

Knowledge, attitudes and acceptance of voluntary medical male circumcision among males attending high school in Shiselweni region, Eswatini: a cross sectional study

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Abstract

Background

In countries such as Eswatini, where there is a high HIV prevalence and low male circumcision the World Health Organization and the Joint United Nations Programme for HIV/AIDS recommend infant and adult circumcision be implemented. The aim of this study was to assess the knowledge, attitudes and acceptability of voluntary medical male circumcision amongst males attending high school in Eswatini.

Methods

An observational cross-sectional study was conducted during February and March of 2018 amongst 407 young males (15-21 years) attending Form 4, in nine high schools in the Shiselweni region of Eswatini using a self-administered questionnaire of 42 close ended questions. Sociodemographic details, circumcision status, acceptance of voluntary medical male circumcision, knowledge and attitude scores analysed in Stata® 14 statistical software were described using frequencies, medians and ranges respectively. Bivariate and multivariate linear regression was used to assess the impact of independent variables on circumcision status and acceptance of voluntary medical male circumcision. The level of statistical significance was $p < 0.05$

Results

Amongst the 407 high school-going males, 48.98% ($n = 201$) reported being circumcised. The majority of the adolescents (75.74%; $n = 306$) were knowledgeable about voluntary medical male circumcision. However, an even larger majority (84.90% ($n = 343$)) had a negative attitude towards it. In the multivariable logistic regression analysis, having parented their own children (OR: 3.55; 95%CI: 1.2 – 10.48), and having circumcised friends (OR: 3.99; 95%CI: 1.81 – 8.84) were significantly associated with being circumcised. Neither knowledge nor attitude were associated with the acceptability of voluntary medical male circumcision.

Conclusion

In Eswatini male high school students are knowledgeable about voluntary medical male circumcision, but have a negative attitude towards it. Having parented their own children, and having circumcised friends influenced being circumcised.

Background

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) are a global public health problem. There were an estimated 37.7 million people living with HIV at the end of 2020, over two thirds of whom (25.4 million) are in the World Health Organization (WHO) African region (1). Despite the significant impact, new infections in this region have declined by 38% since 2010 (2). However, in order to reach the new proposed global 95–95–95 targets set by Joint United Nation Programme on HIV/AIDS

(UNAIDS), there is still a need to redouble the efforts to avoid the worst-case scenario of a half million excess HIV-related deaths in Sub-Saharan Africa (SSA), increasing HIV infections due to HIV service disruptions during COVID-19, and the slowing public health response to HIV (1). Eswatini, in the SSA region has the highest HIV prevalence at 27% (3).

As the HIV epidemic has approached its fourth decade, calls for urgent and effective prevention, more especially in high prevalence communities including Eswatini, are increasing. The World Health Organisation and the (UNAIDS) recommended voluntary medical male circumcision (VMMC) should always be part of the comprehensive HIV prevention package(4). Behavioural prevention comprises, among other elements, delaying the onset of sexual intercourse, having a single sexual partner with protected sex, and avoiding needle sharing (5).

Voluntary medical male circumcision is the complete surgical removal of the foreskin of the penis by qualified professionals with the client's informed consent (4). The foreskin undercover is highly susceptible to HIV infection (6, 7). Medical male circumcision can be performed on infants, adolescents, and adults. In 2007, the WHO and UNAIDS recommended VMMC be recognised as an important additional intervention to reduce the risk of heterosexually transmitted HIV infection in men (7). This was after the Randomised Clinical Trials (RCTs) done in Africa have shown a 60% reduction of HIV in circumcised men as compared to the uncircumcised (8–10). Voluntary medical male circumcision has been used as a prevention strategy for HIV transmission since then (11). Eswatini is one of the 14 countries that were recommended by the WHO and UNAIDS to scale up the access to male circumcision services since this country has a high prevalence of HIV and low rates of male circumcision (12). The Eswatini Ministry of Health's Male Circumcision Strategic and Operational Plan 2014–2018 adopted an implementation strategy that called for VMMC to be scaled up to 80% among males ages 10–29 years and 55% among males ages 30–34 years (13).

Several studies have found VMMC is accepted by adults in SSA (11, 14, 15). Swati culture does not mention anything about VMMC. However, since the UNAIDS and WHO recommended VMMC to reduce the HIV epidemic, Eswatini has put in more effort to meet the recommendation (11). A recent study done in Eswatini to assess factors associated with the parent's decision on Early Infant Male Circumcision (EIMC) showed mothers had a high knowledge of male medical circumcision (MMC), and they accepted it (16). Nevertheless, adolescents have different social concerns and risks, and their knowledge and attitudes are unknown (17, 18). Voluntary medical male circumcision in adolescence and youth can reduce the risk of HIV infection and is cost-effective, as the prevalence is low in their age group (19). Therefore, there is a need to assess their knowledge and attitudes and to understand the impact these elements have on the acceptability of VMMC amongst young males.

