

Risk Compensation over Two Years among Men in a National VMMC Roll-Out in Zimbabwe

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BACKGROUND

Context

Three randomized control trials (RCTs) demonstrated at least 60% protection against HIV acquisition of voluntary medical male circumcision (VMMC). VMMC has also been shown to be protective against the acquisition of ulcerative sexually transmitted infections (STIs) and human papillomavirus. VMMC provides important reproductive health benefits to men.

Important questions for VMMC programs are:

- Whether circumcision provides the same level of protection within the context of a National VMMC Program, and
- Whether risk behavior among circumcised men, offsets these benefits

Follow-up with men who were circumcised during the three RCTs showed little or no post-VMMC risk behavior, except Orange Farm Trial circumcised participants reported a significantly higher mean number of sex partners than uncircumcised men during both Year 1 and Year 2 of follow-up.

While the RCT results suggest little increased post-circumcision risk behavior, there are several limitations to their generalizability to a national level VMMC program. All participants in the RCTs were healthy, sexually active HIV uninfected individuals who were:

- Followed every 3 or 6 months for up to 2 years,
- Repeatedly counseled,
- Provided free condoms,
- Tested for HIV and STIs,
- Treated for STIs.

Participants were also informed that the evidence for circumcision's protective effect against HIV acquisition was inconclusive. Thus, Trial participants may have been more cautious than men who now know trial results proved conclusively that VMMC is protective.

We designed a study to follow a cohort of men who were referred to male circumcision after receiving a negative HIV test result. The study tracked sexual behavior to determine whether risk compensation (RC) occurs, post circumcision.

