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Chapter

Voluntary Medical Safe Male Circumcision for HIV/AIDS Prevention in Botswana: Background, Patterns, and Determinants

Mpho Keetile

Abstract

The safe male circumcision program has been running for about 10 years now, in Botswana. This chapter uses data derived from the two Botswana AIDS Impact Surveys (BAIS III and IV) conducted in 2008 and 2013, the period before and after the implementation of the SMC program to assess the background, patterns, and correlates of safe male circumcision. Data were analyzed using multivariate logistic regression models. Overall, 785 (12.5%) and 956 (25.2%) men reported to have been circumcised in 2008 and 2013, respectively. Elderly men aged 55–64 years were more likely to have been circumcised than men aged 10–24 years (APR = 3.40, CI = 2.00–5.76 in 2008 and APR = 3.63, CI = 2.36–5.57 in 2013). Men with primary or low and secondary education and those who reside in rural villages (APR = 0.70, CI = 0.54–0.89 in 2008; APR = 0.71, CI = 0.58–0.86 in 2013) were less likely to have been circumcised compared to men who resided in cities and towns. The odds of circumcision were also significantly low among never married (APR = 0.43, CI = 0.24–0.76) and cohabiting (APR = 0.45, CI = 0.26–0.80) men than once-married men in 2008. In 2013, the odds of circumcision were significantly low among married men (APR = 0.93, CI = 0.47–1.82). Understanding the background, patterns, and correlates of safe male circumcision is essential for programming and assessment of the effectiveness of the program.

Keywords: voluntary, safe male circumcision, HIV/AIDS, prevention, Botswana

1. Background

Male circumcision is not a new practice in Africa. It has been practiced for thousands of years as a ritual and a rite of passage to manhood [1, 2]. Similarly, in Botswana, male circumcision has been practiced as far as 1875, marked by an initiation ceremony into manhood called “*bogwera*” [3]. During the *bogwera* ceremony, young adolescent males were taken through a month-long period of seclusion into the wilderness where they were taught survival skills, tribal laws, and customs [4]. The *bogwera* was not practiced by all tribes in Botswana; only the Baletle and Bakgatla tribes were participating in this ceremony [5]. In 1917, the British High Commissioner

to Botswana passed a law to abolish initiation ceremonies, indicating that they were unhygienic and cruel [6].

In 1985, Botswana had the first HIV/AIDS case. Ever since from that time, a series of response plans and programs have been devised to reduce HIV transmission. In the early 2000s, epidemiological studies observed a significant association between circumcision and low HIV/AIDS prevalence [7–9]. It was found that countries with high circumcision rates recorded the lowest HIV/AIDS prevalence rates, in West, East, and Southern Africa [1]. Most of the studies conducted in these regions found that circumcision reduced vulnerability to HIV [10–12]. In order to provide conclusive empirical evidence, three randomized clinical trials were conducted to assess the effects of safe male circumcision for the prevention of HIV infection through heterosexual contact in South Africa, Uganda, and Kenya [13–15]. These trials congruently showed that HIV transmission was reduced by over 60% among circumcised men.

Owing to the evidence of the protective effects of circumcision against HIV transmission, several studies were undertaken in Botswana. Initial studies assessed the acceptability of safe male circumcision (SMC) among men in Botswana [16]. Subsequently, a mathematical model was used to calculate the public health impact of large safe male circumcision for HIV prevention. It was found that male HIV prevalence reduced from 30 to 10% and female HIV prevalence was reduced from 40 to 20% [17]. In 2009 the government of Botswana through the Ministry of Health and Wellness adopted the voluntary safe male circumcision program [17]. A 5-year strategy was then developed, which aimed at reaching 80% circumcision coverage [17]. According to Dickson et al. [18], less than 20% of males in Botswana had access to male circumcision services in 2010. Although the SMC program has been running for about 10 years in Botswana, recent evidence indicates that the program has failed to achieve its intended coverage [3].

This chapter is therefore intended to provide the background and assess the patterns and correlates of safe male circumcision within the context of a high HIV/AIDS prevalence setting. The chapter starts by providing a brief background on male circumcision and the SMC program in Botswana. It goes on to assess the patterns and determinants of SMC since the introduction of the program in 2009. An understanding of the background, patterns, and correlates of safe male circumcision is essential for programming and assessment of the effectiveness of the program.