The Health Belief Model (HBM) is based on the understanding that a person will take health-related action if he feels that a negative health condition can be avoided, has positive expectations of taking the recommended action, and believes that he can successfully take the recommended health action (20). It has six constructs that are relevant for youth male circumcision and fits well in explaining what influences youth's readiness to undergo VMMC. In order to act (undergo or be willing to) VMMC, they have to believe

that they are susceptible to the condition and its perceived severity. They perceive benefit from VMMC, but also barriers. However, they must be exposed to the factors that prompt action and need to be confident enough to undergo the procedure(20). Cues to action will encourage their participation. Self-efficacy relates to an individual's confidence to his/her ability to undergo the health behaviour. It positively predicts the adoption of the preventive behaviour (21). This modified HBM guided the question formulation in answering the research question for this study.

Methods

Aim of the study

The main aim of the study was to assess the impact of knowledge and attitudes on the acceptability of VMMC among high school going males in Eswatini in 2018.

Study design

This study was an observational cross-sectional study with descriptive and analytical components.

Study setting

The study was conducted in high schools in the Shiselweni region of Eswatini. Eswatini is a landlocked country in southern Africa with a land surface of about 17 364 Km² (3). It is divided into four administrative regions. The estimated population of Eswatini in 2017 was 1 119 375, 49% of whom are under 20 years of age (22). Shiselweni is the most impoverished of the country's four regions and is the second smallest region (3 786.71Km²). According to the Swaziland HIV Incidence Measurement Survey (SHIMS) 2016/2017 report 2, the Shiselweni region had an HIV prevalence of 25.9% (3). Approximately 6.1% of males had completed secondary education, and 2.5% in the region had reached tertiary education by 2015 (23).

Population and sampling

The study population comprised all male students in Form 4, attending nine selected high schools out of the 54 high schools in Shiselweni region, Eswatini.

A cross sectional study was conducted during February up to March 2018 among Form 4 high school attending males in the Shiselweni region of Eswatini.

A complete sampling frame was used where all of the 54 high schools in the Shiselweni region were listed and grouped as urban versus rural. All of the four urban high schools were automatically included in the study, and 10% (n=5) of the rural high schools were randomly selected. Based on information from the Ministry of Education, each Form 4 class had, on average, 40 pupils (including boys and girls) with a gender ratio of 1:1. Urban schools had four classes in Form 4 while each of the rural schools had an average of 2 classes per form with an average of 20 boys per class. Thus it was estimated that there were approximately 2320 males in the 54 schools in Shiselweni. In this population of 2320 males, assuming a

male circumcision prevalence of 40% with a precision of 5%, the minimal sample size that was required was 318 participants (24). In each school, all of the students who met the inclusion criteria in the Form 4 classes were invited to participate. A total number of 407 participants were recruited in this study period

Male students were invited to participate in the study, and the study was explained to them. Information and consent forms explaining the details of the study were distributed to the adolescents to give to their parents. Participants' parents were asked to read and sign the consent form if they understood and agreed to their sons participation in the study. Parents had to give consent, and participants below 18 years old had to assent.

Measures

Demographics

Demographic information on age, region where participants were born, race, religion, where they live (home/ boarding school), with whom they live with at home (both parents/ mother/ father/ grandparents), household members and estimated average monthly household income was collected.

Knowledge

Participants were asked to report their level of understanding information about male circumcision by indicating the extent to which they agreed with the statements on a pre-determined Likert scale (Strongly disagree, disagree, neutral, agree, strongly agree). The knowledge questions were about circumcision only preventing female to male HIV prevention, circumcised men being 100% protected from HIV, circumcised men not needing to use a condom, having a circumcision if HIV positive, only sexually active men needing to be circumcised, circumcision as preventing the risk of cancer in men, circumcision preventing the risk of sexually transmitted infections, circumcision improving penile hygiene, circumcision at adolescence resulting in fertility problems and the circumcised penis taking six weeks to heal

Attitudes

The attitude questions were to indicate the extent to which the participants agreed with the statements on a pre-determined Likert scale (strongly disagree, disagree, neutral, agree, strongly agree). The attitude questions covered the beliefs that male circumcision decreases sexual satisfaction, circumcised men have more feelings than uncircumcised men, circumcised men enjoy sex more than uncircumcised men, women prefer circumcised men than uncircumcised men, circumcision is un-Swati/ un-Godly, circumcision proves manhood, circumcision makes one incomplete, the tip of the penis must always be covered, male circumcision in adolescents is very painful and may lead to death, male circumcision is old-fashioned and must not be done in modern society and the foreskin is used as a raw material for a certain spice.

The knowledge and attitude questions were developed using the following Health Belief Model's constructs: Perceived susceptibility, Perceived severity (threat of HIV), Perceived benefits, Perceived barriers and Cues to action.

Acceptance

The participants were asked to report their circumcision status and their future willingness to get circumcised.

