HIV Knowledge and change in Sexual Behaviour among youth in South Africa (2012): A retrospective analysis of risky sexual behaviour histories.

By

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Declaration

I Shamsunisaa Miles-Timotheus, declare that this research report is my own work. It is being submitted for the degree of Master of Arts in Demography and Population Studies at the University of the Witwatersrand, Johannesburg. To the best of my knowledge, it has not been submitted before in part or in full for any degree or examination at this or any other University.

……. [Signature of candidate]

…… day of ……, 20….

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I would like to thank my parents Conrad and Zahieda Miles for providing me with the opportunity to attend university and for their unwavering support. My husband Charl Timotheus for always being available when I needed him as well as my sister Tasnim and my best friend Paige. Lastly and most importantly I would like to thank my mentor and supervisor Professor Nicole De Wet-Billings for her continuous guidance.

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Chapter 1: Introduction

1.1 Background

HIV knowledge is accurate information pertaining to how disease gets transmitted from one person to the next, as well as ways to protect oneself from contracting the virus (Carey & Schroeder, 2012). One can see from previous research that HIV knowledge is generally measured by asking the participants a set number of questions about HIV which is then marked as either being correct or incorrect, higher scores indicate more accurate HIV knowledge (Carey & Schroeder, 2012; Yaya et al., 2016 De Wet, Akinyemi & Odimeguwu, 2019). Knowledge about HIV benefits individuals as it helps them to make informed decisions that could reduce infection and change sexual behaviour (Hoque & Ghuman, 2011). This relays into preventative measures which are consistent throughout the literature and include condom use, delay of early sexual debut and not having more than one sexual partner at a time (Zuma et al., 2016). Condom usage has been pushed by the public health services to prevent the transmission of HIV as it acts as a physical barrier between two individuals (CDC, 1993; Kincaid Babalola & Figueroa, 2014). The reason that delay of early sexual debut is important when combating HIV is because it decreases the exposure time that the individual would be subjected to, hence decreasing the risk of contracting HIV (Zuma et al., 2010). A systematic review done by Stöckl, Kalra, Jacobi and Watts (2012) found that high quality studies found a significant relationship between age at first sex and HIV. Multiple sexual partners relate to an overlap between sexual partners, this is believed to increase the chances of contracting HIV (Mah & Halperin, 2010).

There is a positive relationship between HIV knowledge and testing (Haile, Chambers & Garrison, 2007). This kind of knowledge also benefits those who are already infected. With the knowledge regarding access to health services, as well as creating an understanding of the

medical information beneficial to the upkeep of their health (Jones et al., 2013). HIV knowledge could be used for both disease prevention and health promotion campaigns.

However, certain cultural beliefs could hinder the dissemination of accurate HIV knowledge. This includes contradictory information that leads individuals to be misinformed and this contributes to the high prevalence of HIV (Sivelä, 2016). One misleading belief is that sexual intercourse with a virgin could reverse a HIV positive status (Sivelä, 2016). Another myth which leads to misconceptions around the transmission of HIV is that it is passed on through witchcraft (Ashforth, 2002). A high rate of awareness has to be given to HIV in the Sub-Saharan African regions as it has the highest rates of HIV globally (Kharasany & Karim, 2016). The prevalence rates in the region of adults (15-49) is high with Angola at 1.9%, Mozambique 12.5%, Zimbabwe 13.3%, Botswana 22.8%, Lesotho 23.8% and Eswatini 27.4% (UNAIDS, 2018).

1.2 Problem statement

HIV within South Africa is equally high as the rest of the region. The estimated amount of people living with HIV in South Africa is 7.97 million, this is an increase of 810 000 individuals since 2012, 19.07% of individuals between the ages of 15-49 have HIV (Statistics South Africa, 2019). Whereas the prevalence rate for those aged 15-49 in 2012 was 18.8% hence showing an increase. In 2016 young females in the country (15-24) were most at risk of contracting HIV, they contribute to 30% of new infections (UNAIDS, 2017). Women in India possess low levels of HIV knowledge (Yaya et al., 2016). A study was done in America on young black adults (18-30 years old) the authors found that 77.2% of the participants received high HIV knowledge scores (Okumu et al., 2017). When taking thirty-three sub-Saharan African countries into account researcher found that only 37% of the participants had complete knowledge of HIV (Chan & Tsai, 2018). Long et al., (2018) stated that 52.1% of university students (18-25)

possessed poor HIV knowledge. Statistics South Africa (2019) has estimated that 22.71% of females (15-49) are HIV positive, in their households and communities the burden of HIV on the youth in South Africa is evident with 40.37% being affected by HIV (De Wet, Akinyemi & Odimeguwu, 2019). HIV like any other illness does not only affect the individual with the disease, it also has an impact on the lives of those around them. Deaths related to HIV are high and combating transmission could lower these rates by reducing the prevalence of the disease. In 2018 it was estimated that 22.06% of total deaths were caused by HIV/AIDS (Statistics South Africa, 2018).

Adolescents and youth who engage in unsafe sexual behaviours are exposed to a higher risk of contracting HIV (Adeokun, Ricketts, Ajueon & Ladipo, 2009; Cooper, 2002). Unsafe/risky sexual behaviours refers to behaviours which counter the preventive measures of contracting HIV and STIs such as inconsistent condom usage, early sexual debut and having multiple sexual partners. Some of the factors leading to unsafe sexual behaviours such as non-condom usage has been identified as stigmatisation, as using a condom is often associated with not trusting one's sexual partner (Marston & King, 2006). A study done on the use of condoms among young males (15-26) in South Africa found that 47.7% never used condoms and 36.9% did not use condoms consistently (Shai, Jewkes, Nduna & Dunkle, 2012). Mchunu and colleagues (2012) found that 16.2% of females (10-19) had an unwanted pregnancy due to unsafe sexual behaviours. Further Bengesai, Khan & Dube (2017) found in a trend analysis of 2002 to 2009 that a total of 61.4% of individuals had their first sexual debut between ages 16 and 17 in South Africa (Bengesai, Khan & Dube, 2017).

The effect of HIV knowledge on sexual behaviour is contested with some studies finding a positive bivariate relationship between HIV knowledge and sexual behaviour or alluded to an

increase in knowledge resulting in an increase in safer sexual behaviours (Hoque & Ghuman, 2011; Kirby, Laris, Lori & Rolleri, 2007; Trani, Gnisci, Nobile & Angelillo, 2005). However, some studies have found that HIV knowledge is essential but not enough (Agius et al., 2010; Hoehn et al., 2016; Idele., et al, 2014; Lou & Chen, 2009; Nubed & Akoachere, 2016; Williams et al., 2003).

There is a chance that risky sexual behaviour is not static however and differs by sexual partner. A cohort study was done and found that there was a change in sexual behaviour, some unsafe sexual practices are becoming more common such as early sexual debut and having multiple sexual partners (Hargreaves et al., 2007). Johnson and colleagues (2012) found that there has been an increase in the use of condoms which could have led to the decrease in infection rates, however other behavioural changes could have played a role but not enough reliable information is available. In Ghana they found that the change in girls' sexual behaviour is as a result of a change in socialisation and attitudes about sex (Gyan, 2019). However, an examination of HIV knowledge by partner histories has not been done. Therefore, this study will examine the relationship between HIV knowledge and changes in sexual behaviour by assessing sexual behaviour history, particularly consistency of condom use.

1.3 Justification

There is a pressing need to address the condom usage practices among youth in South Africa as well as low HIV knowledge. Youth are vital to South Africa's development, they are not only a human resource, to bring about societal change, but they are also beneficial to the growth of the economy (National Youth Development Agency, 2015). Youth play vital roles within their communities, they often the ones focusing on and improving the lives of those around them (National Youth Development Agency, 2015). Youth are estimated at 20,585,145 individuals

which is 35.66% of the total population (Statistics South Africa, 2018). Having to deal with the consequences of unsafe sexual practices such as pregnancy and HIV acquisition would hinder this age groups efforts to develop themselves and assist others in their households and communities as it places an additional burden upon them to provide financial, health and social care as well as deal with bouts of illness to HIV and other STIs (Smith, 2002; WHO, 1993). Therefore, HIV knowledge and sexual behaviour needs to be addressed to prevent negative health outcomes (Agius, Pitts, Smith & Mitchell 2010). Hence why different strategies press that HIV knowledge needs to increase as to help individuals make better informed decisions (NDoH, 2015; UNAIDS, n.d). As research shows that HIV knowledge is a vital component for engaging in safer sex (Hogue & Ghuman, 2011; Kirby et al., 2007; Trani et al., 2005).

This study aims to add to the literature on the relationship between HIV knowledge and sexual practices and further to address the identified gap of looking at the relationship between HIV knowledge and change in sexual behaviour between partners. This aligns with policies such as the South African National Youth Policy (2015) to prioritise the health of the youth in South Africa, which in turn will empower them and drive development. This policy under section 7.3.2 aims to promote sexual and reproductive health and rights (National Youth Policy, 2015). They plan to do this by providing better access to services and information as well as breaking down barriers to enable youth to seek services (National Youth Development agency, 2015). The National Adolescent and Youth Health Policy (2017) also seeks to provide better interventions to promote and enhance the health of the youth. The first objective under the NAYHP (2017) includes creating a curriculum which is accessible and provides learners with information about HIV. By assessing HIV knowledge as well as reasons behind inconsistent condom usage this

study could help identify where the policies are falling short as well as particular areas to focus on.

1.4 Main research question

What are the levels and relationship between HIV knowledge and sexual behaviour history among youth in South Africa in 2012 among youth between the ages of 15 and 34?

Sub- Questions

1. What are the levels of changes in sexual behaviour history by characteristics of youth in South Africa in 2012?
2. What is the relationship between HIV knowledge and sexual behaviour history among youth in South Africa in 2012?

1.5 Main research objective

To determine the levels and relationship between HIV knowledge and sexual behaviour history among youth in South Africa in 2012.

Sub-Objectives

1. To assess the changes in sexual behaviour history by characteristics of youth in South Africa in 2012.
2. To determine the relationship between HIV knowledge and sexual behaviour history among youth in South Africa in 2012.

Chapter 2: Literature review and Theoretical Framework

2.1 Literature Review

Researchers views on condom use and the lack thereof is evident in literature. There is controversy surrounding the relationship that exists between HIV knowledge and condom use. Some studies found a relationship, or alluded to an increase in knowledge, resulting in safer sexual behaviours (Hoque & Ghuman, 2011; Kirby, Laris, Lori & Rolleri, 2007; Trani, Gnisci, Nobile & Angelillo, 2005). HIV knowledge should not only be seen as a prevention strategy but also as health promotion. HIV knowledge can also be beneficial for clinic appointment adherence as a positive relationship was found between HIV knowledge and the outcomes of treatment (Jones et al., 2013), showing not only the benefits it has for prevention but also for treatment. Whilst other studies found that there was no significant relationship and that knowledge was needed but not enough (Agius et al., 2010; Idele et al., 2014).

A study found that despite high HIV knowledge, condom use among mine workers remain low (Williams et al., 2003). A study done on Chinese adolescents found that there was no significant relationship between HIV knowledge and condom use (Lou & Chen, 2009). We have to acknowledge that just because an individual has knowledge on prevention methods does not mean that they understand how to incorporate that method into their own life (Singh, Bankole & Woog, 2005). Hence an individual might have the knowledge that using a condom during sex could reduce one's risk of contracting HIV, but might not know how to make use of a condom correctly.

A study done by De Wet, Akinyemi & Odimegwu (2019) found that approximately 40% of youth in Sub-Saharan Africa are affected by HIV. The knowledge of those affected by the disease is shocking, with only one quarter getting 75% of all questions relating to HIV correct

and only 10% answering all questions correctly. Engelbrecht, Letsoalo & Chirowodza (2017) found that the mean score of HIV knowledge for adults (15-24) was 73%. In order to prevent the transmission of HIV, accurate knowledge has to be spread (De Wet, Akinyemi & Odimeguwu, 2019). Yet there are still campaigns that focus on the biomedical approach, with regards to condom use and male circumcision (Zuma et al., 2016). That alone is not enough, it has to be accompanied by social campaigns which educate the population about HIV (Zuma et al., 2016).

