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## Abstract

**Background:** The objectives of the current national study were to determine the rates of self-reported circumcision among South African men and, more importantly, evaluate the acceptability of male circumcision in South Africa by uncircumcised adult men and all adult women.

**Materials and Methods:** The study based on a population-based survey included a nationally representative subgroup of 6654 men aged 15 years and older who were included in the analysis on male circumcision prevalence, and a subgroup of 6796 women aged 15 to 49 years who were included in the analysis on male circumcision acceptance.

**Results:** An overall prevalence of self-reported male circumcision of 42.8% was found. Among the Black African population group the prevalence of male circumcision was 48.2%, 32.1% were traditionally and 13.4% were medically circumcised. Among males not circumcised 45.7% of 15-24 years olds indicated that they would consider being circumcised compared to 28.3% among 25-49 years olds. In multivariate analysis among non-circumcised men Black African and Coloured population groups and having heard of the HIV protective effect of male circumcision were significant predictors for male circumcision acceptability, and among women with a non-circumcised sexual partner, Black African and Coloured population groups and higher education were predictors for male circumcision acceptability.

**Conclusion:** The study found high rates and high acceptability of male circumcision. Findings associated with the acceptability of male circumcision can be used to increase awareness of the benefits of male circumcision for HIV prevention.

**Key words:** Male circumcision, prevalence, acceptability, national population-based survey, South Africa

## Introduction

There is compelling evidence that medical male circumcision partially reduces new HIV infections in men and consequently the scaling-up of male circumcision in several sub-Saharan African countries, including South Africa, has been recommended (WHO, 2007a, 2007b). In 2002, a national study in South Africa showed that 35% of men were circumcised, with ethnic variations (Connolly et al., 2008). Several studies have been conducted about the acceptability of introducing circumcision as an HIV prevention strategy, and generally the proportion of uncircumcised men who would consider circumcision was over 50% in African populations (Gasasira et al., 2012; Mavhu et al., 2011; Scott et al., 2005; Westercamp & Bailey, 2007). Factors identified with the acceptability of male circumcision include demographic, knowledge about benefits and social factors (Brito et al., 2009; Gasasira et al., 2012; Peltzer, & Mlambo, 2012; Westercamp et al., 2012; Yang et al., 2012).

Male circumcision-based HIV prevention programmes target young men, but little is known about the prevalence and acceptability of male circumcision in South Africa (Andersson & Cockcroft, 2012). Therefore, the objectives of the current study were to determine the rate and acceptability of male circumcision among South Africans.

## Methods

### Sample and procedure

The survey, conducted in 2008, targeted all persons over 2 years of age living in South Africa and residing in homes (i.e. excluding individuals living in educational institutions, old-age homes, hospitals and uniformed service barracks but including those living in hostels.) A multi-stage cluster stratified sample stratified by province, settlement geography (geotype) and predominant population group in each area was used. A systematic sample of 15 households was drawn from each of 1 000 census enumeration areas (EAs). In each household, one person was randomly selected in each of four mutually exclusive age groups (under 2 years; 2–14 years; 15–24 years; 25+ years). Socio-demographic and behavioural information was collected with questionnaires administered by trained field workers (more details on the methodology are described by Shisana et al., 2009). A subgroup of 6654 men aged 15 years and older who participated in the study were included in the analysis on male circumcision prevalence, and a subgroup of 6796 women aged 15 to 49 years were included in the analysis on male circumcision acceptance.

### Measurement

The prevalence of male circumcision was assessed with the question “Have you been circumcised?” Traditional and medical circumcision was assessed with two questions: where were you circumcised and who circumcised you? Medical circumcision was defined as having been performed in hospital and/or by a medical doctor, while traditional circumcision was defined as having been performed in a traditional setting (in the mountain/in the bush/initiation school) and/or a spiritual or religious leader or traditional circumcisor. Other questions included the age of male circumcision. Knowledge of HIV protective effect of male circumcision was assessed with the question “Have you heard that circumcision has recently been shown to partly reduce the chances of HIV infection among males?” Men and women were asked about the acceptability of male circumcision with the question, “Would you support the idea that all men should be circumcised or not?” Women were also asked about the circumcision status of their sexual partner.