2. Theoretical framework

This chapter generally adopts a multifaceted approach that considers HIV/AIDS risk perception among circumcised men by assessing patterns of circumcision and factors associated with circumcision among men in Botswana. This is done with the assumption that circumcision can only be effective in the context where men consider its health benefits. Most public health studies have often used individual and social behavioral theories to explain why individuals are willing to undertake a certain action and why they behave the way they do [19–22]. Individual behavior models focus on the role of individual characteristics in controlling individual behavior. Thus they focus on how individuals control their behaviors and make reasoned actions that impact those decisions [23]. On the other hand, social models include social pressures, peer influences, cultural expectations, economic factors affecting resource availability, legal and political

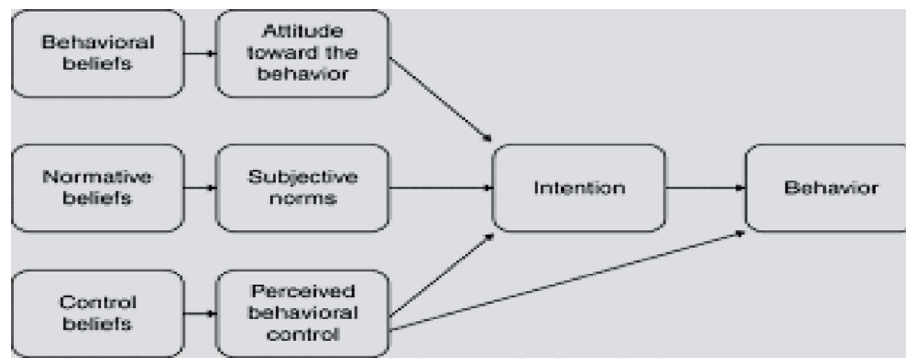


Figure 1.
Theory of reason action [25].

structures, and political and religious ideologies that restrict individual's options and the flow of information [23].

Among the various individual and social behavioral models, the theory of reasoned action (TRA) has been selected and used in this chapter to explain why men would or would not circumcise. The TRA was developed and revised numerous times by Ajzen and Fishbein [24, 25]. This theory proposes that behavioral intentions are a combined function of the attitude toward performing a particular behavior in a given situation and of the norms perceived to govern that behavior multiplied by the motivation to comply with those norms [26]. The assumption is that human beings are usually quite rational and make systematic use of the information available to them. People consider the implications of their actions before they decide to engage or not engage in a given behavior [25].

As circumcision is recommended for medical reasons (especially prevention of HIV acquisition), men who may choose circumcision must also believe that circumcision may reduce chances of HIV acquisition. This model was mainly chosen because, the constructs of this model are key in informing men's decision to accept circumcision. The assumption of TRA is that most behaviors of social bearing are under voluntary control and that a person's intention to perform or not do the behavior is the direct determinant of that action [25]. Consequently, men's intention regarding SMC is determined by personal and social influences. One personal factor is the person's evaluation of the outcome of circumcision, which can be either positive or negative.

Men who perceive that circumcision is necessary for reduction of HIV transmission may choose the procedure. Meanwhile men who believe otherwise may have negative evaluation of circumcision and may choose not to circumcise. Subjective norm is the other determinant of a person's intention which is a person's perception of the social pressures applied to perform the behavior [25]. As illustrated in **Figure 1**, an individual's intentions and behaviors are influenced by certain background factors which include individual, social, and information factors.

3. Methodology

3.1 Data

Data used in this chapter was derived from the two Botswana AIDS Impact Surveys (BAIS III and IV). BAIS III was conducted in 2008 before the implementation of SMC program, while BAIS IV was conducted in 2013 after the implementation of the SMC program. The main objectives of the BAIS were to

provide information to assess whether programs are operating as intended; assess performance of intervention programs; assess whether people are changing their sexual behavior; establish the proportion of people in need of care due to HIV infection; establish the proportion of people who are at risk of HIV infection; assess the impact of the pandemic at household level; and provide information on issues related to the impact of HIV/AIDS on households and communities [27]. BAIS III and IV are the two surveys which have asked the same questions on male circumcision that can be used to assess the patterns and determinants of SMC in Botswana. A sample consisting of 6290 and 3787 men in ages 10–64 years who had successfully completed BAIS III and IV individual questionnaires, respectively, were selected and included for analyses. Respondents who did not complete the individual questionnaire were excluded from the present analysis.