A meta-analysis done on African countries found that condom use is highest in countries with higher HIV rates (Doyle et al., 2012). One could assume that countries that have higher HIV rates would have many interventions in place that would disseminate HIV prevention information, leading to higher condom use. Using condoms correctly is one of the best ways to prevent contracting HIV yet, condom usage remains low in several countries within Sub-Saharan Africa (Idele et al., 2014). Surprisingly there has been a consistency of condom use from 1997 to 2008 despite an increase in HIV knowledge (Agius et al., 2010). A study found that the participants accepted the use of condoms but this did not result in an increase in actual condom usage (James et al., 2004). Condom use in rural South Africa is low, particularly for women who were engaging in sexual intercourse with older men (Chimbindi et al., 2010). A study done in South Africa on university students found that less than half of the sample used a condom the last time they had sex and only 28.5% used condoms every time they engaged in sex (Haffejee, Koorbanally & Corona, 2018). The authors conclude that the low level of condom use among university students is as a result of a lack of confidence to use condoms (Haffejee, Koorbanally & Cornona, 2018).

Male condoms are not the only barrier method available. Despite the global establishment of the female condom programme, the use of condoms consistently and incorrectly remains a problem (Beksinska, Smit & Mantell, 2013). Male students in South Africa had much to say about the dimensions of the female condom, they felt it was too big, it became evident in the study that these males lacked familiarity with the female condom and many were misinformed regarding them (Mantell et al., 2011). Mkhize (2012) makes mention that the male condom is more accessible as it is distributed extensively, compared to female condoms.

Communication about sex with important adults in adolescent's lives has been shown to increase the probability of engaging in safer sexual practices within South Africa and Tanzania (Nomisi et al., 2013). Kincaid, Babalola and Figueroa (2014) found a correlation between communication about HIV and the use of condoms at first sex. There was a study done in KwaZulu-Natal, South Africa in 2015 which looked at HIV positive individuals. The study found that within these relationships of individuals who have HIV, only 58% used a condom the last time that they engaged in sex. What is even more concerning is that only 66% of these individuals told their partners that they were HIV positive and 60% had no idea whether their partner was HIV positive or negative (Fladseth et al., 2015). Fladseth and colleagues (2015) suggested that communication about HIV status needs to be present in relationships. A qualitative study in South Africa on male students found that communication about sex with the male students' partners were low and generally the topic was not discussed (Mantell et al., 2011). The males felt like they could not bring up the topic of condom use as it might make their partner feel uncomfortable, and they felt that the female brining up condom use is inappropriate (Mantell et al., 2011). A study done on South African students found that only 33% of the sample felt like they could negotiate the use of condoms (Haffejee, Koorbanally & Corona, 2018).

Adolescents who live in rural areas are more at risk of lacking the appropriate knowledge (Idele et al., 2014). Placing them at a disadvantage and an increased risk of being infected with HIV. Females with higher education were more likely to report having more than one sexual partner. Knowledge may lead to some safer sexual practices but not much change is seen overall. Education needs to be considered when evaluating HIV knowledge as it plays a role in the individual identifying the accurate information that they receive (Matlho et al., 2019; De Wet, Akinyemi & Odimeguwu, 2019). Information that individuals receive about HIV from others could either be correct or incorrect, education could play a role in what an individual accepts as being correct or incorrect by accessing previous knowledge. This previous knowledge relating to HIV could have been acquired through education, in South Africa the subject Life Orientation is compulsory and teaches learners about HIV prevention and various STI's (Ryan et al., 2020). As women advance within their educational career so does the perception of susceptibility (Baiden & Rajulton, 2011). A study done in Portugal found that women who were less educated were also less probable to use condoms despite the presence of awareness of the risk (Costa et al., 2015). Protogerou et al., (2013) stated that as the participants increased in age, their intentions to use condoms decreased. Consistency of condom use was less for females compared to males, and decreased as the females got older (Chimbindi et al., 2010).

Women who have a low risk perception of contracting HIV are less likely to use condoms consistently, this was seen in a study done on Portuguese women (Costa et al., 2015). Holding a perception that one's risk is low on contracting HIV and no knowledge of the benefit of using condoms are believed to be the paramount indicators of risky sexual behaviour among Nigerian males (Lammers, Van Wijnbergen & Willebrands 2013). The same study found that the predictors of low condom use for Nigerian women are different and is as a result of stigma

(Lammers, Van Wijnbergen & Willebrands, 2013). When a female's perception of contracting a STI is low she shows a higher likelihood to engage in risky sexual behaviour (Osuafor & Ayiga, 2016). In order to become a parent to a biological child, individuals have sex without a condom. Societies that place great emphasis on a women's ability to conceive places women at risk, as often times she has to provide "proof of motherhood" by having a child before she is formally married (Osuafor & Ayiga, 2016).

There are certain factors that affect informed behaviour. Condoms are available at local clinics, however females prefer not to take condoms at clinics due to the stigmatization and prejudice shown towards them by clinic staff (MacPhail & Campbell, 2011). Some issues that play a part in the lack of condom use include socialisation of sexuality, peer pressure and power relations within the given relationship due to gender differences (MacPhail & Campbell, 2011). Externalising HIV and making it a disease that could only affect 'the other' as well as power dynamics which contribute to females been unable to bargain condom use during sex (MacPhail& Campbell, 2011). Substance abuse and alcohol also needs to be taken into consideration as it affects decision making, the use of alcohol was related to risky sexual behaviours (Cooper, 2002).

A qualitative study was done in Australia to better understand condom use, the women in the study did not negotiate male condom usage and are at a greater risk of getting STI's because of gender constructs which limits their ability to engage in safe sex (East et al., 2011). Chimbindi et al., (2010) states that condom use is a method which is determined by males. In Uganda women who experience any type of intimate partner violence have a higher risk of contracting HIV compared to those who do not experience any intimate partner violence, an increase in the

severity and duration of intimate partner violence is associated with a higher risk of contracting HIV (Kouyoumdjian et al., 2013).

A study done in Botswana found that older individuals were not as concerned about contracting HIV due to antiretrovirals (Matlho et al., 2019). This speaks to the health belief model and perceived seriousness, these individuals' perception of the severity of HIV has declined as a result of HIV not being seen as a death sentence. Older women in South Africa (40-60) who are married or cohabiting do not like the idea of trying to engage in safer sexual practices because of patriarchy (Madiba & Ngwenya, 2017).

Antiretroviral medication is not the only factor that contributes to risky sexual behaviour. Male circumcision is seen as an intervention to prevent the transmission of HIV (Pintye & Baeten, 2019). But males who are circumcised have shown an increase in risky sexual behaviour (Korte, Djimev & Calvo, 2019). This is seen as a result of a lower risk perception due to circumcision lowering one's risk of contracting HIV (Korte, Djimev & Calvo,2019). Therefore, showing that an increase in one safe sexual practice could lead to an increase in a different risky sexual practice.

One of the determining factors of condom usage is believed to be relationship status. This is evident in a study which was done in Portugal that found safer sexual practices among unmarried women (Costa et al., 2015). Inconsistent condom use in Cape Town was linked to being a coloured male who was in a relationship which lasted longer than nine months (Delva et al., 2013). One of the challenges that HIV and STI programmes face is the discontinued use of condoms within relationships which are long term (Beksinska, Smit & Mantell, 2012). Single students in South Africa report using condoms more often compared to students who were in

relationships, the study indicated that 20% of the variance in use of condoms was explained by whether the student was in a relationship (Protogerou et al., 2013). Condom usage is higher for young adults who are not living with their significant other (Chimbindi et al., 2010). Chimnindi et al., (2010) believe that the low rates of condom use within long-term relationships are as a result of trust and expectations held within that relationship. The prevalence of condom use is low for women who are either married or cohabiting (Osuafor et al., 2018). When condoms are not used at the start of the relationship it hinders use later on as it is then seen as either an admission of guilt or as accusatory (Osuafor et al., 2018).

Interventions need to include more than just dissemination of knowledge. Other factors that could affect the decisions an individual makes needs to be taken into consideration (James et al., 2004). An intervention to promote safe sexual practices should include knowledge, reducing stigma that is attached, access to information, delaying age of sexual debut and reducing the number of sexual partners (Coates, Riches & Caceres, 2008).

2.2 Theoretical Framework

The Health Belief Model is made up of five components these are: perceived susceptibility, perceived seriousness, perceived benefits to taking action, and barriers to taking action and lastly cues to action (Rosenstock, 1974). Perceived susceptibility can be described as the belief that the individual holds on their probability to get a disease. Perceived seriousness differs from individual to individual. This includes the kind of emotional state that arises from the mere thought of an illness (Rosenstock, 1974). Perceived susceptibility and perceived seriousness are cognitive processes that depend upon knowledge of the disease (Rosenstock, 1974). Perceived benefits of taking action and barriers to taking action, depends upon the availability and effectiveness of the action, if an individual believes that that taking an action could be beneficial

it could be countered by something as simple as the action not being convenient (Rosenstock, 1974).Cues to action is when something either within or external from the individual such as media campaigns creates a sense of readiness for the individual to engage in health seeking/preventing measures (Champion & Skinner, 2008). Self- efficacy has also been added to the model which relates to the individual confidence in being able to engage in a particular behaviour (Champion & Skinner, 2008) .

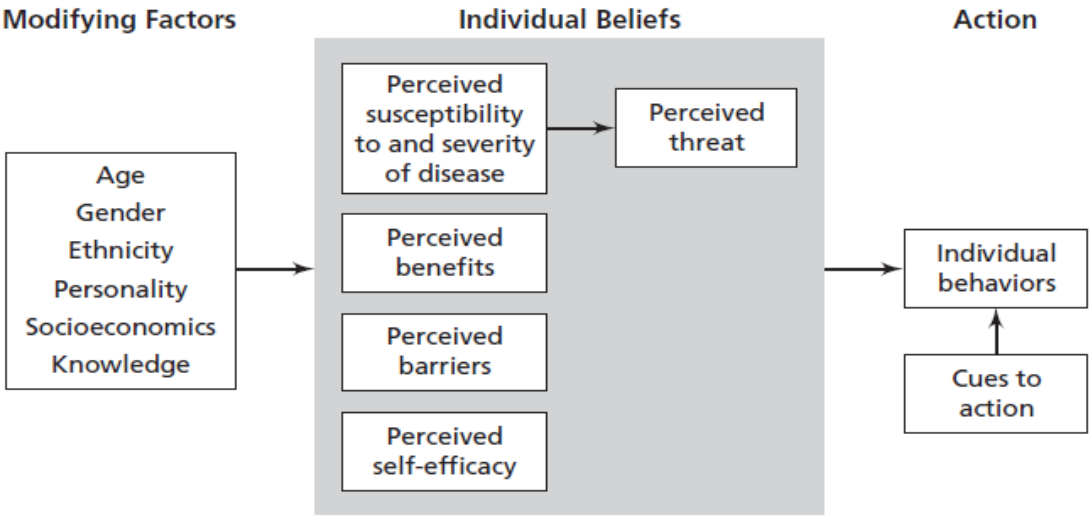

Figure 2.2. Theoretical framework by (Champion & Skinner, 2008)