**Data analysis**

Analysis was done using STATA 10 software taking into account the complex multi-level sampling design. STATA software (svy methods) was used to obtain the estimates of selected variables and confidence intervals (95% CI). In the analysis weighted percentages are reported and sample sizes refer to the actual number of individuals who responded to the selected questions. Descriptive analysis was conducted on individuals aged 15-49 years regarding male circumcision status. We also conducted logistic regression analysis to estimate the association between relevant predictor variables and acceptability of male circumcision for women with a non-circumcised sexual partner and men who have not been circumcised separately. We report unadjusted odds ratios for selected predictor variables while considering acceptability of male circumcision as a dependent variable. We therefore report results of adjusted odds ratios for the factors, having controlled for factors as significant ( $P < 0.05$ ) in the bivariate analysis.

**Results****Prevalence of male circumcision**

The overall prevalence of self-reported male circumcision was in this sample 42.8%. Among the Black African population group the prevalence of male circumcision was 48.2%, 32.1% were traditionally and 13.4% were medically circumcised. There were considerable differences among different African ethnic groups in male circumcision rates, ranging from 82.7% among Venda, 75.7% Northern Sotho, 74.2% Xhosa, 67.6% Tsonga, 54.3% Ndebele to 24.5% among Swati and 18.4% among Zulu. Provinces with high male circumcision rates (>68%) were Limpopo and Eastern Cape and all other provinces had rates below 40%, with the lowest (around 20%) in Northern Cape and KwaZulu-Natal. Traditional male circumcision was practiced among older age, i.e. 55.8% 18 years or older, while medical circumcision was practiced across different age groups ranging from 16.9% during infancy to 33.9% at 18 years or older. There are differences by ethnic groups; for example, for the Ndebele and Xhosa the age of male circumcision is mainly 18 years and above, and for the Swati, Northern Sotho, Tsonga, Tswana and Southern Sotho it is mainly 12 to 17 years, and for the Venda it appears the age of traditional male circumcision is below 12 years. Traditional male circumcision rates were higher in rural than urban areas and medical male circumcision was higher in urban than rural areas, and with higher education medical male circumcision increased (see Table 1).

**Table 1:** Male (traditional and medical) circumcision by population group (race), ethnicity and age group (N=6654)

Demographics	Male circumcision		Traditional male circumcision					Medical male circumcision				
	N	% (95% CI)	All	0-1	2-11	12-17	18+	all	0-1	2-11	12-17	18+
All	6654	42.8 (40.3-45.4)	24.5	3.3	8.9	32.0	55.8	15.3	16.9	27.2	22.0	33.9
African Black	3604	48.2 (45.0-51.3)	32.1	2.7	8.6	32.4	56.3	13.4	2.5	24.1	30.5	56.4
-Ndebele	51	54.3 (34.0-74.5)	45.9	0	0	0	100	6.3	0	49.6	46.2	4.2
-Swati	121	24.5 (14.0-34.9)	10.5	0	8.3	81.5	10.3	11.4	0	6.2	47.1	46.8
-Xhosa	658	74.2 (68.7-79.7)	68.7	2.5	0.2	9.4	87.8	5.1	7.6	0	28.8	63.6
-Zulu	641	18.4 (14.3-22.5)	8.2	0	15.0	36.8	48.2	9.9	5.0	21.3	24.4	49.3
-Southern Sotho	327	36.4 (27.6-45.3)	16.0	3.4	0.9	46.9	44.8	19.8	0	35.8	10.0	54.2
-Northern Sotho	381	75.7 (69.3-82.0)	55.3	0.6	17.9	69.6	11.9	20.7	0	22.0	48.0	30.0
-Tswana	406	30.0 (21.7-38.3)	13.6	2.0	4.2	48.0	45.9	15.5	0	19.6	16.2	64.2
-Venda	68	82.7 (72.0-93.3)	49.1	12.3	41.2	29.1	17.3	29.5	0	49.0	36.8	14.2
-Tsonga	163	67.6 (55.5-79.7)	38.8	3.3	20.9	52.9	22.9	27.1	0	13.3	19.1	72.3
Coloured	1301	24.0 (20.2-27.8)	3.1	20.1	21.4	13.5	45.1	20.3	27.1	40.0	8.2	24.7
White	918	25.5 (20.2-30.8)	1.0	65.3	15.9	18.8	0	23.5	57.0	26.4	6.0	10.5
Indian or Asian	810	32.6 (24.9-40.4)	1.2	52.3	27.3	0	20.3	30.0	47.0	31.4	1.4	20.3
<i>Province</i>	N	%# (95% CI)	%# [All]					%# [All]				
Western Cape	989	38.9 (32.2-45.6)	21.3					16.2				
Eastern Cape	868	68.4 (61.6-75.2)	54.3					11.3				
Northern Cape	505	19.3 (12.9-25.6)	8.7					10.2				
Free State	420	34.5 (26.0-42.9)	21.2					10.6				
KwaZulu-Natal	1196	20.7 (16.4-24.9)	7.2					12.1				
North-West	507	30.5 (23.5-37.4)	20.3					8.8				
Gauteng	1116	43.4 (37.9-48.9)	18.1					23.1				
Mpumalanga	500	37.6 (29.7-45.4)	23.6					11.5				
Limpopo	553	74.9 (67.5-82.2)	48.8					22.6				
<i>Geolocality</i>												
Urban formal	4362	40.1 (36.6-43.6)	18.7					20.0				
Urban informal	676	46.0 (38.4-53.6)	35.1					5.0				
Rural	1616	46.6 (41.9-51.2)	43.6					11.5				
<i>Education</i>												
<Grade 8	1179	43.2 (38.6-47.8)	36.9					4.9				
Grade 8-11	2189	41.4 (37.8-45.1)	25.3					15.5				
Grade 12 or more	1846	43.7 (39.8-47.6)	19.0					24.6				