Data analysis

Stata®14 statistical software (StataCorp.2014. Release 14 College Station, TX: StataCorp LP) was used to analyse the data. Categorical and continuous data were summarized using frequency distributions and percentages and means and 95% confidence intervals, respectively. The knowledge questions were scored in the following categories: strongly agreed, agreed, neutral, disagreed, strongly disagreed. The categories were then collapsed to agreed, neutral, and disagreed. Knowledge scores were generated by summing together the correct responses to the knowledge questions. The attitude questions were scored by allocating a point each to the positive attitudes. The knowledge and attitudes scores were categorised around the median. A score equal to or above the median was defined as having knowledge and a positive attitude respectively. There were two dependent variables under study: (1) presence of circumcision and (2) acceptability of VMMC (intention to be circumcised). To test for associations of knowledge and attitudes with the presence of circumcision, adolescents who were circumcised were the focus of the analysis. To test for associations of knowledge and attitudes with acceptability of VMMC, adolescents who intended to circumcise were the focus of the analysis. Bivariate analysis between the study outcomes and all independent variables was conducted. All predictors that were found to be statistically significant ($p < 0.05$) on bivariate analysis were then put into the multivariable models using multilevel logistic regression to identify the factors influencing the presence of circumcision and the acceptability of VMMC (intention to be circumcised). Multilevel regression analysis was used to account for the clustering of students within clusters of higher-level units, being the schools.

Results

Demographic profile of the study participants

Four hundred and seven high school males participated in the study in the age range from 15 - 21 years, with a median age of 18.46 years. A greater proportion ($n=310$; 76.59%) of the participants were born in the Shiselweni region. The majority ($n=323$; 79.65%;) of the participants lived at home in 2018 and 42.13% ($n=126$) of them lived with both parents (**Table 1**).

Insert table 1 here

Knowledge of voluntary medical male circumcision among male adolescents

Most participants correctly disagreed, with statements that circumcision only prevents female to male HIV transmission ($n=241$; 59.21%), circumcised men are 100% protected from HIV ($n=357$;87.71), circumcised men do not need to use a condom ($n=380$; 93.37%), only sexually active men need to use a condom ($n=293$, 71.99%) and circumcision in adolescence may result in fertility problems ($n=267$; 65.93%).

Most participants correctly agreed with statements that circumcision can prevent the risk of cancer (n=284; 69.95%), circumcision prevents the risk of sexually transmitted disease (n=319; 78.38%) and circumcision improves penile hygiene (n=294; 72.24%). **(Table 2)**. Participants were scored for their knowledge responses and the median knowledge score was 31 (Range: 18 to 42). All those participants who scored equal to and above this score were considered knowledgeable (n= 306; 75.74%).

Attitudes of high school attending males towards voluntary medical male circumcision

Half of the participants (n=204; 50.12%) disagreed that male circumcision decreases sexual satisfaction, and a slight majority (n=226; 55.53%) disagreed that circumcised men have more sexual feelings than uncircumcised men. A large minority (n=165; 40.54%) agreed that circumcised men enjoy sex more than uncircumcised men **(Table 2)**. Near half of the participants (n=199; 48.89%) agreed that women preferred circumcised men over uncircumcised men. Most participants disagreed that circumcision is un-Godly (n=197; 48.4%) and un-Swati (n=206; 50.61%) **(Table 2)**. Among the participants, about half of the participants (n=203; 49.88%) disagreed that the tip of the penis must always be covered. We further investigated if they thought male circumcision in adolescents was very painful and may lead to death, and 61.82% (n=251) disagreed. Most participants (n=281; 69.04%) disagreed that male circumcision is old fashioned and must not be done in modern society. The majority (n=262; 64.85%) of the participants did not believe the myth that the foreskin is used as a raw material for certain spice **(Table 2)**. The median attitude score was 40.0 (Range: 20-60). Those participants who scored equal to and above the median score (n= 61; 15.1%) were considered to have had a positive attitude toward VMMC.

Insert Table 2 here

Sexual behaviour amongst the young males

The majority of participants (n=238; 57.39%) were sexually active. Furthermore, an even larger proportion (n= 192; 80.95%) of them had started between the age of 15-20 years. A little over half of those (n= 144; 51.51%) who were sexually active reported that they always used a condom when engaging in sexual intercourse. A few of the participants (n= 29; 6.89%) were fathers **(Table 1)**.

Acceptability of voluntary medical male circumcision among male participants

Amongst all the participants, a slight majority (n= 206; 51.02%) were uncircumcised, and 23.43% of those uncircumcised were willing to be circumcised when they got a chance. However, 31.81% (n=17) of them were not yet sure when they were going to get circumcised. **Table 3** shows that the majority (68.5%) of the participants had brothers (n= 158; 59.11%) and friends (n=280; 71.96%) who were circumcised.