2.3 Conceptual Framework

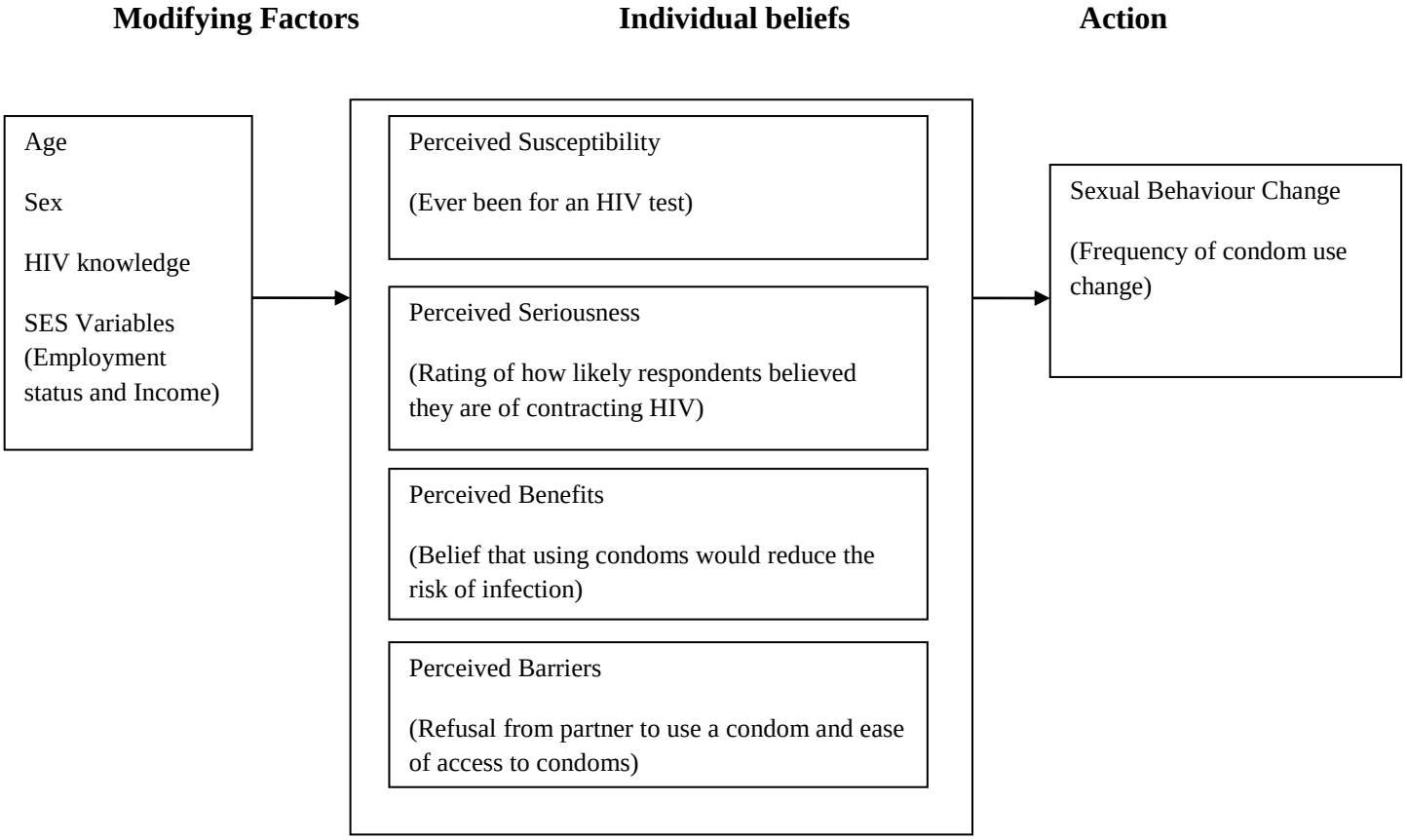

Figure 2.3. Conceptual framework adapted from Champion and Skinner, 2008

This study will adopt most of the health belief model as outlined by Champion and Skinner (2008). The modifying factors such as age, sex, HIV knowledge and socioeconomic variables have an effect on the individual's personal beliefs such as the perception the individual hold of susceptibility, seriousness, benefits and barriers which combined is how an individual perceives the threat of HIV. The perception of the threat of HIV influences the individual's sexual behaviour change from one partner to the next.

Chapter 3: Methodology

3.1 Study design

This study made use of secondary cross-sectional data which was analysed using quantitative analysis by using descriptive and inferential statistical tools. A retrospective question was used when looking at condom use, to allow the observation of condom use behaviour amongst the three most recent sexual partners of the participants.

3.2 Data source

Secondary data was used from the Fourth South African National HIV, Behaviour and Health Survey, 2012. This 2012 survey is the fourth of the series of national HIV household surveys led by the Human Sciences Research Council and partners (Shisana et al., 2014). The data collected from the survey includes demographic, socioeconomic, and behavioural characteristics. In total 38 431 people agreed to be interviewed (Shisana et al., 2014). This is the most recent National HIV, Behaviour and Health Survey available to the public.

3.3 Study population and sample size

Individuals in the survey who were between the ages of 15-34, sexually active and with complete data on three most recent sexual partners were included in the study with a weighted sample size of 543,354 and unweighted sample of 208. The study population extends beyond 24 years of age to allow for a larger sample, those older than 24 are more likely to be in a serious union however they are also more likely to have complete sexual history data on the three most recent sexual partners.

3.4 Questionnaire Design

The questionnaire was structured with four different questionnaires namely; household, parents/guardians for those 0-11, children aged 12-14 and persons aged 15 and older (Shisana et al., 2014). This study used the questionnaire for those aged 15 years and older.

3.5 Study variables

3.5.1 Dependent variable

The dependent variable for the study is condom use change (sexual behaviour history) which is comprised of two different categories.

Table 3.1. Categorisation of the outcome variable for this study

Condom use change (Sexual Behaviour History)	0. Consistent/Positive change 1. Inconsistent/Negative change

Participants were asked under the sexual history section of the survey how often they used condoms with their three most recent sexual partners. They could either answer "every time", "almost every time", "sometimes" or "never". These variables were grouped together to either represent consistent or inconsistent condom use, "every time" and "almost every time" was grouped as 'consistent condom use' and "sometimes" and "never" was grouped as 'inconsistent condom use'. For each sexual partner these binary variables were created and the distributions by all predictor variables were described. Thereafter, a combined variable which shows change across partners was generated and called 'condom use change'. If condom use remains 'consistent' across all three partners, the code (0) 'consistent/positive change' was applied. If condom use is 'inconsistent' with the third most recent partner and was 'consistent' or 'inconsistent' with the second most recent partner but changes to 'consistent' with the most recent partner, the code (0) 'consistent/positive change' was applied. If condom use was 'consistent' with the third most recent partner and is either 'consistent' or 'inconsistent' with the second most recent partner, but was 'inconsistent' for the most recent partner, a code (1) 'inconsistent/negative change' was applied. The code (1) 'inconsistent/negative change' was also used when condom use was 'inconsistent' with all three sexual partners. Table 3.2 below shows how the variable is conceptualised.

Table 3.2. Conceptualisation of dependent variable "condom use change"

Sexual partner			
Third most recent	**Second most recent**	**Most recent**	**Condom use change**
Consistent	Consistent	Consistent	0. Consistent/Positive change
Inconsistent	Consistent/Inconsistent	Consistent	0. Consistent/Positive change
Consistent	Consistent/Inconsistent	Inconsistent	1. Inconsistent/Negative change
Inconsistent	Inconsistent	Inconsistent	1. Inconsistent/Negative change

3.5.2 Independent variables

Table 3.3. Definition and categorisation of independent variables for this study

HIV knowledge	1. 75-100% 2. 50-74% 3. <50%
Perceived Susceptibility (Ratings of how likely respondents believed they are of contracting HIV)	1. Low perceived susceptibility 2. High perceived susceptibility
Perceived Seriousness of HIV (Has respondent ever gotten a HIV test)	1. Yes 2. No
Perceived Benefits (Belief that using a condoms would reduce the risk of infection)	1. Yes 2. No
Perceived Barriers (Ease of access to condoms)	1. Easy to obtain 2. Not easy to obtain
Perceived Barrier (Refusal from partner to use a condom)	1. Refused to use a condom 2. Did not refuse to use a condom

Employment Status	1. Employed 2. Unemployed 3. Student
Income	1. Not applicable 2. Average or less 3. More than average
Age	1. 15-19 2. 20-24 3. 25-29 4. 30-34
Sex	1. Male 2. Female

The HIV knowledge percentage categories which are 75-100%, 50-74% and <50% was created on Stata by assessing how many of the questions the individuals answered correctly and converting it into a percentage. The questions and answers are as follows;

1. "Can HIV be cured?" No
2. "Can a person reduce the risk of HIV by having fewer sexual partners?" Yes
3. "Can a healthy-looking person have HIV?" Yes
4. "Can HIV be transmitted from a mother to her unborn baby?" Yes
5. "Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?" Yes
6. "Can a person get HIV by sharing food with someone who is infected?" No
7. "Can a person reduce the risk of getting HIV by using a condom every time he/she has sex?" Yes
8. "Can medical male circumcision reduce the risk of HIV infection in males?" Yes

The authors of a study done in South Africa which looked at the accurateness of HIV knowledge amongst youth identified the correct answers for the questions on HIV within the survey used (De Wet, Akinyemi & Odimegwu, 2019).

Participants were asked to rate how likely they believed they were to contract HIV, they could either answer (1) 'definitely will not get infected', (2) 'probably won't get infected', (3) 'probably going to get infected', or (4) 'definitely going to get infected'. These categories were then collapsed, 'definitely will not get infected' and probably won't get infected' was then coded (1) 'low perceived susceptibility'. 'Probably going to get infected' and 'definitely going to get infected' was coded as (2) 'High perceived susceptibility'. Perceived seriousness of HIV was measured by asking participants whether they have ever gotten an HIV test done or not.

Perceived benefits of using condoms was measured by asking participants if they thought that using a condom would reduce the risk of getting infected with HIV. Perceived barriers to using condoms was measured by asking participants if it was easy to access condoms and whether a partner has refused to use a condom in the last twelve months. Participants were either coded as being employed, unemployed or a student. In the survey participants were asked to answer how much they earn monthly, this was inserted as a continuous variable. This was converted into categorical data, the mean income is R3278, individuals were either coded as (1) income not applicable, (2) Average or less and (3) above average. Age was grouped into 5 year intervals.

3.6 Hypothesis

H0 – There is no relationship between HIV knowledge and change in sexual behaviour.

H1 –There is a relationship between HIV knowledge and change in sexual behaviour.

3.7 Ethical issues

Secondary data has been used and hence this study was not directly involved with participants. Names of participants were not recorded and hence anonymity of participants was guaranteed (Shisana et al., 2014). Parents of participants under the age of 18 were asked to give informed consent to include their children into the study (Shisana et al., 2012). An ethics waiver was completed for this study, which was approved by the faculty of humanities (Ethics waiver number = WDEMG2019/07/03)

3.8 Data Analysis

The statistical software Stata 15 was used to analyse the data. Variables were analysed in three different stages. Firstly, univariate analysis was done which provided descriptive statistics which describes the characteristics of the youth. This is presented as a bar graph for condom use and frequency tables for the rest of the independent variables which can be found in the results chapter below as well as appendix 1. Secondly a variety of bivariate analyses were done which assesses the association between condom use and all of the independent variables this was done by using cross tabulations between condom use by characteristics of youth such as knowledge of HIV, age, sex, employment status and perception of susceptibility, seriousness, barriers and benefits variables. Chi-Square was used to determine the p-value for each independent variable with condom use.

Lastly to achieve the second objective which is to determine the relationship between HIV knowledge and sexual behaviour history among youth in South Africa in 2012. A binomial logistic regression model was used as the outcome variable is dichotomous. If an individual displayed inconsistent condom use or showed a negative change in condom use the code 1 was used, if they displayed consistent condom use or showed a positive change in condom use the code 0 was used. Three different binomial logistic regressions were done, the first was condom

use change and the socio-economic variables, the second was condom use change and perception variables and the third was condom use change and all variables excluding perceived barriers. The perceived barriers to condom use were not included in the regression due to the low number of responses and small numbers in response categories. The results are presented in three different tables below in the results chapter, odds ratios, p-values and confidence intervals are included in the table. Odds ratios were used to examine the likelihood and p-values were used to determine the significance of results. The binomial logistic regression equation is:

$yi = \beta 0 + + \beta 1x1i + \ldots + \beta pxpi$ (Rabe-Hesketh & Everitt, 2004).

3.9 Limitations

The study made use of a survey which is self-reported and subject to recall bias and social desirability bias. The questions pertaining to sexual history asked the participant to recall the last three sexual partners they had and characteristics of those relationships, which individuals might not accurately remember. Questions around sexual behaviour are sensitive and as a plea to avoid judgment, individuals might not have answered truthfully.

There is no way of determining at what point in time knowledge was acquired or changed and hence we cannot determine if the change in behaviour was due to an increase in knowledge. There is also no way of knowing the reason for condom use or for the change in condom use, two possible reasons could be to prevent fertilisation or infection.

