**RESEARCH ARTICLES**

# Does circumcision influence risky sexual behaviour among circumcised sexually active men in Zambia? Evidence from the 2013-14 Zambia Demographic and Health Survey

**CC Mapoma[1], BB Bwalya[2]**

1. Department of Population Studies, School of Humanities and Social Sciences, the University of Zambia, Lusaka, Zambia
2. Department of Mathematics and Statistics, School of Science, Engineering and Technology, Mulungushi University, Kabwe, Zambia

**Correspondence: Chabila C Mapoma (**chabilamapoma@gmail.com or chrstopher.mapoma@unza.zm**)**

Citation style for this article:
Mapoma CC, Bwalya BB. Does circumcision influence risky sexual behaviour among circumcised sexually active men in Zambia? Evidence from the 2013-14 Zambia Demographic and Health Survey. Health Press Zambia Bull. 2017;1(2), [Inclusive page numbers]

**Low circumcision and high rates of heterosexual acquired HIV infections are among factors that have "influenced" Zambia to adopt, encourage and spearhead Voluntary Medical Male Circumcision (VMMC) as a preventive tool against HIV infection. Circumcision has been portrayed as the single most important "panacea" or "magic bullet" to HIV prevention in some circles of the Zambian society and many African countries. In this respect, this study aimed at answering two questions: Does circumcision influence risky sexual behaviour among circumcised men in Zambia? And; how do socio-economic and demographic characteristics influence such behaviour? Data for men age 15–59 years interviewed during the 2013–14 Zambia Demographic and Health Survey was used. A total of 14773 men were included in the sample. Logistic regression - the odds ratio - was used to assess the association between circumcision on one hand and socio-economic and demographic characteristics as well as risky sexual behaviours on the other hand. Men aged 35-45 and 45-54 were likely to report being circumcised comparatively (OR=0.691, p<0.001; OR=0.761, p<0.047). Men aged 45-54 were more likely to engage in risky sexual behaviour (OR=0.397, p<0.0001). Being married/living with a partner and being formerly married were highly associated with risky sexual behaviour (OR=0.0004, p<0.0001). In terms of wealth quintile, being in the rich bracket is highly associated with engaging in risky sexual behaviour (OR=1.396, p<0.026). Other sexual characteristics such as having two or more non-marital sexual partners was also highly associated with circumcision (OR=0.085, p<0.014). However, paying for sex, taking alcohol before sex and using a condom at last sexual intercourse with non-cohabiting sexual partner were not associated with circumcision status (OR=0.906, p<0.42; OR=0.846, p<0.138 and OR=0.906, p<0.420). There is strong evidence suggesting that men who are circumcised are also having two or more extra non-cohabiting sexual partners. Proponents of VMMC require to up their messages to ensure complete adherence to safe sexual messages, behaviour and practice if transmission of HIV and other STIs is to be halted and reversed.**

# Introduction

Circumcision has been adopted as an effective model to lower HIV transmission among sexually active men in Zambia and many other African countries. However, the practice is still substantially low while HIV infections due to heterosexual engagements are still high. This situation is among factors that have "prompted" Zambia to adopt, encourage and spearhead Voluntary Medical Male Circumcision (VMMC) to fight HIV infection [1]. Notwithstanding this point,

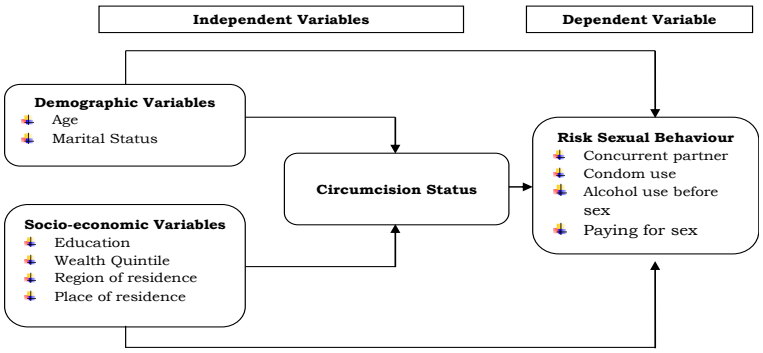


**Figure 1 Conceptual Framework**

circumcision has been misunderstood substantially and to some extent has also been seen to be a driver of risky sexual encounters. Circumcised men, as it has been debated, seem to be more likely to engage in more risky sexual behaviour due to their circumcision status. However, this evidence is inconclusive especially in the Zambian scenario. Arguments for and against the assertion that circumcision encourages or discourages men to engage in risky sexual behaviour have ensued over time and a number of issues have surfaced.

