

Research Article

Correlates of Men's Willingness to Undergo Safe Circumcision in the Era of the HIV/AIDS in Botswana

Patrick Seitiso Seitiso¹, Dr.Hadgu Bariagaber²

¹M.A in Population Studies, Head, Population Unit Ministry of Finance and Economic Development Gov.of Botswana.

²(Ph.D., Senior Lecturer) Department of Population Studies University of Botswana.

Abstract:

Definition and concepts: Male Circumcision is simply defined as the removal of a fold of loose skin (the foreskin or prepuce) that covers the glans of the flaccid penis. It has been practiced as a religious rite since time immemorial, which has been commonly practiced by all African societies among all religious denominations, especially by the Ethiopian Coptic Church.

Motivation and Objectives: Circumcision is recommended as a global efforts to combat the prevalence of the HIV/AIDS pandemic, for it has been widely believed to be important intervention strategy to tackle the scourge since 2007.

Data Sources: In 2008, Botswana AIDS Impact Survey Programme (BAIS- III) was conducted, based on two stages stratified sampling design. The study covered 8275 households, systematically drawn from selected Primary Sampling Units (PSUs), known as Enumeration Areas (EAs).

Methodology: Using the SPSS Package Programme, the target group was screened to constitute 5647 males within the 10-49 age bracket, consisting of about 622(11%) circumcised and 5025 (89 %) uncircumcised. However, the number of the uncircumcised males who responded willing to undergo Safe Male Circumcision(SMC) were 3046 (61%) and those not willing were 1979(39%).

Analytical Approaches: The appropriate statistical analytical models of analysis include the univariate frequency distribution, bivariate chi-squares (χ^2) technique and the Logistic Regression Model.

Keywords: Correlates, Influence, Safe circumcision, willingness, analytical models

Introduction

According to Rain-Taljaard et al (2003), circumcision is the removal of a fold of loose skin (the foreskin or prepuce) that covers the head (glans) of the flaccid male penis. This procedure has been practiced as a religious rite from time immemorial, popularly quoted during Abraham and Herodotus' time. For example, Doyle (2005) said that the Children of Israel used to had been circumcised during their captivity in Egypt around 1200 BC. The ancient Semitic peoples, including Egyptians and Jews, used to had been practiced circumcising their children dating as far back as around 2300 *Before Christ* (WHO and UNAIDS, 2007; and Doye, 2005).

Although Male circumcision had been commonly practiced in many African societies for cultural reasons, it was gradually stopped among many African ethnic groups, such as Botswana, southern Zimbabwe and parts of South Africa and Malawi due to the influence of some European Missionaries & Colonial Administrators (WHO and UNAIDS, 2007).

However, randomized controlled studies in Africa have provided compelling evidence for the protective effect of male circumcision against the HIV acquisition in heterosexual men,

with a 51% to 61% risk reduction ((Gray et al. (2007), Bailey et al. (2007) and Auvert et al. (2005), as cited in Tieu et al. (2010)),

Recently, several studies on acceptability of safe male circumcision (SMC) have been undertaken in many parts of Sub-Saharan Africa (SSA). Accordingly, almost all studies revealed that both men and women were in favour of the procedure. For example, about 51% of uncircumcised men among rural Zulu population (South Africa), reported that they would like to undergo the procedure if it is conducted safely with little pain and at low cost (Scott, et al..2005).

Similarly, Gasasira et al., (2012) revealed that half of the participants in Rwanda were willing to get circumcised and 79% of men would accept circumcision for their sons.

The 2008 Botswana AIDS Impact Survey (BAIS III) results revealed that the incidence and prevalence rates of HIV stood at 2.9% and 17.6%, respectively. Furthermore, the 2010 Botswana progress report on the national response to the 2001 declaration of commitment on HIV/AIDS, highlighted that the spread of the VIRUS was caused by multiple and concurrent sexual partnerships, alcohol and high risk sex, gender violence and sexual abuse, high population mobility and adolescent

intergenerational sex.

It should be noted that Male Circumcision (MC) is not a new phenomenon in Botswana. According to National Strategy on Safe Male Circumcision (2009), the history of male circumcision practice of the country is documented as far back as 1874. This adopted strategy focuses on increasing SMC prevalence among the HIV negative males of 10-49 years from 20% in 2009 to 80% by 2016, among others. However, Botswana remained one of the countries with very low prevalence of *Safe Male Circumcision*.

Accordingly, the focus of this study is to establish the factors which influence male's willingness to circumcise in Botswana through the operationalization of the *Health Belief Model (HBM)*, which is a psychological model that attempts to explain and predict health behaviors, by focusing on the attitudes and beliefs of individuals, based on the outcome of the 2008 BAIS III data set.

Rationale of the Study:

The 2010 WHO report states that data from a range of epidemiological studies, conducted since the mid-1980s, indicated that circumcised men have a *lower prevalence of HIV infection than for uncircumcised men*. Three randomized controlled trials were also conducted in Orange Farm (South Africa); Kisumu (Kenya); and Rakai District (Uganda) and showed that following circumcision, the incidence of HIV infection in men was reduced by more than half.

Although the SMC procedure has applied in both private and public hospitals in Botswana, the performance has been fairly low. Some of the core challenges outlined by the country's SMC National Strategy include ensuring that the population gets the right messages about male circumcision and does not lead to behavior inhibition as well as reducing stigma associated with HIV testing and male circumcision status.

Problem Statement:

Despite the amount of focus put on HIV intervention strategies in Botswana, the scourge continues to spread among the general population. For this reason, safe male circumcision (SMC) was introduced in the country in 2009 as an added value to the National HIV interventions, targeting on HIV negative males, aged 10-49 years. These together with other factors, like shortage of skilled manpower and relevant physical resources necessary for implementation of the programmes, have a great potential in influencing acceptability of safe male circumcision

Objectives of the study:

The main objectives of the study include as follows:

- (a) establish factors which influence males' willingness to circumcise through the operationalization of the Health Belief Model (HBM);
- (b) understand the socio-demographic characteristics of circumcised males in Botswana;

- (c) determine factors associated with males' willingness to circumcise; and Explore factors influencing males' willingness to circumcise.

Literature Review:

A study by Busang et al. (2011) revealed that fear for pain/complication/deaths, lack of time and inadequate information about SMC, remained to be the main barriers to getting circumcised.