Chapter 4: Results

4.1 Characteristics of respondents

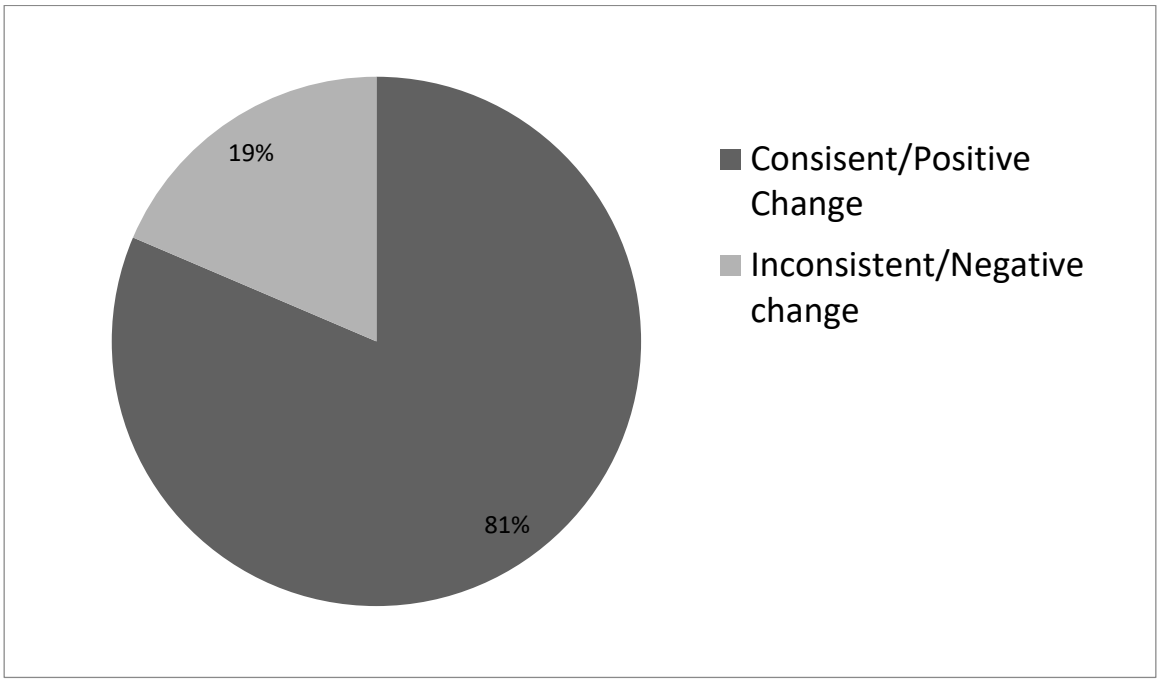

Figure 4.1.1. Percentage distribution of consistency of condom use (15-34 year olds, South Africa)

The figure above indicates that majority (81%) of individuals used condoms either consistently with their three most recent partners or showed positive condom change. Whilst 19% of individuals either used condoms inconsistently or showed negative condom change.

Table 4.1.1. Weighted frequency and percentage of correct HIV knowledge responses.

Question	N	%
"Can a healthy-looking person have HIV?"	473 822	87.20
"Can a person reduce the risk of getting HIV by using a condom every time he/she has sex?"	471 212	86.72
"Can the risk of HIV transmission be reduced by having sex with only one uninfected partner who has no other partners?"	449 395	82.71
"Can HIV be cured?"	441 891	81.33
"Can a person get HIV by sharing food with someone who is infected?"	436 014	80.24
"Can HIV be transmitted from a mother to her unborn baby?"	381 465	70.21
"Can medical male circumcision reduce the risk of HIV infection in males?"	296 104	54.50
"Can a person reduce the risk of HIV by having fewer sexual partners?"	283 713	52.22
Total	*3 233 616	

* Multiple responses as all participants were asked questions and total number of correct answers were summed.

Table 4.1.1 shows the amount of correct responses to questions on HIV knowledge as well as a percentage of individuals who answered the question correctly. The question with the highest correct answers and a percentage of 87.20% of individuals answering correctly is "Can a healthy looking person have HIV?" The questions with the least amount of individuals answering correctly (42.22%) is "Can a person reduce the risk of HIV by having fewer sexual partners",

followed by “Can medical male circumcision reduce the risk of HIV infection in males?” where only 54.50% answered correctly.

4.2 Cross tabulation of consistency of condom use by characteristics of youth.

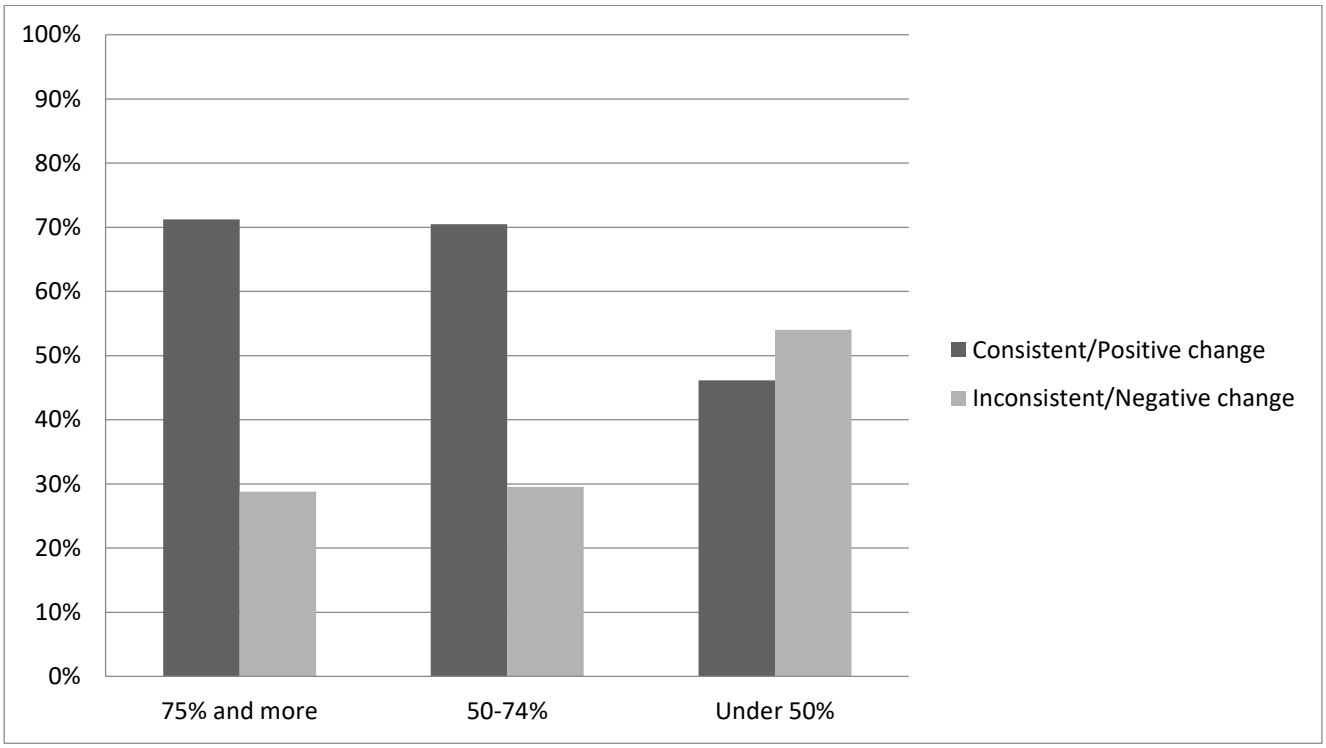

Figure 4.2.1. Weighted percentage distribution of consistency of condom use by HIV knowledge percentage of youth aged 15-34.

The figure above illustrates those individuals who have between 50-100% knowledge use condoms more consistently or show a higher positive condom use change compared to those who score below 50%. Individuals who scored under 50% for HIV knowledge have the highest percentage for inconsistent or negative condom use change.

Table 4.2.1. Weighted frequencies and percentage distribution of consistency of condom use by characteristics of youth aged 15-34 using column frequency.

	Consistency of condom use	
Characteristics	Consistent/Positive change	Inconsistent/Negative change
	N(%)	N(%)
HIV Knowledge		
75% and more	181 298(40.98)	40 213 (39.82)
50-74%	234 816 (53.08)	50 743 (50.25)
Under 50%	26 259 (5.94)	10 026 (9.93)
p = 0.176		
Perceived Susceptibility		
Low Susceptibility	310 204 (70.12)	39 438 (39.05)
High Susceptibility	132 168 (29.88)	61 545 (60.95)
p = 0.003		
Perceived Seriousness of HIV		
Has gotten an HIV test	258 255 (58.38)	60 484 (59.89)
Has not gotten an HIV test	184 188 (41.62)	40 500 (40.11)
p = 0.715		
Perceived Benefit (Belief that using a condom would reduce the risk of HIV infection)		
Condoms will reduce risk of HIV	382 189 (86.40)	89 023 (88.16)
Condoms will not reduce the risk of HIV	60 184 (13.60)	11 959 (11.84)
p = 0.973		
Perceived Barrier (Ease of access to condoms)		

Easy to obtain	265 489 (96.27)	32 054 (97.76)
Not easy to obtain	10 278 (3.73)	733 (2.24)
p= 0.423		
Perceived Barrier (Refusal from partner to use a condom)		
Partner refused to use a condom	17 650 (4.46)	776 (0.94)
Partner did not refuse to use a condom	378 223 (95.54)	81 847 (99.06)
p= 0.202		
Employment Status		
Employed	189 805 (42.91)	56 863 (56.31)
Unemployed	152 750 (34.53)	29 347 (29.06)
Student	99 818 (22.56)	14 773 (14.63)
p = 0.765		
Income*		
Not applicable	250 848 (56.71)	56 841 (56.29)
Average or less	142 384 (32.19)	25 572 (25.32)
More than average	49 140 (11.11)	18 569 (18.39)
p = 0.737		
Age		
15-19	91 262 (20.63)	20 084 (19.89)
20-24	125 943 (28.47)	34 082 (33.75)
25-29	177 393 (40.10)	29 756 (29.47)

30-34	47 774 (10.80)	17 060 (16.89)
p = 0.515		
Sex		
Male	434 946 (98.32)	89 794 (88.92)
Female	7 427 (1.68)	11 188 (11.08)
p = 0.115		

**denotes variable which percentage adds up to 100.01% due to rounding up of numbers.*

Table 4.2.1 shows that majority of individuals who belonged to both consistent/positive change and inconsistent/negative change possessed 50-74% HIV knowledge. The individuals showing inconsistent/negative change had more people in the less than 50% knowledge (9.93%) compared to those belonging to consistent/positive change (5.94%).

Approximately 70% of individuals who used condoms consistently or showed a positive change to condom use had a low perceived susceptibility. Whereas those who used condoms inconsistently or had a negative change in condoms use accounted for 61% of individuals in that group. For perceived seriousness the percentage distribution between the two groups were not showing much difference.

With regard to the belief of the benefits of using condoms, a greater percentage of those who use condoms consistently/positive change believed that using condoms would reduce the risk of HIV. Access to condoms was generally considered easy ranging from 96-98%, with only 2-4% of each group stating that it was not easy to obtain condoms. Less than 1% of individuals in the inconsistent/negative change group said that their partner refused to use a condom with approximately 4% of those belonging to the consistent/positive change saying that a partner had refused. Both groups had more employed individuals with the least being students. More than

50% of both the consistent/positive change and inconsistent/negative change individual's income was not applicable.

For consistent/positive change most people (40.10%) were between 25-29 with approximately 21% 15-19; 28% 20-24 and 11% 30-34. This is different for inconsistent/negative change as most people (33.75%) are between 20-24 with approximately 20% 15-19; 29% 25-29 and 17% 30-34. Within the consistent/positive change group approximately 2% are female and for the inconsistent/negative change that percentage increases to 11%.

4.3 Multivariate analysis

Table 4.3.1. Model 1 Binary logistic regression for change in consistency of condom use and socioeconomic variables.