Insert table 3 here

Factors associated with the presence of circumcision and acceptability of voluntary medical male circumcision

On bivariate analysis age (OR:1.19; 95%CI:1.05-1.35), being sexually active (OR:2.05; 95%CI:1.00-2.26), having parented a child (OR:3.00; 95%CI:1.28-7.04), having a family member who was circumcised (OR:2.06; 95%CI:1.01-4.22) and having a friend who was circumcised (OR:3.96;95%CI:2.09-7.49) were significantly associated with being circumcised. Adolescents who lived with both parents were less likely to have been circumcised (OR: 0.43; 95%CI: 0.23-0.79) on bivariate analysis, and this association persisted on multivariable analysis (OR: 0.35; 95%CI: 0.18-0.69). Young males who had parented a child (OR: 3.55; 95%CI: 1.22-10.48) and those who had friends who had been circumcised (OR: 3.99; 95%CI: 1.81-8.84) remained significantly more likely to have been circumcised on multivariable analysis (**Table 4**)

Insert table 4 here

On bivariate analysis, participants who had a circumcised family member (OR: 0.37; 95% CI: 0.17 -0.81) were less likely to intend circumcising but this association did not persist on multivariate analysis. While not significant participants, who had circumcised brothers (OR: 1.33) and cousins (OR: 3.68), lived in a rural location (OR:1.08), lived with both parents (OR:1.14), became sexually active at a younger age, always used a condom (OR:1.94) were more likely to accept circumcision (**Table 5**).

Insert table 5 here

Discussion

The present study aimed to assess the impact of knowledge and attitudes of the male youth on the acceptability of VMMC in Shiselweni region, Eswatini. The findings of this study indicated the circumcision prevalence (48.98%) was higher in this study than the recent global estimation of male circumcision which is at 37-39%, where almost half of these procedures are carried out for cultural or religious reasons (25, 26). EmaSwati do not circumcise in the cultural context and some common myths including the foreskin making a certain spice, reduction of libido and the operation being very painful (27). The prevalence on this study is slightly higher than a self-reported prevalence of 42.8% done in South Africa (28). It is much higher than that reported at 16.7% amongst Polish university students in 2017 (25). This study also shows a higher prevalence than the self-reported prevalence of VMMC among youth (16.7%) done in the Bahamas in 2019 (29). However, most of the uncircumcised young men in that study were considering being circumcised for HIV prevention purposes (29).

Among the uncircumcised youth in this study population, 23.43% were willing to get circumcised when they had time. This is low when compared to other countries and should be a concern for government. A study done in the Bahamas reported 35% of uncircumcised youth were considering

circumcision (29) while a study done in South Africa, in 2014 reported that 45.7% of the uncircumcised youth (between age 15-24) would consider undergoing VMMC (28). In another study done in Rwanda, 50.2% of uncircumcised men considered circumcision (30).

Knowledge levels about VMMC

The median knowledge score of (75.74%) showed that they were knowledgeable. The knowledge level of young males in this study is higher than that of a Ugandan study in 2018, where it was 30.6% (31). However, the knowledge level in this study is slightly lower than in another study done in Botswana in 2012 where it was 87% (32). Nevertheless, we may not overlook the fact that in this study no information sharing prior to the interview was done.

Cues to action define all events, people or things that are instrumental in pushing individuals to change behaviour (20). We assumed that knowledgeable young males are more likely to get circumcised. During multivariable analysis while not statistically significant, those who are knowledgeable were 1.5 times more likely to be circumcised, than those who were not knowledgeable.

When knowledge was tested in this study, one of the variables used was to ask if male circumcision prevents the risk of STIs. The majority of the male youth (78.86%) correctly answered the question (**Table 2**). This is consistent with the findings of a study done in KwaZulu-Natal (18). It was found that knowledge can also be a facilitator of VMMC as young males may perceive hygienic advantages. In that same study the adolescents perceived increased sexual pleasure if you are circumcised. Similar findings were also found in studies conducted in Zimbabwe and Johannesburg, where most participants were motivated to be circumcised to prevent STIs (33). Having non-significant results on the HIV related variables in this study may suggest that the young males are not very clear about the benefits of VMMC on HIV.

Attitude toward sexuality and VMMC

In this study we found that 17% of the participants agreed that VMMC is very painful and may lead to death. This is lower when compared to other studies (9, 11, 15, 34). Since Eswatini is a non-circumcising country, young males might think that like in traditional male circumcision, pain is a pre-requisite for the procedure in order to “be a man.” This may indicate existence of barriers towards VMMC amongst the young males and that includes their perceptions of sexual satisfaction. In some other studies, the existence of these barriers associated VMMC uptake with promiscuity and stigma. Therefore, capacity building must be applied at all levels, from individual to national level. Other studies have proved that capacity building is effective (35). Importantly, Eswatini has the highest HIV prevalence in Africa, so, interventions such as VMMC to reduce the burden are important (36). However, negative attitudes amongst the youth to VMMC, limit uptake and result in a persistently high HIV prevalence level. Thus interventions which address the negative attitudes amongst the youth have to be implemented to improve VMMC uptake.

