areas.

Clinical training

There was considerable training interest among nurses in both countries (57% of clinicians in South Africa and 66% in Zimbabwe), with no significant differences between the nurse types, or by practice location or setting. Our results show mid-level and advanced nurses are already playing an important role in counseling patients and offering referrals, and that both should be considered for future training in service provision. They could help ameliorate human resource constraints associated with the roll-out of services in both countries. Policy changes in both countries may be needed, however, so that nurses can provide this simple surgical procedure. At present they can only assist doctors in carrying out the surgery.³² Younger age was also associated with greater training interest. The inclusion of male circumcision training in nursing and medical school curricula would help reach younger trainees.

In general, our results suggest that training programs would be well-received. At the same time, this may not ensure clinicians would fully integrate training into clinical practice. The translation of scientific evidence into clinical practice often lags, though many factors can speed the process including a core group of clinicians willing to take the lead.²⁵ In Zimbabwe and South Africa, core groups already exist, increasing the chances that training can be successfully implemented. However, the country crisis in Zimbabwe, including the collapse of the health system, presents myriad challenges.³³

Country-level differences

The country-level differences in male circumcision practices reflect the prevalence levels in each country. South Africa is starting from a higher baseline and greater acceptance of male circumcision in certain groups; furthermore recent initiatives have shown uptake in communities that traditionally don't have male circumcision, such as in Kwa-Zulu Natal, which accounted for 22000 of the 49803 male circumcision procedures nationally in the first

part of 2010.^{34,35} A review of 13 acceptability studies of male circumcision in Sub-Saharan Africa showed that a significant proportion of men are willing to consider circumcision for HIV prevention, however they strongly prefer services by trained health professionals.³⁶

Attitudinal barriers

Despite the degree of training interest, the high level of provider concerns related to male circumcision in both countries, as reflected in responses to the attitudinal variables, raise questions about the extent to which clinicians would be willing to help increase access to services. Research has shown that access to services can be limited through provider attitudes.³⁷ Efforts to address these concerns should therefore be part of male circumcision training programs. In particular, there is a need to educate providers about rising client demand for the procedure, even in communities that haven't traditionally practiced male circumcision.

Limitations

While a strength of this study was its use of national probability surveys, there were several limitations. The response rate is relatively high for a national probability survey of clinicians,^{38,39} but South Africa had a lower response rate than Zimbabwe, and within the South African sample, physicians were less likely to respond than nurses, so provision of male circumcision in South Africa may be slightly underestimated as compared to Zimbabwe, where the physician response rate was high.

The sample focuses on primary care clinicians offering HIV/STI or family planning services in low resource settings, rather than specialist surgeons who would be likely to have fewer hesitations about this relatively simple procedure. Country-level differences may partially reflect differences in mode of survey administration as well as cultural differences in reporting. Additionally, clinician responses are likely to carry social desirability bias, particularly when inquiring about the quality of care provided or HIV prevention practices such as condom counseling. The service provision measures may carry less bias because they relate to a clinical procedure, however counseling and training interest may be overstated. Finally, the attitudinal measures did not require respondents to specify the proportion of patients they were referring to, thus preventing understanding of the extent to which each item may inhibit provision or uptake of services.

Conclusions

Many clinicians in South Africa and Zimbabwe were willing to integrate new HIV prevention evidence into practice: about one-half offered male circumcision counseling and/or referrals, and close to two-thirds indicated desire for training. Where maximizing involvement in training programs is the goal, both countries should consider involving nurses, including those in rural areas when scale-up in less densely populated areas is desired. Furthermore training programs should help clinicians to address cultural and other patient-related concerns.

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Male Circumcision Practices by Country and Professional Training

Figure 1.

Table 1

Clinician, practice and patient-related characteristics of survey respondents (N=1444)