Characteristics	Odds Ratio	P-Value	95% Confidence Interval	
Employment Status (R.C: Employed)				
Unemployed	0.78	0.000*	0.7677	0 .8014
Student	0.46	0.000*	0.4455	0.4693
Income (R.C: Not applicable)				
Average or less	0.71	0.000*	0.6953	0.7249
More than average	1.79	0.000*	1.7392	1.8281
Age group (R.C: 15-19)				
20-24	1.16	0.000*	1.1335	1.1929
25-29	0.54	0.000*	0.5257	0.5549
30-34	1.51	0.000*	1.4614	1.5530
Sex (R.C: Male)				
Female	6.86	0.000*	6.6448	7.0837

**denotes statistically significant results (p<0.05) R.C denotes reference category*

The results from table 4.3.1 above indicate that both unemployed (OR=0.78) and students (OR=0.46) are less likely to use condoms inconsistently or show a negative condom change compared to employed individuals. Individuals who earn the average or less are 0.71 times ($p<0.001$) less likely to use condoms inconsistently or show a negative condom use change when compared to individuals where income is not applicable. Those who earn more than average are 1.79 times more likely ($p<0.001$) to use condoms inconsistently or show a negative condom use change. Individuals 20-24 (OR=1.16) and 30-34 (OR=1.51) where $p<0.001$ are more likely to use condoms inconsistently or show a negative condom use change whereas those 25-29 are 0.54 times less likely to use condoms inconsistently or show negative condom use change when compared to those aged 15-19. Females are 6.86 times more likely to use condoms inconsistently or show a negative condom use change compared to the RC males.

Table 4.3.2. Model 2 Binomial logistic regression for change in consistency of condom use and perception variables.

Characteristics	Odds Ratio	P-Value	95% Confidence Interval	
Perceived susceptibility (R.C: Low)				
High	3.78	0.000*	3.7216	3.8304
Perceived seriousness of HIV (R.C: Has gotten an HIV test done)				
Has not got an HIV test done	1.09	0.000*	1.0782	1.1104
Perceived benefit (R.C: Condoms will reduce the risk of HIV)				
Condoms will not reduce the risk of HIV	0.74	0.000*	0.7231	0.7554

**denotes statistically significant results ($p<0.05$) R.C denotes reference category*

Table 4.3.2 above outlines that individuals who have a high perceived susceptibility are 3.78 times more likely to either use condoms inconsistently or show a negative condom change

(p<0.001). Those who have gotten an HIV test done are 1.09 times more likely (p<0.001) to use condoms inconsistently or show a negative condom use change. Individuals who do not believe that using condoms could reduce the risk of HIV were 0.74 times (p<0.001) times less likely to use condoms inconsistently or show a negative condom change.

Table 4.3.3. Model 3 Adjusted binary logistic regression for change in consistency of condom use and socioeconomic, perception and HIV knowledge variables.

Characteristics	Odds Ratio	P-Value	95% Confidence Interval	
HIV Knowledge (R.C: 75>%)				
50-75%	0.63	0.000*	0.6199	0.6436
<50%	2.56	0.000*	2.4692	2.6578
Employment Status (R.C: Employed)				
Unemployed	0.52	0.000*	0.5044	0.5318
Student	0.19	0.000*	0.1810	0.1920
Income (R.C: Not applicable)				
Average or less	1.02	0.085	0.9969	1.0487
More than average	2.84	0.000*	2.7575	2.9199
Age group (R.C: 15-19)				
20-24	1.12	0.000*	1.0910	1.1528
25-29	0.19	0.000*	0.1818	0.1936
30-34	0.50	0.000*	0.4839	0.5171
Sex (R.C: Male)				
Female	9.37	0.000*	9.0443	9.7110
Perceived susceptibility (R.C: Low)				
High	6.95	0.000*	6.8271	7.0878

Perceived seriousness of HIV (R.C: Has gotten an HIV test done)				
Has not got an HIV test done	0.72	0.000*	0.7085	0.7340
Perceived benefit (R.C: Condoms will reduce the risk of HIV)				
Condoms will not reduce the risk of HIV	0.20	0.000*	0.1903	0.2034

**denotes statistically significant results (p<0.05) R.C denotes reference category*

Table 4.3.3 indicates that individuals who have 50-75% accurate HIV knowledge are 0.63 times (p<0.001) less likely to use condoms inconsistently or show a negative change in condom use compared to those who have more than 75% accurate HIV knowledge. We can see that the same is not true for those who possess less than 50% accurate knowledge as they are 2.56 times (p<0.001) more likely to use condoms inconsistently or have a negative change in condom usage.

Employment status and change in consistency of condom use is significantly associated with a p-value less than 0.001, those who are unemployed have a 0.52 less likelihood, and students a 0.19 less likelihood of using condoms inconsistently or showing a negative change in condom use. Individuals who earn more than average are 184% more likely to use condoms inconsistently or show negative condom change compared to those who income is not applicable to (p<0.001).

There is a significant association between consistency of condom use and age group as the p-value is less than 0.001. Individuals who are between the ages 20-24 are 1.12 times more likely to use condoms inconsistently or show a negative change in condom use compared to those 15-19 years old. Whilst individuals 25-29 (OR=0.19) and 30-34 (O.R=0.50) are less likely to belong to the inconsistent/negative change group compared to those 15-19 years old.

Females are 9.37 (p<0.001) times more likely than males to use condoms inconsistently or show a negative change in condom use. Individuals who have a high perceived susceptibility

($p<0.001$) are 6.95 times more likely than those with a low perceived susceptibility to use condoms inconsistently negative change. People who have not gotten an HIV test done are 0.72 ($p<0.001$) times less likely than those who have gotten an HIV test done to use condoms inconsistently or show a negative change in condom use. Individuals who believe that using a condom will decrease the chances of HIV are 0.20 times less likely to either use condoms inconsistently or show a negative change in condom use.

Chapter 5: Discussion

HIV knowledge and condom use change

The main objective of this research was to determine whether there was a relationship present between HIV knowledge and condom use change. This study uses the binary logistic regression results to determine significance. For ease of understanding results, one can change "less likely" to "more likely" while simultaneously changing "inconsistent/negative condom use" to "consistent/positive condom use". Significant results were found between HIV knowledge and condom use change however, this was not the direct positive relationship that one would expect. Meaning that an increase in knowledge did not always translate into an increase in condom use. There is a gap within literature which needs to be filled to try and understand why this is happening. One possible explanation is that women who experience severe intimate partner violence are fearful when it comes to matters of negotiating condom use, hence less likely to negotiate it's use at all (Peasant et al., 2017). Those with less HIV knowledge (50-74%) were less likely to use condoms inconsistently or move to negative condom use change compared to those with higher HIV knowledge (75+). As expected individuals with less than 50% accurate HIV knowledge were engaging in riskier sexual behaviour compared to those with 75%+ accurate HIV knowledge. The results indicated that HIV knowledge has a role to play in the behaviour of an individual. There are studies similar to this one which has found a positive relationship between HIV knowledge and safe sexual practices or alluded to an increase in HIV knowledge resulting in safer sexual practices (Kirby, Laris, Lori & Rolleri, 2007; Shamu et al., 2018; Trani, Gnisci, Nobile & Angelillo, 2005). Kirby et al., (2007) analysed different HIV campaigns that educated individuals (9-24) and found that there was an increase in safer sexual

practices. Trani et al., (2005) found that knowledge about HIV was low and that it increased as the age of the participant increased, they believe that increasing adolescent knowledge of HIV would translate into a reduction of risky sexual behaviours.

There are studies that have not found similar results that this study has; this includes a study done in Taiwan where researchers found that HIV knowledge does not translate into safer sexual practices (Lou & Chen, 2009). There was a study done in Australia which looked at secondary school children that found an increase in HIV knowledge over the years, however there was not an increase in the rate of condom use despite the increase in HIV knowledge (Agius et al., 2010). Idele and colleagues (2014) mention that HIV knowledge is necessary for individuals to engage in safer sexual practices, however it is not enough to change behaviour.

Levels of condom use

The results from this study indicated that 19% of individuals either used condoms inconsistently with all three most recent partners or moved from using condoms with the third or second most recent sexual partner to not using condoms consistently with the most recent sexual partner. This is a concern and requires attention due to the high rates of HIV within South Africa. Individuals might use condoms, but they might not be using condoms consistently. Hoque (2011) found that about 83% of the sample (17-45) used condoms, however approximately only 59% used a condom every time they had sex (Hoque, 2011). A study done in Ethiopia on university students found that 66% of participants used condoms (Mokagtle & Motuma, 2014). James et al., (2004) indicated that in South Africa of those aged 15-19 33% were not using condoms at all. In 2012 Shai, Jewkes and Dunkle found that in South Africa almost 50% of men (15-26) never used condoms. A study done in Cape Town, South Africa indicated that approximately only 25% of individuals used condoms consistently with all of their sexual partners (Martin et al., 2016). It is

evident that within South Africa the percentage of young individuals using condoms consistently is low. A more recent study which made use of data from 2017 found that 72% of individuals used a condom at last sex (Shamu et al., 2020).

Employment, income and condom use change

This study shows that both unemployed individuals and students were less likely than those who are employed to use condoms inconsistently or show a negative condom use change. The previous statement indicated that both unemployed individuals and students are displaying safer condom usage compared to individuals who are employed. The less likelihood of using condoms inconsistently/negative condom change is not expected for those who are unemployed relative to those who are employed. A study done in South Africa found that being a student and employed was associated with a greater likelihood of condom use (Ntshiqa et al., 2018). Similar results were found in a study done in Ghana, that women who were employed were less probable to use condoms at last sex contrary to unemployed women (Baiden & Rajulton, 2011). Taking income into consideration, when compared to individuals where income is not applicable those who earn an income are more likely to use condoms inconsistently or show a negative condom use change. This is not expected as a higher income is often associated with more education which is often linked to safer sexual practices A study done in KwaZulu-Natal found that individuals who belonged to a household with a higher SES were more likely to use condoms (Chimbindi et al., 2010).

Age, sex and condom use change

Individuals between the ages of 20-24 were more likely to use condoms consistently or show positive condom use change compared to their younger bracket 15-19. A shift is seen for those aged 25-29 and 30-34 as they are less likely than those 15-19 to use condoms inconsistently or

show a negative condom change. Indicating that individuals (25-29) and (30-34) are using condoms more consistently when compared to the younger individuals (15-19). Muchiri, Odimegwu and De Wet (2017) similarly found that younger individuals are more likely to use condoms. Protogerou et al., (2013) stated that the intentions to use condoms decreased as students got older. This could be due to older individuals being in committed relationships. A study done on South African university students found that those in casual relationships used condoms more often compared to participants in committed relationships (Haffejee, Koorbanally & Corona, 2018). Shamu and colleagues (2020) found that older individuals were less likely to use condoms. Regarding sex, most of the participants were male as fewer females had competed sexual history data. This could be as a result of social desirability, or it could be indicative of the promiscuity nature of males. Males are often seen as sexual beings and are not judged negatively when engaging in sexual intercourse comparative to females who get shunned. A study found that approximately 40% of females and 60% of males reported sexual intercourse by 18 (Dietrich et al., 2013). The sexual economic theory can be used to explain this, the theory assumes that males trade resources such as affection and faithfulness for coitus and in turn females display a restriction in sexuality to maintain a low supply (Baumeister & Mendoza, 2011). In this study females displayed a higher percentage of using condoms inconsistently or showing negative condom change. Females make up 1.65% of the consistent and positive condom change, however they make up 11.08% of the inconsistent and negative condom change group. This has to be interpreted with caution due to the low response rates of females. The binary logistic regression found that females were more likely to use condoms inconsistently or show negative condom change. Similarly, James et al., (2004), Hoque and Ghuman (2012) and Shamu et al., (2020) found that males were using condoms more frequently when compared to females.

Perceived susceptibility, perceived seriousness and condom use change

The cross tabulation between condom use change and perceived susceptibility indicated that individuals with a high perceived susceptibility belonged mainly to the consistent condom use and positive condom use change. The opposite is true for those with a low perceived susceptibility as they belonged mainly to the inconsistent and negative condom use group. Hence showing that individuals are aware that their actions are placing them at a greater risk of contracting HIV yet they are not behaving in a manner to prevent themselves from contracting HIV. MacPhail and Campbell (2011) found that lack of perceived risk of contracting HIV was one of the reasons that individuals were not using condoms. They also go further to explain that individuals view HIV as a disease that gets spread through different kinds of sexual encounters such as rape or sleeping with a sex worker (MacPhail & Campbell, 2011). Hence when individuals are not engaging in behaviours that they deem dangerous they won't believe they are at risk. A study done in South Africa found similar results to this study, the authors stated that perceived risk did not play a role in condom use (Muchiri, Odimegwu & De Wet, 2017).