3.2 Response variable

The main variable of interest used in this paper is on “circumcision status.” This is based on the percentage of circumcised men between ages 10 and 64 years in the sample population. This variable is derived from self-reported responses to a question that sought to know whether the respondent was circumcised or not.

3.3 Explanatory variables

Sociodemographic variables such as age, sex, residence, education, and religion were used as control variables based on prior empirical research which has shown that conceptually these variables are associated with sexual risk behaviors [28, 29].

3.4 Statistical analysis

Analyses were conducted using SPSS version 25 program (IBM, SPSS, Chicago, IL, USA). In order to assess patterns of circumcision, adjusted prevalence ratios (APR) and their corresponding 95% confidence intervals were obtained using modified Poisson regression models. The associations between male circumcision and sociodemographic and behavioral factors were estimated for each of the surveys. In order to avoid confounding effects between circumcision and covariates, sociodemographic variables were used as control variables. This ensured that the association between behavioral variables and circumcision becomes credible and discernible. In the adjusted analyses of sexual risk behaviors, sociodemographic characteristics were controlled for. In order to control for cluster effects, complex samples module in SPSS has been used since multistage probability sampling technique was used for both surveys.

4. Results

4.1 Patterns of safe male circumcision in Botswana (2008–2013)

Overall 785 (12.5%) and 956 (25.2%) men in the sample reported to have been circumcised in 2008 and 2013, respectively (**Figure 2**).

Table 1 shows the sociodemographic characteristics of circumcised men in Botswana (2008 and 2013). The proportion of men who were circumcised decreased with age for both surveys. For instance, in both surveys the highest proportions of circumcised men were found in ages 10–24 (25 and 28.7% for 2008 and 2013, respectively) and lowest in ages 55–64 years (8.3 and 9.8% for 2008 and 2013,



Figure 2. Percentage of circumcised men in Botswana (2008 and 2013). Source: Analyzed from Botswana AIDS Impact Surveys III and IV (2008 and 2013).

Variables	2008 BAIS		2013 BAIS	
	Circumcised, % (n)	N	Circumcised, % (n)	N
Age				
10–24	25.0 (184)	2680	28.7 (274)	1490
25–34	31.8 (234)	1600	27.6 (264)	954
35–44	21.8 (160)	934	21.2 (203)	680
45–54	13.1 (96)	586	12.7 (121)	399
55–64	8.3 (61)	318	9.8 (94)	264
Education				
Primary/less	13.7 (78)	841	18.8 (161)	930
Secondary	53.1 (302)	2558	49.5 (423)	1688
Tertiary/higher	33.2 (189)	894	31.7 (271)	724
Residence				
Cities and towns	38.4 (282)	1739	44.1 (422)	1398
Urban villages	31.0 (228)	1901	25.9 (248)	948
Rural villages	30.6 (225)	2478	29.9 (286)	1441
Marital status				
Never married	47.8 (351)	3866	53.7 (513)	2306
Married	24.4 (179)	874	21.9 (209)	635
Cohabiting	23.4 (172)	1251	22.2 (212)	787
Once married	4.5 (33)	127	2.3 (22)	59
Religion				
Christian	64.4 (426)	3686	81.4 (778)	3089
Other non-Christian	35.6 (236)	2031	18.6 (178)	698
Total	12.5 (785)		25.2 (956)	

Table 1. Characteristics of circumcised men aged 10–64 years in Botswana (2008 and 2013).

respectively). A high proportion of circumcised men in both surveys was found among those with secondary education in 2008 and 2013 (53.1 and 49.5%, respectively), cities and towns (38.4 and 44.1%, respectively), never married individuals (47.8 and 53.7%), and Christians (64.4 and 81.4%, respectively).

Majority of men indicated that they were circumcised later in life for both surveys (56.1% in 2008 and 52.7% in 2013). However, the proportion of men who were circumcised in later life was highest in 2008. As for the place of circumcision, a high proportion of men reported that they were circumcised in a health facility, and this was high in 2013 (78.8%) than in 2008 (69%). Under one-tenth of men (9.3% in 2008 and 7.1% in 2013) reported that they experienced some complications during circumcision. The proportion of men who expressed willingness to be circumcised in was highest in 2008 (58.6%) than in 2013 (49.5%) (Table 2).