According to Ndwapi et al. (2012), Botswana's national Safe Male Circumcision (SMC) Program aimed at reaching circumcision prevalence rate of 80% among HIV-negative males aged 10-49 years by 2016. WHO & UNAIDS (2010) reported that the national male circumcision prevalence in Botswana stood at 11.2%, while for other countries, like Kenya, Malawi, Tanzania, Mozambique and Namibia, it was 85%, 21%, 70%, 56% and 21%, respectively.

WHO (2011) has also revealed that in 2011 alone, 4.2% of the targeted males in Botswana underwent the procedure, raising a bit from about 2% in 2009, which accounted for 25,858 targeted males circumcised at national level to date. This low turn out of the targeted males calls for the need to further unpack socio-demographic factors which influence the males' willingness to undergo MC procedure in Botswana, because curbing HIV transmission remains a priority for the country as vital programs which could add to the increase of the expectation of life of the population.

HIV/AIDS still remains a major global health concern for almost three decades. Sub-Saharan Africa is highly affected by the scourge, with observed large scale social and economic consequences. In 2010, about 68% of all persons living with HIV incidence worldwide, were reported in Sub-Saharan Africa, a region with only 12% of the global population (UNAIDS 2011). According to Lau and Muula (2004), the pandemic is responsible for escalating poverty and hunger, making a large number of children orphaned, stigma and discrimination and contributing to the decline in life expectancy.

Global efforts in combating the scourge remain a priority by introducing antiretroviral drugs which appeared to manage HIV mutation, ultimately reducing many incidences of morbidity and mortality in the whole world, including in many sub-Saharan African countries. The challenge that remains is the observed new HIV incidence rates registered by many of these countries.

According to UNAIDS report (2011), about 34 million people were estimated to have been living with HIV worldwide. In recent years, the continued war against HIV/AIDS has seen the introduction of Safe Male Circumcision (SMC) as additional HIV prevention strategy among other existing controlling programs, like condom use, reduction in sexual partners and antiretroviral therapy. Several randomized controlled studies and/or trials have yielded findings that safe male circumcision significantly reduces acquisition of heterosexually HIV infection among men.

In the same vein, Westercamp and Bailey (2007) reviewed

thirteen acceptability studies from nine sub-Saharan African countries to assess factors that will influence uptake for circumcision in traditionally non-circumcising populations. *Accordingly, cross-sectional studies indicated that about 65% of uncircumcised men expressed willingness to become circumcised; 69% of women favored circumcision for their partners and about 71% of men and 81% of women were willing to circumcise their sons.*

Another study conducted by Gasasira et al. (2012) in Rwanda showed that most male participants were willing to get circumcised to prevent STI/HIV infection as well as for hygienic improvement. The findings revealed that the willingness to circumcise was significantly associated with younger ages, marital status (cohabiting & single/living alone), and the knowledge of the preventive role of circumcision. The same Author further elaborated that the prevalence of men's circumcision in Rwanda was higher for those who attended universities and secondary schools with 82% and 41%, respectively.

Tieu et al. (2010) also found out that in Thailand, willingness to be circumcised increased from low baseline of 14.2% to 24.9% after men were educated about circumcision, thereby altering perceptions about the risks and benefits of the procedure. In this connection, counseling, information dissemination and education on SMC are crucial as they inform the intended target population about the benefits of the procedure, ultimately eroding negative perceptions that may be entrenched to interference.

Similarly, Lukobo and Bailey (2007) in their study on acceptability of male circumcision for HIV prevention in Zambia, found out that nearly all the participants in non-circumcising districts expressed willingness to be circumcised or have their son circumcised, if the benefits of male circumcision were clear and the procedure were offered at no or minimal cost. The same scholars also noted certain barriers to circumcision in Zambia being painful and the healing process of length of time for healing, cost and identification of the procedure with certain ethnic and religious groups. However, their study was mainly qualitative and hence did not look into and/or establish the statistical relationship between willingness to circumcise and the chosen variables.

The results of another study undertaken in Nyanza Province (Kenya) by Mattson et al. (2005), indicated that the majority of men (60%) and women (69%) reported that they would welcome male circumcision services if they were safe and affordable. The acceptance was generally associated with penile hygiene and minimal chances of acquiring STIs and HIV infections. These findings are also consistent with Mavhu et al. (2011) study in Zimbabwe which revealed that women were more likely to favour adult SMC if they were informed about its health benefits.

The gaps identified in Mattson et al. (2005) study included a small sample size of 217 (107 men and 110 women) as well as the adoption of the convenience sampling method which has a very low likelihood of sample being representative of the total population. On the other hand, Mavhu studied a large sample

size of 2746 individuals but did not investigate how other important socio-demographic variables, like place of residence, age and religion relate to and/or influence willingness to circumcise among men.

Pelzer and Mlambo (2012) study findings in South Africa have noted that generally there is a tendency for many young people in that country to undergo medical rather than traditional male circumcision, with acceptability positively associated with its better knowledge. This is corroborated by a study by Yang et al., (2012) in China, which revealed that young men below 25 years were more willing to accept MC than those aged over 35 years, and this was attributed to the fact that young men are more knowledgeable about MC and its sexual health benefits.

The same authors notably reported that prevention of penile inflammation and cancer, as well as sexual hygiene and sexual health are as the benefits of the procedure. Their study also identified long foreskin, residing in Xinjiang province, knowing hazards of redundant foreskin and having a friend who underwent circumcision as other factors influencing men's willingness to undergo the procedure in China. Gasasira et al. (2012), also found out that young adults and adolescents in Rwanda were more willing to be circumcised, although they reported that they were afraid of pain, particularly those less than 19 years old (42%). However, Pelzer and Mlambo (2012) study targeted persons aged 18-24 years only, leaving those in other groups and/or ages, who are sexually active and hence prone/vulnerable to HIV transmission.

On the other hand, National Institute for Medical Research and Ministry of Health and Social Welfare (2009), found out (in rural and urban areas of Mara, Kagera & Mbeya regions - Tanzania) that males' willingness to circumcise was influenced by adherence to traditional customs, social desirability (e.g. forces of modernity brought by schooling), religion (Muslims & Christians), awareness about circumcision acquired through various channels including mass media, availability of facilities providing circumcision services in urban areas and social stigma.

Although there are indications of acceptability of MC, questions remain on psychological and socio-cultural underpinnings to adopting the practice as an HIV preventive measure among traditionally non-circumcising communities (Obure, Nyambenda, Oindo, Koderu, 2009). However, circumcision prevalence in Ethiopia is universally high (93%) but men are most likely to be circumcised if they are in a higher wealth quintile, have at least secondary education and live in an urban area (WHO & UNAIDS, 2007). With respect to religion, National Institute for Medical Research and Ministry of Health & Social Welfare (2009) states that Muslims are the largest religious group to practice circumcision in Tanzania. The 2003/04 DHS data in Tanzania showed that 96.8% of Muslim, 60-70% Christians and 25% of men with indigenous beliefs were circumcised. Muslims practice circumcision as a confirmation of their relationship with Allah/God.

