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Sexual behaviours of circumcised men in a private practice in Alexandra, South Africa

BY

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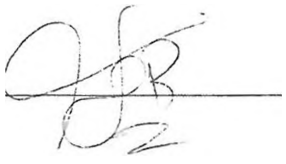
This research report is submitted in partial fulfilment of the Master of Public Health in the Faculty of Health Sciences, at the University of the Witwatersrand

Supervisors: Prof. Charles Chasela and Dr Renay Weiner

June, 2017

Declaration

I, Josephine Asare- Bediako, declare that this research report is my original work. It is submitted in fulfilment of the requirements for the degree of Master of Public Health, in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to this or any other university.



10 June, 2017

ABSTRACT

Sexual behaviours of circumcised men in a private practice in Alexandra, South Africa

Background

Three randomized controlled trials (RCT) conducted showed that voluntary medical male circumcision (VMMC) reduces the risk of female to male HIV transmission by approximately 60%. However, data from countries such as South Africa where VMMC programs have been scaled up are needed to assess changes in sexual behaviours of circumcised men as a result of perceived reductions in risk and factors associated with these behaviours. This risk compensation is a concern for policy makers and programme implementers due to its possible negative effect on HIV incidence.

Methodology

This was a cross-sectional study conducted at a private practice in Alexandra. One hundred and forty-three (n=143) men,18 years and older, medically circumcised three months before commencement of the study were randomly sampled and interviewed using a questionnaire. The questionnaire covered sociodemographic characteristics and elements of condom use, multiple sexual partners, transactional sex and VMMC knowledge. Logistic regression was used to determine factors associated with their sexual behaviour.

Results

Out of the one-hundred and forty-three (n=143) men interviewed, more than half (51%) of the men reported condom use in last sexual intercourse. However, 49% indicated no condom use, which indicates some risk compensation. Men aged 40 years and older, were slightly more likely (UOR 1.04, 95% CI 0.31 – 3.55) to use condoms at last sexual intercourse. HIV positive men were found to be twice likely to use a condom at last sex (UOR 3.72 95% 1.46 – 9.46) and engage in transactional sex (UOR 2.68 95% CI 1.10 – 6.50) than their HIV negative counterparts, indicating a possible link to knowledge of HIV transmission after HIV diagnosis.

Conclusion

Some risk compensation was found in this study, however, the possibility was difficult to determine due to the lack of adequate baseline analysis of the sexual behaviour of the men before circumcision. Several factors such as marital status and being in a long term relationship were among the reasons given for non-condom use. Results indicate the

importance of VMMC and HIV prevention education and counselling and it is recommended that all VMMC programmes include this aspect. Risk compensation should not impede the scale-up of VMMC.

TABLE OF CONTENTS

Contents

ABSTRACT 2

ABBREVIATIONS 5

1.0 INTRODUCTION 6

1.1 BACKGROUND 6

1.2 PROBLEM STATEMENT 7

1.3 JUSTIFICATION OF THE STUDY 8

1.4 AIMS AND OBJECTIVES 8

1.4.1 Aim 8

1.4.2 Specific objectives 9

1.5.1. LINK BETWEEN MMC AND HIV 9

1.5.2 SEXUAL BEHAVIOURS OF MALES AFTER MMC 9

1.5.3 HIV-INFECTED MALES AND MMC 11

2.0 METHODOLOGY 12

2.1 STUDY DESIGN 12

2.2 STUDY SETTING 12

2.3 STUDY POPULATION 13

2.4 SAMPLING AND SAMPLE SIZE 14

2.4.1 Sampling 14

2.4.2 Sampling strategy 14

2.5 DATA COLLECTION 14

2.6 MEASUREMENT OF EXPOSURES AND OUTCOME OF INTEREST 16

2.7 DATA MANAGEMENTAND ANALYSIS 18

2.8 ETHICAL CONSIDERATIONS 19

3.0 RESULTS 20

3.1 Socio-Demographic Characteristics and HIV Status of Participants 20

3.2 Sexual behaviour post circumcision 22

3.3 VMMC Knowledge Post-Circumcision 25

3.4 Factors Associated with Condom Use at Last Sexual encounter 26

3.5 Factors Associated with Multiple Sexual Partners 30

3.6 Factors Associated with Transactional Sex 33

4.0 DISCUSSION 37

5.0 CONCLUSION 41

References 43

ABBREVIATIONS

AFP	Alexandra Family Practice
ART	Anti-Retroviral Therapy
CHAPS	Centre for HIV/AIDS Prevention Studies
HIV	Human Immunodeficiency Virus
HTS	HIV Counselling and Testing
HSRC	Human Sciences Research Council
MMC	Medical Male Circumcision
PEP	Post-Exposure Prophylaxis
PI	Principal Investigator
RA	Research Assistant
UNAIDS	Joint United Nations Program on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organisation

1.0 INTRODUCTION

1.1 BACKGROUND

The United Nations Program on HIV/AIDS (UNAIDS) in 2016 estimated that there wer37.7 million people living with HIV by the end of 2015 (1). By 2015, it was estimated that a total number of persons living with HIV in South Africa increased from approximately 4,02 million in 2002 to 6,19 million (2). Sexual behaviour questions were included in this survey with adults age 15-49 years, 17% of men and 5% of women reporting having two or more sexual partners in the past 12 months. Inadequate condom use was reported during high-risk sex: 58% of women and 65% of men who had multiple partners in the past year report that they used a condom during their last sexual intercourse (2). The survey

The annual number of new HIV infections has been on a steady decline since a peak in 1999, however, the introduction of Antiretroviral Therapy (ART) and subsequent reduction in AIDS-related deaths is shifting focus to an increase in HIV prevalence (3). This possibly indicates that HIV remains a significant public health issue globally which requires as many effective prevention strategies as possible. Many HIV prevention methods have been developed such as Pre-exposure Prophylaxis (PrEP) (4), Post-Exposure Prophylaxis (PEP), condom use , vaccines and vaginal microbicides (5); however Medical Male Circumcision (MMC), coupled with the correct and consistent use of condom is currently the most efficacious intervention, as shown by findings from randomized control trials (6, 7).

MMC, despite the partial protection that it provides, has been linked to lower HIV infection rates in the three randomized trials conducted in Kenya, Uganda and South Africa which have shown that MMC reduces HIV infection by 50-60% in heterosexual men (8-10). Based on these findings, the World Health Organization (WHO) and UNAIDS, in 2007, recommended male circumcision as an effective component of the comprehensive HIV prevention package for 14 countries with high HIV and low MMC prevalence rates (11). WHO recommended after doing impact and cost analyses that, scaling up of adult MMC to achieve an 80% circumcision target of males 15-49 years by 2015 and sustaining coverage until 2025, will result in the prevention of about 4 million new HIV infections by 2025 (12). To achieve this objective, South Africa estimated that 4.3 million circumcisions would have to be done by 2016 to avert the estimated number of new HIV infections. However, a survey conducted in 2012 showed that most of the males above 15 years old (approximately 46.4% of the respondents) reported that they were circumcised (13).

Several countries, such as South Africa, have adopted this recommendation to reduce their HIV incidences, however, a concern remains with the fact that MMC is a partially protective intervention which still requires risk reduction behaviour, such as correct and consistent condom use (14). Many a times, partial protection of MMC is interpreted as full protection against HIV resulting in increased risky behaviour among circumcised men (10). This concept is largely referred to as risk compensation (10). Policy makers and programme implementers remain mindful about risk compensation and its effect on HIV incidence (15). Furthermore, the knowledge by circumcised males about the protection that MMC offers may result in an increase in risk behaviours of circumcised men, compounding the concern (16).

Studies conducted show some change in sexual behaviour after circumcision, with some reporting increase in sexual activity and number of partners as a few of the major ones (15, 17). However, it has also been found that there is still a higher rate of condom use among circumcised men, even with multiple partners (16).

1.2 PROBLEM STATEMENT

Concerns about risk compensation after circumcision and the factors associated with those behaviours still remain among MMC programme implementers (16). This is mainly due to the partial protection that MMC provides (18). Sexual behaviours of medically circumcised men are often compared to uncircumcised men or traditionally circumcised men (19), and while a study in Botswana found no change (15), other studies in Uganda and Swaziland found some change in sexual behaviour after circumcision within the circumcised group (17, 20, 21). In South Africa, the trial in Orange Farm reported risk compensation among the circumcised group with an increase in their number of sexual acts (4). Despite several studies conducted around South Africa, relatively little is known about the sexual behaviour among medically circumcised men and factors that contribute to those behaviours even though the concern among policymakers remains (10). Compounding the issue is the conflicting findings from the various studies within Sub-Sahara (19, 20, 22).