It is evident that individuals who have not gotten an HIV test done are more likely to belong to the consistent/ positive condom use change group. This goes against the Health Belief Model as we would assume that those who take HIV more seriously (take HIV tests) would engage in safer behaviours (consistent/positive condom use). This could be because those who use condoms consistently know that they are protecting themselves and hence do not think that they need to take HIV tests, whereas those who are not using condoms consistently go for HIV tests because they are aware of the risk that could arise because of their behaviour. This study found that 60% of participants got an HIV test done, a similar statistic was found for MSM in Natal, Brazil (Bay et al., 2019). A lower rate of HIV testing was found in China where only 7.3% of the participants

which were male undergraduate students went for an HIV test in the last year before the study (Xu et al., 2019). Jooste et al., (2020) indicated that when looking at the trend of HIV testing from 2005 to 2017 there has been an increase in the rate of testing, it has increased from 30.6% to 75.2%. The rate of testing in 2017 is higher than what this study has found for 2012.

Perceived benefits, perceived barriers and condom use change

This study found that individuals who did not believe that condoms would reduce the risk were less likely to use condoms inconsistently or show a negative condom change; the inverse would usually be expected. The above discussion on the results of perceived susceptibility and perceived seriousness indicated that knowledge about something does not always represent the behaviour displaced and the relationship between the perception variables and condom use change seems to all be related in nature. The inverse was found in a study done in Ghana where participants who knew that a condom would reduce their chances of contracting HIV were 35% more probable to have used a condom the last time they had sex (Baiden & Rajulton, 2011).

Perceived barriers to using condoms include access to condoms as well as refusal from a partner to use a condom. This study found that approximately 4% reported that it was not easy to obtain a condom or that there was refusal from a partner to use a condom The same is not true for individuals in Ethiopia, where the low use of condoms is believed to be as a result of partners refusing to use a condom (Mokagtle & Motuma, 2014). MacPhail and Campbell (2011) found that because gendered power relations females do not even believe that they could get raped by a partner as sex is what a man needs, and the same might be true for condom use where females do not believe that they have the power to negotiate the use nor the right to want to use a condom.

Chapter 6: Conclusion and recommendations

6.1 Conclusion

The null hypothesis for this research was that there was no relationship between HIV knowledge and sexual behaviour history. The binary logistic regression produced significant results and hence we can reject the null hypothesis and accept the alternative hypothesis that a relationship does exist between HIV knowledge and sexual behaviour history.

This study has shown that the relationship between HIV knowledge and condom use change is not simple or straightforward. HIV is a problem in our country and finding prevention strategies is vital to the health of the population. The youth in South Africa have to be commended by government on their knowledge that using a condom every time will reduce the risk of contracting HIV as approximately 96% of the participants answered correctly. They also show high rates of HIV testing.

This study was concerned about the relationship that exists between HIV knowledge and condom use change, as policy places emphasis on increasing HIV knowledge without incorporating strategies to help with the social and behavioural changes that need to take place. Hence this study has tried to uncover the relationship so that we can better understand what interventions are needed to reduce risky sexual behaviours for youth in South Africa.

This study has also shown that perceived susceptibility of HIV does not affect condom use change as expected. Individuals that use condoms inconsistently and show a negative condom use change have a high perceived susceptibility yet engage in these unsafe sexual practices. The use of condoms is not as high as we would want it in order to combat the transmission of HIV.

HIV knowledge is not where it should be and government should pay attention to this as knowledge is a necessary tool for prevention of HIV.

The result from this study would benefit the South African National Youth Policy and the National Adolescent and Youth Health Policy. As it adds to the existing literature on HIV knowledge and condom use, while adding on change in condom use which is often not taken into consideration. All the different factors that contribute to sexual behaviour needs to be understood if policies are to be successful. One has to however take into account that the study made use of data from 2012, which may not be completely representative for behaviours and characteristics in the current day.

6.2 Future research recommendations

This study has found results which are not expected such as the perception variables relationship to condom use change. Above we saw that individuals with a high perceived susceptibility and a high perceived seriousness use condom less consistently or show a negative condom use change. Perhaps this could be better explained and more deeply explored through someone using a qualitative technique. The age of a partner as well as relationship status needs to be taken into account with further research. Akullian and colleagues (2017) found that the age of an individual's sexual partner is a risk for HIV acquisition for both males and females. Relationship status could also play a role, Haffejee, Koorbanally & Corona (2018) make mention that students within committed relationships are less likely to use condoms. Future research could look at the differences between use of female and male condoms. Authors are finding that females have more control over using female condoms (Martin et al., 2016).

6.3 Policy and programme recommendations

Policy and programmes such as the South African National Youth Policy and the National Adolescent and Youth Health Policy which aim to promote the health of youth, should focus on more than just dispersing HIV knowledge. A study done which looked at South African and Tanzanian school going pupils, found that individuals who had an open communication channel with caregivers were more probable to use condoms consistently (Namisi et., 2013). Although encouraged to speak to children regarding safe sexual practices. Parents find it difficult due to the taboo nature around sex and its instruments (Motalenyane, 2019). The government could pair up with broadcasters to create a programme which distributes information about HIV and condoms which also aims to reduce stigma and open up channels of communication within households. Workshops should be held in areas that are identified as having high HIV rates and celebrities could be used to promote condom use in this modern society which focuses on social media influences. This will also help reduce the conservative nature around discussions on sex and condom use.

References

Akullian, A., Bershteyn, A., Klein, D., Vandormael, A., Bärnighausen, T., & Tanser, F. (2017). Sexual partnership age pairings and risk of HIV acquisition in rural South Africa. *AIDS, 31*(12), 1755-1764.

Adeokun, L. A., Ricketts, O. L., Ajuwon, A. J., & Ladipo. (2009). Sexual and reproductive health knowledge, behaviour and education needs of in-schools adolescents in Northern Nigeria. *African Journal of Reproductive Health, 13*(4), 37-50

Ashforth, A. (2002). An epidemic of witchcraft? The implications of AIDS for the post-apartheid state. *African Studies, 61*(1), 121-143.

Agius, P. A., Pitts, M. K., Smith, A. M. A., & Mitchell, A. (2010). Sexual behaviour and related knowledge among a representative sample of secondary school students between 1997 and 2008. *Australian and New Zealand Journal of Public Health, 34*(5), 476-481.

Baiden, P., & Rajulton, F. (2011). Factors influencing condom use among women in Ghana: an HIV/AIDS perspective. *Journal of Social Aspects of HIV/AIDS, 8*(2), 45-54.

Baumeister, R. F., & Mendoza, J. P. (2011). Cultural variations in the sexual marketplace: Gender equality correlates with more sexual activity. *The Journal of Social Psychology, 151*(3).

Bay, M. B., de Freita, M. R., Lucas, M. C., de Souza, E. C., & Roncalli, A. G. (2019). HIV testing and HIV knowledge among men who have sex with men in Natal, Northeast Brazil. *Brazilian Journal of Infectious Diseases, 23*(1), 2-7.

Beksinska, M. E., Smit, J. E., & Mantell, J. E. (2012). Progress and challenges to male and female condom use in South Africa. *Sex Health, 9*(1), 51-58.

Bengesai, A. V., Khan, H. T. A., & Dube, R. (2017). Effects of early sexual debut on high school completion in South Africa. *Journal of Biosocial Science, 50*(1), 124-143.

Carey M. P., & Schroder K. E. (2002). Development and psychometric evaluation of the brief HIV knowledge questionnaire. AIDS *Education and Prevention, 14*(2), 172–182.

Centers for Disease Control and Prevention. (1993). Update: Barrier protection against HIV infection and other sexually transmitted diseases. *Morbidity and Mortality weekly report, 42*(30), 589-600.

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath, *Health behaviour and health education: Theory, research and practice* (4th ed., pp. 45-65). San Francisco: John Wiley & Sons Inc.

Chan, B. T., & Tsai, A. C. (2018). HIV knowledge trends during an era of rapid antiretroviral therapy scale-up: an analysis of 33 sub-Saharan African countries. *Journal of the International AIDS Society, 21*.

Chimbindi, N. Z., McGrath, N., Herbst, K., Tint, K. S., & Newell, M. L. (2010). Socio-demographic determinants of condom use among sexually active young adults in rural KwaZulu-Natal, South Africa. *Open AIDS Journal, 4*, 88-95.

Cooper, M. L. (2002). Alcohol use and risky sexual behaviour among college students and youth: Evaluating the evidence. *Journal of studies on alcohol, 14*,101-117.

Costa, E. C. V., Oliveria, R., Ferreira, D., & Pereira, M. G. (2015). Predictors of consistent condom use among Portuguese women attending family planning clinics. *AIDS Care.*

Delva, W., Meng, F., Beauclair, R., Deprez, N., Temmerman, M., Welte, A., & Hens, N. (2013). Coital frequency and condom use in monogamous and concurrent sexual relationships in Cape Town, South Africa. *Journal of International AIDS Society, 16*.

De Wet, N., Akinyemi, J., & Odimeguwu, C. (2019). How much do they know? An analysis of the accuracy of HIV knowledge among youth affected by HIV in South Africa. *Journal of the International Association of Providers of AIDS Care, 18,* 1-7.

Dietrich, J., Sikkema, K., Otwombe, K. N., Sanchez, A., Nkala, B., de Bryn, G., ... & Gray, G. E. Multiple levels of influence in predicting sexual activity and condom use among adolescents in Soweto, Johannesburg, South Africa. *Journal of HIV/AIDS and Social Services, 12*(3-4), 404-423.

Doyle, A. M., Mavedzenge, S. N., Plummer, M. L., & Ross, D. A. (2012). The sexual behaviour of adolescents in sub-Saharan Africa and trends from national surveys. *Tropical Medicine and International Health, 17*(7), 796-807.

East, L., Jackson, D., O'Brien, L., & Peters, K. (2010). Condom negotiation: Experiences of sexually active young women. *Journal of advanced nursing 67*(1), 77-85.

Engelbrecht, J. G., Letsoalo, M. R., & Chirowodza, A. C. (2017). An assessment of the HIV/TB knowledge and skills. *BMC Health Services Research, 19*(1).

Fladseth, K., Gafos, M., Newell, M. L., & McGrath, N. (2015). The impact of gender norms on condom use among HIV-positive adults in KwaZulu-Natal, South Africa. *PLoS ONE, 10*(4).

Gyan, S. E. (2019). Exploring the causes of change in adolescent girls' sexual behaviour in Begoro, Ghana. *African Journal of Reproductive Health, 23*(1), 55-63

Haffejee, F., Koorbanally, D., & Corona, R. (2018). Condom use among South African university students in the province of KwaZulu-Natal. *Sexuality and Culture, 22,* 1279-1289.

Hagreaves, J. R., Bonell, C. P., Morison, L. A., Kim, J. C., Phetla, G., Porter, J. D. H., ... & Pronyk, P. M. (2007). Explaining continued high HIV prevalence in South Africa: Socioeconomic factors, HIV incidence and sexual behaviour change among a rural cohort, 2001-2004. *AIDS, 21*(7), 39-48.

Haile, B. J., Chambers, J. W., & Garrison, J. L. (2007). Correlates of HIV Knowledge and Testing: Results of a 2003 South African Survey. *Journal of Black Studies, 38*(2), 194–208.

Hoehn, E. F., FitzGerald, M. R., Seema, B., Robinson, V. M., Lippe, J., & Reed, J. L. (2016). Do adolescents with higher knowledge of HIV have lower sexual risk behaviours?. *Paediatric Emergency Care, 32*(12), 846-850.

Hoque, M. E., & Ghuman, S. (2011). Sexual behaviour and knowledge regarding sexually transmitted infections among undergraduate students in Durban, South Africa. *Gender and Behaviour, 9*(1), 3710-3728.