	Zimbabwe (n=830)	South Africa (n=614)	P- value *	Total (N=1444)
CLINICIAN				
Mean age in years (SD)	40.2 (11.9)	42.9 (10.3)	0.000	41.3 (11.3)
Sex				
Male	145 (17.7)	62 (10.2)	0.000	207 (14.5)
Female	674 (82.3)	547 (89.8)		1221 (85.5)
Professional Training				
Mid-level nurse	229 (27.7)	55 (9.1)	0.000	284 (19.9)
Advanced nurse	560 (67.8)	468 (77.6)		1028 (71.9)
Physician	37 (4.5)	80 (13.3)		117 (8.2)
Trained in HIV/STI prevention	629 (77.1)	510 (84.4)	0.001	1139 (80.2)
PRACTICE				
Practice Location				
Rural	296 (35.8)	229 (37.3)	0.842	525 (36.5)
Small town / Peri-urban	155 (18.8)	111 (18.1)		266 (18.5)
Urban	375 (45.4)	274 (44.6)		649 (45.1)
Practice setting				
Hospital	484 (58.6)	309 (50.3)	0.002	793 (55.1)
Clinic	342 (41.4)	305 (49.7)		647 (44.9)
Current provision of VCT services	706 (87.8)	476 (78.8)	0.000	1182 (84.0)
PATIENT-RELATED				
Proportion of patients who are HIV+				
None	0 (0.0)	7 (1.2)	0.000	7 (0.5)
Some	367 (46.1)	141 (23.5)		508 (36.4)
Half	160 (20.1)	132 (22.0)		292 (20.9)
Most	239 (30.0)	262 (43.7)		501 (35.9)
All	30 (3.8)	58 (9.7)		88 (6.3)
Proportion of patients at risk of STIs				
None	1 (0.1)	2 (0.3)	0.000	3 (0.2)
Some	238 (29.4)	98 (16.1)		336 (23.7)
Half	139 (17.2)	112 (18.4)		251 (17.7)
Most	360 (44.4)	321 (52.7)		681 (48.0)
All	72 (8.9)	76 (12.5)		148 (10.4)
Proportion of patients at risk of HIV				
None	2 (0.3)	1 (0.2)	0.000	3 (0.2)
Some	173 (21.3)	45 (7.4)		218 (15.4)
Half	112 (13.8)	92 (15.1)		204 (14.4)
Most	367 (45.3)	345 (56.7)		712 (50.2)
All	157 (19.4)	125 (20.6)		282 (19.9)

	Zimbabwe (n=830)	South Africa (n=614)	P- value*	Total (N=1444)
Proportion of patients counseled on condoms				
None	1 (0.1)	3 (0.5)	0.000	4 (0.3)
Some	110 (13.5)	28 (4.6)		138 (9.7)
Half	52 (6.4)	19 (3.1)		71 (5.0)
Most	330 (40.4)	142 (23.3)		472 (33.1)
All	324 (39.7)	418 (68.5)		742 (52.0)

Data are n(%). Percentages have been rounded.

STI denotes sexually transmitted infection and VCT, voluntary counseling and testing.

* P-values were obtained from likelihood ratio chi-square tests and one-way analysis of variance.

Table 2

Male circumcision-related practices and attitudes of clinicians (N=1444)

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
MALE CIRCUMCISION PRACTICES			
Counsel male patients			
Never	374 (45.9)	221 (38.2)	595 (42.7)
Sometimes	335 (41.1)	214 (37.0)	549 (39.4)
Usually	59 (7.2)	84 (14.5)	143 (10.3)
Always	47 (5.8)	59 (10.2)	106 (7.6)
Current provision			
No referrals or services	401 (49.6)	71 (12.2)	472 (33.9)
Referrals	297 (36.8)	382 (65.5)	679 (48.8)
Services	110 (13.6)	130 (22.3)	240 (17.3)
Interest in training			
No	186 (22.9)	211 (35.6)	397 (28.3)
Unsure	94 (11.6)	57 (9.6)	151 (10.8)
Yes	532 (65.5)	324 (54.7)	856 (61.0)
MALE CIRCUMCISION ATTITUDES			
Patients will be upset due to cultural beliefs			
No	282 (35.4)	265 (45.2)	547 (39.6)
Unsure	259 (32.5)	146 (24.9)	405 (29.3)
Yes	256 (32.1)	175 (29.9)	431 (31.2)
Patients will worry about what partner thinks			
No	170 (21.4)	246 (42.6)	416 (30.3)
Unsure	211 (26.5)	142 (24.6)	353 (25.7)
Yes	415 (52.1)	190 (32.9)	605 (44.0)
Patients won't want surgical procedure			
No	197 (24.9)	269 (46.5)	466 (34.0)
Unsure	257 (32.5)	168 (29.1)	425 (31.0)
Yes	337 (42.6)	141 (24.4)	478 (34.9)
Patients will increase risky behaviors			
No	256 (32.4)	206 (35.5)	462 (33.7)
Unsure	173 (21.9)	142 (24.5)	315 (23.0)
Yes	361 (45.7)	232 (40.0)	593 (43.3)
Patients won't abstain from sex during post-operation recovery			
No	376 (47.7)	260 (45.1)	636 (46.6)
Unsure	199 (25.3)	160 (27.7)	359 (26.3)
Yes	213 (27.0)	157 (27.2)	370 (27.1)
OTHER HIV PREVENTION-RELATED ATTITUDES			
Perceived effectiveness of condom counseling for male patients			

	Zimbabwe (n=830)	South Africa (n=614)	Total (N=1444)
Low	55 (6.8)	97 (16.4)	152 (10.9)
Medium	314 (38.7)	262 (44.4)	576 (41.1)
High	442 (54.5)	231 (39.2)	673 (48.0)
Perceived effectiveness of abstinence counseling for male patients			
Low	403 (50.1)	339 (58.1)	742 (53.5)
Medium	318 (39.6)	170 (29.1)	488 (35.2)
High	83 (10.3)	75 (12.8)	158 (11.4)

Data are n(%). Percentages have been rounded.