Evident suggests that uncircumcised men are more likely to get infected with the virus that causes AIDS if they have unprotected sex with women who are infected [2]. However, circumcision has been said to have a protective effect against HIV and other sexually transmitted infections [3, 4, 5]. Notwithstanding this statement, information on the role circumcision plays in protecting circumcised men against STIs including HIV have not gone unchallenged. There are assertions suggesting that, circumcision is, in fact leading men to adopt "careless" and risky sexual behaviours thereby exposing themselves to potential HIV infection [4, 5]. This is so because some circumcised men think that once one is circumcised, one is forever protected [6]. It has also been found that there is complacency in HIV prevention strategies partly due to messages on what circumcision can and cannot do [6]. As a result, some men, even amongst the married, are practicing risky sex such as concurrent multiple relations, inconsistent condom use and transactional sex among others [6].

The question has been: why do circumcised men feel they can engage in risky sexual

behaviour without considering the likely danger associated? This question has been given a lot of attention by a myriad of researchers, and they have come to explain such behaviour with the aid of the Behaviour Risk Compensation Theory (BRCT).

The BRCT proposes that people tend to adjust their behaviour in response to perceived level of risk; usually behaving less cautiously where they feel more protected, and more cautiously where they feel a higher level of risk. In the context of viewing circumcision as a natural condom, the Behaviour Risk Compensation Theory suffices and thereby engendering men to feel less at risk and engage in risky sexual behaviour including non-marital sex, non-condom use, and high number of sexual partners [7, 8, 9, 10]. This may not be the same for uncircumcised men.

However, there is very little or no evidence suggesting how this theory works in practice or giving more insight explaining whether indeed men in Zambia particularly, engage in risky sexual behaviour because they feel "more protected" [11, 12]. In addition, there seems to be no study in Zambia which currently has highlighted and tested whether or not circumcised men "feel" more protected than uncircumcised men and therefore engage in risky sexual behaviour. It is against this background that this paper aimed at investigating whether or not circumcision was influencing risky sexual behaviour among circumcised men in Zambia. Questions this paper aimed to answer were two:

1. Does circumcision influence risky sexual behaviour among circumcised men in Zambia? and;
2. How do socio-economic and demographic characteristics influence risky sexual behaviour given their circumcision status?

## Methods

This paper is based on the Zambian DHS of 2014, men dataset. The ZDHS is a onetime cross-sectional retrospective survey conducted every 4-5 years in Zambia. It follows a two-stage stratified cluster sample design, with Enumeration Areas (EAs or clusters) selected during the first stage and households selected during the second stage. In the first stage, 722 EAs (305 in urban areas and 417 in rural areas) were selected with probability proportional to size. Zambia is administratively divided into 10 provinces (Central, Copperbelt, Eastern, Luapula, Lusaka, Muchinga, Northern, North Western, Southern, and Western). Stratification was achieved by separating each province into urban and rural areas.

**Table 1 Background Characteristics by circumcision Status**

| Background characteristics | Circumcision Status (percentages) |
|---|---|
| **Age groups** | **Circumcised** |
| 15-24 | 24.7 [23.0,26.4] |
| 25-34 | 21.7 [19.9,23.5] |
| 35-44 | 17.7 [16.1,19.5] |
| 45-54 | 18.2 [14.3,22.8] |
| 55+ | 18.2 [14.3,22.8] |
| **Total** | **21.5 [20.3,22.9]** |
| **Residence** | |
| Urban | 28.5 [26.6,30.5] |
| Rural | 15.7 [14.1,17.4] |
| **Total** | **21.6 [20.3,22.9]** |
| **Marital Status** | |
| Never Married | 25.4 [23.8,27.2] |
| Married | 18.6 [17.2,20.1] |
| Former | 22.3 [18.7,26.3] |
| **Total** | **21.5 [20.3,22.9]** |
| **Education level** | |
| No education | 16.4 [12.7,20.9] |
| Primary | 15.9 [14.4,17.5] |
| Secondary | 26.0 [24.4,27.6] |
| **Total** | **21.5 [20.3,22.9]** |
| **Region** | |
| Central | 12.6 [9.7,16.2] |
| Copperbelt | 31.9 [28.6,35.4] |
| Eastern | 56.5 [54.5,77.6] |
| Luapula | 21.7 [20.0,26.0] |
| Lusaka | 22.9 [20.0,26.3] |
| Muchinga | 8.2 [6.6,10.2] |
| Northen | 7.9 [5.73,10.8] |
| North-Western | 78.2 [69.5,85.1] |
| Southern | 10.8 [8.4,13.8] |
| Western | 46.6 [38.7,54.6] |
| **Total** | **21.5 [20.3,22.9]** |
| **Wealth Index** | |
| Poor | 16.9 [13.2,17.1] |
| Middle | 15.0 [13.2,17.1] |
| Rich | 27.3 [25.6,29.1] |
| **Total** | **21.5 [20.3,22.9]** |

As a result, 10 provinces were stratified into 20 sampling strata. In the second stage, a complete list of households served as the sampling frame in the selection of households for enumeration. An average of 25 households was selected in each EA. It was during the second stage of selection that a representative sample of 18,052 households was selected. During the data collection process, trained data collectors performed face-to-face interviews with all eligible men aged 15 to 59 years. Out of the 18,052 households selected, 14773 men were eligible with 13111 being interviewed achieving a response rate of 91.1%. In order to appreciate the analytical process for this paper, a conceptual framework, based on the BRCT was designed as outlined in figure 1. In this conceptual framework, circumcision is both a dependent and an independent variable.