One study conducted by Peltzer et al looked at the impact of risk reduction counselling on sexual behaviour among medically circumcised men and although counselling was found to reduce risky behaviour among circumcised men, there was still a minority that displayed risky behaviour (23). Moreover, countries who have scaled up MMC, such as Uganda, have seen uptake by HIV infected men and have conducted some research on this group (24, 25). However, no such studies have been published in the South African context albeit its HIV

hyper endemic status. This indicates the need for further studies among medically circumcised men including HIV infected to reduce the risk of HIV transmission through risk compensation. This study will therefore include circumcised HIV infected and uninfected participants.

1.3 JUSTIFICATION OF THE STUDY

Studies have indicated an increase in risk compensation of circumcised men after circumcision compared to uncircumcised men (15, 18, 20). However, very little evidence exists on the sexual behaviours of circumcised men in general and the factors associated with those behaviours including the HIV infected ones among them within the South African context. Risk compensation in circumcised men may have an impact on male-to-female HIV transmission and reduce the impact of public health HIV prevention programmes. This remains a public health concern among South African programme implementers. Literature commonly describes sexual behaviour among traditionally circumcised men compared to medically circumcised ones (19).

As HIV Testing Services (HTS) form part of the MMC HIV prevention package, more HIV infected males will be diagnosed and circumcised if eligible (2). They will therefore form part of the circumcised group whose sexual behaviours have not been well described in the literature.

Findings from this study could provide MMC programme implementers and other stakeholders, key information about the sexual behaviour of this group which could inform risk reduction messaging included in MMC programmes.

1.4 AIMS AND OBJECTIVES

1.4.1 Aim

This study aimed to describe the sexual behaviours of medically circumcised men at a family practice in Alexandra, South Africa, assessing whether there is a change in sexual behaviours after circumcision.

1.4.2 Specific objectives

a) To describe the socio-demographic characteristics of medically circumcised males,18 years and older, 12 weeks prior to the study at Alexandra Family Practice (AFP), South Africa in 2016.

b) To describe the sexual behaviors of medically circumcised males, 18 years old and older,12 weeks prior to the study at AFP, South Africa in 2016.

c) To determine factors associated with sexual behaviors of medically circumcised males, 18 years and older, 12 weeks prior to the study at AFP, South Africa in 2016.

1.5 LITERATURE REVIEW

1.5.1. LINK BETWEEN MMC AND HIV

MMC remains an important component of the HIV prevention package. Subsequent evidence from post-trial surveys in Orange Farm showed a reduction of HIV incidence among circumcised men that ranged between 57-61% (26). Similar post-trial studies conducted in Rakai, Uganda also showed not only a reduction in HIV incidence among the circumcised group, but also an increase in HIV incidence in the group who still refused circumcision (27). This evidence coupled with the successful outcomes demonstrated in the three randomized controls trials in South Africa, Kenya and Uganda (4-6) provide an insight into the long term impact of MMC on HIV prevention and reduction in HIV incidence. The need for rapid scale-up based on these successes as well as the evidence of risk compensation still remains a challenge (28). A related concern is expressed in the report by the Human Sciences Research Council (HSRC) from the 2012 HIV prevalence survey. The survey showed an increase in HIV prevalence in South Africa from 10.6% in 2008 to 12.2 (29), with Black Africans, whites, Coloureds, Indians and Asians at a prevalence rate of 15%, 0.3%. 3.1% and 0.8% respectively (29).

1.5.2 SEXUAL BEHAVIOURS OF MALES AFTER MMC

Scale-up of MMC has led to an increase in the number of circumcised men (15) with over 1.3 million men circumcised between 2010 and 2013 country wide (30). The knowledge by these

men that MMC is protective, has been predicted to possibly lead to an increase in HIV incidence as a result of sexual risk compensation (16). This hypothesis has led to a shift in MMC research focus in various Southern African countries to investigate if MMC may lead to high risk behaviours and potentially increase HIV risk (19, 22, 27, 31).

Although most of the studies done in countries like Kenya, Botswana and Uganda found very little to no risk compensation in sexual behaviour especially condom use (15, 16, 22), some found an increase in risky sexual behaviours among circumcised men such as multiple lifetime sexual partners and non-use of condom with non-marital partners (15). Nevertheless, HIV incidence in the circumcised group was still lower than the non-circumcised group (15). A qualitative study conducted in urban Swaziland also found an increase in risky sexual behaviour among the circumcised men. However, it revealed some insight on the timing of the risky sexual behaviours, which was shortly after circumcision (17). The participants went on to report the urge for sexual experimentation as the drive for the brief increase in risky sexual behaviour (17). A recent qualitative study showed that circumcised men in Kenya who had undergone risk reduction counselling and strategic communications had a high level of knowledge of the partial protection that MMC offers and the need to still use other preventive measures such as condoms (31). Another study conducted in South Africa also showed higher condom use in medically circumcised males than traditionally circumcised ones, mainly, as a result of risk reduction counselling received before MMC (32). A recent study in Western Kenya showed an increase in risky sexual behaviours among circumcised fishermen. This study has raised awareness that the perceived HIV risk reduction by circumcised men (risk compensation) is also used for their transactional purposes especially transactional sex (33).

Several factors that influence the sexual behaviours of circumcised men have been described by another recent qualitative study done in KwaZulu-Natal (34). These include sexual performance, masculinity and partner influence which could provide some pointers for the reasons behind some of the reported sexual behaviours (34).

Studies conducted show some change in sexual behaviour after circumcision, with some reporting increase in sexual activity and number of partners as a few of the major ones, (15, 17) however, it has also been found that there is still a higher rate of condom use among circumcised men, even with multiple partners (16).

These conflicting findings from several studies conducted globally further compounds the confusion and concerns around risk compensation for programme implementers.

1.5.3 HIV-INFECTED MALES AND MMC

As efforts to scale-up MMC in various countries in Sub-Saharan Africa increases, HIV infected men with competent immunity are being circumcised (14). Moreover, with the WHO recommendation of not denying HIV infected men MMC services, more men in this group will be circumcised (24).

Thus far, one study conducted to assess safety of MMC for HIV infected and uninfected circumcised males in Rakai, Uganda found the HIV positive participants, on enrolment, had riskier behaviours such as lower condom use than the HIV negative ones (24). On the contrary, a randomised control trial done in Uganda showed no reduction in HIV transmission to the female partners from circumcised men (24). Subsequent studies done have found that HIV transmission may be increased by early post-surgical resumption of sexual intercourse (24). Therefore, this should be emphasised in MMC programme messaging. This study also found that there was an increase in the viral load of the HIV infected men after circumcision possibly due to the surgical stress, posing a risk of transmission to the female partners (24).

A study conducted in Uganda looking at safety of MMC in HIV positive and negative males found that on enrolment, the HIV positive males had increased risky behaviours compared to the HIV negative group (25). This was an unintended, but significant finding which further indicates the need for more research.

2.0 METHODOLOGY

2.1 STUDY DESIGN

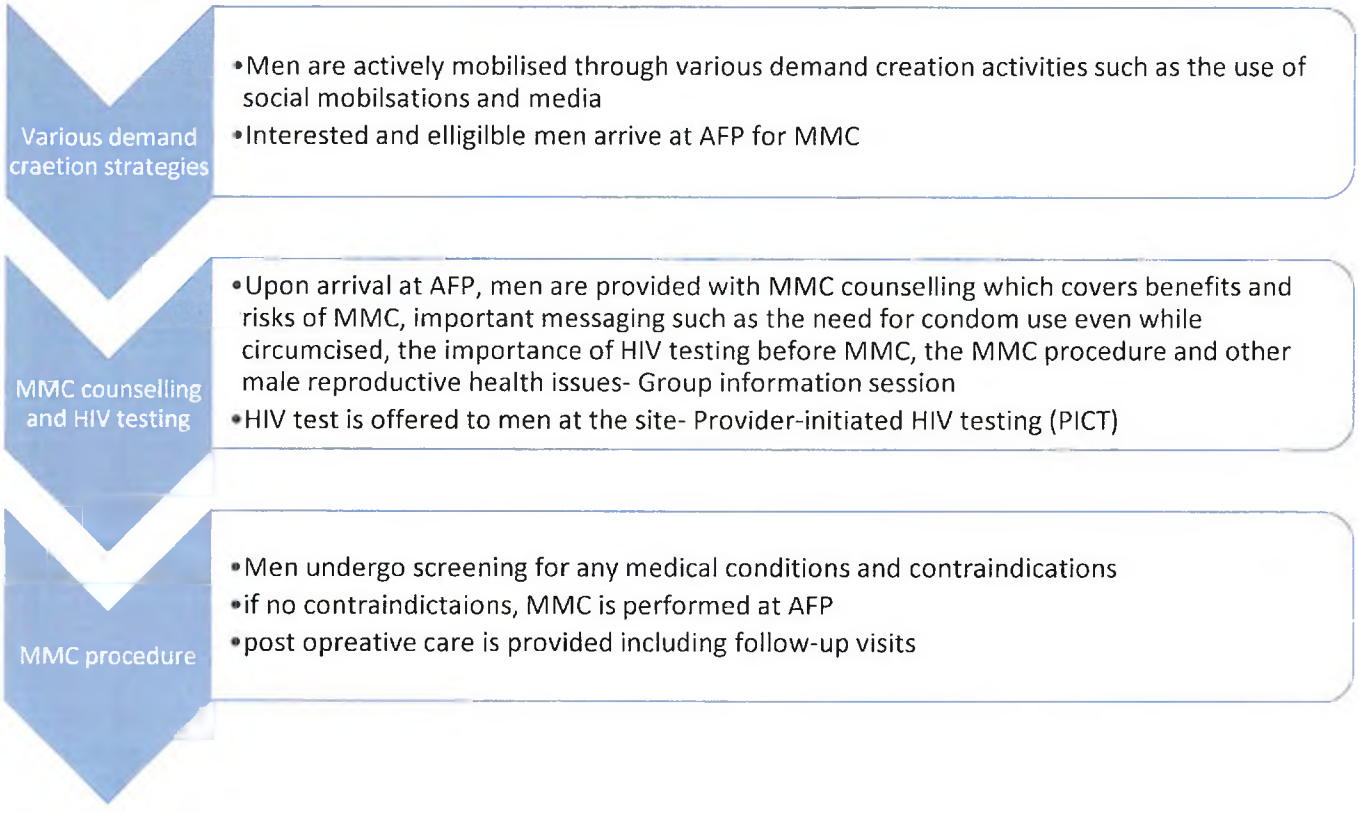
The facility based, cross-sectional study design was used. Data collection, using face-to-face interviews, for all variables was carried out between March and June 2016.