4.2 Determinants of safe male circumcision in Botswana

Results in Table 3 present the adjusted odd ratios for the association between safe male circumcision and sociodemographic factors in 2008 and 2013. Age was observed to be a significant correlate of male circumcision in both 2008 and 2013. The odds of safe male circumcision increased with age for both survey periods, with men aged 55–64 years three times (APR = 3.40, CI = 2.00–5.76 in 2008 and APR = 3.63, CI = 2.36–5.57 in 2013) more likely to have been circumcised than men aged 10–24 years. Considering education level, men with primary or less and secondary education were less likely to have been circumcised than men with tertiary or higher education level for both survey periods.

Men in rural villages were less likely to have been circumcised than men who resided in cities and towns in 2008 (APR = 0.70, CI = 0.54–0.89) and 2013 (APR = 0.71, CI = 0.58–0.86). On the other hand, there were no significant variations observed for circumcision and residing in urban villages. The odds of circumcision were significantly low among never married (APR = 0.43, CI = 0.24–0.76) and cohabiting (APR = 0.45, CI = 0.26–0.80) men than once-married men in 2008, while for married men there was no significant variation. In 2013, the odds of

Variable	2008 BAIS III		2013 BAIS IV	
	%	N	%	N
Time of circumcision?				
At birth	40.3	299	38.1	331
Later in life	56.1	416	52.7	537
Do not know	3.6	27	9.2	88
Place of circumcision?				
Health facility	69	511	78.8	753
Traditional	21.9	162	16.2	155
Do not know	9.1	68	5	48
Experienced complications?				
Yes	9.3	69	7.1	68
No	76.1	564	80.9	773
Do not know	14.6	108	12	115
Willingness to be circumcised in the next 12 months?				
Yes	58.6	3694	49.5	1270
No	41.4	2608	50.5	1295

Table 2.
Selected key safe male circumcision variables.

Variable	2008		2013	
	Adjusted PR	95% CI	Adjusted PR	95% CI
Age				
10–24	1.00		1.00	
25–34	1.76	(1.35–2.30)	1.36	(1.09–1.69)
35–44	2.43	(1.73–3.41)	1.76	(1.35–2.29)
45–54	2.54	(1.65–3.91)	2.41	(1.72–3.38)
55–64	3.40	(2.00–5.76)	3.63	(2.36–5.57)
Education				
Primary/less	0.32	(0.22–0.46)	0.36	(0.28–0.47)
Secondary	0.72	(0.57–0.91)	0.67	(0.55–0.82)
Tertiary/higher	1.00		1.00	
Residence				
Cities and towns	1.00		1.00	
Urban villages	0.79	(0.63–1.00)	0.90	(0.74–1.10)
Rural villages	0.70	(0.54–0.89)	0.71	(0.58–0.86)
Marital status				
Never married	0.43	(0.24–0.76)	1.10	(0.55–2.18)
Married	0.68	(0.39–1.18)	0.93	(0.47–1.82)
Cohabiting	0.45	(0.26–0.80)	1.05	(0.53–2.08)
Once married	1.00		1.00	
Religion				
Christian	0.81	(0.66–1.00)	0.95	(0.77–1.18)
Other non-Christian	1.00		1.00	

Table 3.
 Adjusted prevalence ratios for the association between safe male circumcision and sociodemographic factors (2008 and 2013).

circumcision were significantly low among married (APR = 0.93, CI = 0.47–1.82) than once-married men, while no significant association was found for cohabiting and never married men. When considering religious affiliation, there was no variation on whether a man was from a Christian or any other religious background and circumcision.

5. Discussion

Due to high HIV prevalence and incidence rates, inadequacy of the response programs such as PMTCT program, BCIC programs, HIV testing and counseling, blood safety program, and STI management and control gave way to safe male circumcision program. The SMC program was seen as essential in adding to the existing strategies in preventing the spread of HIV infection [17]. The combination of research findings in South Africa, Kenya, and Uganda and the WHO/UNAIDS recommendations that male circumcision is efficacious in reducing HIV infection prompted the government of Botswana to scale up this component of HIV prevention and develop national policies, strategies, and implementation plans. Although

Botswana is not a traditionally circumcising society, evidence from this study indicates that male circumcision is highly acceptable in Botswana, corroborating the initial evidence [3, 5].

Majority of men who participated in the 2008 and 2013 surveys indicated that they were circumcised later in life and that they were circumcised in a health facility. A relatively low proportion of men reported that they experienced some complications during the procedure. This corroborates findings from other studies which show that when circumcision is done within hygienic clinical settings, there are minor chances of complications [1]. Common complications associated with circumcision in such settings include excessive loss of foreskin, skin bridges, amputation of the glans penis, and buried penis.