STI denotes sexually transmitted infection and VCT, voluntary counseling and testing.

Table 3

Provision of counseling on male circumcision for HIV prevention with male patients: Ordered logistic regression analyses (N=1387)

FREQUENCY OF COUNSELING	Models adjusted for:			
	Clinician & Practice Factors		Clinician, Practice Factors & Attitudes	
CLINICIAN	OR	95% CI	OR	95% CI
Country				
Zimbabwe	1.00		1.00	
South Africa	1.38	1.00–1.02	1.22	0.88–1.68
Age (years)	1.01	1.00–1.02	1.00	0.99–1.01
Professional Training				
Mid-level nurse (reference)	1.00		1.00	
Advanced nurse	1.04	0.80–1.34	0.94	0.73–1.22
Physician	1.45	0.82–2.58	1.24	0.73–2.12
Trained in HIV/STI prevention	1.01	0.77–1.31	0.98	0.75–1.30
PRACTICE				
Practice location				
Rural (reference)	1.00		1.00	
Small town / Peri-urban	0.82	0.52–1.30	0.81	0.51–1.28
Urban	0.73	0.51–1.04	0.78	0.56–1.09
Practice setting				
Hospital (reference)	1.00		1.00	
Clinic	1.23	0.87–1.74	1.22	0.89–1.66
Current provision of VCT services	1.22	0.91–1.65	1.24	0.92–1.68
PATIENT-RELATED				
Half or more patients at risk of STIs	1.06	0.75–1.50	1.17	0.84–1.65
Half or more patients at risk of HIV	1.35	0.91–1.98	1.18	0.81–1.72
Most/all patients counseled on condoms	1.41 [*]	1.04–1.93	1.45 [*]	1.09–1.94
MALE CIRCUMCISION ATTITUDES				
Patients will be upset due to cultural beliefs	–	–	0.53 [‡]	0.41–0.67
Patients will worry about what partner thinks	–	–	0.98	.073–1.32
Patients won't want surgical procedure	–	–	0.53 [‡]	0.41–0.70
Patients will increase risky behaviors	–	–	0.60 [‡]	0.46–0.78
Patients won't abstain from sex during post-operation recovery	–	–	0.73 [*]	0.56–0.95
OTHER HIV-RELATED ATTITUDES				
High perceived effectiveness of condom counseling for male patients	–	–	1.15	0.91–1.45
High perceived effectiveness of abstinence counseling for male patients	–	–	2.00 [‡]	1.40–2.87

^{*} p 0.05

[†]_p 0.01

^{*}_p 0.001

OR denotes odds ratio; CI, confidence interval; STI, sexually transmitted infection; and VCT, voluntary counseling & testing.

Note: odds ratios reflect the proportional odds of being in a higher frequency counseling category, as compared to a lower frequency one.

Table 4

Provision of male circumcision services and referrals: Multinomial logistic regression analyses (N=1385)