2.2 STUDY SETTING

One site was used for this study, the Alexandra Family Practice (AFP). This clinic is a private clinic owned by Centre for HIV/AIDS Prevention Studies (CHAPS) that offers various healthcare services such as MMC, general consultations and minor surgical procedures. With support from the United States Agency for International Development (USAID), it provides free Medical Male Circumcisions, as part of the MMC scale-up initiative of South Africa. It is a four bed clinic performing about 40 circumcisions a week performed by doctors who are fully employed by CHAPS. CHAPS is a Non-Governmental Organization (NGO) that provides technical assistance for government institutions that provide MMC services to communities (35). It is currently one of the few NGOs that performs large volumes of MMC in Alexandra using the Model for Optimising Volume and Efficiency (MOVE), which is a model that allows high volumes of MMC performed efficiently using the principles of task shifting, task sharing and surgical efficiencies (12).

MMC provided at AFP is a comprehensive package including MMC counselling and HTS. Below is a flow chart describing the MMC process at the site.

Figure 1: MMC process flow at AFP



Alexandra, popularly referred to as 'Alex' is a densely populated township, established in 1912, situated at the border of Sandton, one of Johannesburg's wealthiest suburbs. (36). It has about 350 000 residents living mostly in shacks in overcrowded and generally unhygienic conditions (36). There are currently two clinics in Alexandra offering MMC services and contributing to about 5000 circumcisions performed since 2013, when the partnership with CHAPS was established.

2.3 STUDY POPULATION

The study population included males aged between 18-49 years who had been circumcised at the AFP three months before commencement of the study and living in Alexandra. This age group was chosen, as it has been documented to have an increase in risky sexual behaviours and 18 is the legal age for participants to give consent to participate (29).

Both HIV infected and uninfected circumcised patients were recruited. Those fulfilling the inclusion criteria and who were willing to participate in the study and followed all required protocols were enlisted to participate in the study.

2.4 SAMPLING AND SAMPLE SIZE

2.4.1 Sampling

Sample size estimation

The main outcome measure for safe sexual behaviour in this age group was condom use, with the percentage of condom use in circumcised males reported to be 36% in the HSRC survey (18). Predicting that the population surveyed was about 400 (circumcised men over three months before commencement of the study), using a single proportion calculation and an expected frequency of condom use of 36% and a 95% confidence level, the number of people that were sampled was 143. This total number considered a projection that HIV infected men contribute about 20% of the sample, as about 80% of males circumcised at the AFP are HIV uninfected.

Sampling strategy

A simple random sample was drawn from the study population. The Principal Investigator (PI) identified the files of about 400 eligible circumcised men and allocated serial numbers. These were files of all eligible men circumcised three months prior to the commencement of the study.

After extracting this database, simple random sampling was used to select the participants from the eligible men to reach the required number of 143. The random numbers were generated using a random number calculator. This eliminated the possibility of sampling bias.

2.5 DATA COLLECTION

Prior to the formal study data collection, pre-testing process was conducted which included the telephonic calls to the participants, conducting of the interview using the questionnaire by the PI to the AFP clinicians to determine any errors, gaps or inappropriate questions. This process was successful with very good outcomes as very few to no gaps were identified and therefore the questionnaire was of approved quality.

Selected patients were contacted telephonically during which the Research Assistant (RA) or the PI provided a brief explanation of the purpose of the study and enquired whether they were interested in participating in the study. If they expressed interest in the study, they were invited to AFP for their study visit. Those who expressed no interest in the study were appreciated for

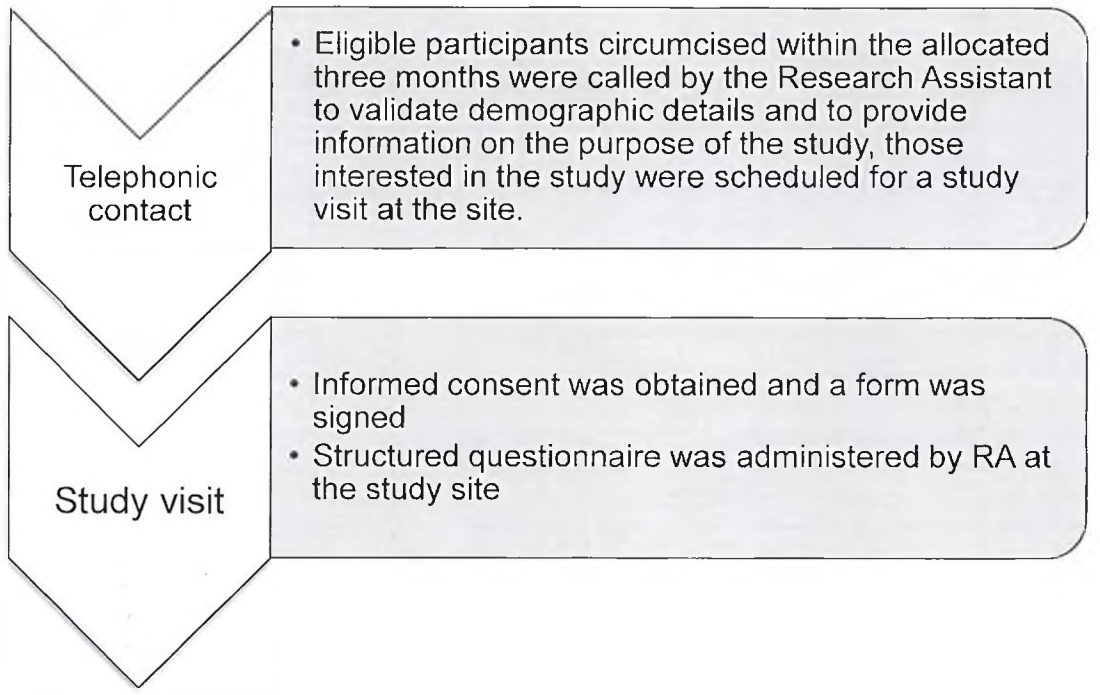
their time and excluded from the list of selected participants. Thereafter, another random sampling would be done to replace the excluded participant.

During this study visit at AFP, an informed consent form was signed after more information was provided and full understanding of the study was ensured. Thereafter, a structured pre-tested questionnaire (see Appendix 1) was administered by a trained RA for about 30 to 45 minutes. The questionnaire used was an adapted version of a previously validated questionnaire that was used in a larger study of partners of pregnant women at Chris Hani Baragwanath Hospital, Soweto (37). The questionnaire was adapted by the PI to ensure relevance and validity for the study and was further checked by the supervisors. The PI also performed data quality checks at the end of each day. It was available in both English and Zulu, which are the spoken and understood languages in Alexandra. However, a translator/interpreter was made available for participants who spoke other languages such as Tsonga, Sotho and Venda to ensure accuracy of data collected during the interview session.

The RA was fluent in the participants' language and administered the questionnaire on a face-to- face basis to ensure a thorough understanding and participation from the participants. The questionnaire was related to the objectives of the study, and included elements on condom use, number of sexual partners, HIV status, alcohol consumption and transactional sex.

A RA who is a nurse was recruited to administer all the questionnaires. All trainings that included telephonic consultations and administration of the questionnaires during the study visits were faciliatted by the PI. Other responsibilities of the PI included supervision of management of the study funds and conducting quality checks on all completed files.