**Table 2 Risky sexual behaviour by circumcision status**

| Risky Sex (percentages) | |
|---|---|
| **Took alcohol before sex** | **Circumcised** |
| Yes | 18.7[15.8,21.9] |
| No | 21.8[20.5,23.2] |
| **Paid partner** | |
| Yes | 23.9 [20.2,28.0] |
| No | 21.1 [20.1,22.8] |
| **2+ Sex partners past 12 months** | |
| Yes | 20.8 [18.6,23.2] |
| No | 21.7 [18.6,23.2] |
| **Total** | **21.5 20.3,22.9]** |
| **Had risk sex in past 12 months** | |
| Yes | 26.0 [24.0,28.1]] |
| No | 18.3 [16.6,19.8] |
| **Used condom last12 months** | |
| Yes | 27.7 [23.5,32.5] |
| No | 18.2 [15.8,20.7] |
| **Total** | **20.8 [18.6,23.1]** |

In relation to demographic and socio-economic variables, circumcision is dependent. It is also an independent variable since linkages illustrated in by the framework suggest that one's circumcision status

influences their sexual behaviour; which is the gist of this paper.

**Table 3 Background characteristics and circumcision status**

| n=14763 | | | |
|---|---|---|---|
| Background Variables | Odds Ratio | Confidence Interval (95%) | |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 0.864 | 0.703 | 1.062 |
| 35-44 | 0.692 | 0.553 | 0.866 |
| 45-54 | 0.761 | 0.582 | 0.997 |
| 55+ | 0.756 | 0.515 | 1.11 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 0.924 | 0.661 | 1.292 |
| Secondary+ | 1.197 | 0.853 | 1.679 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT[1] | 0.937 | 0.76 | 1.156 |
| Formerly Married | 0.966 | 0.735 | 1.269 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 1.987 | 1.425 | 2.772 |
| Eastern | 0.56 | 0.397 | 0.79 |
| Luapula | 2.208 | 1.331 | 3.663 |
| Lusaka | 1.198 | 0.859 | 1.669 |
| Muchinga | 0.675 | 0.465 | 0.981 |
| Northern | 0.67 | 0.428 | 1.049 |
| N/Western | 28.754 | 16.451 | 50.258 |
| Southern | 0.859 | 0.586 | 1.257 |
| Western | 7.15 | 4.585 | 11.15 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 0.615 | 0.506 | 0.749 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 0.831 | 0.696 | 0.992 |
| Rich | 1.389 | 1.156 | 1.669 |

[1]Living with someone as if married

Thus, once circumcised, and based on the aforementioned empirical evidence, these men may engage in risk sexual behaviour because they could be assuming natural protection and immune to the HIV due to circumcision – conforming also to the Behaviour Risk Compensation Theory.

**Table 4 Risky sex behaviour and background characteristics**

| n=11291 | | | |
|---|---|---|---|
| Background Variables | Odds Ratio | Confidence Interval (95%) | |
| Circumcision status | 1.083 | 0.878 | 1.336 |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 1.029 | 0.763 | 1.389 |
| 35-44 | 0.782 | 0.575 | 1.062 |
| 45-54 | 0.398 | 0.281 | 0.563 |
| 55+ | 0.324 | 0.192 | 0.547 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 1.244 | 0.851 | 1.817 |
| Secondary+ | 1.366 | 0.909 | 2.053 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT[1] | 0 | 0 | 0.001 |
| Formerly Married | 0.016 | 0.006 | 0.041 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 0.602 | 0.412 | 0.878 |
| Eastern | 1.258 | 0.852 | 1.859 |
| Luapula | 0.496 | 0.296 | 0.83 |
| Lusaka | 0.814 | 0.563 | 1.176 |
| Muchinga | 0.494 | 0.325 | 0.752 |
| Northern | 0.558 | 0.363 | 0.857 |
| N/Western | 0.741 | 0.486 | 1.131 |
| Southern | 1.812 | 1.246 | 2.634 |
| Western | 2.271 | 1.539 | 3.353 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 1.067 | 0.833 | 1.366 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 1.048 | 0.837 | 1.313 |
| Rich | 1.396 | 1.04 | 1.873 |