Some of the young males (55.5%) in this study perceived increased sexual feeling after circumcision (**Table 2**). A qualitative study in Tanzania showed respondents who highlighted those themes of increased

sexual feelings in their interviews (37) . This corroborates with the literature, where sexual performance interest in young males was a facilitator for uptake of VMMC. Unfortunately it also became a factor for risk compensation (19). It is more likely that once people perceive themselves to be at a lower risk of contracting HIV post VMMC, they will be less careful and will not use a condom (19).

It was interesting to note that the young males in this study had misconceptions about sexual pleasure post male circumcision. This echoes the findings of a study done in Uganda in 2018, where the concern of reduced performance was strongly associated with circumcision status (31). In another qualitative study done in Eswatini in 2015, males did not want to undergo the procedure as they believed that it reduced sexual pleasure. They further justified their decision by mentioning that they were faithful to their partners and practised other preventive measures (38). Nevertheless it was reassuring that adolescents in the same study were mostly positive about circumcision. They believed that girls preferred circumcised men (39). A novel approach should be used to address these misconceptions in Eswatini. Where possible, the female partners should be included (31).

Surprisingly, adolescents with a positive attitude towards VMMC in this study were less likely to have been circumcised (**Table 2**). Factors that may lead to this include, Eswatini being a non-circumcising country and Christianity being the common religion. A study done in Rwanda, in 2012, explored the knowledge and perception of Rwandan men about VMMC to determine the factors associated with VMMC uptake. In that study, the prevalence was high among those who live in Kigali where there is a spread of the Muslim religion(40) . It was also evident in Tanzania where circumcision has increased among the non-circumcising ethnic group who have social contact with circumcising groups (37). Therefore, it is crucial that the VMMC campaigns are modified to suit the diversity of the population and to consider other social dynamics in different areas (41). The barriers of VMMC among that particular population should be addressed.

Demographic factors

Age was one of the modifying factors that showed statistical significance ($p= 0.007$) with the presence of circumcision in this study on bivariate analysis. The estimate was above 1 whilst not significant on multivariate analysis. It is similar to a study done in Botswana in 2018 that showed the prevalence of male circumcision increasing with age. This could be explained by the past VMMC practice in Botswana that was entrenched in the 1980's (42). In contrast to that, a study done in Malawi showed that the overwhelming majority of men accessing VMMC services were 26 years and younger (43). Another study done in Rwanda adolescents were more likely to get circumcised than adults aged 40 years and above (40). In this non-traditional circumcising society, circumcision was associated with younger age and more knowledge (40). Age, on the contrary, was less likely to influence the adolescents' willingness to circumcise (OR= 0.93). These findings are inconsistent with findings from studies done in South Africa, Zimbabwe and Tanzania which showed a higher proportion of younger adolescents reporting a desire for VMMC. Their study identified age-specific facilitators of VMMC uptake among adolescents, who reported different reasons for undergoing VMMC (44).

Living with both parents was statistically associated ($p=0.002$) with the presence of circumcision on multivariate analysis (**Table 5**). However, those living with both parents were less likely to be circumcised than those who lived with a single parent or just relatives. This is contrary to the review findings done in SSA where parents thought it important to be supporting their adolescents' in VMMC decision making. Surprisingly, those who lived with both parents were more likely ($OR= 1.14$) to accept circumcision than those who lived with their relatives, though not significant. A study done in China showed that parents can play a major role in male circumcision uptake, more especially among younger children (45). The above-mentioned studies' findings could mean a challenge and a gap in adolescent-parent communication. Some parents may not support discussions of HIV risk and sexual health information due to their cultural and gender norms, or lack of appropriate knowledge regarding HIV (44). The findings from this study show that parents' contribution to the cue to action construct of the HBM being significantly associated with VMMC acceptance. However, since there is a minority who lived with relatives who were less likely to be circumcised, there is a need for a social marketing strategy to both the young males in schools and parents too. This is more especially because VMMC is just a new preventative measure for HIV and the parents are not familiar with its evidence.

Sexual activity

The majority of young males in this study (57.28%) reported being sexually active and they were 1.5 times more likely ($OR= 1.53$) to be circumcised than those who are not. This is similar to a study done in China, 2016, where the perceived susceptibility construct was statistically significant. It is however concerning, that almost half of the sexually active young males (48.9%) did not always use a condom during sexual intercourse. The HIV prevalence in Eswatini is very high (27%) and this risky behaviour exposes them to HIV and sexually transmitted infections (STIs) (36).