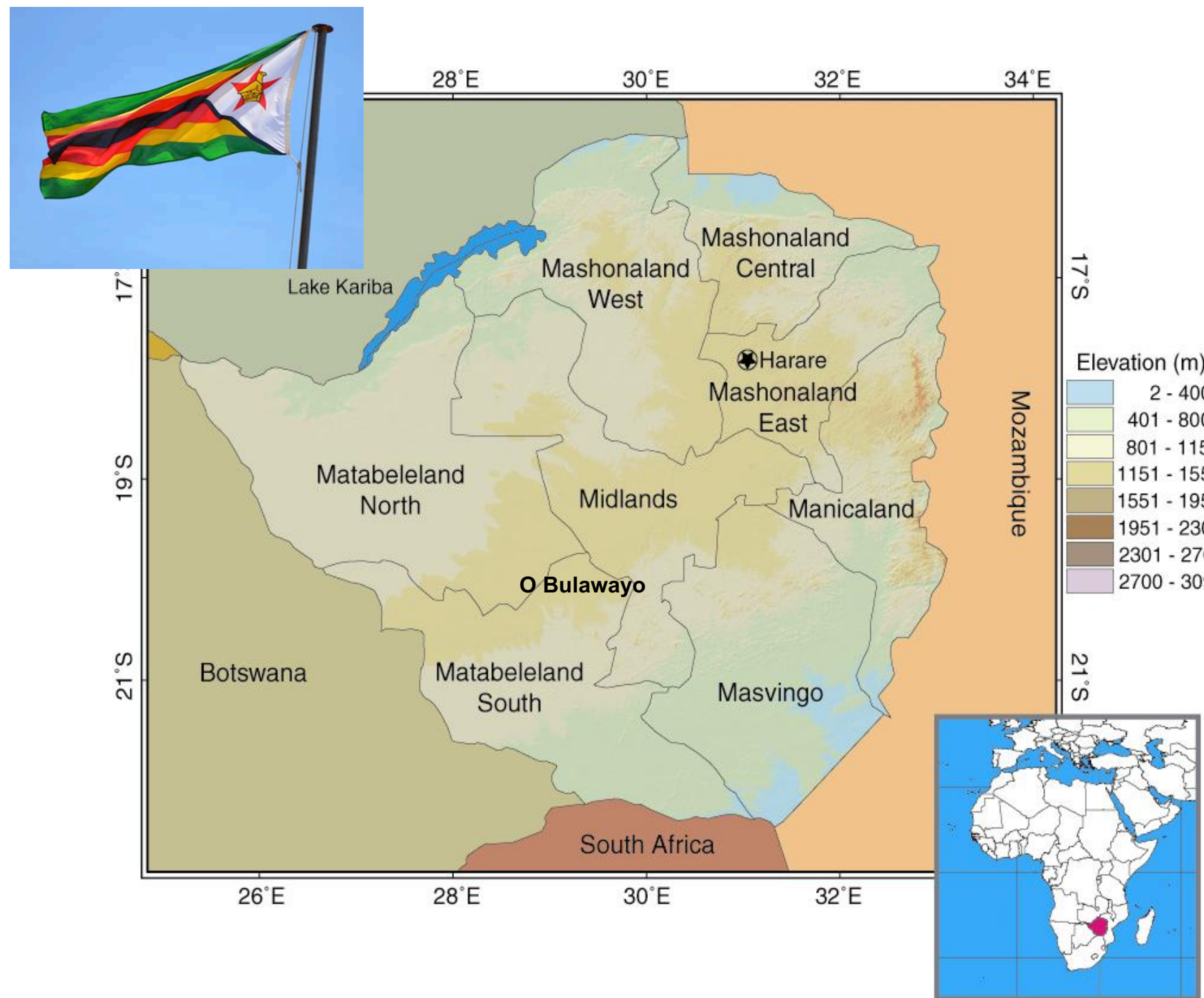
The Research Question

- Are there differences in risk behavior between men who choose vs. decline circumcision?
- Do men who are circumcised through the national VMMC Program engage in more risk behavior over time, compared with men who decline circumcision?

STUDY METHODS

Cohort Accrual and Outcomes

- Accrued a cohort of men, post HIV-negative test results;
 - Those who chose to get circumcised, and
 - Those who did not choose circumcision
- Men were approached and recruited after they had received their HIV negative test results, and were referred to the National VMMC Program Centers for an adult VMMC
- Men aged 18 - 40
- Total N = 2379
 - VMMC group = 1196
 - Non VMMC group = 1183
- Measured specific sexual behaviors at:
 - Baseline, and
 - 6- 12- and 24-month follow-ups,
 - Test whether VMMC group showed greater change in target sexual behaviors compared with non-VMMC group



Demographics and Sexual Behavior Survey

- Translated and back-translated to Shona and Ndebele
- 81% response rate at 24 month follow-up

- Measured demographics
 - Age
 - Education
 - Marital status
 - Employment
 - Income
- Measured sexual behavior
 - Age of sexual onset
 - Partner age at first sex
 - Lifetime number of partners
 - Number of partners
 - Last 6 months
 - Last 12 months
 - Number of steady partners last 12 months
 - Number of casual partners last 12 months
 - Sex worker partners
 - Ever given money, goods for sex
 - Ever had sex with sex workers
 - Number of paid partners in past 12 months
 - Concurrency
 - Point prevalence
 - Condom use
 - Used condom first time had sex
 - Know how to use male condom
 - Ever used male condom
 - Used condom at last sex
 - Times used condom



Demographics and Sexual Behavior Survey (continued)

- Measured sexually transmitted infection (STI) symptoms in the past 12 months
 - Genital discharge
 - Burning or pain upon urination
 - Sore or ulcer on genitals
 - Warts in genital area
 - Diagnosed with STI in last year
 - Number of times tested for HIV
- Measured alcohol and drug use
 - Ever had drink of alcohol? (% yes)
 - Times drank alcohol last 30 days (mean)
 - Times drunk in last 30 days (mean)
 - Times had 5+ drinks on same occasion (mean)
 - Times drank before sex-last 10 times (mean)
 - Ever smoked marijuana? (% yes)
 - Times smoked marijuana last 30 days (mean)

Risk Compensation Analysis

- Baseline Analysis
 - Tested for baseline group differences in demographics, sexual behavior, STI symptoms, alcohol use
- Longitudinal Analysis of data over 4 waves
 - Generalized Estimating Equation (GEE)
 - Excluded 132 men in uncircumcised group who were circumcised during the study period
 - Controlled for baseline demographic differences and baseline DV measure
 - Tested for main effects for group and wave
 - Tested for group by wave interaction

Baseline Demographic Characteristics

Demographic Characteristics	No VMMC	VMMC	p
Age (mean)	25.3	25.2	NS
Ethnic group (% Shona)	78.5%	76.2%	NS
Marital status (% married or living as)	40.4%	33.6%	<.01
Years of school (mean)	11.4	12.1	<.01
Number of children (mean)	.65	.67	NS
Regularly earn money (% yes)	56.9%	53.4%	NS
Monthly family income (mean)	\$371	\$618	<.01

Cohort Demographic Differences

- Groups differed only on marital status, years of school, and mean family income

Baseline Sexual Behavior

Partner Numbers and Types	No VMMC	VMMC	p
Age at first sex (mean)	19.2	19.5	<.01
Partner age at first sex (mean)	17.9	18.2	<.05
Number partners – lifetime (mean)	5.9	6.3	NS
Number partners – last year (mean)	1.4	1.4	NS
Number partners – last 6 months (mean)	1.1	1.1	NS
Steady partners last year (% yes)	45.9%	48.1%	NS
Casual partners last year (% yes)	14.0%	16.5%	NS
Point prevalence of concurrent partners (% yes)	8.5%	10.4%	NS
Ever given money, goods for sex (% yes)	20.0%	18.8%	NS
Ever had sex with sex worker (% yes)	21.4%	19.3%	NS
Number paid partners last year (mean)	.15	.26	NS
Condom Use	No VMMC	VMMC	p
Used condom first time had sex (%yes)	45.2%	47.9%	NS
Know how to use male condom (% yes)	90.4%	92.9%	<.05
Ever used male condom (% yes)	88.2%	87.5%	NS
Used condom at last sex (% yes)	43.0%	48.9%	<.01
Times used condom – lifetime (mean)	36.2	35.2	NS