Methodology:

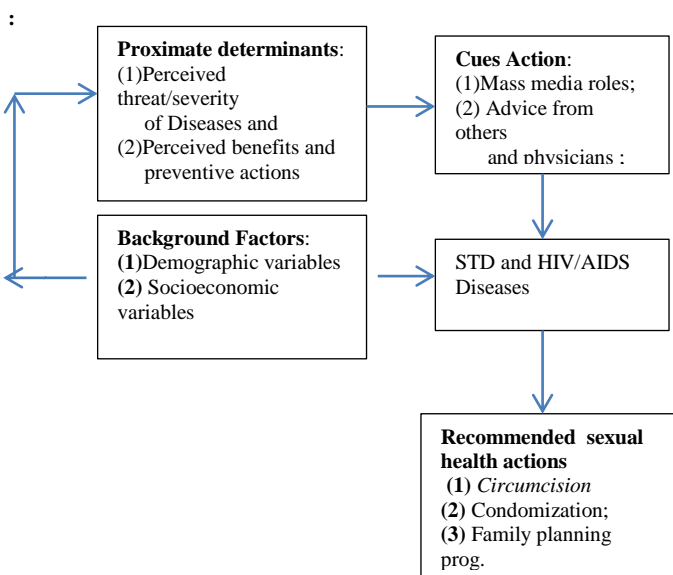
1 Conceptual framework:

The conceptual analytical framework for this study is constructed by modifying the Health Believe Model (HBM) of Janz and Becker (1984), as presented in Figure 1. The model attempts

to reflect the factors that influence male's willingness to undergo circumcision. The HBM is a psychological model that attempts to explain and predict health behaviors by focusing on the attitudes and believes of individuals. This study assumes that male's perceived threat, which is the central indicator of behavioral motivation, is HV/AIDS and other debilitating diseases (refer to figure 1).

This conceptual model tries to address the individual's perceptions of the threat posed by a health problem (susceptibility, severity), the benefits of avoiding the threat, and the factors influencing the decision to act on the barriers, cues to action and self-efficacy (US Department of Health & Human Services, 2005; Masuri et al. , 2012). Perceived susceptibility to disease is when an individual (or a male in this case) becomes conscious and/or aware of contracting a disease or condition. In this case, the framework was modeled to show that a man will show willingness to circumcise if he perceives himself to be susceptible to HIV/AIDS, and also has a positive expectation by undergoing the procedure.

Figure 1: Modified Health Belief Model:



According to Redding et al (2000), an individual is more likely to take action to prevent cancer if she/he believes that possible negative physical, psychological, and/or social effects resulting from developing the disease pose serious consequences (e.g., altered social relationships, reduced independence, pain, suffering, disability, or even death). Furthermore, individuals who are not convinced that there is a causal relationship between smoking and cancer, are unlikely to quit smoking because they believe that quitting will not protect against the disease. In this case, if males do not see the benefits of male circumcision, then they won't show willingness to circumcise, resulting in few targeted beneficiaries coming forth to consume the service.

On the other hand, perceived barriers to preventive action are potential individual's perceptions detrimental to undertaking

recommended healthy behavior. A study by Lukobo and Bailey (2007) in Zambia revealed that the biggest barriers to circumcision in study communities were identification of the procedure with certain ethnic and religious groups, pain, healing process, length of time for healing and cost. Furthermore, perceived susceptibility to disease and perceived seriousness (severity) of disease are influenced by socio-demographic variables, like level of education, religion, place of residence, age and marital status. Kenyon et.al(2010) stated that sex, race/ethnicity, age, education, class and sexual orientation are some of the categories which influence people's experience and understanding of disease. For instance, educated males are more likely to possess knowledge about the benefits of circumcising and would thus probably show willingness to undergo the procedure, compared to those who are less or not educated. The possessed knowledge translates into perceived benefits such as HIV prevention, penile hygiene and optimal sex enjoyment.

Another proxy models are cues to action which defines initiatives and/or strategies in place acting as stimulus to influencing health actions or decision making. According to this model, people make a rational cost-benefit analysis when trying to decide whether to adopt preventive behavior or not. Actual changes in behavior may then be stimulated by cues to action such as educational messages or learning that someone they know has AIDS (Hingson et al., 1990). In this case HIV/AIDS information could be disseminated to the people through education (sex education in the formal school environment, campaigns), various forms of media (radio, print etc.) as well as from other individuals they interact with in their respective communities, among others.

It should be noted that the recent formulations of the HBM have added another key construct, namely self-efficacy, which basically states that individuals are ready to act if they are confident in their ability to successfully perform an action. Self-efficacy is influenced by mediating variables and in turn influences expectations (Redding et al. 2000). Males who are willing to circumcise are ready to adopt any available measure in place aimed at preventing HIV transmission as they are confident that such would indeed protect them from HIV/AIDS.

Since health motivation is its central focus, the HBM is a good fit for addressing problem behaviors that evoke health concerns (e.g. high risk sexual behavior and the possibility of contracting HIV) (US Department of Health & Human Services, 2005).

2. The Sampling Procedure

The 2008 Botswana AIDS Impact Survey (BAIS-III) was based on two stages stratified sampling design. The study covered 8275 households, systematically drawn from selected Primary Sampling Units (PSU's), known as *Enumeration Areas (EA's)*. These households constituted 24 962 persons, aged between 10-64 years, with a total response rate of 82%. During the survey, a sample of 6302 males in the age group 10-64 years were asked whether or not they were circumcised. Accordingly, a total of 5821 males aged 10-49 years were targeted for the SMC program in Botswana. But, due to the non-response errors and/or missing values, only 5647 in the age group 10-49 were asked if they would be willing to undergo circumcision. Those already circumcised were about 622 (11%), while the number of those not circumcised stood at about 5025 (89%). Those willing to undergo Safe Male Circumcision were about 3046 (61%0 and unwilling were

1979 (39%).

3. Measurement of variables: Independent and Dependent Variables:

Reference could be made for details to the conceptual frame work (**Figure 1**). The basic main independent variables were operationalized to include age ; level of education; marital “secondary”, and “higher /teritil educational levels.

On the other hand , “willingness” to undergo SMC is considered dependent variable, coded as Yes= 1 or No=0 to the question of Circumcision.