Figure2: Flow chart of data collection



All completed questionnaires were checked daily for completeness, appropriateness of responses to all items, legible writing, and the return of all completed questionnaires.

2.6 MEASUREMENT OF EXPOSURES AND OUTCOME OF INTEREST

The questionnaire comprised of 3 sections. The first section examined the socio-demographic variables which included age, education, employment status, marital status as well as HIV status alcohol use. The second and third sections looked at the knowledge and attitudes about sex after circumcision and the sexual behaviour after circumcision of the participants.

All variables measured aligned to the level of risk elicited in the previous literature and studies and include risky behaviours such as decreased condom use that may lead to risk compensation.

2.6.1 **Measurement of exposure variables**

Several exposure variables were measured including sociodemographic characteristics of the participants.

The table below describes the exposure variables and how they were measured.

Table 1. Exposure variables and measurement

Exposure variables	Questions asked	Measurement
Socio-demographic		
Age	**How old are you today?**	24 years and below 25 – 29 years 30 – 34 Years 35 – 39 Years 40 Years and Above
Marital status	**What is your marital status?**	- Not married - Not married or living together but in a steady relationship lasting more than 3 months - Not married, but living with sexual partner/boyfriend/girlfriend - Married, living with husband/wife - Married, NOT living with husband/wife -Divorced/Widowed
Educational level	**What is the highest level of school you attended**	- Primary -Secondary - Tertiary (University)
Employment status	**What your current employment status?**	- Unemployed -Working for someone – (principally in the - Working for him/her self - Full time student - Pensioner (reformed) - Living on disability or other grant
Household income	**Does your household have any income?**	- Yes, regular - Yes, irregular
Alcohol use	**Do you consume alcoholic drinks?**	- Yes - No
HIV status		-Negative -Positive
Knowledge and attitude	**How protective do you think circumcision is against getting HIV?** **Do you believe that circumcised men should have more than one sexual partner?** **How do you think circumcision affect sexual performance or activity?**	- Partially/ Completely Yes/ No Increase/Decrease/No change Yes/No

	Men who are circumcised can never get a sexually transmitted infection. **If a man is circumcised, he does not need to use condoms.**	Yes/No

2.6.2. **Outcome variables**

The outcome of interests measured were condom use at last sex, multiple sexual partners, and transactional sex after circumcision.

The table below describes the outcomes of interest and how they were measured.

Table 2. Outcome variables and measurement

Outcome variable	**Question asked**	**Measurement**
Condom use last sexual encounter	**The last time you had sexual intercourse with any partner, was a condom used?**	- Yes/No
Transactional sex	**Have you ever had sexual intercourse with a woman who received a reward in cash or kind from you?**	- Yes/No
Multiple sexual partners	**How many sexual partners do you have?**	- Number of sexual partners

2.7 DATA MANAGEMENTAND ANALYSIS

2.7.1 Data Management

The questionnaire was coded for each participant. Quantitative data was captured using Redcap and then cleaned by the PI. STATA version 14 was used for all statistical analyses by the PI. Data quality checks were conducted using cross tabulations and range checks.

2.7.2 Data analysis

The socio-demographic characteristics, knowledge and attitudes to condom use post circumcision, and sexual behaviours of the study participants were reported in proportions and

presented in tables. Differences in proportions were evaluated by the *χ2 (chi-squared)* test, and the T-test was used to test mean differences for continuous data. The odds ratio and p-value with a 95% Confidence Interval (CI) was calculated using logistic regression to determine factors associated with risk sexual behaviour (Table 3).

The table below describes the analysis plan for the objectives of the study.

Table 3: Objectives of the Study and Corresponding Analysis Undertaken

Objectives	Analysis
To describe the socio-demographic characteristics of medically circumcised males, 18 years and older, at Alexandra Family Practice (AFP), South Africa in 2016	Categorical variables such as occupation and level of education shown in proportions and presented in tables.
To describe the sexual behaviour of medically circumcised males 12 weeks prior to the study, 18 years and older, at AFP, South Africa in 2016	Categorical variables such as condom userepresented in proportions and differences between HIV positive and negative determined using Chi squared test.
To determine factors associated with sexual behaviour of medically circumcised males 12 weeks prior to the study, 18 years and older, at AFP, South Africa in 2016	Factors/ variables presented in tables. Differences analyzed using chi-squared test. Odds ratios calculated using logistic regression.

2.8 ETHICAL CONSIDERATIONS

Ethical approval was received from the Human Research Ethics Committees (HREC) of the University of Witwatersrand (011-717 1252) (Appendix 2). Prior to the commencement of the study, approval to conduct the research was provided by the management of AFP at CHAPS offices (see Appendix 3).

Those who were selected were informed of the purpose of the study and that participation was entirely voluntary, with no direct benefits or penalties, depending on their decision about study participation. All recruited participants were given the information form (Appendix 4) and consent form (Appendix 5), and the process was explained to them. If they decided to participate, informed consent was obtained and they signed the informed consent form. The questionnaires were only administered after informed consent was signed.

To maintain confidentiality, the names of participants were not written on the questionnaire and the questionnaires were filed in a folder securely locked in the family practice consultation office at the clinic, only accessed by the RA and PI. Furthermore, a confidentiality agreement was signed by the RA (Appendix 6). Data collected will be stored in a secure and locked cupboard at AFP for 5 years.

Study participants were compensated for their travel costs to the clinics for study visits. No other incentives were given.

3.0 RESULTS

3.1 Socio-Demographic Characteristics and HIV Status of Participants

The frequency and percentage distribution of the socio-demographic characteristics of the respondents are shown in table 2 below. From the table, results indicate that the majority of the respondents were aged 25-29 years old (28%), followed by those who are 30-34 (23.8%), while the lowest percentage of respondents were those in the age group 35-39 years and 40 and above (12.6%). The largest proportion of respondents were not married but were living with a sexual partner (47.6%), while the minority were either divorced or widowed (1%) (Table 4).

Table 4: Socio-demographic characteristics and HIV status of circumcised men at Alexandra Family Practice (AFP) (n=143)

	N (%)
Age (years) *[Mean = 30.38; SD = 7.32]*	
24 years and below	33 (23.1)
25 – 29 years	40 (28.0)
30 – 34 Years	34 (23.8)
35 – 39 Years	18 (12.6)
40 Years and Above	18 (12.5)
Marital status	
Single	19 (13.3)
Not married/living together, in a steady relationship (+ 3 months)	68 (47.6)
Not married, but living with sexual partner/boyfriend/girlfriend	19 (13.3)
Married, living with husband/wife	28 (19.6)
Married, not living with husband/wife	8 (5.6)
Divorced/Widowed	1 (0.6)
Highest level of school	
Primary	16 (11.2)
Secondary	104 (72.7)
Tertiary	23 (16.1)
Employment status	
Unemployed	43 (33.8)
Employed (by others or self-employed)	58 (45.7)
Full-Time Student	6 (4.7)
Other	20 (15.8)
Household income	
No income	11 (7.7)
Regular income	90 (63.0)
Irregular income	42 (29.3)
Religion	
No religion	6 (4.2)
Christian	82 (57.3)
Traditionalist	54 (37.8)
Other (muslim)	1 (0.7)
HIV Status	
Negative	113 (79.0)
Positive	29 (20.3)
Use alcohol	
Yes	88 (61.5)
No	55 (38.5)

The majority of the respondents had at least secondary education (72.7%), followed by respondents who had a tertiary level education (16.1%) while the minority only had primary level education (Table 4). The largest proportion of the respondents were employed (45.7%), followed by 33.8% who were unemployed, while 4.7% were full-time students. Household income revealed that the majority of respondents had a regular income (63%), while the minority had no income (7.7%). The majority of the respondents (79%) reported that they were HIV negative while 20.3% stated that they were HIV positive. Only 1% of the respondents did not know their HIV status.

3.2 Sexual behaviour post circumcision

Approximatley half of the respondents reported that they used condoms at their last sexual intercourse (51%), while 49% indicated that they didn't use a condom at their last sexual intercourse. Two thirds of the respondents (67.8%) indicated that they had not always used a condom with any of their sexual partners, while 32.2% indicated that they had (Table 4). Approximately 77.6% of the respondents reported that they were not engaging in transactional sex, while 22.4% report that they were. Most of the respondents reported that they drink alcohol (62%).