BASELINE RESULTS

Baseline STI Symptoms

STI Symptoms	No VMMC	VMMC	p
In the last 12 months have you had:			
genital discharge? (% yes)	6.9%	2.7%	<.01
burning or pain during urination? (% yes)	10.8%	8.6%	<.05
sore or ulcer on genitals? (% yes)	5.4%	4.9%	NS
warts in genital area? (% yes)	2.3%	2.5%	NS
Diagnosed with STI in last year (% yes)	7.1%	4.4%	<.01
Number times tested for HIV (mean)	3.5	3.3	NS

Baseline Alcohol Use

Alcohol and Drug Use	No VMMC	VMMC	p
Ever had drink of alcohol? (% yes)	62.2%	59.3%	<.05
Times drank alcohol last 30 days (mean)	6.0	4.2	<.01
Times drunk in last 30 days (mean)	3.4	2.3	<.01
Times had 5+ drinks on same occasion (mean)	3.5	2.5	<.01
Times drank before sex- last 10 times (mean)	2.2	1.9	NS
Ever smoked marijuana? (% yes)	33.4%	33.8%	NS
Times smoked marijuana last 30 days (mean)	7.9	4.7	<.01

Cohort Risk Behavior Differences

- Groups did not differ on most sexual behavior characteristics
- Groups differed on mean age of sexual onset, partner's age at first intercourse, knowing how to use a condom, and condom use at last sex
- Men who chose not to get circumcised were more likely to have had an STI symptom
- Men who did not choose to get circumcised were more likely to have used alcohol and marijuana than men who chose circumcision

LONGITUDINAL RESULTS

Generalized Estimating Equation (GEE) Analysis Results

[Model β Coefficients listed were significant at $p < .05$]

Measure	Group	Wave	Group by Wave	Marital Status	Age
Any partner – last 6 months	0.484	0.187	–	3.725	–
Any partner – last 12 months	0.702	0.088	–	4.427	–
2+ partners – last 6 months	NS	0.201	–	-0.538	–
2+ partners – last 12 months	NS	NS	–	-0.827	–
Casual partner – last 12 months	NS	NS	–	-0.844	–
Paid partner – last 12 months	NS	NS	–	-0.462	–
2+ non-spouse partners	NS	NS	–	-1.455	–
2+ non-spouse partners (among unmarried)	NS	0.167	–	NA	–
Any non-spouse partners (among married)	NS	NS	–	NA	–
Concurrent partners (point prevalence)	NS	0.508	–	–	-0.030
Had partner of unknown HIV status	0.185	0.425	–	-1.071	-0.020
Believe partner had other partners – last 12 months	NS	0.199	–	-0.752	-0.025
Used condom at last sex	NS	-0.151	–	-2.682	–
Consistent condom use with spouse (among married)	NS	-0.981	–	NA	–
Consistent condom use with non-spouse partners	NS	-0.141	–	0.507	–
Concurrent partners + no condom at last sex	NS	0.528	–	0.875	–
Any STI or symptoms – last 12 months	-0.363	-0.254	–	–	-0.034
Drank alcohol last 30 days	NS	NS	–	–	–
Got drunk last 30 days	-0.210	0.133	–	–	–
Binge drank last 30 days	NS	NS	–	–	–
Consumed alcohol before sex – last 10 times	-0.441	0.161	-0.215	–	–

Notes: 1. Controlled for baseline variation in each dependent variable. Beta coefficients not listed.

2. Controlled for Income, Education, Marital Status, Age. Income and Education dropped out of all analyses.

3. – indicates variable dropped out of the model

CONCLUSIONS

- This is the first and only study of risk compensation among men circumcised through a national VMMC program, with no additional risk reduction counseling provided in the research
- We found no evidence for Risk Compensation after VMMC. Group by Wave interaction results found no evidence that circumcised men increased their risk behavior over time to a greater degree than uncircumcised men.
- Wave effects indicate increases in 14 risk behaviors among both groups: Increased partners, concurrency, drinking; Decreased condom use
 - This study coincided with increased availability of ART in Zimbabwe.
 - Wider availability of treatment may have led men to view HIV as a chronic treatable condition, leading to greater risk among all men.