Analytical Methods

Applying the SPSS Package Programme, the analytical techniques include *univariate descriptive frequency distributions; Pearson's chi-square statistic (χ^2) and binary logistic regression models*

The *univariate cross-tabulation analysis* is simply expressing the percentage and absolute distribution of the sample target males to be circumcised,constructed in contingency tabular form. Accordingly, we compare the share of each categorical variable out of the categories of a given main variable and observe the distributional pattern/level in the designed Table.

In the case of the *bivariate analysis*, the Pearson's chi-square statistics (χ^2) are applied to assess the association between male's willingness to circumcise against the selected categorical variables, say, religion, place of residence, age, marital status and level of education and other HBM proxies. The *Chi-Square Test* is carried out to examine the association of the proportional distribution of the categorical independent variables against the dependent variables. The level of significance of associations is established at 95% and the level of significance of the association is defined to be 5 % or 0.05 .

Accordingly, the formula of the Pearson Chi-square test of association is defined as follows:

$$\chi_c^2 = \sum_{i=0}^3 \frac{(O_i - E_i)^2}{E_i}$$

where; χ^2 = computed Chi-squares;

Σ = sigma notation/ summation sign;

O_i = observed frequencies where $i=1,2, 3$, etc

E_i = expected frequencies where $i= 1,2,3$,etc

The decision criteria is based on the stated Null-Hypothesis.

status; place of residence; religion; perceived susceptibility to disease; perceived seriousness (severity) of disease; perceived benefits of preventive action; perceived barriers to preventive action; cues to action; .self-efficacy etc. Each main variable will be split into categorical variables. For example, education as main variable is categorized as: “no-education”, “primary”,

Normally, the H_0 (Null-Hypothesis) is stated as: “there is no difference in the association between selected categorical variables of each main independent variable against any categorical variables of a dependent variable”. The decision criterion is that If the computed χ^2 is higher than the one picked from the standard Pearson's chi-squares table, under a given degree of freedom (df) , then the H_0 is rejected, implying that there are differences among the given categorical variables in the distribution of the target population (ie., males responding to the question of willingness to circumcise)

In order to examine the differentials in the degree of impact among the categorical variables of a main variable, we select a *Reference Category* from among the group of the categorical variables of the same main variable and apply the *Logistic Regression Model* which is appropriate for our analysis (Refer to Sarkar and Midi,2010: *Binary Logistic Model*).

The magnitude of the influence of each independent variable “X” on the dependent variable “willingness to circumcise” is expressed as “Odds Ratio”, which signifies the importance of each categorical variable of the main variable in relation to the appropriately designated “**Reference Category**” in the model. The formula of Odds Ratio is expressed as follows:

Odds Ratio = $\exp(\beta)$, interpreted as creating an additional column for “ β ” coefficients, showing +ve or –ve values of β which facilitates the interpretation of the **odds ratios**, expressing the magnitude of the relations against the reference category, being interpreting as *times more likely or times less likely etc,”* .

4. Analysis of Results:

4.1. Univariate Analysis

The percentage frequency distribution of the 5025 targeted uncircumcised men in the age group 10-4 are presented in Table 1.

Table 1: Percentage distribution of sampled males by selected potential confounders:

Variables	%	total	Variables	%	Total	Variables	%	Total
Education:			12 months sexual partner			4 weeks ago hear on HIV/AIDS?		
Never attend	9.7	487	One or no partner	77.3	3885	Yes	617	3103
Primary	30.3	1523	More than one partner	22.7	1142	No	38.3	1922
Secondary	44.9	2256	Total	100.0	5027	Total	100.0	5025
Higher	15.1	759						
Total	100.0	5025						
Residence:			Action to prevent HIV??			4 weeks ago talked HIV/AIDS with anyone?		
Rural	39.8	2000	Yes	98.1	4928	Yes	40.6	2040
Urban Village	31.1	1563	No	1.9	97	No	59.4	2985
Cities/towns	29.1	1462	Total	100.0	5025	Total	100.0	5025
Total	100.0	5025						

AgeGroup:		ARVs cure AIDS?		Ever want to be tested for HIV?	
10-29	64.7 3250	Yes	22.0 1105	Yes	
30-.39	22.0 1106	No	78.0 3920	No	87.0 4369
40-49	13.3 669	Total	100.0 5025	Undecided	9.1 462
Total	100.0 5025			Total	100.0 5025
Religion:		Can HIV transmit to uninfected partner?			
Christian	60.9 3061	Yes	88.2 4434		
Non-christian	6.0 303	No	11.8 591		
No-Religion	33.1 1661	Total	100.0 5025		
Total	100.0 5025				
MaritalStatus:		Get HIV/AIDS because of witchcraft?			
Never	68.4 3437	Yes	10.2 515		
Married	11.6 583	No	89.8 4510		
Once Married	20.0 1005	Total	100.0 5025		
Living together	100.0 5025				
Total					

The salient features of the background variables in the table are summarized as follows:

- 45% of those completed secondary education and about 30 % of those completed primary education have not yet been circumcised;
- 40% of rural males and 31% of males in urban villages were found not circumcised;
- 65% of those in the age bracket 10-29 were not yet circumcised;
- 61% of the Christian male respondents have not been circumcised and
- 68% of never married on
- es were found to have been uncircrucised.,

With respect to the responses to the Qualitative Questions (Table1), a large proportions of males responded not to have been circumcised, as summarized below:

- 77% of the males remained with *one or no partners*;

98% of them believed that something could be done to prevent HIV infection;

- 78% believed that ARVs 'couldn't cure AIDS;
- 88% believed that HIV transmission could be reduced if one intercourses with uninfected partner;
- 90% of them responded that witchcraft couldn't be responsible to transmit HIV/AIDS;
- 62% responded to have heard or seen any information about HIV/AIDS during the past 4 weeks and ;
- 59% against 41% of males responded to have not discussed about HIV/AIDS with any one during the last 4 weeks; and
- 87% of them responded that they would like to have tested for HIV.

4.2. Bivariate Analysis:

Table 2 shows the outputs of Chi-Squares (χ^2) analytical technique with respect to those males who responded "willingness" to undergo Safe Male Circumcision (SMC) against their background and related questions posed to each respondent.