The higher odds of those who are sexually active being circumcised, may increase HIV and STI infection risk if they do not use a condom. These results suggest that VMMC counselling for both sexually active and abstinent adolescents needs to be substantially improved to increase knowledge and post-VMMC preventive intentions against sexual risk. According to the literature, female partners, especially non-married, may have the ability to negotiate safer sex thus influencing their male partners to be circumcised (42). Moreover, unlike in the past, women nowadays can play a major role in sexual matters within the relationships. Females might also have knowledge of being prone to cervical cancer when engaging with an uncircumcised partner (42, 46).

From these results, it is shown that HBM is a potentially suitable framework to guide the design for future interventions to upscale VMMC in order to reduce HIV infection. This should increase the perceived susceptibility and perceived severity related to HIV. Other approaches besides information dissemination are warranted. The fear appeal approach can be used as a useful strategy. According to this approach, a perceived threat is triggered only in the presence of both perceived susceptibility and perceived severity (21). However, it should be applied in an encouraging way and in an ethical manner. This application is necessary since in this study, those who do not use a condom are less likely to be circumcised ($OR=0.44$), suggesting that they do not fear contracting HIV.

In this study, those who parented children were three times more likely (OR =3.55) to be circumcised than those who do not have children. As a father, you are considered a major influence in the household's decision-making process and because of the power dynamics, if they undergo VMMC they can be role models to their sons (47) . This correlates with a study in Kenya which showed 90% of circumcised fathers being role models to their adolescent sons. They believed their experience can lead others, including their sons, to understand the impact of VMMC in preventing HIV and to seek out the procedure for their own health (48).

Behavioural change at an individual level may be influenced by interpersonal communication between family members and friends. People's experiences are likely to change other people's perceptions and attitudes towards health interventions like VMMC, thus increasing the uptake. This study showed that adolescents who had friends who were circumcised were almost four times more likely to be circumcised than those who had uncircumcised friends. In a study conducted in Zimbabwe in 2014, males who reported to have social support for VMMC from their friends were three times more likely to get circumcised (34).

The results from this study have shown that peer norms can influence adolescent and youth decisions. Some adolescent boys may fear stigma from peers and girls if they are not circumcised. However, some may be less concerned about stigma but just respond to external cues such as seeing their friend volunteering for the procedure.

Limitations

Information bias could be the possible limitation of this study as we relied on self-reporting on their circumcision status. The boys may have reported in the affirmative in order to be seen as displaying the correct behaviour. The quantitative nature of the study channelled the participants to answer according to the data collection tool. They could not express themselves further. The questionnaire did not ask when and why they were circumcised.

Since it is a cross-sectional study design, we measured responses at one point in time which might affect study results as the participants could have responded depending on their mood, feelings or other stimulants at that particular time. It might happen that if the participants were given the same questionnaire at a different time and setting, that they would not give the same responses. Further, answering the questionnaire while the researcher waited could have created pressure on the participants and hence affected their responses.

Conclusion

The purpose of this cross-sectional study was to assess the impact of knowledge about, and attitudes towards VMMC and its acceptability among male students in Shiselweni high schools. The results have shown that although the young males have knowledge about voluntary medical male circumcision, they

have a negative attitude towards it. Neither knowledge nor attitude were associated with the acceptability of voluntary medical male circumcision. The social environment influenced the uptake of voluntary medical male circumcision amongst adolescent males in Eswatini. The findings of this study will help in improving the VMMC programme implementation in future.

Abbreviations

AIDS- Acquired Immunodeficiency Syndrome

EMIC

Early Infant Male Circumcision

HBM- Health Belief Model

HIV- Human Immune Virus

UNAIDS - Joint United Nations Programme on HIV/AIDS

VMMC- Voluntary Medical Male Circumcision

WHO

World Health Organisation

Declarations

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Author's' contributions

MS reviewed the literature, made substantial contributions to the conception, design, and drafting of the manuscript. SN participated in the design of the study and/or the drafting of the manuscript. BT contributed with the biostatistical expertise. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used in this study is available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The experimental protocol for this study was approved by the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal, Durban, South Africa (Ethics Number: BE 532/17) and the Research Ethics Committee of the Swaziland Ministry of Health. Relevant permission was obtained from

the Ministry of Education for the study to be conducted. All parents gave written informed consent for their sons to participate and the participants also assented to participation. All participants were aware that they could withdraw from the study at any time. All the methods used in this study were carried out in accordance with the relevant guidelines and the regulations of Eswatini.

Consent for publication

Not applicable

Competing interest

No competing interest declared.