Hoque, M., & Ghuman, S. (2012) Contraceptive practices in the era of HIV/AIDS among university students in KwaZulu-Natal, South Africa. Journal of Social Aspects of HIV/AIDS, 9(1), 15-19.

Idele, P., Gillespie, A., Porth, T., Suzuki, C., Mahy, M., Kassede, S., Luo, C. (2014). Epidemiology of HIV and AIDS among adolescents: Current status, inequalities, and data gaps. *Journal of Acquired Immune Deficiency Syndrome, 66*, 144-153.

James, S., Reddy, S., Taylor, M., & Jinabhai C. C. (2004). Young people, HIV/ AIDS/STIs and sexuality in South Africa: The gap between awareness and behaviour. ActaPaediatrica.2004;93(2):264–269.

Johnson, L. F., Hallet, T. B., Rehle, T. M., & Dorrington, R. E. (2012). The effect of changes in condom usage and antiretroviral treatment coverage on human immunodeficiency virus incidence in South Africa: a model-based analysis. *Journal of Royal Society interface, 9*, 1544-1554.

Jones, D., Cook, R., Rodriguez, A., & Waldrop-Valverde. (2013). Suggested running head: Personal HIV knowledge, appointment adherence and HIV outcomes. *AIDS Behaviour, 17*(1), 242-249.

Jooste, S., Mabaso, M., Taylor, M., North, A., Tadokera, R., & Simbayi, L. (2020). Trends and determinants of ever having tested for HIV among youth and adults in South Africa from 2015-2017: Results from four repeated cross-sectional nationally representative household-based HIV prevalence, incidence, and behaviour surveys. *PLoS ONE, 15*(5).

Kincaid, D. L., Babalola, S., & Figueroa, M. E. (2014). HIV communication programs, condom use at sexual debut, and HIV infections averted in South Africa, 2005. *Journal of Acquired Immunodeficiency Syndrome, 66*(3), S278-S284.

Kirby, D. B., Laris, B. A., & Rolleri, L. A. (2007). Sex and HIV education programs: Their impact on sexual behaviours of young people throughout the world. *Journal of Adolescent Health, 40*(3), 206-217.

Korte, J. E., Djimeu, E. W., &Calvo, F. A. (2019). Evidence of behavioural compensation in internal replication study of male circumcision trial to reduce HIV acquisition in Kisumu, Kenya. *The Journal of Development Studies,* 55(5), 1034-1041.

Kouyoumdjian, F. G., Calzavara, L. M., Bondy, S. J., O'Campo, P., Serwadda, D., Serwadda, D., ... & Gray, R. (2013). Intimate partner violence is associated with incident HIV infection in women in Uganda. *AIDS, 27,* 1331-1338.

Lammers, J., Wijnbergen, S. JG., & Willebrands, D. (2013). Condom use, risk perception, and HIV knowledge: A comparison across sexes in Nigeria. *HIV/AIDS- Research and Palliative Care, 5*, 283-293.

Lin, C. A., Roy, D., Dam, L., & Coman, E. N. (2017). College students and HIV testing: Cognitive, emotional self-efficacy, motivational and communication factors. *Journal of Communication in Health Care, 10*(4), 250-259.

Long, L., Nyasulu, P., Andreasson, S., Larshan, C., Nattey, C., Musakwa, N ... Bor, J. (2018). Knowledge, risk perception, and access to healthcare services for HIV and tuberculosis among university students in Johannesburg, South Africa. *South African Journal of Child Health, 1*, 19-31

Lou, J. H., & Chen, S. H. (2009). Relationships among sexual knowledge, sexual attitudes, and safe sex behaviour among adolescents: A structural equation model. *International Journal of Nursing Studies, 46,* 1595-1603.

MacPhail, C. L., & Campbell, C. (2001). 'I think condoms are good but, aai I hate those things' : Condom use among adolescents and young people in a Southern African township. *Social Science and Medicine, 52*(11), 1613-1627

Madiba, S., & Ngwenya, N. (2017). Cultural practices, gender inequality and inconsistent condom use increase vulnerability to HIV infection: Narratives from married and cohabiting women in rural communities in Mpumalanga province, South Africa. *Global Health Action, 10*, 55-62

Mah, T. L., & Halperin, D. T. (2010). Concurrent sexual partnerships and the HIV epidemics in Africa: Evidence to move forward. *AIDS Behaviour, 14*, 11-16.

Mantell, J. E., Smit, J. A., Beksinska, M., Scorgie, F., Milford, C., ... & Stein, Z. A. (2011). Everywhere you go, everyone is saying condom, condom. But are they being used consistently? reflections of South African male students about male and female condom use. *Health Education Research, 26*(5), 859-871.

Marston, C., & King, E. (2006). Factors that shape young people's sexual behaviour: A systematic review. *Lancet, 368*(9547), 1581-1586.

Martin, J., de Lora, P., Rochat, R., & Andes, K. L. (2016). Understanding female condom use and negotiation among young women in Cape Town, South Africa. *International Perspectives on Sexual and Reproductive Health, 42*(1), 13-20.

Matlho, K., Randell, M., Lebelonyane, R., Kefas, J., Driscoll, T., & Negin, J. (2019). HIV prevalence and related behaviours of older people in Botswana - Secondary analysis of

the Botswana AIDS. Impact Survey (BAIS) IV. *African Journal of AIDS Research, 18*(1), 18-26

Mchunu, G., Peltzer, K., Tutshana, B., &Seutlwadi, L. (2012). Adolescent pregnancy and associated factors in South African youth. *African Health Sciences, 12*(4), 426-434.

Mkhize, N. (2012). *From practice to policy: A cultural study of the perceptions and use of the female condom by women in Durban.* (master's thesis, University of KwaZulu-Natal, South Africa). Retrieved from http://ukzn-dspace.ukzn.ac.za/handle/10413/11946.

Mokgatle, M. M., & Motuma, T. R. (2014). Knowledge and use of contraceptives among college students in North Shoa, Central Ethiopia. *Botswana Journal of African Studies, 28*(1), 81-89.

Motalenyane, A. M. (2019). Parent sex education and belief in a rural South African setting. *Journal of Psychology in Africa, 29*(1), 84-86.

Muchiri, E., Odimegwu, C., & De Wet, N. (2017). HIV risk perception and consistency in condom use among adolescents and young adults in urban Cape Town, South Africa: a cumulative risk analysis. *South African Journal of Infectious Diseases, 32*(3), 105-110.

Namisi, F. S., Aarø, L. E., Kaaya, S., Onya, H. E., Wubs, A., & Mathews, C. (2013). Condom use and sexuality communication with adults: a study among high school students in South Africa and Tanzania. *BMC Public Health, 13*(874).

National Department of Health. (2015). *Strategic Plan 2015-2020.* Retrieved May 8, 2019, from http://www.health.gov.za/index.php/2014-03-17-09-09-38/strategic - documents/category/229-2015str?download=1057:strategic-plan-2015

National Department of Health. (2017). *National Adolescent and Youth Policy*. Retrieved May 1, 2019, from http://www.health.gov.za/index.php/shortcodes/2015-03-29-10-42-47/2015-04-30-08-18- 10/2015-04-30-08-25-54?download=2366:adolescent-and-youth-policy-4th-sept

National Youth Development Agency. (2015). *National Youth Policy 2015-2020.* Retrieved May 8, 2019, from http://www.thepresidency.gov.za/download/file/fid/58

Ntshiqa, T., Musekiwa, A., Mlotshwa, M., Mangold, K., Reddy, C., & Williams, S. (2018). Predictors of male condom use among sexually active heterosexual young women in South Africa, 2012. *BMC Public Health, 18*(1137).

Nubed, C. K., & Akoachere, J-F.T. (2016). Knowledge, attitudes and practices regarding HIV/AIDS among senior secondary school students in Fako Division, South West Region, Cameroon. *BMC Public Health, 26*(847).

Okumu, E., Jolly, D. H., Alston, L., Eley, N. T., Laws, M., & MacQueen, K. M. (2017). Relationship between human immunodeficiency virus (HIV) knowledge. HIV-related stigma, and HIV testing among young black adults in a Southeastern city. *Frontiers in Public Health, 5*(47).

Osuafor, G. N., & Ayiga, N. (2016). Risky sexual behaviour among married and cohabiting women and its implications for sexually transmitted infections in Mahikeng, South Africa. *Sexuality and Culture, 20*, 805-823.

Osuafor, G. N., Maputle, S., Ayiga, N., & Mturi, A. J. (2018). Condom use among married and cohabiting women and its implications for HIV infections in Mahikeng, South Africa. *Journal of Population Research, 35*, 41-65.

Peasant, C., Sullivan, T. P., Weiss, N. H., Martinez, I., & Meyer, J. P. (2017). Beyond the syndemic: Condom negotiation and use among women experiencing partner violence. *AIDS Care, 29*(4), 516-523.

Pintye, J., & Baeten, J. (2019). Benefits of male circumcision for MSM: Evidence for action. *Lancet, 7*, 388-389.

Protogerou, C., Flisher, A. J., Wild, L. G., & Aarø, L. E. (2013). Predictors of condom use in South African university students: A perspective application of the theory of planned behaviour. *Journal of Applied Social Psychology, 43*, E23-E36.

Rabe-Hesketh, S., & Everitt, B. S. (2007): *A Handbook of Statistical Analyses using Stata. 4th Edition*. New York: Chapman and Hall.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs, 2*(4), 328-335.

Ryan, S., Hahn, E., Rao, A., Mwinnyaa, G., Black, J., Maharaj, R., ...Hansoti, B. (2020). The impact of HIV knowledge and attitudes on testing acceptance among patients in an emergency department in the Eastern Cape, South Africa. *BMC Public Health, 20*(1066).

Shai, N. J., Jewkes, R., Nduna, M., &Dunkle, K. (2012). Masculinities and condom use patterns among rural South African men: A cross-sectional baseline survey. *BMC Public Health, 12*(432)

Shamu, S., Khupakonke, S., Farirai, T., Slabbert, J., Chidarikire, T., Guloba, G., & Nkhwashu, N. (2020). Knowledge, attitudes and practices of young adults towards HIV prevention: an analysis of baseline data from a community-based HIV prevention intervention study in two high HIV burden districts, South Africa. *BMC Public Health, 20*(1249).

Shisana, O., Rehle, T., Simbayi, L. C., Zuma, K., Jooste, S., Zungu, N., ...Wabiri, N. (2014). *South African national HIV prevalence, incidence and behavioural survey.* Cape Town: HSRC Press

Singh, S., Bankole, A., &Woog, V. (2005). Evaluating the need for sex education in developing countries: Sexual behaviour, knowledge of preventing sexually transmitted infections/HIV and unplanned pregnancy. *Sex Education, 5*(4), 307-331.

Sivela, J. (2016). Dangerous AIDS myths or preconceived perceptions? A critical study of the meaning and impact of myths about HIV/AIDS in South Africa. *Journal of Southern African Studies, 42*(6):1179–1191

Smith, M. K. (2002). Gender, poverty and intergenerational vulnerability to HIV/AIDS. *Gender and Development, 10*(3).

Statistics South Africa. (2018, July 23). *Mid-year population estimates 2018.* Retrieved March 27, 2019,http://www.statssa.gov.za/publications/P0302/P03022018.pdf

Statistics South Africa. (2019, July 29). *Mid-year population estimates 2019.* Retrieved August 30 , 2019,http://www.statssa.gov.za/publications/P0302/P03022019.pdf

Stöckl, H., Kalra, N., Jacobi, J., & Watts, C. (2012). Is early sexual debut a risk factor for HIV infection among women in sub-Saharan Africa? A systematic review. *American Journal of Reproductive Immunology, 1*: 27-40.

Trani, F., Gnisci, F., Nobile, C. G. A., Angelillo, I. F. (2005). Adolescents and sexually transmitted infections: Knowledge and behaviour and Italy. *Journal of Paediatrics and Child Health, 41*, 260-264.