Table 5: Sexual behavior after circumcision

	N (%)
Condom use at last sexual intercourse	
Yes	72 (51.0)
No	69 (49.0)
Condom use always with any partner	
Yes	46 (32.2)
No	97 (67.8)
Transactional sex	
Yes	32 (22.4)
No	111 (77.6)
Unprotected sex while drunk	
Never	124 (86.7)
1 to 10 times	18 (12.6)
Don't remember	1 (0.7)
Multiple sexual partners after circumcision	
No	138 (96.5)
Yes	5 (3.5)
Number of sexual partners after circumcision	
0	2 (1.4)
1	100 (69.9)
2	28 (19.6)
3 or more	13 (9.1)
Same number of sexual partners before and after circumcision	
No	77 (53.9)
Yes	66 (46.2)
Sexual debut after circumcision	
0 -4 weeks	11 (7.8)
5 -8 weeks	118 (83.7)
9 -12 weeks	10 (7.1)
More than 12 weeks	2 (1.4)
Last sexual intercourse after circumcision	
1 – 7 days	97 (68.8)
2 -4 weeks	28 (19.9)
2 -3 months	16 (11.4)
Use condoms less after circumcision	
No	71 (50.4)
Yes	70 (49.7)

Results show that 96.5% of the respondents reported that they had not had multiple sexual partners after circumcision, while 69.9% reported only having had one sexual partner after circumcision, while 29% reported having had two or more sexual partners. Eighty-three percent (83%) of the respondents indicated that they resumed sexual intercourse 5-8 weeks after circumcision, while only 1% of respondents resumed sexual intercourse more than 12 weeks after circumcision. Results show that about 50.4% of respondents used a condom less after they had been circumcised, compared to before they had the procedure (Table 5). The

results further show that the majority of the respondents indicated that they had never had unprotected sex while drunk (87%), while 1% did not remember whether they had unprotected sex whilst drunk.

Table 6: Percentage distribution of condom use during last sexual intercourse amongst medically circumcised males, by socio-demographic characteristics

Condom use during last sexual intercourse	No	%	Yes	%
Age category				
Below 24	12	36.36	21	63.64
25-29	22	56.41	17	43.59
30-34	22	64.71	12	35.29
35-39	7	38.89	11	61.11
40 years an older	6	35.29	11	64.71
Pr = 0.08				
Marital status				
Single	10	55.56	8	44.44
Not married/living together, in a steady relationship (+ 3 months)	27	40.3	12	63.16
Not married, but living with sexual partner/boyfriend/girlfriend	12	63.16	7	36.84
Married, living with husband/wife	17	60.71	11	39.29
Married, not living with husband/wife	3	37.50	5	62.50
Divorced/Widowed	6	0.00	1	1.00
Pr = 0.24				
Level of education				
Primary	10	62.50	6	37.50
Secondary	47	45.63	56	54.37
Tertiary	12	54.55	10	45.45
Pr = -0.39				
Employment status				
Unemployed	31	54.39	26	45.61
Employed	3	50.00	3	50.00
Full-Time student	14	70.00	6	30.00
Other	16	38.10	26	61.90
Pr = 0.11				
Religion status				
No religion	38	47.50	1	52.50
Christian	4	66.67	42	33.33
Traditionalist	1	100.00	2	0.00
Other	26	48.15	28	51.85
Pr = 0.60				
Household income				
No income	22	52.38	20	47.62
Regular income	6	54.55	5	45.45
Irregular income	41	46.59	47	53.41
Pr = 0.77				
Alcohol use				
No	27	49.09	28	50.91
Yes	42	48.84	44	51.16
Pr = 0.98				
HIV status				
Positive	62	55.36	50	44.64
Negative	7	25.00	21	75.00
Unknown	0	0.00	1	100.00
Pr = 0.01				
Used condoms less after circumcision				
Complete protection	67	48.55	71	51.45
Partial protection	2	66.67	1	33.33
Pr = 0.53				
No STIs after circumcision				
No	69	50.00	69	50.00
Yes	0	0.00	2	100.00
Pr = 0.23				

Table 6 above shows the percentage distribution of medically circumcised males by socio-demographic characteristics and condom use. Results show that most of the characteristics had no association with the use of condoms after circumcision. The only characteristic that was significantly associated with condom use after circumcision, was the respondents' HIV status; in which HIV negative respondents were more prone to wearing a condom than those who were HIV positive.

The highest percentage of respondents who indicated that they used condoms during sexual intercourse were between the ages of 24 years and below (63.6%), 35-39 years (61.1%) and 40 years and above (64.7%). However, age was not significantly associated with condom use at sexual intercourse. Marital status, level of education, employment status and household were also not significantly associated with condom use at last sexual intercourse. However, the highest proportion of condom use was among respondents who had secondary education (54.4%), while the lowest proportion of condom use was among respondents with primary level education. Furthermore, the lowest proportion of condom use was among full-time students.

3.3 VMMC Knowledge Post-Circumcision

Table 7 shows the distribution of VMMC knowledge among medically circumcised males. Ninety-seven percent (97%) or more of the participants knew that it was false to say that there was "*no need for a condom after circumcision*" and that it was false that you "*do not get STIs after circumcision*". Furthermore, 97.9% of participants stated that "*VMMC offers partial protection from HIV*". The majority of the respondents believed that "*medical circumcision gives partial protection from HIV infection*", 97.9% believed that "*a condom is necessary after circumcision*", and 99.3% believed that one could still "*get infected with STIs after circumcision*".

Table 7: Voluntary Medical Male Circumcision (VMMC) knowledge

	N (%)
Knowledge question: VMMC offers protection from HIV	
Partial protection	140 (97.9)
Complete protection	3 (2.1)
Knowledge question: No need for a condom after circumcision	
True	2 (1.4)
False	140 (97.9)
Don't Know	1 (0.7)
Knowledge question: No STIs after circumcision	
True	1 (0.7)
False	142 (99.3)

3.4 Factors Associated with Condom Use at Last Sexual encounter

Tested at a p-value of 0.05, table 8 shows the unadjusted and adjusted logistic regression that models a relationship between socio-demographic variables and condom use at last sex.

Table 8: Factors associated with condom use at last sex

	Unadjusted Odds Ratios			Adjusted Odds Ratios		
	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value
Socio-Demographic Variables						
Age						
24 years and below	1			1		
25-29 Years	0.44	0.17 – 1.14	0.09	0.51	0.13 – 1.97	0.33
30-34 Years	0.31	0.11 – 0.85	0.02	0.33	0.08 – 1.37	0.13
35-39 Years	0.89	0.27 – 2.93	0.86	2.17	0.26 – 18.31	0.48
40 years and above	1.04	0.31 – 3.55	0.94	0.88	0.13 – 5.78	0.89
Marital status						
Single	1			1		
Not married/living together, in a steady relationship (+ 3 months)	1.85	0.64 – 5.29	0.25	1.55	0.38 – 6.39	0.54
Not married, but living with sexual partner/boyfriend/girlfriend	0.73	0.19 – 2.72	0.64	0.39	0.05 – 2.88	0.36
Married, living with husband/wife	0.81	0.24 – 2.68	0.73	0.23	0.03 – 1.77	0.16
Married, not living with husband/wife	2.08	0.38 – 11.48	0.39	3.91	0.19 – 76.89	0.37
Divorced/Widowed	1	-	-	1	-	-
Highest level of education						
Primary	1			1		
Secondary	1.99	0.67 – 5.87	0.22	4.67	0.74 – 29.48	0.10
Tertiary	1.39	0.37 – 5.17	0.62	2.67	0.29 – 23.92	0.38
Employment status						
Unemployed	1			1		
Employed (by others or self-employed)	0.52	0.23 – 1.16	0.11	0.44	0.12 – 1.62	0.22
Full-Time Student	0.62	0.11 – 3.43	0.58	0.43	0.05 – 3.61	0.44
Other	0.26	0.08 – 0.86	0.02	0.33	0.06 – 1.81	0.20
Religious affiliation						
No religion	1			1		
Christian	2.21	0.38 – 12.76	0.38	10.46	0.08 – 1336.90	0.34
Traditionalist	2.15	0.36 – 12.76	0.39	10.07	0.08 – 1294.55	0.35
Other	1	-	-	1	-	-
Household income						
No income	1			1		
Regular income	1.38	0.39 – 4.84	0.62	6.75	0.86 – 53.15	0.07
Irregular income	1.09	0.29 – 4.13	0.89	6.31	0.82 – 48.58	0.07
Alcohol use						
No	1			1		

	Unadjusted Odds Ratios			Adjusted Odds Ratios		
	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value
Yes	1.01	0.51 – 1.99	0.97	0.64	0.24 – 1.73	0.38
HIV Status						
Negative	1			1		
Positive	3.72	1.46 – 9.46	0.01	18.15	4.12 – 79.87	<0.01
Unknown	1	-	-	1	-	-
Knowledge						
VMMC Protects against HIV						
Complete protection	1			1		
Partial protection	0.47	0.04 – 5.33	0.54	0.42	0.02 – 8.11	0.56
VMMC Protects against STIs						
True	1			1		
False	1	-	-	1	-	-
Don't Know	1	-	-	1	-	-
No condom use required after circumcision						
True	1			1		
False	1	-	-	1	-	-

Although most variables were not significantly associated with condom use at last sex, it is important to note that individuals who were between the ages 25 and 39 years were less likely than those 24 years and below to use a condom at their last sexual intercourse. While males aged 40 years and older, were slightly more likely (UOR 1.04, 95% CI 0.31 – 3.55) to use condoms at last sexual intercourse. On the other hand, respondents who were in a steady relationship and are not married/living with their partners were almost twice as likely to use a condom(UOR 1.85, 95% CI 0.64 - 5.29). Furthermore, those who were married but not living with their spouse were more than twice as likely (UOR 2.08. 95% CI 0.38 – 11.48) to use a condom at their last sexual encounter, as opposed to respondents who were single. However, respondents who were cohabiting with their marital or non-marital sexual partners were slightly less likely to use condom.