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Tables

Table 1. Demographic profile and sexual behaviour of young males in form four in Shiselweni region, Eswatini in 2018 (n=407)

Variable	Frequency (%)
Age (mean; 95%CI)	18.46 (18.18-18.74)
Birth Region	
Hhohho	29 (6.58)
Shiselweni	310 (76.59)
Manzini	47 (12.35)
Lubombo	17 (3.79)
Other	4 (0.69)
Population Group	
African	399 (98.75)
Coloured	8 (1.25)
Indian	0
White	0
Religion	
Christian	369 (91.15)
Muslim	6 (1.44)
Hindu	2 (0.87)
Traditional	30 (6.53)
Other	0 (0)
Place of residence	
Boarding school	36 (10.25)
At Home	323 (79.65)
Other (foster homes, rented flat, live with relatives)	48 (10.1)
With whom do you live?	
Both Parents	126 (42.13)
Mother Only	98 (29.58)
Father only	25(7.04)
Grandmother/ grandfather	65 (18.97)

Other (uncle, aunt, siblings)	9 (2.28)
Number of people in your household (n;%)	
1	4 (0.9)
2	18 (3.92)
3	31 (8.17)
4	85 (22.29)
5 or more	267 (64.72)
Household income (n; %)	
E500- E1000	55 (13.44)
E1000- E 5000	47 (9.75)
E 5000- E 10000	28 (7.11)
E 10000- and above	23 (5.56)
Do not Know	254(64.14)
School location (n; %)	
Rural	286 (66.27)
Urban	121 (33.73)
Sexually active	
Yes	239 (57.28)
No	168 (42.72)
If Yes, at what age did you become sexually active	
10-15 years	49 (17.62)
15- 20 years	186 (80.95)
21 and above	4 (1.43)
Do you use a condom	
Always	126 (51.51)
Sometimes	85 (36.34)
Never	28 (12.15)
Have you parented any children	
Yes	29 (6.89)
No	378 (93.11)

How many children do you have	
1	20 (65.17)
2	8 (30.82)
3 or more	1 (4.01)

Note: 1E = Lilangeni currency (Swaziland) = **1ZAR** = 0.0528941 **GBP**

Table 2. Frequency distribution table of knowledge and attitudes toward voluntary medical male circumcision in young males in Shiselweni high schools, Eswatini, 2018 (n=407)

Knowledge Variable	Frequency (%)
Circumcision only prevents female to male HIV transmission	
Agree	102 (25.06)
Neutral	64 (15.72)
Disagree	241 (59.21)
Circumcised men are 100% protected from HIV	
Agree	20 (4.91)
Neutral	30 (7.37)
Disagree	357 (87.71)
Circumcised men do not need to use a condom	
Agree	11 (2.70)
Neutral	16 (3.93)
Disagree	380 (93.37)
Only sexually active men need to circumcise	
Agree	72 (17.69)
Neutral	42 (10.32)
Disagree	293 (71.99)
Circumcision can prevent the risk of cancer in men	
Agree	284 (69.95)
Neutral	54 (13.30)
Disagree	68 (16.75)
Circumcision prevents the risk of sexually Transmitted Infections	
Agree	319 (78.38)
Neutral	39 (9.58)
Disagree	49 (12.04)
Circumcision improves penile hygiene	
Agree	294(72.24)
Neutral	62 (15.23)
Disagree	51 (12.53)

Circumcision at adolescence may result in fertility problems	
Agree	61 (15.06)
Neutral	77(19.01)
Disagree	267 (65.93)
VMMC decreases sexual satisfaction	
Agree	104 (25.55)
Neutral	99 (24.32)
Disagree	204 (50.12)
Circumcised men have more sexual feelings than uncircumcised men	
Agree	60 (14.74)
Neutral	121 (29.73)
Disagree	226 (55.53)
Circumcised men enjoy sex more than uncircumcised men	
Agree	165 (40.54)
Neutral	116 (28.50)
Disagree	126 (30.96)
Women prefer circumcised men than uncircumcised	
Agree	199 (48.89)
Neutral	123 (30.22)
Disagree	85 (20.88)
Circumcision is un-Godly	
Agree	95 (23.34)
Neutral	115 (28.26)
Disagree	197 (48.40)
Circumcision is un-Swati	
Agree	76 (18.67)
Neutral	125 (30.71)
Disagree	206 (50.61)
Circumcision proves manhood	
Agree	143 (35.14)

Neutral	120 (29.48)
Disagree	144 (35.38)
Circumcision makes one incomplete	
Agree	127 (31.20)
Neutral	76 (18.67)
Disagree	204 (50.12)
The tip of the penis must always be covered	
Agree	94 (23.10)
Neutral	110 (27.03)
Disagree	203 (49.88)
VMMC in adolescents is very painful and may lead to death	
Agree	69 (17.00)
Neutral	86 (21.18)
Disagree	251 (61.82)
VMMC is old fashioned and must not be done in modern society	
Agree	67 (16.46)
Neutral	59 (14.50)
Disagree	281 (69.04)
The foreskin is used as raw material for certain spice	
Agree	71 (17.57)
Neutral	71 (17.57)
Disagree	262 (64.85)

Table 3: Circumcision status and acceptability of voluntary medical male circumcision among participants attending form 4 in Shiselweni high schools, Eswatini, 2018 (n=407)