UNAIDS. (n.d). *The aids response in the 2030 agenda for sustainable development: joint work, shared gains*. Retrieved May 8, 2019, from http://www.unaids.org/en/AIDS_SDGs

UNAIDS. (2017). A snapshot of men and HIV in South Africa. Retrieved June 6, 2019, from https://www.unaids.org/en/regionscountries/countries/southafrica

UNAIDS. (2018). *Data 2018.* Retrieved May 21, 2019, from https://www.unaids.org/sites/default/files/media_asset/unaids-data-2018_en.pdf

UNAIDS. (2018). Retrieved May 21, 2019, from https://www.unaids.org/en/regionscountries/countries

World Health Organisation. (1993). *The health of young people: A challenge and a promise. England*: World Health Organisation Library.

Williams, B. G., Taljaard, D., Campbell, C. M., Gouws, E., Ndhlovu, L., van Dam, J., ... Auvert, B. (2003). Changing patterns of knowledge, reported behaviour and sexually transmitted infections in a South African gold mining community. *AIDS, 17*(14), 2099-2107.

Xu, H., Xie, J., Xiao, Z., Xiao, H., Li, X., Goldsamt, L., Williams, A. B., & Wang, H. (2019). Sexual attitudes, sexual behaviours, and use of HIV prevention services among male undergraduate students in Hunan, China: a cross-sectional survey. *BMC Public Health, 19*(250).

Yaya, S., Bishwajit, G., Danhoundo, G., Shah, V., & Ekholuenetale, M. (2016). Trends and determinants of HIV/AIDS knowledge among women in Bangladesh. *BMC Public Health, 16*(812).

Zuma, K., Setswe, G., Ketye, T., Mzolo, T., Rehle, T., &Mbelle, N. (2010). Age at sexual debut: A determinant of multiple partnerships among South African youth. *African Journal of Reproductive Health, 14*(2), 47-54.

Zuma, K., Shisana O., Rehle, T. M., & Onoya, D. (2016). New insights into HIV epidemic in South Africa: key findings from the National HIV Prevalence, Incidence and Behaviour Survey, 2012. *African Journal of AIDS Research, 15*(1), 67-75.

Appendix 1:

Annexure A: Table of weighted frequency and percentage of characteristics of youth (15-34) in South Africa.

Characteristic	N	%
Perceived Susceptibility of HIV		
Low	349 642	64.35
High	93 713	35.65
Perceived Seriousness of HIV		
Has gotten an HIV test done	318 736	58.66
Has not gotten an HIV test done	224 617	41.34
Perceived Benefit (Belief that using a condom would reduce the risk of HIV infection)		
Condoms will reduce risk of HIV	471 212	86.72
Condoms will not reduce the risk of HIV	72 143	13.28
Perceived Barrier (Ease of access to condoms)		

Condoms will reduce risk of HIV	297 535	96.43
Condoms will not reduce the risk of HIV	11 011	3.57
Perceived Barrier (Refusal from partner to use a condom)		
Partner refused to use a condom	18 425	3.85
Partner did not refuse to use a condom	459 711	96.15
Employment Status		
Employed	246 668	45.40
Unemployed	182 097	33.51
Student	114 591	21.09
Income		
Not applicable	307 689	56.63
Less than average or average	167 956	30.91
More than average	67 710	12.46

Age		
15-19	111 346	20.49
20-24	160 025	29.45
25-29	207 149	38.12
30-34	64 834	11.93
Sex		
Male	524 739	96.57
Female	18 615	3.43

Appendix 2:

Annexure B. Literature matrix

Title (A) ***Journal Source* (B)**	**Author(s) and Year**	**Data Source**	**Methods of Analysis**	**Main Findings**	**Gaps**
(A) Condom use and sexuality communication with adults: A study among high school students in South Africa and Tanzania (B) *BMC Public Health*	Namisi, F. S Aaro, L. E Kaaya, S. Onya, H. E Wubs, A. Matthews, C. 2013	Data from multi-site randomized controlled trial of a school-based HIV prevention intervention implemented in Cape Town and Mankweng, South Africa and Dar es Salaam, Tanzania	-Cronbachs alpha -GLM -multiple ordinal logistic regression	-Individuals who use condoms more consistently had significantly higher scores of communication	-Did not assess if there is a difference based on who the individual is with whom they communicate.
(A) Factors influencing condom use among women in Ghana: an HIV/AIDS perspective (B) Journal of Social Aspects of HIV/AIDS	Baiden, P. Rajulton, F 2011	Ghana Demographic and Health Survey (2003)	-Logistic regression	-Speaking to a partner about avoiding HIV and the benefits of using condoms are predictors of condom use -Condom use among women is low. -15% used a condom at last sex (urban) and 10% (rural)	-Purpose of condom use not assessed

(A) Predictors of consistent condom use among Portuguese women attending family planning clinics (B) *AIDS Care*	Costa, E. C. V. Oliveira, R. Ferreira, D. Pereira, M. G. 2015	Interviewer-administered fully structured questionnaires	-Logistic regression	-78.7% of women inconsistent condom users. -Consistent condom use predicted by marital status. -Less educated women less likely to use condoms.	-Limited sample as only looking at women who attend fertility clinics.
(A) Condom negotiation: Experiences of sexually active women (B) *Journal of Advanced Nursing*	East, L. Jackson, D. O'Brien, L. Peters, K. 2010	Online interviews	-Qualitative -Feminist Narrative Approach	-None of the women negotiated condom use.	-Only used women with STI's, this leaves out women who use condoms consistently.
(A) HIV communication programs, condom use at sexual debut, and HIV infections averted in South Africa, 2005 (B) *Journal of Acquired*	Kincaid, D. L. Babalola, S. Figueroa, M. E. 2014	-Household interviews	-Structural equation modeling -multivariate probit regression -propensity score matching	-Communication has an indirect effect on HIV infection as it influences condom use at first sex.	-Does not take current condom use into account.

Immunodeficiency syndrome					
(A) Condom use, risk perception, and HIV knowledge: A comparison across sexes in Nigeria (B) *HIV/AIDS Palliative care*	Lammers, J. Wijnbergen, S. Willebrands, D. 2013	-Household survey	-Multivariate model	-Low risk perception and not knowing the benefits of condoms are best predictors of risky sexual behaviour among men. -Stigma is associated with low condom usage for women.	-Does not take difference of knowledge between males and females into account.
(A) Coital frequency and condom use in monogamous and concurrent sexual relationships in Cape Town, South Africa (B) *Journal of the International AIDS Society*	Delva, W. Meng, F. Beauclair, R. Deprez,N. Temmerman, M. Welte, A. Hens, N. 2013	-Cross sectional survey	-Mixed effects logistic regression. -Poisson regression	-Being male, coloured and being in a relationship that lasted longer than 9 months was associated with inconsistent condom use. -36% consistent condom usage.	-Only looks at areas that have a high HIV rate within South Africa.
(A) Intimate partner violence is associated	Kouyoumdjian et al	-Rakai community cohort study annual survey	-Multivariate Poisson regression model with mixed effects	-Risk of HIV infection is higher for females who experience IPV and risk increases as severity of IPV does.	- Data of perpetrators not used, no way of knowing if increase was as a result of

with incident HIV infection in women in Uganda (B) *AIDS*	2013				perpetrator.
(A) The impact of gender norms on condom use among HIV-positive adults in KwaZulu-Natal, South Africa (B) *PLoS ONE*	Fladseth, K. Gafos, M. Newell, M. L. McGrath, N. 2015	-Cohort study	-Multivariate logistic regression	-58% used condoms at last sex. -66% told partner about HIV status -60% did not know the HIV status of their partners	-Only looking at people that are on ARV treatment, this is healthy behaviour. What about those who are HIV-positive and are not taking medication.
(A) Progress and challenges to male and female condom use in South Africa (B) *Sex Health*	Beksinska, J. A. Smit, J. A. Mantell, J. E. 2012	-Existing data on condom use	-Systematic analysis	-Discontinued use of condoms in long term relationships is a challenge that programmes against HIV and STI's face.	-Does not consider HIV knowledge as a whole nor stigma as a reason for low condom usage.
(A) Cultural practices, gender inequality and inconsistent condom use increase vulnerability to HIV	Madiba, S. Ngwenya, N.	-Focus group discussions	-Thematic analysis	-Patriarchy within society is playing a role in women not being able to negotiate safe sex.	-Only looks at women between the ages of 40-60.

infection: Narratives from married and cohabiting women in rural communities in Mpumalanga province, South Africa (B) *Global Health Action*	2017				
(A) Condom use among married and cohabiting women and its implications for HIV infection in Mahikeng, South Africa (B) *J of Po*p Research	Osuafor, G. N. Maputle, S. Ayiga, N. Mturi, A. J. 2018	-Cross-sectional survey -women aged 18-49 in Mahikeng local municipality	-Logistic regression	-Consistent condom use low in study for married and cohabiting women	-Data from partners not looked at or analysed.
(A) Risky sexual behaviour among married and cohabiting women and its implications for sexually transmitted infections in Mahikeng, South	Osuafor, G. N. Ayiga, N. 2016	-Cross-sectional survey -women aged 18-49 in Mahikeng local municipality	-Chi Square -Binary logistic regression -Thematic content analysis	-Married and cohabiting women in Mahikeng are engaging in risky sexual behaviour.	-Data from partners not looked at or analysed.

Africa (B) *Sexuality and Culture*					
(A) Condom use among South African university students in the province of KwaZulu-Natal (B) *Sexuality and Culture*	Haffejee, F. Koorbanally, D. Corona, R. 2018	-Cross-sectional survey on university students living in residence	-Multivariate logistic regression	-33% felt like they could negotiate condom use with their partner. -Less than half used a condom at sexual debut	-Only looked at university students living in residences of university, this leaves out students who live on their own or with their parents.
(A) New insights into HIV epidemic in South Africa: Key findings from the National HIV Prevalence, Incidence and Behaviour survey, 2012 (B) *African Journal of AIDS Research*	Zuma, K. Et al., 2016	- National HIV Prevalence, Incidence and Behaviour survey, 2012	-Chi Square -formal trend tests	-HIV prevalence increased from 10.6% to 12.2%. -Condom use at last sex decreased from 45.1% to 36.2%	-Does not look at characteristics of partner at last sex nor reason for using condoms.

(A) Socio-demographic determinants of condom use among sexually active young adults in rural KwaZulu-Natal, South Africa (B) *The Open Aids Journal*	Chimbindi, N. Z. McGrath, N. Herbst, K. Tint, K. S. Newell, M-L. 2010	-Africa Centre Demographic Surveillance Area annual survey	-Multivariate logistic regression	-Condom use is low, especially amongst females	-Did not look at the reasons behind the use of condoms
(A) Evidence of behavioural compensation in internal replication study of male circumcision trial to reduce HIV acquisition in Kisumu, Kenya (B) *The Journal of Development Studies*	Korte, J. E. Djimeu, E. W. Calvo, F. A 2019	-Randomized control trial	-Cox proportional hazard regression	-Circumcised males are less likely to practice abstinence and less likely to use condoms.	-Did not take culture/religion into account in terms of both circumcision and condom use
(A) Knowledge and use of contraceptives among college	Mokagtle, M. M. Motuma, T. R.	-Descriptive cross-sectional survey	-Chi square	-Mean age of first sex is 19.8 years -Condom usage at last sex was 64%	

students in North Shoa, Central Ethiopia (B) *Botswana Journal of African Studies*	2014				
(A) Understanding female condom use and negotiation among women in Cape Town, South Africa (B) *International Perspectives on Sexual and Reproductive Health*	Martin, J. De Lora, P. Rochat, R. Andes, K. L. 2016	-In depth interviews	-Thematic analysis	-The use of female condoms are easier for a female to bargain with. -Negative reactions from the partners were a barrier to using condoms.	-Only representative of Cape Town women, could include other areas to see if it is the same or different in other provinces.
(A) HIV prevalence and related behaviours of older people in Botswana AIDS impact surey (B) African Journal of AIDS Resaerch	Matlho, K. Et al., 2019	-Botswana AIDS Impact Survey IV	-$\chi 2$ test of association	-Prevalence of HIV was higher among males. -58.9% reported being sexually active -59% of those who are sexually active used condoms inconsistently	-Could have evaluated the age of their partners to see whether the age of their partner contributes to condoms.

Appendix 3: Turnitin Originality Report

Turnitin Originality Report

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