[1]Living with someone as if married

The analytical structure included re-coding men as either circumcised (1) or not circumcised (0) at the time of the survey. Circumcision status was first linked to socio-demographic and economic characteristics and thereafter linked to specific risky sexual

behaviour. Socio-demographic and economic characteristics were linked to both the status of being circumcised and identified specific risky sexual behaviours. This analytical approach was necessary to provide specific explanatory modifications associated with the identified risky sexual behaviour on one hand and circumcision on the other hand. The following terms were used to describe "risky sex" in general: *Risky sex* was defined as engaging in concurrent sexual partnerships or multiple on-going partnerships or overlapping partnerships (Zambia Sexual Behaviour Survey 2009); where a man was having two or more steady sex partners other than their "permanent" partner in the last 12 months [14]. *Two plus sexual partners* is where a man had sexual relations or encounters with two or more non-marital/non-cohabiting sexual partners in the last 12 months. *Alcohol intake before sex*; the ZDHS collects data on whether a respondent took or drank alcohol before they engaged in sex. This behaviour is classified "risky" because alcohol consumption is known to influence one's perception of risk and decision making on safe sex [15]. Having taken alcohol before any sexual encounter qualifies to be classified as risky sexual behaviour because of associated judgement errors. *Paid sex*; in this paper, all men who reported to have ever paid for sex were also associated or considered to have engaged in risky sexual behaviour [14].

**Table 5 more than two sexual non-marital/cohabiting partners and background characteristics**

| n=14763 | | | |
|---|---|---|---|
| Background Variables/ | Odds Ratio | Confidence Interval (95%) | |
| Circumcision status | 1.193 | 1.037 | 1.373 |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 1.663 | 1.357 | 2.039 |
| 35-44 | 1.568 | 1.267 | 1.941 |
| 45-54 | 1.108 | 0.867 | 1.416 |
| 55+ | 0.989 | 0.684 | 1.429 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 1.187 | 0.897 | 1.572 |
| Secondary+ | 1.211 | 0.901 | 1.626 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT[1] | 1.479 | 1.207 | 1.812 |
| Formerly Married | 1.242 | 0.89 | 1.732 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 0.749 | 0.549 | 1.021 |
| Eastern | 1.652 | 1.224 | 2.231 |
| Luapula | 0.773 | 0.546 | 1.095 |
| Lusaka | 0.905 | 0.664 | 1.233 |
| Muchinga | 0.967 | 0.689 | 1.356 |
| Northern | 1.107 | 0.8 | 1.53 |
| N/Western | 0.774 | 0.538 | 1.112 |
| Southern | 2.137 | 1.594 | 2.865 |
| Western | 2.125 | 1.551 | 2.913 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 1.447 | 1.224 | 1.71 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 1.185 | 1.018 | 1.38 |
| Rich | 1.276 | 1.036 | 1.571 |

[1]Living with someone as if married

*Condom use during last sexual intercourse*; within the confines of risky sex, condom use was important. In this paper, all men reporting to have engaged in any risky sexual encounters were also asked to state whether

or not they used a condom the last time they had sex with a non-marital or non-cohabiting sexual partner. Bivariate analyses were performed using Stata 13.0 (Stata Corp., College Station, TX, USA) to situate and estimate descriptive relations between the outcome variables and predictor or explanatory variables.

**Table 6 Paid sex and background characteristics**

| n=12688 | | | |
|---|---|---|---|
| Background Variables/ | Odds Ratio | Confidence interval (95%) | |
| Circumcision status | 0.906 | 0.713 | 1.152 |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 0.972 | 0.743 | 1.27 |
| 35-44 | 0.763 | 0.543 | 1.071 |
| 45-54 | 0.371 | 0.22 | 0.626 |
| 55+ | 0.302 | 0.114 | 0.801 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 1.084 | 0.636 | 1.847 |
| Secondary+ | 0.92 | 0.518 | 1.634 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT[1] | 0.577 | 0.42 | 0.793 |
| Formerly Married | 2.429 | 1.645 | 3.585 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 0.475 | 0.305 | 0.739 |
| Eastern | 0.376 | 0.252 | 0.56 |
| Luapula | 0.74 | 0.482 | 1.137 |
| Lusaka | 0.663 | 0.467 | 0.942 |
| Muchinga | 0.401 | 0.239 | 0.671 |
| Northern | 0.3 | 0.194 | 0.463 |
| N/Western | 0.977 | 0.652 | 1.465 |
| Southern | 0.506 | 0.337 | 0.761 |
| Western | 0.886 | 0.514 | 1.529 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 0.75 | 0.565 | 0.995 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 1.089 | 0.858 | 1.383 |
| Rich | 0.686 | 0.486 | 0.969 |

[1]Living with someone as if married

Logistic regression models were fitted to the data to model associations between circumcision status and dimensions of background characteristics on one hand and, between circumcision status and identified risky sexual behaviour on the other hand. By adding one explanatory variable after another, it was possible to check how each addition affected the outcome in relation to other variables. In order to check for multi-collinearity among independent variables in the logistic regression, standard errors were examined to observe whether or not they exceeded 2.0 [21]. However, in this study, all independent variables in all adjusted models had a standard error of <2.0, indicating absence of multi-colinearity. Odds ratios (ORs) were estimated to assess the strength of the associations and a 95% confident level and interval (CIs) and a p-value of less than 0.05 were used for significance testing [22]. Due to the complex multistage sampling designs employed in DHS methodologies, a weight variable was calculated and used to accommodate variations in the population.