Table 2: Percentage distribution of males willing to circumcise by selected variables

Variables	% (n)	Variables	% Total	Variables	% Total
Education:		12 months sexual partner		4 weeks ago hear on HIV/AIDS?	
Never attend	54.1 291	One or no partner	66.2 1648	Yes	63.1 2035
Primary	51.9 865	More than one partner	70.5 521	No	55.5 1111
Secondary	62.4 1559	Total	2169	Total	3146
Higher	62.3 523	df= 1, X²= 4.7		df= 1, X²= 30.2	
Total	3238				
df=3, X²=58.2					
Residence:		Action to prevent HIV??		4 weeks ago talked HIV/AIDS with anyone?	
Cities/Towns	63.3 1034	Yes	98.1 4928	Yes	67.3 1433
Urban villages	59.5 1039	No	46.9 46		
Rural areas	54.2 1207				

Total df= 2, X²= 33.6	3280	Total df= 1, X²= 8.5	3104	No Total df= 1, X²= 74.5	55.4 1737 3170
AgeGroup: 10-29 30-39 40-49 Total df= 2, X²= 87.0	54.5 1967 66.3 824 64.7 489 3280	ARVs cure AIDS? Yes No Total df= 1, X²= 0.18	63.1 611 62.4 2163 2774	Ever want to be tested for HIV? Yes No Undecided Total df= 1, X²= 124.9	63.1 2885 41.4 196 38.9 79 2983
Religion: Christian Non-christian No-Religion Total df= 2, X²= 10.15	59.9 2024 61.5 211 55.6 1040 3275	Can HIV reduce with uninfected partner? Yes No Total df= 1, X²= 5.8	61.7 2714 56.6 331 304 5		
MaritalStatus: Never Married Once Married Living together Total df= 2, X²= 91.13	54.6 2087 61.1 396 70.3 794 3277	Get HIV/AIDS because of witchcraft? Yes No Total df= 1, X²= 5.2	56.2 277 61.5 2604 2881		

We observe that willingness to circumcise increases with educational level and/or attainment, indicating a positive relationship between the two variables at hand. The results depict a strong association between males' willingness to circumcise and level of education.

Results also reveal a strong association between place of residence and males' willingness to undergo safe male circumcision. We observe that out of the total males who showed willingness to go for the procedure, 63.3% of them resided in cities and towns, 59.5% in urban villages while 54.2% of them live in rural areas. Thus, males living in rural areas are less willing to undergo safe male circumcision than their counterparts living in urban villages as well as towns and cities.

With respect to religion, 59.9% of males showing willingness to circumcise reported that they were Christians, while 61.5% were non-Christians and 55.6% had no religion at all. The relationship between males' willingness to circumcise and religion is also statistically significant at 5% interval.

For the male's marital status variable, we observe that 54.6% of those showing willingness to circumcise were never married, 61.1% were once married whereas 70.3% of them were living together with their partners. Again, a strong association was observed between the two variables. Cross-tabulation results from table 2 also indicate that, 54.5% of males who showed willingness to circumcise were aged 10-29 years, 66.3% aged 30-39 years while 64.7% were aged 40-49 years. There is an increase in males' willingness to circumcise with age which slightly falls at the ages 40-49. Likewise, results show a strong association between willingness to circumcise and age.

Results also reveal that 66.2% of the males willing to

circumcise reported having slept with one or no sexual partners in the last year, while 70.5% indicated that they slept with more than one partners. On the other hand, 61.5% of the males showing willingness to undergo the procedure believed that there is anything a person can do to prevent becoming infected with HIV, whereas 46.9% of them answered 'no' to the question, meaning they did not believe that. Males were also asked if they believed that ARVs cure AIDS. Among the males who showed willingness to circumcise, 63.1% of them answered affirmatively, while 62.4% believed that ARVs do not cure AIDS.

However, the relationship between the two variables at hand is statistically insignificant at 5% level. Results in table 4 also show that 61.7% of males showing willingness to circumcise believed that people can reduce their chances of getting HIV/AIDS by having only one uninfected sex partner who has no other partners, while 56.6% did not see that as practical and/or possible. Furthermore, 63.1% of males willing to circumcise reported that they have heard or seen HIV/AIDS information in the past four weeks, whereas 55.5% of them indicated that they did not. We also observed that 67.3% of males showing willingness revealed that they discussed HIV/AIDS with someone during the past four weeks while 55.4% reported that they did not. Note that these relationships are statistically significant at 5% level.

Among the males showing willingness to undergo safe male circumcision, 56.2% of them believed that people can get HIV/AIDS because of witchcraft while 61.5% of them did not see that as a possibility. Finally, 63.0% of males willing to be circumcised reported that they would ever want to be tested again for HIV, while 40.9% did not want to be tested again. On the other hand, 41.1% of the males willing to undergo circumcision were undecided about ever testing again for HIV.

We also observe statistically significant relationships between the variables above at 5% level.

In conclusion, Table 2 strongly manifests the variations in willingness to circumcise across all categorical variables of each main independent variable with strong computed χ^2 as related to the lower values of χ^2 in the standard statistical chi-squares corresponding with the degree of freedom (df) at 5% significance level.

4.3. Application of the Logistic Regression Model: Factors which contribute towards men's willingness to circumcise.

4.3.1. Binary logistic regression results for likelihood that a man will undergo safe male circumcision. (Gross effect Model).

Table 3 shows binary logistic regression gross effect model results. According to the results, the odds of males' willingness to circumcise for males who have attended

primary education are less than the odds of those who have never attended formal education (OR=0.913). Thus, males with primary level of education as their highest qualification are less likely to circumcise than those who have never attended school. However, the relationship between having attended primary level of education and willingness to circumcise is statistically insignificant at 5% level.

Furthermore, males with secondary level of education as their highest qualification are 1.408 times more likely to be willing to circumcise as compared to those in the control group (who have not attended formal education). In this case, the relationship between the two variables at hand is statistically significant at 5% level. On the other hand, males who have attained higher education are 1.402 times more likely to show willingness to undergo safe male circumcision compared to those with no formal education. The relationship is also statistically significant at 5% level.

Table 3: Determinants of males' willingness to circumcise (Gross effect model).