PROVISION OF SERVICES/ REFERRALS		Services v. no services or referrals					
		Model 1			Model 2		
CLINICIAN		RRR	95% CI	RRR	95% CI	RRR	95% CI
Country							
Zimbabwe (reference)		1.00		1.00		1.00	
South Africa		6.69 [‡]	3.14–14.27	6.79 [‡]	3.30–13.94	6.90 [‡]	4.65–10.25
Age (years)		0.99	0.97–1.01	0.99	0.97–1.01	1.00	0.99–1.01
Provider type							
Mid-level nurse (reference)		1.00		1.00		1.00	
Advanced nurse		1.67	0.92–3.01	1.58	0.84–2.96	1.3	0.91–1.88
Physician		4.47 [‡]	1.87–10.68	3.82 [‡]	1.51–9.65	1.33	0.70–2.54
Trained in HIV/STI prevention		1.08	0.68–1.71	1.09	0.66–1.79	0.87	0.63–1.21
PRACTICE							
Practice location							
Rural (reference)		1.00		1.00		1.00	
Small town / Peri-urban		1.76	0.78–3.97	1.74	0.82–3.70	0.95	0.60–1.49
Urban		0.97	0.44–2.14	1.04	0.50–2.20	0.82	0.54–1.23
Practice setting							
Hospital (reference)		1.00		1.00		1.00	
Clinic		0.06 [‡]	0.03–0.15	0.06 [‡]	0.02–0.13	2.07 [‡]	1.45–2.98
Current provision of VCT services		1.19	0.61–2.30	1.27	0.66–2.47	1.61 [*]	1.08–2.40
PATIENT-RELATED							
Half or more patients at risk of STIs		0.66	0.40–1.10	0.67	0.38–1.18	0.86	0.57–1.30
Half or more patients at risk of HIV		2.06 [*]	1.07–3.96	2.00 [*]	1.04–3.85	0.94	.057–1.53
Most/all patients counseled on condoms		0.87	0.53–1.42	0.92	0.55–1.53	1.24	0.83–1.86
MALE CIRCUMCISION ATTITUDES							
Patients will be upset due to cultural beliefs		–	–	0.51 [‡]	0.32–0.83	–	–
						0.67 [*]	0.47–0.96

PROVISION OF SERVICES/REFERRALS	Services v. no services or referrals			
	Model 1		Model 2	
Patients will worry about what partner thinks	–	1.23	0.71–2.13	–
Patients won't want surgical procedure	–	0.71	0.46–1.11	–
Patients will increase risky behaviors	–	0.49 [‡]	0.31–0.77	–
Patients won't abstain from sex during post-operation recovery	–	0.67	0.42–1.06	–
OTHER HIV-RELATED ATTITUDES				
High perceived effectiveness of condom counseling for male patients	–	0.69 [*]	0.49–0.98	–
High perceived effectiveness of abstinence counseling for male patients	–	1.85	0.98–3.52	–

* p 0.05

[‡] p 0.01

[‡] p 0.001

RRR denotes relative risk ratio; STI, sexually transmitted infection; and VCT, voluntary counseling and testing.

Table 5

Interest in male circumcision training: Ordered logistic regression analyses (N=1398)

TRAINING DESIRED	Models adjusted for:			
	Clinician & Practice Factors		Clinician, Practice Factors & Attitudes	
CLINICIAN	OR	95% CI	OR	95% CI
Country				
Zimbabwe (reference)	1.00		1.00	
South Africa	0.64 [†]	0.48–0.85	0.64 [†]	0.48–0.85
Age (years)	0.97 [†]	0.96–0.98	0.97 [†]	0.96–0.98
Provider type				
Mid-level nurse (reference)	1.00		1.00	
Advanced nurse	1.24	0.92–1.66	1.21	0.89–1.63
Physician	0.50 [†]	0.28–0.89	0.46 [*]	0.25–0.83
Trained in HIV/STI prevention	1.05	0.76–1.45	1.06	0.76–1.46
PRACTICE				
Practice location				
Rural (reference)	1.00		1.00	
Small town / Peri-urban	0.79	0.51–1.23	0.79	0.51–1.24
Urban	0.92	0.68–1.26	0.94	0.70–1.30
Practice setting				
Hospital (reference)	1.00		1.00	
Clinic	0.96	0.69–1.33	0.95	0.69–1.28
Current provision of VCT services	1.10	0.80–1.51	1.15	0.83–1.59
PATIENT-RELATED				
Half or more patients at risk of STIs	0.97	0.70–1.34	1.00	0.72–1.39
Half or more patients at risk of HIV	1.36	0.90–2.03	1.30	0.87–1.94
Most/all patients counseled on condoms	1.14	0.86–1.53	1.14	0.85–1.54
MALE CIRCUMCISION ATTITUDES				
Patients will be upset due to cultural beliefs	–	–	0.71 [*]	0.53–0.96
Patients will worry about what partner thinks	–	–	1.25	0.91–1.72
Patients won't want surgical procedure	–	–	0.86	0.64–1.15
Patients will increase risky behaviors	–	–	1.13	0.82–1.56
Patients won't abstain from sex during post-operation recovery	–	–	0.80	0.60–1.07
OTHER HIV-RELATED ATTITUDES				
High perceived effectiveness of condom counseling for male patients	–	–	0.99	0.78–1.25
High perceived effectiveness of abstinence counseling for male patients	–	–	0.97	0.68–1.39

* p 0.05

† p 0.01

[†]_{p0} .001

OR denotes odds ratio; CI, confidence interval; STI, sexually transmitted infections; and VCT, voluntary counseling & testing.