Variable	Frequency (%)¹
Are you circumcised?	
Yes	201 (48.98)
No	206 (51.02)
Are any of your family members circumcised?	
Yes	276 (68.50)
No	92 (21.99)
Do not know	39 (9.51)
Who is circumcised in the family?	
Grandfather	3 (0.70)
Father	40 (14.60)
Brother	163 (59.11)
Cousin	46 (16.34)
Other (uncle, nephew)	25 (9.25)
Do you have friends who are circumcised?	
Yes	287 (71.96)
No	60 (14.36)
Not sure	60 (13.68)
If Not circumcised, given a chance would you be circumcised?	
Yes	52 (23.43)
No	87 (38.39)
Not Sure	67 (38.18)
If yes, when?	
Next school vacation	17 (30.25)
When I finish school	9 (1.94)
About to get married	9 (18.54)
Not sure	17 (31.81)

Note ¹ the weighted percentages of the frequencies

Table 4: Bivariate and Multivariate analysis of factors associated with male circumcision among males attending Form 4 in Shiselweni high schools, Eswatini, 2018 (n=407).

Explanatory variables	Explanatory variables categories	UNIVARIATE			MULTIVARIABLE		
		Odds Ratio	95% Confidence Interval	p-value	Adjusted Odds Ratio	95% Confidence Interval	p-value
Age		1.19	1.05 – 1.35	0.007*	1.02	0.87 – 1.21	0.771
Living with	Other ¹	1					
	One Parent	1.02	0.56 – 1.87	0.952	0.97	0.51 – 1.88	0.944
	Both Parents	0.43	0.23 – 0.79	0.007*	0.35	0.18 – 0.69	0.002*
School Location	Urban	1					
	Rural	0.77	0.41 – 1.44	0.420			
Knowledgeable about VMMC	Yes	1.50	0.94 – 2.4	0.089	1.433	0.78 -2.62	0.242
Positive Attitude toward VMMC	Yes	1.50	1.00 – 2.26	0.052	0.20	0.77 – 3.39	0.202
Sexually Active	Yes	2.05	1.00 – 2.26	0.001*	1.53	0.90 -2.61	0.117
Parented Children	Yes	3.00	1.28 – 7.04	0.011*	3.55	1.2 – 10.48	0.022*
Have a family member who is circumcised	Yes	2.06	1.01 – 4.22	0.048*	2.42	0.96 – 6.09	0.061
Have friends who are circumcised	Yes	3.96	2.09 – 7.49	<0.001*	3.99	1.81 – 8.84	0.001*
At what age did you become sexually active	21 and above	1					
	15 -20	4.44	0.45 – 43.53	0.201			
	10 – 15	3.13	0.30 – 32.27	0.338			
Have ever used a condom	Never	1					
	Always	0.71	0.40 – 1.24	0.228			
Who is the circumcised	Grandfather	0.36	0.03 – 4.59	0.428			

family member				
Father	0.93	0.33 – 2.63		0.896
Brother	0.83	0.34 – 1.99		0.672
Cousin	0.65	0.24 – 1.81		0.413

Note * statistically significant at p-value 0.05

¹Other includes aunt, uncle and siblings

Table 5: Bivariate and multivariable analysis of factors associated with acceptability of voluntary medical male circumcision among males attending form 4 in Shiselweni high schools, Eswatini, 2018 (n=206).

		UNIVARIATE			MULTIVARIATE		
Explanatory variables	Explanatory variables categories	Odds Ratio	95% Confidence Interval	p-value	Adjusted Odds Ratio	95% Confidence Interval	p-value
Have circumcised family member	Yes	0.37	0.17 – 0.81	0.013*	0.49	0.22 – 1.10	0.082
Age		0.93	0.79 – 1.09	0.373			
School Location	Urban	1					
	Rural	1.08	0.52 – 2.24	0.841			
Living with	Other 1						
	One Parent	0.68	0.29 – 1.56	0.361			
	Both Parents	1.14	0.53 – 2.47	0.730			
Knowledgeable about VMMC	Yes	1.00	0.57 – 1.76	0.998			
Positive Attitude toward VMMC	Yes	0.75	0.44 – 1.26	0.27			
Sexually Active	Yes	0.72	0.43 – 1.21	0.215			
Parented Children	Yes	0.64	0.16 – 2.47	0.513			
Have circumcised friends	Yes	0.53	0.27 – 1.03	0.063			
At what age did you become sexually active	21 and above	1					
	15 -20	3.91	0.36 – 41.89	0.260			
	10 – 15	1.30	0.11 – 15.45	0.838			
Have ever used a condom	Never	1					
	Always	1.94	0.83 – 4.52	0.126			
Who is the circumcised	Grandfather	0.79	0.04 – 14.03	0.869			

family member	Father	0.51	0.10 – 2.51	0.408
	Brother	1.33	0.37 – 4.75	0.658
	Cousin	3.68	0.87 – 15.54	0.076