# Results

Table 1 describes study respondents by demographic and socio-economic characteristics and circumcision status. Overall, about two in every ten men are circumcised in Zambia. About a quarter

(24.7%) of the men aged 15-24 years were circumcised. More urban compared to rural men reported to be circumcised (28.5% vs. 15.7%). One in four (25.5%) of the never married were circumcised while only 18.7% of those married were.

**Table 7 Alcohol intake before sex and background characteristics**

| n=14763 | | | |
|---|---|---|---|
| Background Variables/ | Odds Ratio | Confidence interval (95%) | |
| Circumcision status | 0.846 | 0.679 | 1.055 |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 2.748 | 2.005 | 3.766 |
| 35-44 | 3.17 | 2.168 | 4.634 |
| 45-54 | 2.914 | 1.942 | 4.373 |
| 55+ | 2.71 | 1.693 | 4.335 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 1.234 | 0.815 | 1.868 |
| Secondary+ | 1.13 | 0.745 | 1.714 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT* | 1.248 | 0.887 | 1.755 |
| Formerly Married | 2.251 | 1.487 | 3.408 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 1.334 | 1.003 | 1.775 |
| Eastern | 0.599 | 0.436 | 0.822 |
| Luapula | 0.439 | 0.31 | 0.621 |
| Lusaka | 1.058 | 0.768 | 1.457 |
| Muchinga | 1.132 | 0.838 | 1.528 |
| Northern | 0.804 | 0.587 | 1.101 |
| N/Western | 0.728 | 0.489 | 1.084 |
| Southern | 0.564 | 0.423 | 0.753 |
| Western | 0.568 | 0.401 | 0.805 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 0.552 | 0.449 | 0.678 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 1.044 | 0.874 | 1.246 |
| Rich | 0.593 | 0.453 | 0.777 |

[1]Living with someone as if married

By education level, men with higher education (26.0%) were reportedly more circumcised compared to those with primary education (15%). Table 2 describes study respondent's risk sexual behaviour by circumcision status. Nineteen (18.7%) of the circumcised men took alcohol before sex compared to (21.9%) among those who did not take. About (23.9%) of the circumcised men paid for sex compared to those (21.0%) who did not. Slightly more than a quarter (26.0%) of circumcised men had risk sex in the twelve months prior the survey. Table 3 shows outcomes of the regression model between background characteristics and circumcision status. The table shows that men who are aged 35-44 and 45-54 were more likely to be circumcised compared to other age groups (OR=0.691, $p<0.001$; OR=0.761, $p<0.047$). Education and marital status seem to have no particular statistical significant on circumcision. However, circumcision status was associated with all provinces except Lusaka (OR=1.198, $p<0.287$) and Southern (OR=0.859, $p<0.432$) provinces respectively. In the same way, circumcision was also associated with both residence – rural (OR=0.615, $p<0.001$) as well as the middle wealth quintile (OR=0.831, $p<0.041$) and rich (OR=1.389, $p<0.001$). Table 4 shows relationships

between circumcision, risky sex and socio-demographic and economic characteristics. Data in this table suggests that there is no association between being circumcised and engaging in "risky sex". However, after including (adjusting) other variables in the model (background characterises of respondents), there were instances where circumcision was strongly associated with risky sex. For example, circumcised men aged 45 and over were more likely to engage in risky sex compared to other age groups (OR=0.398, p<0.0001 and OR=0.324, p<0.001). Similarly, circumcised married men or those reporting to be living with a partner and those who said they are formerly married were also more likely to indulge in risky sex (OR=0.016, p<0.001). While there are significant associations between circumcision, some provinces and risky sex, there is no association with residence. The table also shows that circumcision status, risky sex and wealth have a significant relationship. Sex with two or more non-marital/non-cohabiting partners is a critical driver for HIV transmission. According to table 5, circumcision was highly associated with having two or more non-marital/non-cohabiting sexual partners (OR=1.193, p=0.014). This phenomenon was more pronounced among men who are between 25-34 and 35-44 years old respectively (OR=1.663, p<0.001; OR=1.568, p<0.001).