With regards to education level, respondents who had secondary and tertiary level education were more likely to use a condom, than those with a primary level education. However, respondents who were employed were less likely to have used a condom at their last sexual encounter than those were unemployed; while respondents who had a regular and irregluar income were slightly more likely to use a condom at their last sexual encounter than those who had no income.

In terms of HIV status, results showed that although higher number of HIV negative respondents reported use of condom in their last sexual encounter, however logistic regression indicated that the HIV positive group were significantly almost four times (UOR 3.72, 95% CI 1.46 – 9.46) more likely to have used a condom at their last sexual encounter than those who were HIV negative.

As in the unadjusted model, the adjusted model shows that at a p-value of 0.05, the only variable that was a significant predictor of condom use at last sexual intercourse is HIV status (p-value<0.01), while other variables remained insignificantly associated with condom use at last sex.

Men who were between the ages 25-34 years, and 40 years and older were less likely to have used a condom at their last sexual encounter than those 24 years and below. On the other hand, men aged 35-39 years were more than twice as likely to have used a condom at their last sexual enounter (AOR 2.17, 95% CI 26 – 18.31). Furthermore, and similar to what was found in the unadjusted model, respondents who were in a steady relationship and were not married/living with their partners, as well as those who were married and not living with their spouse, were more likely to use a condom at their last sexual encounter than those who were single. On the other hand, those who were not married but living with their sexual partners and

those who were married and living with the spouse, were less likely to have used a condom in their last sexual encounter compared to those who were single. Unlike in the unadjusted model, the adjusted model found that respondents who drank alcohol were 36% (AOR 0.64, 95% CI 0.24 – 1.73) less likely to have used a condom in their last sexual encounter, than those who did not take alcohol.

Respondents with secondary and tertiary education, as with the unadjusted model, were more likely to have used a condom than those with a primary education. Furthermore, those with both regular and irregular income were almost 7 times more likely to have used a condom in their last sexual encounter, compared to those with no income. However, those who were employed or full-time students, were less likely to have used a condom at their last sexual encounter compared to those who were unemployed.

With regards to HIV status, which was the only result that was significantly related to whether or not the respondent used a condom at their last sexual encounter, showed that HIV positive respondents were 18 times (AOR 18.15, 95% CI 4.12 – 79.87) more likely to have used a condom at their last sexual encounter than those who were HIV negative.

3.5 Factors Associated with Multiple Sexual Partners

Table 7 provides results from the unadjusted model that predicts a relationship between socio-demographic variables, HIV status and whether respondent's believed that one should have more than one sexual partner after they have been circumcised (multiple concurrent partners).

Results from the unadjusted model show that for most of the socio-demographic characteristics, and many of the categories within these socio-demographic characteristics, respondents did not have either a higher or lower likelihood of believing that one should have more than one sexual partner after they have been circumcised. Furthermore, none of the results were significant. However, those aged 30-34 years and those aged 40 years and above, were less likely to report that they believed that one should have more than one sexual partner after they have been circumcised than those aged 24 years and below, but these findings did not reach significance.

Those who were not married/living together but in a steady relationship of 3 or more months, were also less likely to have reported that they believed that one should have more than one sexual partner after they have been circumcised than those who were single.

Table 9: Factors associated with multiple concurrent sexual partners

	Unadjusted Odds Ratios		
	Odds Ratio	95% CI	P Value
Socio-Demographic Variables			
Age			
24 years and below	1		
25-29 Years	1	-	-
30-34 Years	0.30	0.03 – 3.07	0.31
35-39 Years	1	-	-
40 years and above	0.59	0.06 – 6.12	0.66
Marital status			
Single	1		
Not married/living together, in a steady relationship (+ 3 months)	0.26	0.03 – 1.96	0.19
Not married, but living with sexual partner/boyfriend/girlfriend	1	-	-
Married, living with husband/wife	1	-	-
Married, not living with husband/wife	1	-	-
Divorced/Widowed	1	-	-
Highest level of education			
Primary	1		
Secondary	1	-	-
Tertiary	1	-	-
Employment status			
Unemployed	1		
Employed (by others or self-employed)	1.12	0.18 – 7.00	0.91
Full-Time Student	1	-	-
Other	1	-	-
Household income			
No income	1		
Regular income	0.69	0.11 – 4.29	0.69
Irregular income	1	-	-
Alcohol use			
No	1		
Yes	0.96	0.15 – 5.78	0.94
HIV Status			
Negative	1		
Positive	1	-	-
Unknown	1	-	-
Knowledge			
VMMC Protects against HIV			
Complete protection	1		
Partial protection	1	-	-
VMMC Protects against STIs			
True	1		
False	0.99	0.86 – 1.15	0.94
Don't Know	1	-	-
No condom use required after circumcision			
True	1		
False	1	-	-

Respondents with a regular income were also less likely to report that they believed that one should have more than one sexual partner after they have been circumcised than those with no income. However, those who were employed were slightly more likely to respond that they believed that one should have more than one sexual partner after they have been circumcised than those who were unemployed.

3.6 Factors Associated with Transactional Sex

Table 8 provides results from the unadjusted model, as well as the adjusted model, which predicts a relationship between socio-demographic variables, HIV status and whether the respondent engaged in transactional sex.

In the unadjusted model, respondents aged 40 years and above were 5 times more likely (UOR 5.00, 95% CI 1.07 – 23.30) to have engaged in transactional sex than those aged 24 years and less; while those aged 25 and 39 were more than 3 times more likely to have engaged in transactional sex. Although age above 40 years was the only statistically significant finding, respondents who had a secondary education were slightly more likely than those with primary education to engage in transactional sex than those who had a tertiary education. Furthermore, employed respondents were also less likely to engage in transactional sex than those who were unemployed. Surprisingly, those with both regular and irregular income were also less likely to engage in transactional sex than those with no income.

Respondents who drank alcohol were significantly almost 3.5 times (UOR 3.42, 95% CI 1.31 – 8.98) more likely than those who did not drink alcohol to have engaged in transactional sex post-circumcision, who were HIV positive were significantly more than 2.5 times (UOR 2.68, 95% CI 1.10 – 6.50) more likely than those who were HIV negative.

In the adjusted model, the only variable that remained statistically significant was the variable on alcohol use; whereby those that drank alcohol were over 5 times (AOR 5.27, 95% CI 1.48 – 18.89) more likely to have engaged in transactional sex than those who do not drink alcohol. Those that were HIV positive, in the adjusted model, were only slightly more likely to have engaged in transactional sex than those who were HIV negative.

Table 10: Factors associated with transactional sex post-circumcision

	Unadjusted Odds Ratios			Adjusted Odds Ratios		
	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value
Socio-Demographic Variables						
Age						
24 years and below	1			1		
25-29 Years	3.33	0.83 – 13.33	0.09	4.25	0.75 – 24.10	0.10
30-34 Years	3.08	0.74 – 12.82	0.12	2.87	0.49 – 16.67	0.24
35-39 Years	3.85	0.80 – 18.53	0.09	1.39	0.13 – 14.96	0.79
40 years and above	5.00	1.07 – 23.30	0.04	6.00	0.73 – 49.20	0.10
Marital status						
Single	1			1		
Not married/living together, in a steady relationship (+ 3 months)	1	-	-	1.71	0.25 – 11.75	0.59
Not married, but living with sexual partner/boyfriend/girlfriend	1	-	-	1.93	0.20 – 18.52	0.57
Married, living with husband/wife	1	-	-	1.42	0.16 – 12.78	0.76
Married, not living with husband/wife	1	-	-	1.88	0.08 – 41.74	0.69
Divorced/Widowed	1	-	-	1	-	-
Highest level of education						
Primary	1			1		
Secondary	1.37	0.36 – 5.20	0.64	0.95	0.18 – 4.97	0.95
Tertiary	0.91	0.17 – 4.77	0.91	0.37	0.04 – 3.08	0.40
Employment status						
Unemployed	1			1		
Employed (by others or self-employed)	0.67	0.27 – 1.70	0.40	0.45	0.11 – 1.77	0.25
Full-Time Student	1	-	-	1	-	-
Other	0.65	0.18 – 2.32	0.01	0.72	0.12 – 4.36	0.72
Religious affiliation						
No religion	1			1		
Christian	1.51	0.17 – 13.71	0.72	1.34	0.10 – 17.45	0.82
Traditionalist	0.83	0.14 – 12.10	0.83	0.49	0.04 – 6.72	0.59
Other	1	-	-	1	-	-
Household income						
No income	1			1		
Regular income	0.76	0.18 – 3.14	0.71	3.24	0.29 – 36.74	0.34
Irregular income	0.73	0.16 – 3.32	0.68	1.60	0.15 – 16.92	0.70
Alcohol use						
No	1			1		