**Acceptability of male circumcision**

Among 15-24 years old 45.7% indicated that they would consider being circumcised compared to 28.3% among 25-49 years old males. Only 30.6% of 15-24 and 38.2% of 25-49 years old females indicated that their partners were circumcised and 60.6% and 63.3% respectively indicated that they would be supportive of their partners getting circumcised. The results show that majority of the respondents were of the view that all men should be circumcised. Among men, more than a third had heard about the HIV protective effect of male circumcision (see Table 2).

**Table 2:** Partner male circumcision status and acceptability of male circumcision among men and women 15 to 49 years

Variables	15-24 years		25-49 years	
	N (%)	95%CI	N (%)	95%CI
Would you consider being circumcised (Among uncircumcised men)				
Yes	734 (45.7)	41.4-50.0	327 (28.3)	24.9-31.9
No	755 (54.3)	50.0-58.6	1227 (71.7)	68.0-75.0
Is your current sexual partner circumcised? (Women)				
Yes	589 (30.6)	27.6-33.7	1825 (38.2)	35.8-40.7
No	556 (23.2)	20.8-25.8	1941 (34.1)	32.0-36.2
Don't know	265 (12.4)	10.5-14.5	256 (6.1)	5.0-7.4
If your partner is not circumcised would you be supportive of him getting circumcised (Women)				
Yes	1248 (60.6)	57.2-63.9	3060 (63.1)	60.7-65.4
No	753 (38.9)	35.7-42.2	1918 (36.2)	33.9-38.5
Would you be supportive that all men should be circumcised (Both sexes)				
Support	2062 (53.3)	50.6-56.0	4403 (54.1)	52.0-56.1
Oppose	1238 (30.1)	27.7-32.7	2593 (28.3)	26.7-30.0
Don't know	820 (16.6)	14.7-18.6	1735 (17.6)	16.2-19.1
Have you heard that male circumcision has recently been shown to partly reduce the chances of HIV infection among men? (Men)				
Yes	574 (34.1)	31.0-37.2	697 (38.8)	35.4-42.2
No/Do not know	1349 (65.9)	62.8-69.0	1366 (61.2)	57.8-64.6

#Percentages may not add up because fewer participants responded to the type of circumcision questions than to the male circumcision status question

**Predictors of male circumcision acceptability**

Among non-circumcised men, in bivariate analyses, lower education, Black African and Coloured population groups, and having heard of the HIV protective effect of male circumcision were associated with being supportive that all men should be circumcised, while in multivariate analysis Black African and Coloured population groups and having heard of the HIV protective effect of male circumcision remained significantly associated with male circumcision acceptability.

Among women with a non-circumcised sexual partner, in bivariate analyses, higher education, urban informal and rural residence, and Black African and Coloured population groups were associated with being supportive that all men should be circumcised, while in multivariate analysis Black African and Coloured population groups and higher education remained significantly associated with male circumcision acceptability (see Table 3).