Variables (Odds Ratio)	β (P-value)	exp(β) Lower	Std. error Upper	Sig. test	95% C.I.)	
Level of Education (1)						
<i>Never attended (Ref)</i>	-	1.000	-	-	-	-
<i>Primary</i>	-0.091	0.913	0.099	0.361	0.752	1.109
<i>Secondary</i>	0.342	1.408	0.096	0.000	1.167	1.697
<i>Higher</i>	0.338	1.402	0.112	0.003	1.126	1.745
Religion (1)						
<i>Christian</i>	0.173	1.189	0.058	0.003	1.061	1.333
<i>Non-Christian</i>	0.242	1.274	0.120	0.044	1.006	1.613
No religion (Ref)	-	1.000	-	-	-	-
Place of Residence (1)						
<i>Cities/towns</i>	0.379	1.460	0.067	0.000	1.281	1.664
<i>Urban villages</i>	0.219	1.245	0.065	0.001	1.097	1.413
<i>Rural areas (Ref)</i>	-	1.000	-	-	-	-
Marital status (1)						
<i>Never married</i>	-0.679	0.507	0.073	0.000	0.440	0.585
<i>Once married</i>	-0.411	0.663	0.104	0.000	0.541	0.812
<i>Living together (Ref)</i>	-	1.000	-	-	-	-
Age (1)						
<i>10-29</i>	-0.424	0.654	0.083	0.000	0.556	0.770
<i>30-39</i>	0.074	1.076	0.097	0.448	0.890	1.302
<i>40-49(Ref)</i>	-		1.000	-	-	-
12 months sexual partners (2)						
<i>One or no partner(Ref)</i>	-	1.000	-	-	-	-
<i>More than one partner</i>	0.197	1.218	0.091	0.030	1.019	1.456
Is there anything a person can do to prevent being infected with HIV?						
<i>Yes</i>	0.590	1.803	0.204	0.004	1.208	

<i>No (Ref)</i>	-	1.000	-	-	-	-
<hr/>						
Do you believe that ARVs cure AIDS?						
<i>Yes (Ref)</i>		1.000	-	-	-	-
<i>No</i>	-0.032	0.968	0.075	0.670	0.836	1.122
<hr/>						
Possibility of HIV transmission reduction with one uninfected sexual partner?						
<i>Yes</i>		0.214	1.238	0.089	0.016	1.040
<i>No(Ref)</i>		-	1.000	-	-	-
<hr/>						
Can people get HIV/AIDS because of witchcraft (5)						
<i>Yes (Ref)</i>		-	1.000	-	-	-
<i>No</i>		0.218	1.243	0.096	0.023	1.030
<hr/>						
In the past 4 weeks have you heard or seen any information about HIV/AIDS? (6)						
<i>Yes</i>		0.318	1.374	0.058	0.000	1.227
<i>No (Ref)</i>		-	1.000	-	-	-
<hr/>						
During the past 4 weeks have you discussed HIV/AIDS with anyone? (6)						
<i>Yes</i>		0.504	1.655	0.059	0.000	1.475
<i>No(Ref)</i>		-	1.000	-	-	-
<hr/>						
Would you ever want to test (again) for HIV? (7)						
<i>Yes (Ref)</i>		-	1.000	-	-	-
<i>No</i>		-0.887	0.412	0.098	0.000	0.340
<i>Undecided</i>		-0.988	0.372	0.147	0.000	0.279
<hr/>						

We also observe that Christian males are 1.189 times more likely to be willing to undergo safe male circumcision than those with no religion. The relationship between being male Christian and willingness to circumcise is statistically significant at 5% level. On the other hand, the results reveal that non-Christian males are 1.274 times more likely to be willing to undergo the procedure than the males with no religion. We also observe a statistically significant relationship at 5% level between the variables. With regard to place of residence, table 5 indicates that males who live in cities and towns are 1.460 times more likely to show willingness to circumcise than those living in rural areas. Those residing in urban villages are 1.245 times more likely to be willing to undergo safe male circumcision compared to those residing in rural areas. All these relationships are statistically significant at 5% level as shown in table 5.

As far as marital status is concerned, results indicate that the odds of males' willingness to circumcise for never married and once married males' are less than the odds of those living together with their partners or the control group (OR = 0.507 & 0.663 respectively). Thus males who are never and once married are less likely to show willingness to circumcise than those living with their partners. Both these relationships are statistically significant at 5% level. Results in table 5 also reveal that the odds of males' willingness to circumcise for youth (aged 10-29 years) are less than the odds of the adult

males in the age group 40-49 (OR=0.654). In other words, the youth are less likely to show willingness to circumcise than the adults. The relationship between the two variables is statistically significant at 5% level. On the other hand, we observe that young adult males aged 30-39 years are 1.076 times more likely to show willingness to circumcise than those in the reference category. However, the relationship is statistically insignificant at 5% level.

Males who reported that they had sexual intercourse with more than one partners in the last twelve months were 1.218 times more likely to show willingness to circumcise than the ones who indicated that they had zero or one partner. On the other hand, men who believed that a person can do something to prevent becoming infected with HIV were 1.803 times more likely to be willing to circumcise than those who believed otherwise. Both these relationships are statistically significant at 5% level.

The odds of males' willingness to circumcise for those who believed that ARVs cure AIDS are less than the odds of males who did not agree with that (OR=0.968). Thus males who believed that ARVs cure AIDS are less likely to show willingness to circumcise than those who did not believe that. However, the relationship between the two variables is statistically insignificant at 5% level. We also observe that males who feel that people can reduce their chances of getting HIV/AIDS by having only one uninfected sex partner who has

no other partners were 1.238 times more likely show willingness to go for circumcision than those who did not agree with that. The relationship in this case is statistically significant at 5% level as shown in table 5.

Results further reveal that males who do not agree that people can get HIV/AIDS because of witchcraft were 1.243 times more likely to show willingness to circumcise than those who agree with that. For the males who have reported that they have heard or seen HIV/AIDS information in the past four weeks, we observe that they are 1.374 more likely to show willingness to do circumcision than those who did not see or hear about such information. Results also show that males who have indicated that they have had HIV/AIDS discussions with someone during the past four weeks were 1.655 times more likely to show willingness to circumcise than those who reported that they did not embark on such discussions. All these relationships are statistically significant at 5% level.

Finally, we observe that the odds of males' willingness to circumcise for those who did not want to be tested again for HIV and those undecided about it were less than the odds of the males who would ever want to be tested again (OR=0.412 & 0.372 respectively). This tells us that males who did not want to be tested again for HIV and those undecided about it were less likely to show willingness to circumcise than those who would ever want to be tested again. Note that likewise, both these relationships are statistically significant at 5% level as shown in table 5.

Discussion, Conclusions & Recommendations

Discussion

The results of this study showed a low prevalence of circumcision (12.3%) among the study population. However those who underwent the procedure may have done so for hygiene, religious and traditional purposes. Circumcision prevalence increased with education level and age. On the other hand, we also observe that circumcision prevalence was high among males residing in towns and cities, non-Christians and those who have once married. The observed increase of circumcision prevalence with age for instance, could be explained by the past cultural practice. Circumcision was historically entrenched in Botswana until around the 1980s. Hence, this increasing pattern may be due to the fact that most of the older males (40-49 years) circumcised at the time, while young people and adults did it later in life, mainly for hygiene purposes. A slightly high prevalence among males who have once married may also be due to the fact that, historically, young men were expected to go through initiation school before being declared adults, to later marry. So there is a likelihood that most of these men circumcised at initiation schools.