	Unadjusted Odds Ratios			Adjusted Odds Ratios		
	Odds Ratio	95% CI	P Value	Odds Ratio	95% CI	P Value
Yes	3.42	1.31 – 8.98	0.01	5.27	1.48 – 18.89	0.01
HIV Status						
Negative	1			1		
Positive	2.68	1.10 – 6.50	0.03	1.03	0.29 – 3.64	0.96
Unknown	1	-	-	1	-	-
Knowledge						
VMMC Protects against HIV						
Complete protection	1			1		
Partial protection	7.33	0.64 – 83.64	0.11	1	-	-
VMMC Protects against STIs						
True	1			1		
False	1	-	-	1	-	-
Don't Know	1	-	-	1	-	-
No condom use required after circumcision						
True	1			1		
False	1	-	-	1	-	-

Unlike in the unadjusted model where all marital status categories were just as likely to have engaged in transactional sex compared to those who were single, this pattern changed in the unadjusted model. All marital status categories, except for those who were divorced, were between 1.42 and 1.93 times more likely to have engaged in transactional sex than their single counterparts. Furthermore, while in the unadjusted model those with a secondary education were slightly more likely to have engaged in transactional sex than those with a primary education, in the adjusted model they were slightly less likely to have engaged in transactional sex.

4.0 DISCUSSION

Globally, South Africa is one of the countries with the highest HIV prevalence rates at 12.2% in 2012 (18). MMC has been included as part of the HIV care and prevention strategies following strong evidence of HIV transmission risk-reduction (2, 3). With an increase in the number of men above 15 years circumcised as a result of the scale-up in MMC, risk compensation, that is, an increase in risky sexual behaviour after MMC as a result of the perceived decrease in HIV risk, remains a concern for MMC programme implementers in Sub-Saharan Africa (10). Therefore, the purpose of this study was to describe the sexual behaviours of medically circumcised men at a family practice in Alexandra, South Africa, and to describe factors that are associated with these behaviours with particular emphasis on whether there was a change in their sexual behaviours as a result of risk compensation.

Condom use at last sexual encounter

The results from this study suggest that, overall, MMC does contribute to increase risky sexual behaviour, especially condom use at last sexual encounter through risk compensation. Several factors elaborated in this discussion, however, contributed to this finding. This finding is in line with a study by Ayiga et al and the trial in Orange Farm by Auvert et al (4,19), however, it is in contrast with the findings from Westercamp et al and Gray et al, who found no risk compensation after MMC in their study in Kenya and Uganda, respectively (6,12).

Although the study found that socio-demographic and economic characteristics such as marital status, education level, employment status, income, and religious affiliation were not associated with the use of condoms at last sexual encounter, an interesting finding was that men who were in married and living with their spouses and those cohabiting were equally less likely to use a condom. This finding is in contrast with a study by Shisana et al, which found that marital status plays a vital role in having protected sex (38).

The majority of the men (87%) indicated that they had never had unprotected sex while under the influence of alcohol. In addition, there was no association between the lifestyle choice of alcohol consumption and condom use. This result is similar to the findings in a study conducted in rural North West province in South Africa which found a lower risk of unprotected sex under alcohol influence among medically circumcised men (32). Although there was no association between knowledge regarding the protection benefits of MMC against HIV and the use of condoms at last sexual encounter, substantial evidence in other studies support the significance of education in MMC programmes (23, 28). Results found that despite high MMC knowledge among medically circumcised males (97.9-99.3%), this was not associated with

behaviour change. This is an unexpected finding due to increasing evidence of the association between risk reduction counselling and reduced risk compensation (21). Perhaps, the main contributing factors to this unexpected finding were the small sample size, the quality of the content of the counselling and environmental determinates such as availability of condoms.

As projected, twenty (20%) of the participants were HIV infected. There was an association between HIV status and the use of condoms at last sexual encounter. Results suggest the effectiveness of HIV risk reduction counselling among this group, in that, HIV infected circumcised males were almost 4 times (unadjusted odds ratio 18; times more with adjusted odds ratio) more likely to use condoms at their last sexual encounter compared to HIV negative males. This finding plays a vital role in a hyper endemic country such as South Africa, where male-to-female HIV transmission is high even after circumcision (38). Condom use in this group is therefore of paramount importance.

Condom use was reported highest among the respondents who were less than 24 years and over 40 years old and above. Although 51% reported condom use during last sexual intercourse, the remaining 49% raised some concern about risky sexual behaviour in general. Furthermore, there is an association between age and use of condoms at last sexual encounter. Males aged 30-34 were less likely to use condoms than males younger than ages 24, which is mainly explains the high HIV prevalence rates among this age group (18).

A notable characteristic of men who undergo VMMC is their level of education. Most of the respondents had either a secondary or tertiary education. Approximately 72% of respondents have secondary education, while a minority only have primary level education

Findings from this study correlate with results from a study by Lau et al. who found a correlation between higher level of education and employment with higher odds of being circumcised (39). In this study, males who had secondary level education had a higher likelihood of undergoing medical male circumcision as opposed to traditional circumcision (21). Furthermore, these males displayed significant positive changes in sexual behaviour such as increased condom use after circumcision. This was similar to the findings in other studies conducted in South Africa (21). However, the study conducted by Westercamp et al. found that individuals who had at least a secondary level education had lower odds of displaying risk compensation. Furthermore, another study by Tram et al did not find a significant association between individual level of education and the likelihood of circumcision (40).

Employment status played a vital role in the likelihood of condom use. Employed respondents were less likely to have used a condom at their last sexual encounter than those who were

unemployed. This is surprising given that most employed respondents had a secondary or tertiary level of education, and one would expect that the effects of the HIV counselling the respondents undergo, would have been better understood and internalised by those with a higher level of education.

Multiple Sexual Partners

There was no association between having multiple concurrent sexual partners after circumcision and demographic and socio-economic status (age, marital status, education level, employment status, and household income), alcohol use, HIV status, and MMC knowledge.

The majority (97%) of the respondents reported that they did not believe that one should have more than one sexual partner after being circumcised; while just over 50% of respondents indicated that they did not use condoms any less after circumcision with their partners. This result was expected, as a study by Grund and Hennink found that the majority of men who underwent medical circumcision, as opposed to traditional male circumcision, displayed changes in attitude that are more aligned to HIV prevention (13). These included reduced number of sexual partners and more consistent use of condoms. Contrary to this, however, a study conducted in Kenya found that medically circumcised males did not show a difference in behaviour after they had been circumcised (20). This change in behaviour or lack thereof, is attributed to the HIV and MMC counselling that respondents receive. Thus, counselling is a strategic element that remains a key factor to educating males about HIV and medical circumcision (13; 20).

It is important to note that almost 97% of the participants did not have multiple sexual partners after circumcision, however only 70% indicated that they had 1 partner and 9% had 3+ partners. This suggests possible information bias in answering questions.

Transactional Sex

Majority of the participants (77.6%) did not engage in transactional sex. There was no association between males engaging in transactional sex post MMC and factors such as marital status, level of education, religious affiliation, household income, MMC knowledge, and engaging in transactional sex post MMC. However, age was a determinant in transactional sex following MMC. Results suggest that men over the ages of 40 were 5 times more likely to engage in transactional sex as opposed to males aged 24 and below surprisingly, as it is found

that younger men are generally at a higher risk of transactional sex than older men in Sub-Saharan Africa (41).

Alcohol consumption was also a determinant in transactional sex behaviour post MMC; males who drank were approximately 3.5 times more likely to engage in transactional sex post MMC compared to their counterparts. This is similar to the result from Magni et al, who also found that alcohol dependence and binge drinking were associated with transactional sex(42). Furthermore, some studies have found that VMMC can influence an individual's behaviour to either help reduce risk of HIV infection or engage in riskier sexual behaviour. This is mainly due to the HIV counselling received by males who undergo medical circumcision. As in other studies, this study found that there was some change in sexual behaviour after circumcision, although not statistically significant, but a higher reported rate of condom use (11, 12, 13).

Regardless of employment status, respondents believed that one should have more than one sexual partner after they have been circumcised. However, those who were employed were surprisingly less likely to engage in transactional sex than those who were unemployed. This finding is surprising, as those who are employed and earning a salary have income to spend on transactional sex as opposed to unemployed men.