**Table 8 Condom used last time had sex and background characteristics**

| n=2280 | | | |
|---|---|---|---|
| Background Variables/ | Odds Ratio | Confidence interval (95%) | |
| Circumcision status | 1.251 | 0.904 | 1.731 |
| **Age** | | | |
| 15-24 | 1 | | |
| 25-34 | 1.295 | 0.88 | 1.904 |
| 35-44 | 1.047 | 0.659 | 1.664 |
| 45-54 | 0.52 | 0.278 | 0.971 |
| 55+ | 0.383 | 0.136 | 1.078 |
| **Education** | | | |
| No Education | 1 | | |
| Primary | 1.129 | 0.627 | 2.033 |
| Secondary+ | 1.169 | 0.621 | 2.197 |
| **Marital Status** | | | |
| Never Married | 1 | | |
| Married/LT[1] | 0.278 | 0.19 | 0.406 |
| Formerly Married | 0.703 | 0.39 | 1.265 |
| **Province** | | | |
| Central | 1 | | |
| Copperbelt | 0.596 | 0.342 | 1.039 |
| Eastern | 1.094 | 0.702 | 1.707 |
| Luapula | 0.336 | 0.17 | 0.666 |
| Lusaka | 1.009 | 0.608 | 1.674 |
| Muchinga | 0.694 | 0.378 | 1.274 |
| Northern | 0.454 | 0.261 | 0.791 |
| N/Wester | 0.564 | 0.315 | 1.008 |
| Southern | 0.853 | 0.542 | 1.342 |
| Western | 1.41 | 0.808 | 2.459 |
| **Residence** | | | |
| Urban | 1 | | |
| Rural | 0.65 | 0.461 | 0.915 |
| **Wealth quintile** | | | |
| Poor | 1 | | |
| Middle | 0.82 | 0.6 | 1.121 |
| Rich | 1.053 | 0.707 | 1.569 |

[1]Living with someone as if married

Men who are married and circumcised were also highly likely to have two or more non-marital/non-cohabiting sexual partners compared to those who reported being formerly married (OR=1.479, p<0.001).

Circumcised men from Eastern, Southern and Western provinces seem to be having two or more non-marital/non-cohabiting sexual partners compared to other provinces (OR=1.652, p<0.001, OR=2.137, p<0.001 and OR=2.125, p<0.001 respectively). In the same way, residents of rural areas and men who are in the middle and rich wealth quintiles respectively are highly likely to have two or more non-marital/non-cohabiting sexual partners (OR=1.447, p<0.001; OR=1.185, p=0.029; OR=1.276, p=0.022). Results indicated in table 6 show that there is no significant association between circumcision and paying for sex. However, when background variables are factored in the regression model, the relationship was observed. In this case, table 6 shows that, older circumcised men (45+) were likely to pay for sex compared to other age groups (OR=0.371, p<0.0001; OR=0.302, p<0.016). Data in table 6 also shows that, circumcised married men and those men who reported to be formerly married were paying for sex. In fact, the odds of being circumcised and paying for sex were almost twice as likely for men who reported to be formerly married compared to those who reported to be married (OR=0.577, p<0.001; OR=2.429, p<0.001). By province and residence, it is also evident that a higher proportion of men were paying for sex. In this example, apart from Luapula, North-Western and Western provinces, the rest of men in other provinces paid for sex. What is also evident from data in table 6 is that, men with a middle wealth quintile status were more likely to pay for sex compared to the rich and poor quintile. However, the odds were not statistically significant. On the other hand, a statistically significant relationship existed between being rich and circumcised and paying for sex (OR=0.686, p<0.033). Results in table 7 show that circumcision on its own has little or no effect on the risky behaviour of consuming alcohol before engaging in sex. However, upon introducing background variables in the regression model, results in the table show strong associations between circumcision and taking alcohol before sex. For example, all age categories are highly associated with taking alcohol before sex. Similarly, there is a strong relationship between taking alcohol before sex and a background characteristic of “formerly married”; similarly, circumcised men in rich wealth quintile were also likely to take alcohol before sex (OR=0.593, p<0.001). Consistent and correct condom use is one of the emphatic messages propagated widely by both HIV/STI prevention campaigners and by those advocating for VMMC. This paper

was also anchored on investigating whether or not men who have been circumcised are "practicing" what they have been taught, especially correct and consistent condom use. Table 8 shows results of condom use at last sex encounter with a non-marital/non-cohabiting sexual partner by men who reported to be circumcised. Although the odds of condom use among circumcision is higher, there is no significant relationship between circumcision and condom use at last sex (OR=1.251, p=0.176). In other words, circumcised men who are having sex with non-marital/non-cohabiting sexual partners are not using condoms. After adjusting for background variables in the regression model, it seems clear that there are moderately few instances where circumcision influences condom use. In terms of age, only the age group 45-54 has results suggesting condom use the last time they had sex (OR=0.520, p<0.04). Married men were also more likely to use condoms (OR=0.277, p<0.001). Respondents in Luapula, Northern and North-Western provinces and those residing in rural areas were 0.3 times more to use condoms during the last sexual encounter compared to other provinces and urban (OR=0.336, p<0.002; OR=0.454, p<0.005; OR=0.563, p<0.053; OR=0.649, p<0.014).

## Discussion

In summary, results in this paper show that circumcision status, on its own does not influence sexual behaviour as such. The only direct association between circumcision and risky sexual behaviour was only seen among respondents who reported to have had multiple concurrent sexual partners (two plus sexual partners). However, adjusting or factoring into account socio-economic and demographic characteristics in the circumcision equation produced substantial effects on risky sexual behaviour among circumcised sexually active men in Zambia.

VMMC has been well received. One of the main reasons for this acceptance is the evidence suggesting that it reduces the risk of men acquiring HIV through vaginal intercourse [16]. However, while this fact is evident, the question begging answers has been "do men and women understand that circumcision has but partial protection?" and secondly, do they act on the messages to protect themselves from HIV and STI infection after circumcision? [17]. In this paper, the question asked was whether or not circumcision (and messages around it) is influencing risky sexual behaviour among circumcised sexually active men in Zambia.

Messages on circumcision and how circumcision protects or provides partial

protection have been misconstrued by many. For example, study results in different societies seem to suggest that men who are circumcised think they are protected or immune to HIV infection [18]. On the contrary, FHI360 found that almost 100 per cent of all respondents in their 2014 study seemed to understand that circumcision only has but partial protection against HIV infection. The FHI360 study further suggested that there was little evidence about men engaging in riskier sexual behaviour after VMMC. However, while this may have been the case, results in this paper are different.

While there is no strong evidence from the ZDHS 2013-14 data on circumcision and risky sex, adjusting this relationship by socio-demographic characteristics, shows there is. In the same way, circumcision has also particular influence on men having two or more sexual partners. The data shows that the odds of being circumcised and having two or more non-marital/non-cohabiting sexual partners are about 1.19. Going by this finding, messages encouraging men in general and those who are circumcised in particular to "have one faithful sexual partner" emphasised also during circumcision counselling are not having any meaningful effect. This may mean that before men get circumcised, they could be more "faithful" to the counselling, however, after "graduating", common sense and rumour directs more their decisions on sex and sexuality thereby diluting altogether the safety associated with circumcision.

This study went on to explore whether circumcised men were paying for sex and whether they were taking alcohol before indulging in sex. Results suggest that there is no direct relationship between circumcision and paying for sex. However, older circumcised men (45+), residents of rural areas and the rich by the wealth quintile are likely to pay for sex. On the other hand, there is a strong relationship between taking alcohol before sex and circumcision .The message here again is the same; that information on what circumcision is able or not able to do in the fight against HIV seems to be misplaced to give a "false sense of security" where circumcision becomes a "shield" against HIV infection irrespective of the functional state of the person or individual practicing the risky behaviour.

This paper has also provided concrete evidence suggesting that circumcised men are not using condoms during sex with non-marital/non-cohabiting sexual partners. Even after adjusting for other background

variables, very little evidence suggests otherwise.

In the context of VMMC objectives and purpose and also situating such with a view to fight HIV infections, results in this paper are not encouraging for any advocate or supporter of circumcision and the strong, well-intended messages around it. Frankly, positive sexual behaviour change takes long, unless it is painful. In this respect, encouraging positive messaging on what VMMC does and doesn't do is critical to addressing challenges resulting from what has been misconstrued as reasons for VMMC. Although VMMC is well intended and seems to have strong partial protection against HIV and other STIs, findings in this paper show the need to structure messaging that take into account a strong stance against general falsehood on how and what works for the circumcised. In a study in North-Western Province of Zamia on circumcision by Mapoma et all [19], focus group discussion participants unearthed misleading "street" messages that go round on how circumcision gives protection against HIV infection. This definitely is not a reflection of what goes on in the country. However, this is localised evidence of wrongly compounded information on what circumcision does or does not do and may easily be replicated to the whole country. To be belabour the point, one participant said:

***"Circumcision provides 60% protection; when you include a condom, this goes up to 100% protection"***

Indeed, there is no such a thing as 100% protection; even where 100% abstaining is present, there is chance of infection. However, circumcision is totally being misconstrued to mean "total protection" and messages in communities seem to be highly "polluted" and volatile to the extent of making VMMC a "risky factor" by itself instead of playing the role of protection. This study therefore also highlights further the fact that men are circumcised for various reasons [20]. It could be that they get VMMC so as to avoid condom use; or it may mean getting circumcised so as to have as many sexual partners as possible without worrying about the risk of infection. However, proponents and advocates of VMMC should reiterate that the procedure provides only partial protection against HIV infection and therefore specific additional ways to reduce the risk of HIV infection such as discouraging multiple sexual relationships, encouraging correct and consistent condom use and the like should instead be emphasised.