The findings also revealed a strong association between level of education and male's willingness to circumcise. This could be attributed to the fact that generally, more educated males reside in cities/towns and have an advantage of information and knowledge on the benefits of circumcision. In this case, there is a possibility that quite a significant percentage of them circumcised for hygiene and/or clinical purposes. This corroborates with a study findings by Gasasira et al, (2012) in Rwanda, that higher education was significantly associated with being circumcised. Another study by Tieu et al., (2010) found out that willingness to be circumcised among Thailand men increased from a baseline of 14.2% to 24.9% after they were educated about the benefits of the procedure. The findings are also in line with WHO and UNAIDS (2007) study

that men in Ethiopia are most likely to be circumcised if they have at least secondary education and live in urban area. This suggests that male circumcision promotion campaigns would have more impact in increasing men's willingness to circumcise if they are modeled to take into account varying educational levels of the target population.

The findings also revealed that place of residence is strongly associated with males' willingness to circumcise. We observe that males residing in cities/towns were more willing to circumcise than their counterparts residing in urban villages and rural areas. Gasasira et al, (2012) study in Rwanda revealed that there was high acceptance of SMC in the city of Kigali due to the coupling effect of access to information and education compared to other provinces. Generally males living in cities/towns are more educated than those residing in urban villages and rural settings. They also have better leverage in terms of access to information in varying formats like print, internet and diverse radio channels (mass media) through which they can increase their knowledge on sexual reproductive health matters. The application of the binary logistic multivariate analysis yielded expected results that males residing in urban villages and cities/towns were more likely to show willingness to circumcise than their counterparts in rural areas. However, these relationships were statistically insignificant and hence contradict Busang et al. (2011) study findings that urban dwellers in Botswana were 1.5 times more willing to get circumcised than rural dwellers.

A strong association was also observed between men's willingness to circumcise and religion, although the logistic regression multivariate odds ratio showed a statistically insignificant relationship at 5% level between the variables at hand. This could be proof that circumcision is widely accepted in Botswana, irrespective of religious affiliation. In many countries worldwide, SMC prevalence and acceptability is high among Muslims. As part of their Abrahamic faith, Muslims practice circumcision as a confirmation of their relationship with God; the practice is also known as *tahera*, meaning "purification" (WHO & UNAIDS 2007). Yang et al, (2012) after conducting a study in China concluded that; it is possible that the universal practice among Muslims influenced greater MC acceptability among the population in other groups across Xinjiang province. A study by National Institute for Medical Research and Ministry of Health & Social Welfare (2009) revealed that Muslims are the largest religious group to practice circumcision in Tanzania. However, this study has revealed male's willingness to circumcise across all religious denominations, including those with no religion.

Furthermore, this study has also revealed a strong association between males' willingness to circumcise and their relationship status. Logistic multivariate analysis results show that males who are once married are less likely to show willingness to circumcise than those who are never (single) and living together with their partners, and were statistically significant. Married couples may not see the need to adopt HIV preventive means due to trust. For instance Drezin et al, 2007 (as cited by Population Action International, 2008) maintain that condom use is infrequent among married couples for multiple reasons, including the desire for children and the widespread association of condoms with infidelity and lack of trust.

Hence, wives may not be instrumental in encouraging their male partners (husbands) to circumcise. Outside marriage, females may feel vulnerable to HIV and encourage their partners to circumcise. Whereas non-married women may

have some ability to negotiate safer sex, married women face extra challenges because of the fear of being suspected of promiscuity by their spouses, which may lead to unwanted consequences such as separation or even divorce (Akwaru et al, 2003). Unlike in the past, women nowadays play a part in sexual matters within their relationships, particularly those who are educated and staying in towns/cities. A Study by Mavhu et al. (2011) in Zimbabwe, have found out that 58% of women indicated that they would like their partners to be circumcised. Hence involving females in the SMC educational campaigns, as both resource persons and beneficiaries (target audience) is crucial to increase its acceptability and thus demand/or uptake.

A strong association between male's willingness to circumcise and age was also observed. However logistic multivariate analysis yielded a statistically insignificant relationship between willingness to circumcise and age. Results show that youth (10-29) and young adults (30-39) were less likely to show willingness to circumcise than adults (40-49). These results contradict what was found in Rwanda by Gasasira et al. (2012) and in China by Yang et al, (2012) that adolescents and young adults were more willing to be circumcised

Perceived susceptibility to disease variable was measured by two questions, the first being the number of sexual partners a man had in the last 12 months. The assumption was that men who slept with more than one partner in the last 12 months perceived themselves as not being at risk of contracting HIV and hence were less likely to show willingness to circumcise. An association was observed between the variables at hand. The fact that a higher percentage of males who slept with more than one partner were willing to circumcise may be due to the fact they perceived themselves at risk of HIV/AIDS, and probably thought SMC was a complete solution to HIV prevention, given their sexual behavior. This could be the case especially that no prior education sessions on SMC were undertaken before males were interviewed. SMC offers up to 61% HIV risk reduction, but this does not mean people should take risks in view of that. On the other hand, multivariate analysis deemed the relationship statistically insignificant.

The second question used to measure perceived susceptibility to disease was "is there anything a person can do to prevent becoming infected with HIV, the virus that causes AIDS?" However, multivariate analysis revealed a statistically insignificant relationship but a strong association was observed between this variable and willingness to circumcise. If males who perceive themselves to be susceptible to HIV/AIDS are effectively made aware of the protective effect of circumcision against HIV, then they will show willingness to undergo the procedure. Maes and Louis (2003) observed that generally older adults believe that they are not at risk of contracting HIV, and hence many do not practice safer sex. Perceived risk of getting AIDS may have important implications for health if the perceptions are rational and lead to a willingness to avoid risky behavior (Akwaru et al, 2003). HIV/AIDS campaigns should continue, especially Multiple Concurrent Partnership programme, to show everyone (including males) that they are susceptible to the scourge if they embark on sexually risky behaviors.