**Table 3:** Factors predicting acceptability of male circumcision (Would you be supportive that all men should be circumcised)

	Women with non-circumcised sexual partner (15-49 yrs) (n=1958)		Non-circumcised men (15-49 yrs) (n=2539)	
	COR (95% CI)	ADR (95% CI)	COR (95% CI)	ADR (95% CI)
Age group				
15-24	1.00	---	1.00	1.00
25-34	0.92 (0.64-1.32)		0.84 (0.60-1.18)	0.72 (0.48-1.08)
35-49	0.78 (0.56-1.08)		0.73 (0.54-0.99)*	0.79 (0.56-1.11)
Education				
0-Grade 7	1.00	1.00	1.00	---
Grade 8-11	1.54 (1.04-2.03)*	1.56 (1.12-2.19)**	0.86 (0.64-1.22)	
Grade 12 or more	0.90 (0.64-1.28)	1.19 (0.82-1.72)	0.74 (0.51-1.06)	
Geolocality				
Urban formal	1.00	1.00	1.00	---
Urban informal	1.64 (1.15-2.33)**	0.96 (0.59-1.56)	1.26 (0.83-1.72)	
Rural	1.48 (1.17-1.89)***	0.95 (0.66-1.38)	1.35 (0.99-1.84)	
Population group				
White	1.00	1.00	1.00	1.00
African Black	3.44 (2.09-5.67)***	3.46 (1.97-6.05)***	3.49 (1.96-6.19)***	2.81 (1.56-5.07)***
Coloured	3.18 (1.83-5.53)***	3.21 (1.83-5.63)***	2.59 (1.43-4.69)**	2.44 (1.34-4.45)**
Indian or Asian	1.61 (0.80-3.26)	1.61 (0.79-3.26)	0.76 (0.32-1.77)	0.99 (0.39-2.50)
Heard that male circumcision is partially protective from HIV	---	---	2.99 (2.28-3.92)***	2.88 (2.10-3.95)***

\*\*\*P&lt;.001, \*\*P&lt;.01, \*P&lt;.05

## Discussion

In 2002 the Nelson Mandela/HSRC study showed that 35% of men in South Africa are circumcised (Connolly et al., 2008) while in the present 42.8% indicated that they had done so. This shows an increase in the prevalence of self-reported male circumcision. A similar increase (42%) was reported from the South African Second National HIV Communication Survey 2009 among men 16-55 years old (Johnson et al., 2010). Overall, African Blacks reported more circumcisions than other race groups. They undertook mostly traditional male circumcision especially in Limpopo and Eastern Cape provinces. Non-African Blacks (i.e., other race groups) used mostly medical circumcision. As regards the age at which most circumcisions were done, this was done mostly medically among Whites and Indians aged 0-1 years, traditionally among the Venda aged 2-11 years and Northern Sotho and Tsonga aged 12-17 years, and traditionally among the Xhosa and Ndebele aged 18 years. These results replicate most of the findings reported by Connolly et al., (2008) from 2002.

The study found a high acceptability of male circumcision among the youth, as found in previous studies in sub-Saharan Africa (Gasasira et al., 2012; Mavhu et al., 2011; Westercamp & Bailey, 2007). In agreement with other studies (Brito et al., 2009; Mavhu et al., 2011; Westercamp et al., 2012), this study found that better knowledge about the benefits of male circumcision was positively associated with the acceptability of male circumcision. Given the above mentioned results this shows that the number of acceptability of male circumcision is in the increase and this would be a help in the process of promoting male circumcision as a partial protective measure towards HIV infection. South African is not an exception, where the youth accept male circumcision above the older generation. Similar results were found in countries like Malawi (Ngalande et al., 2006). Given the above results, there is an indication that both youth and adults females had a higher percentage of male circumcision acceptance as compared to their male counterpart.

The study limitations included the self-reporting of the male circumcision status. Because this survey was cross-sectional, no conclusions regarding causality can be drawn.

## Conclusion

The study found high rates and high acceptability of male circumcision. Findings associated with the acceptability of male circumcision can be used to increase awareness of the benefits of male circumcision for HIV prevention. Adults and young men should continue to be the focus of programmes that aim to scale-up the demand for medical male circumcision services.

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