Clearly, circumcision does have negative effects on risky sexual behaviour. A number of reasons do explain this situation. While there is no concrete base upon which to investigate why men who are circumcised maybe engaging in risky sex, it is possible conclude that substantial amount of misinformation on what circumcision can and cannot is influencing this outcome. Based on these findings, it is important to note that the messaging and counselling that goes on around VMMC should be followed up to a logical conclusion. It should be noted that for behaviour change to ensue and take effect, people getting circumcised must undergo pre and post circumcision with deliberate processes of follow ups in communities to help "safe guard" against "falsehood" which if not corrected would inadvertently expose men to a more heightened risk of getting infected with HIV contrary to intended objectives of VMMC.

# References


1.Welsh M. and Katayamoyo P. Expanding access to male circumcision in Zambia: The ZPCT II experience. FHI 360. 2013

2.Wabwire-Mangen, F., M. Odiit, W. Kirungi, K. Kaweesa, David, and O. Wanyama, James, Uganda HIV Prevention Response and Modes of Transmission Analysis. Kampala, Uganda National AIDS Commission, UNAIDS. 2009

3.Gray RH, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. Lancet. 2007;369:657–66.

4.Bailey RC, Moses S, Parker CB, Agot K, Maclean I, Krieger JN. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. Lancet. 2007;369:643–56.

5.Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A .Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 trial. PLoS Med. 2005; 2(11):e298. 2.

6.MOH and ICF International. Uganda AIDS Indicator Survey. Kampala, Uganda and Calverton Maryland, USA, Ministry of Health and ICF International 2011

7.Hedlund, J. "Risky business: safety regulations, risk compensation, and individual behaviour." Inj Prev 2000. 6: 82-90.

8.Adams, J. and M. Hillman. "The risk compensation theory and bicycle helmets. Injury Prevention." Injury Prevention 2001 7(4): 343

9.Bonner, K. "Male circumcision as an HIV control strategy: not a 'natural condom'." Reproductive Health Matters 2001. 9(18): 143-155.

10.Riess, H. T., M. M. Achieng, S. Otieno, J. O. Ndinya-Achola and C. R. Bailey. "'"When I Was Circumcised I Was Taught Certain Things": Risk Compensation and Protective Sexual Behavior among Circumcised Men in Kisumu, Kenya." PLoS ONE 2011 5(8).

11.Cassell, M. M., D. T. Halperin, J. D. Shelton and D. Stanton. "Risk compensation: the Achilles' heel of innovations in HIV prevention?" BMJ 332(7541): 2006 605-607.

12.Eaton, L. and S. C. Kalichman . "Behavioral aspects of male circumcision for the prevention of HIV infection." Curr HIV/AIDS Rep 6(4): 2009 187-193.

13.Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], and ICF International. Zambia Demographic and Health Survey 2013-14. Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International. 2014

14.Chikutsa A, Ncube AC, and Mutsau S. Male Circumcision and Risky Sexual Behaviour in Zimbabwe: Evidence from the 2010-11 Zimbabwe Demographic and Health Survey. ICF International, Calverton, Maryland, USA. 2013 No. 102

15.Central Statistical Office (CSO), Ministry of Health (MOH), University of Zambia, and MEASURE Evaluation. Zambia Sexual Behaviour Survey 2009. Lusaka, Zambia: CSO and MEASURE Evaluation

16.FHI360. Communicating Male Circumcision's Partial Protection from HIV. Male Circumcision Consortium 2014

17.L'Engle K.L, Lanham M, Loolpapit M, and Oguma I.O. Understanding partial protection and HIV risk and behaviour following voluntary medical male circumcision rollout in Kenya. Health Education Research. 2014

18.Lawrence W. Green, Ryan G. McAllister, Kent W. Peterson and, John W. Travis. Male Circumcision is not the HIV 'vaccine' we have been waiting for. Future Medicine LTD. 2008

19.Mapoma C C, Chimbungule D and Veary J. Integrating Youth in Community Response to HIV and AIDS – Zambia Chapter. Southern Africa Aids Trust. 2010

20.Antony Chikutsa, Alfred C Ncube and Shepard Mutsau. Association between wanting circumcision and risky sexual behaviour in Zimbabwe: evidence from the 2010–11 Zimbabwe demographic and health survey. Reproductive Health-Open access. Biomed Central; 2015

21.Chan YH. Biostatistics: logistic regression analysis. Singapore Med J 45: 2004 149-153

22.Tabachnick BG, Fidell LS. Using Multivariate Statistics, Third Ed. New York: Harper Collins, 1996. pp. 100-85