Evidence from this chapter indicates that between 2008 and 2013, the period before and after the implementation of the safe male circumcision program, the proportion of men who circumcised doubled. Although the program has not met its target [5], substantial gains have been made in getting high numbers of men to undergo circumcision. The scale-up of safe male circumcision program has benefited immensely from external funding which has supported biomedical marketing in the media including, billboard, radio, and TV advertising. Moreover, a renowned afro-pop artist was contracted as the campaign ambassador during the program in order to attract more men [5]. Additionally, specialized clinics have been set up in selected areas in addition to general public health facilities where SMC is conducted in hygienic, clinical conditions by medical practitioners [5].

On the other hand, the proportion of men who expressed willingness to undergo safe male circumcision had declined by about 10% in 2013. A plausible explanation for this decline is linked to several reasons. First, a review study on the SMC program by Katisi et al. [5] indicates that during the implementation of the program, cultural taboos such as the breaching of secrecy of the circumcision act by inclusion of women in performing circumcision procedure were introduced. Second, there are views that the traditional leadership has been left during the implementation of the program [3]. Lastly, elements of the minimum package for SMC that include counseling and voluntary HIV testing were repeatedly mentioned as other barriers that blocked men from circumcising [5]. HIV testing, in particular, seems to scare men away even if they would opt for circumcision.

Age was a significant predictor of male circumcision. For example, circumcision was found to increase with age, with highest proportions of circumcised men found in ages 55–64 years and lowest in ages 10–24 years. Similar observations were made in Uganda, where it was found that more than half of elderly men indicated that they have been circumcised compared to two-fifths of youth [30]. Although circumcision levels are lowest among young adolescents in Botswana, a study by Lane et al. [31] has shown that at the country level, deliberately prioritizing young adolescents is likely to achieve national coverage targets more quickly and cost-effectively than continuing to focus on older, harder-to-reach men. In Botswana, prioritization of younger men is critical to VMMC sustainability. As a result there is the school-going children circumcision initiative, whereby young boys are targeted to undergo circumcision through parental involvement. In this approach young boys consent to undergo circumcision through the involvement of parents. However, the decision to circumcise or not to circumcise lies with the children.

Considering education level, men with primary or less and secondary education were less likely to have been circumcised than men with tertiary or higher education level for both survey periods. This corroborates findings from other studies that men with high education and socioeconomic status have the propensity to undergo safe male circumcision compared to men with low education and poor socioeconomic status [32–34]. Educational attainment predisposes individuals to appreciate

health programs better [35]. This is because men who have high education have better perception of the risk of HIV infection than men with low education. Consequently, there is need for more education and information for men with low education to take part in circumcision.

Men in rural villages were less likely to have been circumcised than men who resided in cities and towns in 2008. A plausible explanation for this scenario is that in 2008, the safe male program was not yet rolled out in the country. Moreover, men in rural areas are prone to lack of access to information and education. The odds of circumcision were significantly low among never married and cohabiting men than once-married men in 2008. This corroborates findings of a study by Mangombe and Kalule-Sabiti [36] which also found that in Zimbabwe never married and cohabiting men were less likely to circumcise. The main reason being that this cohort of men assumes that they are at low risk of HIV infection. Meanwhile, other studies show the contrary that married men are at risk of infection compared to never married and cohabiting men [37].

In 2013, the odds of circumcision were significantly low among married than once-married men. Low prevalence of circumcision among married men can also be attributed to low risk of infection, especially where marital fidelity is practiced. There was no variation on whether a man was from a Christian or any other religious background and circumcision. Findings of the association between religion and circumcision are at best mixed. In some contexts, religion is a key predictor of circumcision among men [38], while in other contexts, as is the case in Botswana, it is not [39].

6. Conclusion

Safe male circumcision is as an effective additional strategy for HIV prevention. The medical benefits of SMC outweigh the risks. Age, education, residence, and marital status are significant determinants of male circumcision in Botswana. Consequently, more efforts should be geared toward educating men, especially those residing in rural areas and those in cohabiting relationships about the benefits of circumcision. Moreover, women need to be involved in understanding the benefits of male circumcision to ensure effectiveness of the SMC program.

Author details

Mpho Keetile

Department of Population Studies, University of Botswana, Gaborone, Botswana

*Address all correspondence to: mphokeet@yahoo.com

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