This study also measured males' perceived seriousness (severity) of disease through a question which asked if they believed that ARVs cure AIDS. Results revealed no association between this variable and willingness to circumcise. Also, through multivariate analysis, the relationship was statistically insignificant. An association was

observed between perceived benefits of preventive action and willingness to circumcise, although multivariate analysis yielded statistically insignificant relationship. In this case the assumption was that males who agree that people can reduce their chances of getting HIV/AIDS by having only one uninfected sex partner who has no other partners would show willingness to circumcise. Continued HIV/AIDS campaigns are still crucial in influencing males' decisions to circumcise, as they will fully understand the benefits of the procedure.

This study results revealed an association between perceived barriers to preventive action and willingness to circumcise. We also observed a statistically significant relationship between the two variables through binary logistic multivariate analysis. In this case, males who do not believe that people can get HIV/AIDS because of witchcraft were more likely to show willingness to circumcise than those who believe that. Some cultural beliefs and practices have high propensity to compromise health intervention initiatives, especially in rural areas where such may be entrenched. According to Wasti et al, (2011), in Nepal HIV/AIDS related sickness is perceived as a punishment for some wrong doing that has been committed. HIV/AIDS and SMC campaigns should be modeled in such a way that they take cognizant of the diversity of geographical locations of a country, to address the varying educational levels, cultural practices and other social dynamics.

A strong association between cues to action and willingness to circumcise variables was also observed. Cues to action define all events, people and/or all things that are instrumental in pushing individuals to change their behavior. The study assumed that males who have heard, seen and discussed HIV/AIDS information during the past four weeks were more likely to show willingness to circumcise. However, for multivariate analysis, results were in the expected direction but statistically insignificant. Behavioral change at individual level can be influenced by interpersonal communication, between friends, family members and colleagues at workplaces. People's experiences are likely to change other people's perceptions and/or attitudes towards a health intervention like SMC, ultimately increasing its uptake.

Again, a strong association and statistically significant relationships were observed between males' willingness to circumcise and self-efficacy in this study. In this case self-efficacy was measured by the question "would you ever want to be tested (again) for HIV?" The assumption was that males who would want to be tested again for HIV would show willingness to circumcise because they are always careful not to contract HIV. The results were in expected direction and revealed that males who did not want to test again for HIV, and/or undecided thereof, were less likely to show willingness to circumcise respectively. This tells us that males' willingness to circumcise is compromised by lack of self-efficacy. People generally do not try to do something new unless they think they can do it. For instance, according to Wallace (2002), women who do not engage in the recommended levels of weight bearing exercise tend to have low exercise self-efficacy, meaning they do not believe they can exercise. We should note that at the time of BAIS III in 2008, SMC had not been introduced in the country as an add-on HIV/AIDS intervention strategy. Hence there is likelihood that most men interviewed at the time did not have full information about its clinical effects. There is also a possibility that they harbored negative perceptions about the procedure (barriers) and hence felt they could not do it.

Conclusion

Although the government of Botswana has over the years adopted various intervention strategies to curb and manage HIV/AIDS, the scourge remains a challenge for the country. Recently (2009) SMC was introduced by Ministry of Health as an add-on HIV intervention strategy, targeting HIV negative males aged 10-49 years. However, the challenge at hand is that there is low uptake of the SMC service countrywide. This study aimed at establishing factors which influence males' willingness to circumcise through the operationalization of the Health Belief Model.

Results show a strong association between male's level of education, marital status, religiosity, place of residence, age (socio-demographic characteristics), their perceived susceptibility to disease, perceived benefits of preventive action, cues to action, self-efficacy and willingness to circumcise. Furthermore, multivariate analysis reveal statistically significant relationships between once married, belief that it is impossible for people to get HIV/AIDS because of witchcraft, not being ready as well as being undecided to test for HIV again and willingness to circumcise. HIV/AIDS campaigns and males' individual socio-demographic characters are crucial in improving SMC campaigns. This study findings need to be considered in educational campaigns, as evidence based planning is vital for desired program's output. HIV intervention strategies, including SMC, can only be effective if their modeling and evaluation are informed by timely data to address their bottlenecks. Access to relevant SMC information is an important factor in that men residing in rural areas for instance, may be less willing to circumcise than their counterparts in urban areas because of limited information and/or knowledge about the procedure.

Recommendations

It is evident from the study findings that a significant percentage of males have shown willingness to circumcise. Ministry of Health and the relevant stakeholders should double their efforts in SMC campaigns and service provision to increase the program's demand and adequately meet it thereof.

The findings have revealed that once married males are less likely to show willingness to circumcise. Married males and couples in general may not feel susceptible to HIV and hence may not see the need to adopt HIV preventive means (including SMC) due to trust. However, they are still affected by the scourge particularly through multi concurrent partnerships. There is need for SMC service providers to emphasize other procedure's benefits like hygiene to attract more married males. This will likely trigger their willingness to circumcise with the support of spouses.

The study findings also revealed that male's willingness to circumcise is compromised by lack of self-efficacy. Thus, males who did not want to be tested again for HIV as well as those undecided about it were less likely to show willingness to circumcise. This has a potential to lead to low uptake of SMC as HIV testing is a pre-requisite. There is need to further intensify efforts in educating people about the importance of voluntary HIV testing.

The study also recommends that the upcoming BAIS IV expand the questions on circumcision (more open ended) so that males can be probed further on the responses on the procedure, to capture much more needed information vital to further improve the program or address its bottlenecks.

Lastly, there is need for further research to investigate if (and when) willingness to circumcise translates into actual circumcision.

Study limitations

- The study utilized 2008 BAIS III data set which was collected prior to SMC program adoption and implementation in Botswana. The results may hence not reveal a true picture as circumcision prevalence has increased over time in the country. Also the causal relationship between willingness to circumcise and selected confounders may have shifted due to the fact that now all relevant information about the procedure has been given to the people countrywide (threat to internal validity).

BAIS III questionnaire did not specifically ask men reasons why they would be willing and not willing to circumcise, as a way of capturing their perceptions regarding the procedure. This study hence measured most of the HBM variables (*perceived susceptibility to disease, perceived (severity) seriousness of disease, perceived benefits of preventive action, perceived barriers to preventive action, cues to action and self-efficacy*) with proxies, yielding threats to construct validity (overall quality of the measurement operations used). It would be more ideal to measure such constructs with direct questions like the ones below;

Do you believe a circumcised man should have more than one sexual partner?

During the past 4 weeks have you discussed MC with anyone? Why would you be willing to test?

In the past 4 weeks have you heard or seen any information about MC?

The data set used had many missing cases which could be attributed to among other, non-responses. This yielded inconsistent variable values for this study and has a high potential to affect representativeness of the sample to the general population.

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