Limitations

The study contained a number of limitations. The one limitation is that only one site was used, which may limit the generalisability of the findings. Furthermore, the sample size was small, and this too may have affected the generalisability of some of the findings. It is possible that different results may be found with a larger sample size. Limitations of using a cross sectional study design include difficulty in establishing the temporal relationship between the current sexual behaviour and the time of circumcision, though the questionnaire attempted to be clear about time frames. In addition, social desirability bias could not be completely eliminated even though a male RA was used. Having a study in future with a larger sample could yield more significant results between the determinants and medical male circumcision.

5.0 CONCLUSION

The purpose of this study was to describe the sociodemographic characteristics and sexual behaviors of medically circumcised men at a family practice in South Africa, and assess whether there is a change in sexual behaviors after circumcision. Results from the study show that males who are likely to undergo medical circumcision are males who at least have secondary education, males who are employed and who are getting a regular income. This shows that education and an individual's wealth status play a role in whether a respondent chooses to undergo medical circumcision.

With regards to displayed behavior after circumcision, although overall, risk compensation post circumcision was found in nearly half of the men, results show that factors that increased the likelihood of condom use after circumcision are a higher level of education, household income, and HIV status. However, only HIV status was statistically significant, and men who are HIV positive reported high condom use during last sexual encounter. This change in behaviour could be as a result of the HIV risk reduction counseling provided through the circumcision process that the respondent receives and also the concern about HIV transmission to partners or reinfection. Nevertheless, this is a strategic element that remains a key factor to educating males about HIV and medical male circumcision. It is imperative that programmes and policies that offer comprehensive HIV prevention continue to encourage both circumcised and uncircumcised men to wear condoms at every sexual encounter, and centre messaging around the partial protection that circumcision provides. Furthermore, quality assurance and monitoring checks must be put in place in order to ascertain whether counselling procedures remain systematic (the consistent and correct messaging are provided within each counselling session). Condoms should be easily accessible in both medical and non-traditional outlets, and promoted continuously through different social and print mediums – for both circumcised and uncircumcised men.

However, further research is required to assess whether changes in these behaviours continue over a longer period of time. A longitudinal study would be desirable in knowing if these males who have had medical male circumcision will continue with the protective behavior or if the protective behavior will turn to risk compensation overtime. Secondly, a study with a larger sample size could yield more reliable estimates between the determinants and medical male circumcision.

Medical male circumcision is safer than traditional circumcision, and as results have shown that males who have higher income, and are educated have higher odds of getting medical male circumcision, it is important that males of a lower wealth status and level of education are as protected from HIV risk. This highlights the need to strengthen campaigns on male circumcision so that they are appealing to males who currently have lower odds of undergoing medical male circumcision.

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QUESTIONNAIRE

Section 1: QUESTIONNAIRE IDENTIFIERS

Questionnaire ID: _____

PARTICIPANT ID	_____
Interviewer visits	
DATE	Day :
	Month :
	Year :
Name of interviewer	
Signature of interviewer	
Result Of Study	
COMMENTS	

RESULTS CODE
1. ACCEPTED INTERVIEW 2. NOT AT HOME 3. POSTPONED 4. DECLINED 5. PARTLY COMPLETED- NEW APPOINTMENT NEEDED 6. PARTLY COMPLETED- END QUESTIONNAIRE 7. OTHER

VERIFICATION OF QUESTIONNAIRE

	PRINCIPAL INVESTIGATOR
NAME	_____
CODE	☐☐
DATE	DAY ☐☐ MONTH ☐☐ YEAR ☐☐

HIV STATUS – NEGATIVE 01 POSITIVE 02 UNKNOWN 03 CIRCLE APPROPRIATE CODE

Section 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS

	Question	Coding Categories	Skip
1.	How old are you today?	NUMBER |___|___| 97.Declined 98. I don't know/remember	
2.	What is your marital status? (Marital status referring to legal, traditional or common-law) [ONLY ONE response possible] READ FOR SPECIFIC RESPONSES	1.Not married 2. Not married or living together but in a steady relationship lasting more than 3 months 3. Not married, but living with sexual partner/boyfriend/girlfriend 4. Married, living with husband/wife 5. Married, NOT living with husband/wife 6. Divorced/Widowed 7. Polygamous relationship 11. Other (Specify)_____	
3.	What is the highest level of school you attended: primary, secondary, or higher education?	0. None 1. Primary 2. Secondary 3. Tertiary (University) 97.Declined	
4.	What your current employment status?	1. Unemployed, (without looking for work 2. Unemployed, (looking for work) 3. Working for someone – (principally in the informal sector)	

	[Only one answer possible] READ TO SPECIFY ANSWERS	4. Working for someone – (principally in the formal sector) 5. Working for his/her self – (principally in the informal sector 6. Working for his/her self – (principally in the formal sector 7. Full time student / student / learner at school 8. Fulltime student in College/University 9. Pensioner (reformed) 10. Living on disability or other grant 11. Other (Specify)_____	
5.	What is/are your religious affiliation(s)?	1. Christian: roman catholic 2. Christian protestant 3. Pentecostal/Adventist and other evangelical churches 4. Traditional religion 5. Islam 11. Other (Specify) _____ 0.No religion 97.Declined	
6.	Does your household have any income? If YES, is it regular?	1.Yes, regular 2.Yes, don't know if regular 3.Yes, irregular 0.No 97.Declined	

SECTION 2: KNOWLEDGE AND ATTITUDES ABOUT SEX AFTER CIRCUMCISION

Now, I would like to talk to you about your knowledge and attitude about sex after circumcision. Your answers to these questions will be kept confidential and will not be revealed to anybody.

	Question	Coding Categories	Skip
1.	How protective do you think circumcision is against getting HIV?	1. Partially 2. Completely 97. I don't know/ remember	
2.	Do you believe that circumcised men should have more than one sexual partner?	1. Yes 0. No 97. Declined 98. I don't know	
3.	How do you think circumcision affect sexual performance or activity?	1. Increase 2. Decrease 3. It doesn't affect 97. Declined 98. I don't know	
4.	*"Please tell me if the following statements are true or false."* Men who are circumcised can never get a sexually transmitted infection.	1. True 0. False 97. Don't Know 98. Refuse to Answer	

5.	If a man is circumcised, he does not need to use condoms.	1. True 0. False 97. Don't Know 98. Refused to Answer

SECTION 3: SEXUAL BEHAVIOUR AFTER CIRCUMCISION

Now, I would like to talk to you about some personal matters regarding your sexual encounters. Your answers to these questions will be kept confidential and will not be revealed to anybody.

	Question	Coding Categories	Skip
1.	How many sexual partners do you have?	NUMBER |___|___| 97.Declined 98.I don't know/remember	
2.	Before circumcision, did you have the same number of partners?	1. Yes 0. No	
3..	How long after circumcision did you engage in sexual intercourse?	NUMBER |___|___| 97.Declined 98 .I don't know/remember	
4.	When was the last time you had sexual intercourse after circumcision with any partner?	1 2 3 4 5 6 7 days ago .....1 1 2 3 4 weeks ago .....2 3 2 3 months ago .....3 0. Never 97.Declined 9.I don't remember	Skip to # 10, if answer is never
5.	The last time you had sexual intercourse with any partner, was a condom used?	1. Yes 0. No 97.Declined	
6.	Do you always use a condom during sexual intercourse with any partner?	1. Yes 0. No 97. Declined	
7.	Now thinking about times when you <u>do not</u> use condoms, what are <u>ALL THE REASONS</u> you <u>DO NOT</u> use them? *[Circle ALL reasons chosen]*	1. I don't know how to use condoms 2. Using condoms is embarrassing 3. I do not like the way condoms feel 4. I don't know the reason, I just don't use them. 5. Other 97. Don't know 98. Refuse to answer	
8.	Are you having more sexual intercourse without a condom now than before circumcision?	1. Yes 0. No 97. Declined 98. I don't remember	

9.	Have you ever had sexual intercourse with a woman who received a reward in cash or kind?	1. Yes 0. No 97. Declined 98. I don't remember	
10.	Do you consume alcoholic drinks?	1. Yes 0. No 97. Declined 98. I don't remember	Skip #10 and 11, if answer is No.
11.	How many times were you intoxicated due to alcohol use in the last week?	NUMBER |___|___| 97. Declined 98. I don't remember	
12.	How many times have you had sexual intercourse without a condom while intoxicated by alcohol in the last month?	NUMBER |___|___| 97. Declined 98. I don't remember	

We have finished the interview.

Do you now have any comments or questions yourself?

Comments respondent: _____

Comments/observations interviewer: _____

Thank you very much for your time and collaboration.

R14/49 Dr Josephine Asere-Bediako et al

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M151128

NAME: (Principal Investigator)	Dr Josephine Asere-Bediako et al
DEPARTMENT:	School of Public Health Alexandra Family Practice
PROJECT TITLE:	Sexual Behaviours of Circumcised Men in a Private Practice in Alexandra
DATE CONSIDERED:	27/11/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Charles Chasela and Dr Renay Weiner
APPROVED BY:	Professor P Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	03/02/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature

Date 10/02/2016

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES