SITUATION ANALYSIS OF HIV TESTING AMONG FAMILY HEALTH INTERNATIONAL MOBILE SERVICE UNITS (MSU) CLIENTS IN FOUR PROVINCES OF SOUTH AFRICA.

by

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Submitted as the dissertation component
in partial fulfilment of the academic
requirements for the degree of
Master of Population Studies in the
School of Built Environment and Development Studies,
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December 2012.

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DECLARATION - PLAGIARISM

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ACKNOWLEDGEMENTS

I would like to thank my supervisor Professor Pranitha Maharaj for the continuing support and wise advice provided to me throughout this project. I would also like to thank my family for all the support, patience and encouragement to finish the writing.

ABSTRACT

Background

The study objective was to determine how the population located in five remote rural areas responded to HIV testing offered by mobile clinics operating under Family Health International, an international NGO that provides health services, especially HIV prevention and family planning. The study sought to identify how different segments of the population, classified according to their socio-demographic characteristics, responded to HIV testing. The analysis is based on secondary data, collected between October 2009 and September 2010, on clients who came to seek health services at mobile clinics. The population is geographically located in five districts: OR Tambo in Eastern Cape, Amajuba in KwaZulu-Natal, Gert Sibande and Ehlanzeni in Mpumalanga, and Sekhukhune in Limpopo. Although these mobile clincs provided comprehensive health services, HIV prevention and family planning were the main focus of attention.

Methods

A total number of 9015 individuals aged 18 years and older visited the mobile clinics during the period October 2009 to September 2010. Eight socio-demographic characteristics were collected and used to determine the association between HIV testing and the aforementioned eight variables. The association between the independent variables (sex, age, level of education, marital status, occupation, number of living children, district of residence and area of residence) and HIV testing (the dependent variables) was first investigated using a descriptive analysis and then performing a logistic regression.

Results

More than 88% of individuals aged 18 years and older who visited the mobile clinics in the areas covered by the FHI project are from rural areas. HIV testing is still low in these areas, even though the services are provided close to their homes by the mobile clinics. It was found that only 34.7% of the mobile clinic's clients tested for HIV during the period from October 2009 to September 2010. Out of eight independent variables included in the logistic regression model, five were found to have a statistically significant association with HIV testing, being: sex, age, education, occupation and area of residence. Although the majority of these mobile clinics' clients are females (77.1%),

males tested in higher proportion than females accross all areas. The results showed that HIV testing decreases with age, with the age category 18 - 24 years testing for HIV in higher proportion than the age group 25 - 34 years and decreasing further when people become older. Individuals are more likely to take an HIV test when their level of education is higher than matric and tend to respond the same to a HIV testing offer when they have no education, primary or secondary level. Employment was found to be an enabling factor to test for HIV. People who are employed tested for HIV in a higher proportion than people who were unemployed or still in school. The area of residence (classified as rural, semi-urban and urban) showed that HIV testing is higher in urban than in semi-urban areas, and low in rural areas.

The analysis by sex showed that education is important for women because women who had either primary, secondary or a higher level of education tested for HIV better than women who do not have any level of education. For males, education was not statistically significant regarding HIV testing. The different age groups showed the same pattern for both sexes regarding HIV testing, but young males in the category 18-24 years showed higher odds of testing for HIV than females in the same age category. With occupation variable, females who are either students or employed tested for HIV almost in the same proportion and their odds of testing for HIV were double that of unemployed females. Employed males showed a notably higher difference in testing for HIV than males who were either in school or unemployed. The area of residence showed the same pattern for males and females, with both testing in higher proportions in urban and semi-urban areas than in rural areas.

Conclusion

Women from rural areas, with no education, were found to test for HIV less than any other individual in the areas under study. Women tested better when they had been exposed to any form of education. The provision of education to women in the form of an extensive and aggressive door to door HIV awareness campaign should therefore make a difference in increasing the uptake of HIV testing in the five areas covered by the mobile clinics.

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1. Introduction to the problem

The number of people living with HIV has grown considerably since the first case was discovered in the early eighties. In 1990 the number of people infected with the disease was around 8 million which rose to 33.3 million in 2009. In addition almost two thirds of the people living with HIV are found in sub-Saharan Africa. Since the first case, 25 million people have died of AIDS and Africa alone has more than 14 million orphans due to AIDS (UNAIDS, 2010).

The first known case of HIV in South Africa was recorded in 1982 and by 1990 0.8% of pregnant women attending antenatal surveys were found to be HIV positive. Since then antenatal surveys have been performed annually as a direct means to monitor the progression of HIV. By 1993, it was found that HIV prevalence amongst women attending antenatal surveys had increased by more than 60%. In 1994, HIV prevalence in women attending antenatal surveys reached 7.6%, ten times than in 1990, only four years after the first antenatal survey. In 1998, the prevalence rate reached an unprecedented rate of 22.8%, tripling the rate recorded in 1994 in just four years. It was then reported worldwide that South Africa had experienced the fastest expanding epidemic in the world during the period 1990 - 1998 (DOH, 2007).

Since 2006 the HIV prevalence among women attending antenatal clinic services in South Africa appears to have stabilised: 29.1% in 2006, 29.4% in 2007, 29.3% in 2008, 29.4% in 2009 and 30.2 in 2010. The rate fell from 15.9% in 2005 to 13.7% in 2009 among young women (age group 15-19). This rate slightly increased to 14.0% in 2010 (DOH, 2011). This correlates with the recent projections by UNAIDS that the HIV curve is reaching a plateau (D0H, 2009). It should, however, be noted that the Department of Health's 2006 study took into account more women than in the previous surveys, and samples collected from clinics were three times higher than previous antenatal care surveys. This change in the sampling frame may have influenced the results as less infected areas may have been included in the studied population (DOH, 2007).

Despite the signs of stabilisation highlighted above, HIV prevalence among women attending antenatal clinic services remains high in South Africa. KwaZulu-Natal has the highest HIV prevalence in the country, with 40.7% in 2004, 39.1% in 2006 and 39.5% in 2009 and 2010 (DOH, 2011).

Since the onset of the epidemic in the 1990s its impact on individuals and on the country as a whole has been devastating. UNAIDS (2006) reported that South Africa's human development index has lost 35 places in the global ranking during the period 1990 - 2003.

At a global level, it was observed that the highest number of new infections was at its peak in 1996 when 3.5 million people were living with the virus. It was also found that the number of new infections in 2008 was 30% lower as compared to those recorded in 1996 (UNAIDS, 2009). Despite these encouraging observations, HIV continues to be a major threat and many efforts are being put together to continue fighting its spread in an attempt to stop new incidences from occurring. The main entry point to fighting HIV and AIDS is voluntary counselling and testing which allows individuals to know their status and to have access to prevention, care and treatment.

Voluntary HIV counselling and testing (VCT) is defined by UNAIDS/WHO (2004) as a process by which an individual undergoes counselling, enabling him or her to make an informed choice about being tested for HIV. This decision must be entirely the choice of the individual and he or she must be assured that the process will be confidential (UNAIDS/WHO, 2004).

In addition to VCT, UNAIDS/WHO differentiate three more types of HIV counselling and testing:

- Diagnostic HIV testing for people who show symptoms of HIV-related or AIDS deseases such as TB.
- Routine HIV testing by health care providers, which can be provided to people who show signs of or have sexually transmitted infections. It can also be provided to pregnant women who come for antenatal services where antiretroviral treatment is available to prevent the transmission of mother to child.
- Mandatory HIV screening in some circumstances such as blood transfusion samples or in some countries where HIV testing is a prerequisite to enroll in the army or where immigration rules include HIV testing as one of the conditions for entering the country (UNAIDS/WHO, 2004).

1.2. Background of the study

Knowing your own HIV status at an early stage is the only way individuals will be eligible to get access to a growing number of opportunities for HIV prevention, treatment, and care. This is particularly possible with the recent availability of rapid tests methods that make results immediately available to individuals who need and want to test for HIV. Increasing the uptake of HIV testing has been an urgent priority in many countries where HIV is already a burden and a serious threat to an individual's life (Nieburg et al., 2005).

Estimates by UNAIDS (2003) showed that only 0.2% of adult individuals in lowand middleincome countries have received HIV counselling and testing services. People do not subject themselves to testing for fear of knowing their HIV status (in case the HIV test result is positive), or they lack information regarding testing services, etc (UNAIDS, 2009). It is in this context that UNAIDS and WHO have supported a major scaling up of HIV testing through the expansion of client-initiated HIV testing to provider-initiated testing. However, provider-initiated testing remains a supplement to voluntary counselling and testing and clients still have the right to accept or refuse a HIV test offered by health service providers (WHO/ UNAIDS, 2004).

In the same context, and in a strategic session held in Johannesburg in November 2004, WHO set a target of 3 million people on anti-retrovirals by the end of 2005 in poor countries hard hit by HIV. Reaching high numbers of people willing to test for HIV and thereby knowing their HIV status has been very slow in most countries where the prevalence is high. Reaching the target set by WHO and access to testing for all requiress a comprehensive sea change in attitudes. The target set by WHO will be reached if high numbers of people change their attitudes and agree to a HIV test which will inform them of their HIV status. Due to the lack of access to counselling and testing and due to the continuation of increasing HIV incidence in most affected countries, WHO and UNAIDS have promoted and put in place new policies with regard to counselling and testing, especially in clinical settings. The policy states that counselling and testing should be universal and systematically offered to individuals who show clinical signs of AIDS illness. People with sexually transmitted infections (STIs) and pregnant women should also be systematically tested. This policy should also be

applicable to all individuals that visit any health setting if treatment using ART is available. It is again advised by WHO and UNAIDS to let a patient reach their own decision and have the option to refuse a HIV test after receiving all relevant information and counselling regarding the test (WHO and Global Business Coalition on HIV, 2004).

While different countries and organisations such as WHO and UNAIDS, the Global fund, donor fundings and other multilateral agencies continue to put more efforts into halting the expansion of HIV/AIDS, statistics published by UNAIDS (2006) show that the number of new infections continues to grow and the demand or need for treatment still outnumbers the capacity of existing health facilities to respond adequately (UNAIDS, 2006).

In 2011 in South Africa 5.38 million people were estimated to be living with HIV/AIDS, which made South Africa the country with the highest number of people living with HIV/AIDS in the world. It was also estimated by Statistics South Africa that in 2011 alone the number of new infections among the population aged 15 years and plus was 316 900 (STATSSA, 2011).

The results of the 2011 antenatal survey conducted by the Department of Health in South Africa showed that the highest HIV prevalence rate remains in KwaZulu-Natal, followed by Mpumalanga, the Free State and Gauteng. The lowest prevalence rates are in Western Cape, Northern Cape and Limpopo.

The HIV prevalence rate remains high in South Africa despite high profile campaigns to create awareness about HIV/AIDS and to make sure that people are informed about HIV/AIDS, and the negative and devastating effect it has on individuals, on communities and on the country as whole. Khomanani (Caring Together) is an awareness campaign run by the Department of Health using various media channels, including radio and television. The programme was launched in 2001 and messages regarding HIV/AIDS prevention have reached quite a number of the targeted population groups (Shisana et al., 2009).

Soul City, Sould Buddyz and Lovelife have also used various media channels dedicated to adults and particularly youths aged 15-24 years. Many youth-friendly centres have

been created around the country to attract the youth and to increase HIV/AIDS awareness (The Henry J. Kaiser Family Foundation, 2007).

A survey organised by the Human Science Research Council (HSRC) in 2008 assessed how these awareness campaigns were reaching the population and it was found that over 80% of the population have heard about these HIV messages, an increase of 5% over 2005 figures. These messages were particularly well received by people aged between 15 - 24 years, which is the main target demographic of these awareness campaigns (Shisana et al., 2009).

Despite the progress in reaching more people with HIV messages, the HSRC survey found that knowledge about HIV/AIDS is still low, especially with regards to the preventive effect of using condoms to prevent STIs and HIV infection. What was most alarming is that across all age groups and sexes accurate knowledge has decreased compared to few years ago (Shisana et al., 2009).

Given the consistently high HIV prevalence and incidence in some countries, governments, private and civil society continue to increase their efforts to prevent HIV infections. HIV prevention is possible through voluntary counselling and testing. Some countries have put more effort into increasing the percentage of the population getting tested for HIV; however, the response remains low in most instances, as noted earlier. For example, in 2008 a report by UNAIDS showed the following rate of HIV testing per 1000 population: 210 in Botswana, 186 in Lesotho, 179 in Sao Tome and Principe, 146 in Uganda and 139 in Swaziland (UNAIDS, 2009).

In addition, the national response has been strengthened, especially since 2007 when the national strategic plan for HIV/AIDS and STIs was revitalised and covering the period 2007-2011. Targets were set to reach 80% of people in need of ARVs and to reduce new HIV infections by 50% by the end of 2011. After a mid-term review conducted between October and November 2009, it was found that progress has been made in various areas. More than 80% of pregnant women attending antenatal care have been tested for HIV. VCT coverage has increased and 96% of public health facilities are able to provide VCT services in 2008/2009. However HIV testing

throughout the country is relatively low and only 24.7% of adults targeted had tested countrywide between 2004 to 2009 (SANAC Secretariat, 2010).

In an effort to scale up further, different measures were taken in 2009 and among them was an endorsement by the South African Cabinet in October 2009 for a massive HIV testing campaign targeting all South Africans. In December 2009, the President announced the launch of a massive project that would commence on 1 April 2010 and that all health institutions in South Africa should be at the level of providing HIV counselling, testing and treatment and be able to make all South Africans aware of their HIV status. The objectives of the massive HCT campaign as defined by the South African National AIDS Council (SANAC) were to: "1. mobilise people to know their HIV status; 2. support people with key prevention messaging in order to take proactive steps to a healthy lifestyle, irrespective of their HIV status; 3. Increase the incidence of health seeking behaviour; 4. Increase the access to treatment, care and support" (SANAC Secretariat, 2010).

Embarking on a massive HIV counselling and testing campaign was influenced and supported by various experiences observed in other African countries where extensive HIV counselling and testing had already yielded positive results. In Kenya and Uganda a door to door campaign and provider-initiated HIV counselling and testing had increased the percentage of pregnant women who tested for HIV to 85%; In Malawi, 186 217 individuals were tested in one week through mobile and outreach sites; In Tanzania, a six-month testing campaign was able to test up to 3.25 million individuals (SANAC Secretariat, 2010).

In February 2010 the South African policy on voluntary counselling and testing was modified and expanded to shift from client-initiated voluntary counselling to provider-initiated HIV counselling and testing. With this new option, testing will remain voluntary, however, health service providers will have to offer counselling and testing to every patient who seeks out such services at the facility, even though the acceptance will remain voluntary. The targeted number of people to be counselled and tested was 15 million by June 2011 in all districts and all provinces (SANAC Secretariat, 2010).

In the same context, and since 2008, Family Health International (FHI) implemented provider-initiated HIV testing in five areas located in four provinces (Eastern Cape, KwaZulu-Natal, Mpumalanga and Limpopo) in South Africa through mobile clinics. From October 2008 to September 2009, the statistics showed that among people aged 18 years and older who were counselled for HIV, 34.7% accepted to get tested and among them 14% tested positive.

1.3. Aim of the study

The aim of the study is to use demographic and socio-economic characteristics of MSU clients who are 18 years of age and older, to determine how they respond to HIV testing. The focus will be on five areas where FHI mobile service units provide services. The five areas are located in four provinces (Eastern Cape, KwaZulu-Natal, Mpumalanga and Limpopo) as highlighted earlier, in remote and under-served villages where patients have to travel more than 10 kilometers to reach a health facility.

Despite government efforts to increase the number of individuals who know their HIV status by means of HIV testing, significant progress towards that aim has yet to be made. In areas served by FHI mobile service units, similar observations have been registered, hence a need to increase the number of individuals who know their HIV status in those areas.

The research question to be asked can be broken down into the following sub-questions:

- What proportion of clients accessing the FHI MSU in four provinces accept provider-initiated HIV testing?
- What are the socio-demographic and economic characteristics of those accepting provider-initiated HIV testing at FHI MSU?

FHI is the only service provider in the areas under study. These areas, which are under-served and situated in remote areas, were allocated to FHI by the provincial departments of health in the four provinces. This study uses secondary data collected on a daily basis in the FHI five mobile clinics from clients, aged 18 years and older that are seeking health services. The focus is on those 18 years and older because they can

decide for themselves whether to test for HIV. Initially the mobile clinic's clients come mainly for the following services: treatment of minor ailments, family planning, chronic illnesses treatment, HIV counselling and testing and sexual transmitted infections treatment.

The study deals with VCT outside PMTCT as pregnant women have their own needs and are different compared to other people with regard to VCT. The period covered in the study falls between October 2009 and September 2010. The number of cases under study are 9015 clients and among them 34.7% tested for HIV. Analysis of data in this study is done using SPSS 18.0 and is descriptive and inferential.

1.4. Empirical framework

This study is guided by an empirical framework in which the likelihood that an individual tested for HIV/AIDS is a function of the individual's socio-demographic characteristics, being: age (Shisana et al., 2005; Bwambale et al., 2008; Larose et al., 2011), education level (Gage and Ali (2007); Hutchinson and Mahlalela (2006); Haile et al., 2007)), occupation (Ma et al., 2007; Larose et al., 2011). The analysis is guided by the fact that the likelihood of testing for HIV is a function of the environment where the individual stays, either in an urban or a rural area (Wringe et al., 2008; Larose et al., 2011). Following this empirical framework, this study can be applied to behaviour towards accepting to take a HIV test based on the different socio-demographic characteristics of individuals who were exposed to the HIV testing offer. The environmental context can be explained by the individual's area of residence.

1.5. Organisation of the study

Chapter one highlighted HIV prevalence trends, the history of voluntary counselling and testing, both worldwide and in South Africa, and its contribution to reduce HIV incidence. The second chapter explored different literature with regard to HIV testing in different contexts as it was researched and found by several studies conducted in South Africa and elsewhere, highlighting factors that are seen as barriers and those

contributing to the use of HIV testing. In chapter three there is a description of the geographical areas where the study took place; a description of how the dataset was constructed, the tools used to collect data, the number of cases under study, the target population as well as the method used to analyse the data. Analysis of data and the findings based on socio-demographic and economic characteristics of mobile service units clients are discussed in chapter four. Different categories of independent variables will be classified in similar groups to show how the groups respond to HIV testing. The findings will be discussed in chapter five and the conclusion and recommendations will close the study in chapter six.

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

HIV testing is the entry point to treatment, care and prevention (Hong, et al.,2011; Valdiserri et al., 1999; Mshana et al., 2006; Nsigaye et al., 2009). It allows individuals to know their HIV status and to adopt adequate strategies that help them to live a healthy sexual life. For those who test negative, HIV testing helps them to take preventive measures and to stay free from infections. HIV testing also allows individuals who test positive to take further protective measures, which will prevent them from acquiring more viruses and infecting others. The literature has documented a number of factors that are associated with HIV testing. Age, education, marital status and perception with regard to risk of being infected are among factors that are associated with HIV testing (Hong et al., 2011, Larose et al.,2011; Snow et al., 2006; Genberg et al., 2008). Stigma and discrimination have widely been cited as the main barriers to HIV testing (MacPhail et al., 2009; Meiberg et al., 2008) and have contributed significantly to the rise of new infections. However, there was no information available on stigma and discrimination for the current study. Access to HIV testing services and the costs associated with it in some countries are also among the barriers to HIV testing. In some areas, availability of information regarding HIV testing was also limited and has prevented people from accessing HIV testing. Intimate partner violence also contributes to limiting HIV testing and impact negatively on HIV testing. Despite the slow development in the increase of HIV testing uptake, strong commitment from some countries has contributed significantly to the prevalence of HIV testing, enabling many people to know their HIV status, therefore facilitating implementation of HIV prevention, care and support. Over the next few pages, the literature review related to South Africa and elsewhere will highlight some of the limiting and enabling factors with regard to HIV testing and different measures suggested to increase the number of people who know their HIV status by being tested. Provider-initiated HIV testing and counselling that was recommended by WHO in 2002 has been widely documented to have contributed significantly to the increase in the numbers of people opting to take a HIV test.

2.2. Barriers to the use of HIV testing

2.2.1. Knowledge, attitudes and perceptions

Ignorance is one of the main barriers to HIV testing, as found by a study conducted in 2006 by Zhang et al. (2011) in Houma county of Shanxi province in central China. The study objective was to gather evidence on knowledge, attitudes and practices on voluntary counselling and testing among rural migrants. That county has 230 000 permanent local residents and 70 000 migrants. In this study a migrant was defined as someone who left his/her rural area and went to work in an area (either rural or urban) other than his/her area of usual residence. By the time of the study in 2006, nine cases of HIV were found and five out of them were migrants. Because the majority of HIV infections cases were migrants, the study targeted migrants to find out what were their attitudes and perceptions towards HIV and AIDS. Awareness of HIV among the population studied was low, especially among women. For example the majority of participants believed that HIV can be transmitted through a mosquito's bite (70%), or that HIV can be cured with continuous use of antibiotics (51%). Nearly one in five (21%) thought that AIDS was curable and 44% did not know that consistent use of a condom can prevent HIV infection. Some migrants did not consider HIV as a real risk or a serious threat to their life (Zhang et al., 2011). General ignorance about HIV, perceived low risk behaviour and not seeing any benefit in testing, learning that you are HIV positive and the associated consequences (especially death), were the strongest barriers to HIV testing among the migrants sampled in the study.

Through a cross-sectional study, Sasaki et al. (2011) investigated the perceptions of individuals in the workplace in Indonesia with regard to HIV testing. It was found that not knowing where to get tested and the feeling that there is no need to get tested because there is no perceived risk of HIV infection were the main arguments against and barriers to undergoing a HIV test among sampled workers. The study suggested that providing basic information on HIV testing sites and services, as well as the proximity and accessibility of the testing sites, may promote an increase in the uptake of HIV testing (Sasaki et al., (2011).

A study was conducted by Njagi and Maharaj (2006) at the University of KwaZulu-Natal among male and female students in the age range of 18 to 24 years to determine key factors that influence the use or non-use of HIV testing. The study found that the majority of participants opted to use VCT services because they wanted to know their HIV status, which will allow them to take further preventative measures against HIV infection by practicing safe sex in case they are negative. The study also found that information from peers was one of the enabling factors that pushed participants to go for voluntary counselling and counselling. Lack of information or knowledge about existing VCT services was among the main barriers against the use of VCT services by the majority of participants in the study. Another barrier to VCT services was the low perceived risk of HIV infection by the respondents, i.e., they did not see a reason to be tested when they have only one partner or use condoms consistently, or have not yet begun to engage in sexual activities (Njagi and Maharaj, 2006).

Poor information on existing VCT services was also a limiting factor in people accessing HIV testing services as it was found in Hanf et al. (2011), a study conducted in French Guyana to assess the barriers to HIV testing among patients who visited hospitals. In that country, and especially in the capital, Cayenne, 80% of HIV-positive clients are migrants from various countries (mainly Brazil, Suriname and Haiti). Information on the importance of HIV testing has been provided for many years, but there has been no improvement in the number of people opting to take a HIV test in the country, despite the existence of a large number of free VCT centres in the country (Hanf et al., 2011). The objectives of the study were to assess the knowledge of VCT centres and their hours of operation and to find out if the migrants were willing to test for HIV. It was found that ignorance was the main obstacle to HIV testing among those migrants. Twenty-eight per cent (28%) of respondents did not know that free VCT centres existed in Cayenne. Forty per cent (40%) did not know where the VCT centres were located and 65% had no information about the operating hours of the centres. It was found that 76% of the targeted population in the study were willing to have an HIV test after receiving all the required information on VCT centres. Those who did not want to take a test were stopped by the fear of receiving a positive result and the possibility that the result would not be kept confidential (Hanf et al., 2011).

It emerges from the above that lack of information about HIV testing are strong barriers to taking an HIV test. Education helps individuals to get exposed to knowledge and information regarding HIV testing than those who did not go to school. It has also been found that people are more likely to go for a HIV test where more services are available, which also puts people living in rural areas in a less beneficial position than people living in urban areas, where they are more exposed to media and availability of HIV services.

2.2.2. Intimate partner violence

Intimate partner violence has also been identified as a major barrier to HIV testing in a study conducted in Tanzania in Kilimanjaro region. Prabhu et al. (2010) investigated the relationship between HIV testing and intimate partner violence among women who attended voluntary testing and counselling between 1 June 2005 and 31 January 2008. Among the 2436 women who participated in the study, 432 or 17.7% reported that they have experienced either physical or sexual violence. More partner violence cases were found among women with the following characteristics: married, divorced, uneducated and old. The study also found that the seropositivity was more prevalent in women experiencing partner violence. This was reported in other studies that violence limits women's ability to negotiate condom use and increases HIV transmission because of coercion (Prabhu et al., 2010). The same author indicated that women attended HIV counselling and testing with a lot of hesitation, fearing the violence they will experience at the moment of disclosure, in the event that the result is positive. It will then result in fewer women attending HIV testing and counselling, preventing them from knowing their HIV status and therefore losing the opportunity to access prevention services and eventual treatment and care.

In the same context of partner violence and HIV testing linkages, a study was conducted in Muhimbili Health Information Centre in Tanzania by Maman et al. (2001) to gather information regarding attitudes, beliefs, HIV testing disclosure and partner violence experiences amongst women and men who went to seek voluntary counselling and testing between January and December 1999. The study targeted men, women and couples of 18 years and over, who attend Muhimbili Health Information Centre, which is

a free counselling and testing centre located in the Muhimbili Medical Centre (the largest public hospital in the country). The study found that partners, especially women, are afraid of going to test for HIV because they fear a break in the relationship with their male partners who will accuse them of lack of trust. Therefore, females miss HV testing opportunities for fear of a negative reaction from the male partner. In one case, a male partner threatened to abandon the female partner if she tested and received a positive result. When it is a male partner who wants to test for HIV, there is a perceived sentiment that the female may react badly but there is no perceived risk of tension between the couple, as is the case when a woman wants to initiate a HIV test. Again the participants in this study reported that the disclosure of results is a difficult process as they fear a reaction from the partner. Female partners are the ones who find difficult to disclose to their male partners, especially when they tested without the male permission. They are then accused of bringing HIV home, as reported by a 29 years old female who tested positive: “When I informed him of the results there was endless violence in the house”.

Three months after testing for HIV, 11.4% women who participated in the study reported different types of violence such as twisting arms, grabbing, punching, kicking, choking and slamming against a wall. In addition to HIV testing, the study found that the likelihood of reporting partner violence was higher among women who were married or permanently staying with their partners. It was also five times higher among women with less than a secondary school education level than women with a post-secondary school education. Women who went to test and received a positive result were 2.68 times more likely to experience partner violence than women who tested with a negative result. When associating age and partner violence, HIV-positive women aged between 18 and 29 years were ten times more likely to experience violence from their male partners than women of the same age who tested negative, while only 47.5% older women who received a positive test result reported partner violence. The age difference between partners was found to be a predictor of partner violence.

Even though some men reported some violence from the female partners, women experienced more severe violence than men and women reported more barriers to testing, expressed in various forms of violence. However, women who went to test for HIV found it more important to avoid the risk of being infected than risking any violence they may experience from the partner (Maman et al., 2001).

2.2.3. Socio-demographic characteristics

An individual's behaviour, coupled with their socio-demographics characteristics, can also be a barrier to HIV testing uptake. Larose et al. (2011) also examined the association of six socio-demographic variables and voluntary counselling and testing. These variables are sex, age, marital status, education, income and urban/rural living. It was found that within countries, individuals with a higher education were more likely to access VCT services than individuals with a lower level of schooling, or none at all. Individuals of low age (still young) were accessing VCT more than individuals who were older. As was found in many studies, females accessed VCT services more than males (Larose et al., 2011). With regard to marital status, individuals who are married, co-habiting, widowed and separated were more likely to attend VCT services than individuals who never married. The study suggests that individuals who are single have a better chance at negotiating the use of condoms than married individuals who, when they suggest using condoms to their partners, are often accused of infidelity. Therefore, individua ls who are still single do not go to test because they do not see any perceived risk of contracting HIV because they can easily use condoms during intercourse.

As highlighted above, income was seen to be directly influencing the access to VCT, with individuals living in households with a higher income having greater likelihood of attending VCT services than individuals with lower income. The study found that the probability of going to a VCT centre is higher for individuals living in urban areas than individuals living in rural areas. They are more likely to find more human resources, infrastructure and other resources that allow the implementation of VCT services in urban than in rural areas (Larose et al., 2011).

In the same context of behavioural and socio-demographic characteristics, a study conducted in Mpumalanga by Snow et al. (2006) showed a behavioural difference between men and women with regard to HIV testing. A census was conducted in all 282 supported HIV testing centres in Mpumalanga and data was collected in 260 among 282 centres that were targeted. The targeted population included men and women (including women who were pregnant). The objective of the study was to determine the trends of individuals testing from 1998 to 2006 and not the volume of people who tested. To that end, a single month of February was selected and this was used to

determine the trends during the period 1998 to 2006. The study recorded the age and sex of individuals who tested for HIV in all months of February since 1998. It was found that the number of people testing started to increase dramatically in 2001 due to the high increase of testing sites, which grew from 25 sites in 2001 to more than 200 in 2004. This increase moved parallel with the number of individuals trained to provide HIV testing services, as well as the increase in information regarding testing centres and other information on HIV testing. The number of PMTCT sites also increased in the province from 25 in 2002 to 60 in 2003, and in 2005 the sites reached the number of 185 (Snow et al., 2006).

The study found that the number of females going for HIV testing were far higher than males. Between 1998 and 2006, females comprised 72.7% of all individuals who tested for HIV. They even remained 65.1% of all individuals testing when excluding PMTCT related testing.

When cross-tabulated with age, the study showed that males tend to test at an older age than females, 17.4% of females who tested were aged 40 years and above, while males of the same age were 30.4%. Females aged 50 years and above who went for testing were only 5.7% while males in the same age group who tested for HIV were 11.7% (Snow et al., 2006).

A study conducted in 2007 to research HIV risk behaviour in four sites in Sub-Saharan Africa (two sites in KwaZulu-Natal and Soweto; one in Tanzania and one in Zimbabwe) and one site in Northern Thailand showed that HIV testing response varied with socio-demographic characteristics of participants. Each site was composed of 8 to 14 communities ranging from 5 000 to 20 000, the population size varied due to residential area, lower in rural, medium size in semi-rural and higher in urban areas. The study targeted individuals aged between 18 and 32 years, and showed that HIV testing response varied between males and females participants. It was found that the number of females who ever tested for HIV was higher than the number of males across all the sites, although the participating population of males was a little lower of than of females (Becky et al., 2008).

A study conducted by Venkatesh et al. (2007) in Soweto involving 1539 men and 1877 women to find out who received testing in an urban South African township found many

socio-demographics and behavioural characteristics which are associated with HIV testing. This can help in the design of strategies that could assist to increase the number of people who test for HIV to guide prevention, care and treatment. It was found in this study that 51% of participants did not know their HIV status because they had never been tested for HIV and among them adolescents and youth are less likely to go for a test than other age groups. Although this proportion of individuals who did not test is close to the HSRC national survey on HIV conducted in 2008, it remains high due to the high HIV prevalence rate in the country (DOH, 2010). It was also found that more women accept an HIV test than men as it was highlighted previously in this literature review. However, men who are employed, older and having a high education level are more likely to get tested for HIV. This study also found that married women who have a high number of children under their responsibility and with a low socio-economic status have a higher likelihood of going to test for HIV(Venkatesh et al., 2007).

In the same context of risk behaviour, Abebaw et al. (2009) conducted a study on the acceptance of HIV testing among pregnant women at Dil Chora Hospital in Dire Dawa, Ethiopia. Checking for the association of the acceptance of HIV testing with socio-demographic characteristics of antenatal clients, the study found that acceptance increases with age. Women older than 30 years were more likely to accept testing than the younger ones. The study found that married women were more accepting of being tested than women who were still single. Employment also played a role in the acceptance of testing for HIV - employed women were more likely to be tested than their unemployed counterparts. Education was found not to be associated with the acceptance of testing for HIV (Abebaw et al., 2009).

In another study using 2006 Uganda Demographic and Health Survey (DHS) data, it was found that among women of reproductive age (15 – 49 years) in northern Uganda, age, education attainment and marital status were strongly associated with the acceptance of HIV testing (Nansubuga et al., 2006). Women who never married were less likely to accept a test than those who were married. This study, however, differs with the Abebaw et al. study which was conducted in 2006 as women in the age range of 20-34 tested more than the older ones. Also this study found that HIV testing decreases with education as women with higher education were found to test less than women with a lower level of education (Nansubuga et al., 2006).

A nine month study was conducted in Addis Ababa hospital and the objective was to find out how many admitted patients accepted an HIV test. The study started in May 2003 and lasted nine months. Clients had the option to consent for pre-test counselling, testing and return for post-counselling. They had also the option to refuse testing or returning for post-counselling. In total there were 1601 cases in the study. The study found that women are more willing to test than men. Individuals with higher education accepted testing more readily than those with lower education. With regards to marital status, singles were more likely to test than married individuals (Reniers et al., 2009).

2.3. Factors contributing to the use of HIV testing

2.3.1. Provider-initiated HIV testing and counselling

From November 2004 to February 2006, Wanyeze et al. (2008) researched on provider-initiated HIV testing in Mulago and Mbarara, the two largest tertiary, public and teaching university hospitals in Uganda, to determine the uptake of HIV testing among patients offered that service after the introduction of routine HV testing. From 1987 in Mulago and 1998 in Mbarara up until 2004 HIV testing services were limited and were only provided on request and by paying US$3 per individual. A HIV Counselling and Testing (HCT) routine programme was only implemented in the two hospitals in November 2004. In this survey, partners of patients as well as their family members were offered HIV testing if they were present during the testing process. In the two hospitals 51642 people were offered HIV counselling and testing between 1 November 2004 and 28 February 2006. Out of this number 98% or 50649 accepted the offer and were tested. Among the 10439 family members who were offered HIV counselling and testing, 9720 or 93% accepted the offer and 73% have never been tested before. Overall 48454 have never tested HIV-positive before and among them 25% or 12107 tested positive. From the 48454 patients, 39037 or 81% were tested for the first time and among them 28% or 11108 tested positive. The study showed that a routine offer of HIV testing can increase the uptake of HIV tests and can identify high numbers of unidentified HIV infections (Wanyeze et al., 2008).

Between 2008 and 2010, Topp et al. (2011) from the Centre for Infectious Disease Research in Lusaka Zambia researched the uptake of HIV testing in nine clinics in Lusaka to find out how the uptake of HIV testing has progressed since provider-initiated HIV testing was implemented in 2004 on a large scale. During that period, all clinical and administrative processes were standardised in all nine clinics and all patients attending outpatients departments were referred for HIV pre-test counselling, if they have not been tested before or were not under HIV treatment. Patients were freed to accept the pre-test counselling or not. It was found that over this investigated period 44 420 patients were sent for pre-test counselling and out of those 75% tested for HIV. Out of the patients who were pre-tested and counselled, 21% tested positive and among them 38% enrolled for treatment. The research found that in all clinics where the study was conducted, provider-initiated HIV testing programme helped to increase HIV testing acceptance among outpatients from 52% in the first three months (July to September 2008) to 83% in the last months (October 2010) of the programme. The study found that the demand for voluntary counselling and testing (client-initiated) also increased in addition to provide-initiated HIV testing counselling. The increase came from the fact that the health care providers were available for all patients who requested an HIV test. Provider-initiated HIV testing was then found to be a boost to VCT rather than a replacement and this allowed them to considerably increase the number of patients accepting to test for HIV and to know their status and ultimately enrol for treatment if found positive (Topp et al., 2011).

Similar findings were reported in a study conducted in Mbale Hospital in Uganda by Byamugisha et al. (2010) where pregnant women attending antenatal services expressed their attitudes towards routine HIV testing. The study targeted women attending antenatal services for the first time in their pregnancy at Mbale Hospital between August and October 2009. In Uganda, HIV testing policy was revised from client-initiated testing to routine HIV testing in 2006 and then integrated into the programme of mother to child transmission (PMTCT) of HIV. HIV testing among women attending antenatal services has increased since June 2006 to the time of the study to 90% in Mbale hospital. Out of the 388 women who participated in the study, 98.5% (or 382) had a positive attitude about routine HIV testing. They reported that it allowed them to know their HIV status and to plan their future and that of their babies. The health education, the individual pre-test counseling and post-test counselling were highly rated

by the participants. Out of the 338 participants, 99.5% tested for HIV and received same day results (Bayamugisha et al., 2010). The overall rating of the routine HIV testing was much rated by the antenatal attendees, who hailed it as an effective vehicle for increasing the number of HIV testing individuals, especially pregnant women.

Evidence from Botswana (Kenyon et al., 2007) suggested that provider-initiated HIV testing improved the uptake of HIV testing. Provider-initiated HIV testing has also been found to be effective in tertiary health care settings in Uganda (Kiene et al., 2010; Wanyenze et al., 2008) and in South Africa (Basset et al., 2007, 2010).

2.3.2. Political commitment

In addition to the adoption of provider-initiated HIV testing strategy, strong commitment from some governments has supported the implementation of this strategy. In addition to the Uganda experience, which was documented in many different papers, Botswana has also shown a commitment to stopping the spread of HIV among its population. In early 2000 Botswana was one of the countries with the highest HIV prevalence in the world. In an effort to reduce HIV infections in its population, the country expanded HIV testing from client-initiated testing to the provider-initiated testing, an option proposed by WHO. Prior to that process, the Government has tried to fight HIV and AIDS by dedicating a budget of US$60 million specifically to fight and control HIV. In the 2004-2005 financial year that budget was increased to US$198 million (Nieburg et al., 2006). In addition to its own funds the government of Botswana received funding support from other donors and projected to provide ART treatment to 20% of infected population. Initially people who benefited from the ART programme were estimated to be more than 4%. The problem that the government was facing is the identification of those 4% as many people don't test due to many reasons stated earlier and don't know their HIV status. VCT centres increased between 2002 and 2003 but the numbers who were testing was far from matching the numbers targeted (Nieburg et al., 2006). So, the normal VCT strategy and how it was operating was not leading to expected or planned results. Then in 2004 the government started provider-initiated HIV testing or routine testing. Although the programme has not quickly reached high numbers of people tested or accessing ART, between 2004 and 2006 the number of women attending antenatal survey increased from 75% to more than 90% in many clinics in the country;

the number of other people who test for HIV has also increased dramatically. Although the programme was reaching more people, it wasn't without challenges such as placing an added burden on health services providers who had to deal with an increased number of clients.

Another political commitment that has allowed the increase of HIV testing among the population is the Uganda case. In 2002, the United States Agency for International Development (USAID) commissioned a study that was conducted by four experienced researchers in HIV prevention in Africa to find out what happened in Uganda regarding the decline of the prevalence and incidence of HIV. The four authors, Green, Nantulya, Stoneburner, and Stover (2002) have put together different findings of behaviour change that were found to have allowed the decline of HIV infections in Uganda's population. In 1986, responding to a serious emerging HIV epidemic that was decimating the population, the strong political commitment from the President of Uganda, Yoweri Museveni, allowed to strongly fight the epidemic. He interacted with the population through events and other gatherings, from the State House (Presidency) to villages, advocating for behaviour change and putting in place different mechanisms that support the fight against HIV. The charismatic approach that he took throughout this process placed the fight against HIV on the development agenda of the country. A series of measures were taken following this high level support, among them the creation of Africa's first confidential voluntary counselling and testing services in the country. The first AIDS information centre on voluntary counselling and testing opened in 1990 in Uganda.

By 1993, voluntary counselling and testing was implemented in four major urban areas due to a high number of individuals showing interest in HIV testing to know their HIV status. Uganda was unique in that it placed more emphasis on voluntary counselling and testing in a period when international organisations specialising in the fight against HIV and AIDS had not yet recommended voluntary counselling and testing as preventative measures to combat HIV. Although the reduction of multiple partners per individual has been cited as the cornerstone in the reduction of HIV incidence and prevalence in Uganda, voluntary counselling and testing was also a major contributor in the fight against HIV and AIDS. Again, the success in the reduction of HIV infections in

the population was primarily the result of strong and committed political will from the authorities at the highest level (Green et al., 2006).

2.3.3. Massive HIV testing campaigns

Massive and intensive HIV testing campaigns have proved to be vital to promote the increase of HIV testing. This has been observed in countries such as Kenya, Uganda, Malawi and Tanzania. In Kenya and Uganda, national door to door HIV testing campaigns reached up to 85% of pregnant women at maternal clinics. In 2008 in Malawi, a one week testing campaign was able to test 186127 people in 1588 static, outreach and mobile sites. In Tanzania, 3.25 million people were tested within a six-month HIV testing campaign (SANAC Secretariat, 2010).

In South Africa, the low uptake of HIV testing led the government to embark on a vast, countrywide HIV counselling and testing campaign, with the target of ensuring that all South Africans must know their HIV status. New measures were included in the campaign, such as provider-initiated counselling and testing. The government set targets to test 15 million people by June 2011. In light of the prevalence of HIV in the country and, given the fact that South Africa still continues to have the highest number of people living with HIV/AIDS and TB in the world, the government decided to strengthen the approach and deal strongly with HIV in the country.

The target of testing 15 million people in South Africa is noble objective in itself, but the success will depend on certain conditions as suggested by Nyabadza et al. (2011). Using a mathematical model, Nyabadza et al. (2011) predicted that HIV prevalence in South Africa will stabilise at values above 15% in the next decade and the level of infection can only be reduced if people's behaviour changes, increasing use of condoms and reducing the number of partners, which are both crucial elements and requirements to HIV prevention. The model estimated the rate of HCT campaign testing to be 1.5 million per year, far from the 7.5 million that was targeted by the HCT campaign. Reaching that target will be very limited unless people's behaviour changed rapidly to match this intended purpose (Nyabadza et al., 2011). But in a recent SANAC meeting held in August 2011 and chaired by Deputy President Kgalema Motlante, important progress on the HIV and testing campaign that started in April 2010 was noted. Just 15

months after the campaign kicked off, 14 million people have been counselled and among them 12 million accepted to test for HIV. Among individuals who tested and received their results 2 million tested positive and were referred for further treatment and care (SANAC Secretariat, 2011).

A national campaign to test for HIV also took place in Swaziland, a country that has been severely hit by HIV epidemic since the first HIV case was discovered in 1986. In 2009, the Government of Kingdom of Swaziland in its progress report to United Nations General Assembly (UNGASS), stated that the HIV prevalence among adults aged 15-49 years reached a high rate of 31% among women and 20% among men. In its 2010 annual report, UNAIDS also reported that in 2009 alone 7000 adults and children died of AIDS. HIV testing has been slow in Swaziland due to a variety of reasons, such as availability of testing centres and the stigma associated with HIV testing. By 2003, only 13 voluntary counselling and testing centres existed in the country; this increased to 110 in 2007 and again to 170 in 2008. The number of people who tested for HIV per 1000 population also increased from 90 in 2007 to 139 in 2008 and to 251 in 2009 (UNAIDS, 2010). Despite these improvements the rate of HIV testing continues to be slow and existing facilities put in place could not meet the needs of people who expressed the needs for HIV testing. Then in April 2009 a national campaign promoting HIV testing was partly funded by PEPFAR with the support of UNAIDS. The objective of the campaign was to encourage people, especially couples, to attend HIV testing services together. Initiators of the campaign were hoping that testing together as couples will reduce the number of people who do not disclose their HIV status to their partners (Kaiser Daily Global Health Report, 2009). In the same year, Population Services International (PSI) also launched a national campaign to test public transport and taxis drivers. PSI made available voluntary counselling and testing centres at taxis and bus terminals around the country and this campaign was a success as reported by PSI (Kaiser DailyGlobal Health Report, 2009).

2.3.4. Use of mobile clinics

Another option that has shown to be an enabling factor in the increase of HIV testing access is the use of mobile clinics. Mobile clinics were found to be a way of improving

access to HIV testing and increasing the number of people who test for HIV. "Many of our patients have told us that they prefer not to go to public clinics for an HIV test because they are afraid of being seen by people they know," said Liz Thebus, one of the Tutu Tester's health workers. "Because we test for other diseases too, like diabetes and high blood pressure, the outside world does not know for what reason patients are waiting at our doors." These are the words borrowed from an article by Miriam Mannak and published by Inter Press Service (IPS) on April 7, 2009 showing how HIV testing clients behave in a mobile clinic. People feel comfortable because they are not known and because the mobile is not seen as an HIV testing point because there are other conditions that are also treated (Mannak, IPS, April 7, 2009).

In the same context, a research conducted by the University of California, San Francisco (UCSF) researchers in Zimbabwe and presented at the XV International AIDS Conference in Thailand on July 14, 2004, found that mobile clinics are convenient with regard to voluntary counselling and testing. They remove the barriers of travelling long distances as they come closer to the clients. In addition, the stigma of being in a place where individuals seeking testing are known is significantly reduced. The mobile clinic was travelling to six places on rotation in villages and townships in Epworth and Seke in Zimbabwe offering rapid tests and giving results the same day. It was found that the number of individuals who come to test for HIV increased because the community liked the idea of having results the same day, as the blood sample was not sent somewhere else for a long time, which assured each individual that the result belongs to him or her. In the testing process, the mobile clinic included the post-counselling support for both negative and positive individuals who tested and linked it with psychosocial and spiritual counselling for those who test positive. This made test seekers more comfortable and found the mobile a better place to test than going in a clinic or a hospital (Sheehy, 2004).

A study conducted by Family Health International in 2005 also found that mobile clinic services reduce stigma because they are not seen exclusively as HIV test centres because they offer other services (FHI, 2005).

A study by Lindgren et al. (2011) describes the use of two mobile clinics in a rural area of Malawi to show how health services, including HIV testing, were boosted in the

remote areas where normal health facilities are out of reach. The two four-wheel vehicles serving as mobile clinics are part of a programme developed in 2008, jointly by a non-governmental organisation called Global Aids International Alliance (GAIA) and Mulanje District. This district is situated in the South part of Malawi and its district health office has, for the purpose of this project, identified two areas in the district, Muloza and Chitakale, as particularly under-served and very distant from existing health centres. The two mobile clinics' main objective was to increase the uptake of HIV testing and referral for treatment. Due to the overwhelming needs in other health services, the project included other services such as diagnostic and treatment of malaria, sputum collection for TB suspects, diagnosis and treatment of STIs and other opportunistic infections as well as pre-natal care. After just one year of operation (starting October 2008), the two mobile clinics had already reached 38647 patients, with sometimes 100 clients being seen daily. Of these clients, 714 pregnant women received antenatal care, including HIV counselling and testing and among them 75% agreed to test for HIV, which is a high rate given that those women did not test before due to lack of services in the area. After 18 months of the programme, the two mobile clinics were well integrated in the two communities, receiving strong support from the community members and the district office. HIV testing services needed for HIV prevention were initiated and attended to by many after group health education, and individual counselling during one on one consultation with a nurse at the mobile (Lindgren et al., 2011).

It emerges from the above three studies that the practice of mobile HIV counselling and testing allows to test a large number of people, especially in remote and underserved areas. Despite the availability of services in close proximity and the easing of barriers related to long distance travel and transport cost, not everybody is testing for HIV. A study conducted between December 2007 and April 2008 in four villages of the Kilimanjaro Region of Tanzania by Ostermann et al. (2011) had the objective of comparing the characteristics of individuals participating in the mobile voluntary counselling and testing services and randomly selected individuals and community residents who did not participate in the mobile counselling and testing. The study examined the difference between the two groups with regard to socio-demographic characteristics, HIV testing history, HIV stigma and attitudes towards HIV testing, in order to assess the extent to which mobile HIV counselling and testing campaigns attract people who test for HIV for the first time and people who are at high risk of HIV

infection. The assessment also aimed to determine how mobile HIV counselling and testing reduces barriers to HIV testing. It was found that the mobile VCT campaign in the four villages attracted a lot of people who tested in two months of which half were first time testers and both sexes were equally represented. Compared to community respondents who did not present themselves for testing, it was discovered that mobile VCT attracted people with greater exposure to HIV infection such as individuals reporting having high number of partners or having suspected HIV infected partners. The study also showed that Mobile VCT helped to overcome socio-economic barriers which have prevented individuals in some countries from going for a HIV test. Compared to people who did not test, mobile VCT campaigns clients reported having low weekly income household expenditures, especially women and men reported having unstable income sources to sustain their families. People who tested for the first time cited the long distance to a testing centre as reason for not testing before, but the study did not find mobile VCT campaigns playing a big role in overcoming stigma or fear of testing that are still present in the community (Ostermann et al., 2011).

2.3.5. Home HIV testing

HIV testing acceptability depends on the way and context in which it is offered, as highlighted by a study conducted in Zambia by Mutale et al. (2010). This study was conducted in 2003 in both urban and rural areas and 5035 individuals participated. Voluntary counselling and testing was offered in the homes of all participants who accepted to test and the results were given one day later in urban areas and a week later in rural areas. Logistic regression was used to test differences in exposure to HIV testing before and after the VCT in the homes, using socio-demographic characteristics of participants (sex, urban/rural, age, education attainment and marital status). The study showed that there was an increase in acceptability when testing is provided in the homes of participants. Before the offering of VCT in the homes, urban individuals seemed to be more exposed to testing than individuals living in rural areas and the acceptability was higher in the urban than in rural areas. After VCT was offered in the homes there was no significant difference between the urban and rural settings and women were more likely to accept HIV testing than men. After the exposure to VCT in the homes there was no more significant difference between the two sex categories.

This was the case for unmarried and married individuals as well. Individuals in the married category responded better to HIV testing than unmarried ones and after exposure to HIV testing in the homes there was no significant difference between the two above marital status categories. Education levels - which seemed to be positively influencing the uptake of HIV testing - no longer played a significant role after VCT was offered in the homes. Age differentiation regarding VCT also ceases to be a factor when VCT is offered in the home as opposed to clinics. The study showed that the proportion of youth who accepted to test in the homes increased from 3 to 25% when compared to usual testing in clinics environment (Mutale et al., 2003).

In 2008, Negin et al. (2009) conducted a study in a Kenyan rural village called Sauri in the province of Nyanza on home-based voluntary counselling and testing so as to demonstrate the level of acceptability and cost of home–based voluntary counselling and testing. A local community-based organisation was responsible for implementing this outreach through consultation with the local community. Initially, group meetings were conducted by the community health workers to inform the community about the initiative. These meetings were followed by individual consultations between the community health workers and interested parties, who then took appointments for home testing and counselling. During the three months that the intervention took place, 2033 adults aged 15 to 49 years or 63.9% of the same age group population of 3180 was visited by the community health workers, among them 1984 individuals or 97.6% accepted to get tested for HIV. Prior to this outreach, a survey conducted at the village in 2005 showed that 81% adults were willing to test for HIV. Individuals younger than 15 years and older than 50 years were also tested but in a smaller scale. The community health care workers revealed that they were approached by individuals who did not participate in the group's mobilisation and who requested to be visited in their homes for counselling and testing. On the other hand, some individuals declined the testing and counselling because of stigma. The authors highlighted that this study showed that home-based voluntary counselling and testing is possible and has the potential to expand access to HIV testing. The acceptance of HIV testing was consistently higher during the three months of intervention than the testing and counselling at a facility level (Negin et al., 2009).

2.3.6. Community mobilisation

In addition to mass HIV testing campaign and home HIV testing, a community mobilisation has been found in a study by Sweat et al. (2011) as a means of increasing the uptake of HIV tests when compared to HIV testing and counselling which use standard health centre facilities. The study was conducted in three sites located in Thailand, Zimbabwe and Tanzania and aimed to compare HIV testing uptake between individuals aged 16 to 32 years who access HIV testing through fixed health centres facilities, and individuals who accept to test through community mobilisation activities and mobile VCT. In the three study sites, the number of individuals who tested through community VCT was higher than individuals who tested at the fixed health facilities. The number was four times higher in Tanzania, nine times higher in Zimbabwe and three times higher in Thailand. Individuals testing in the communities were a little bit younger than individuals going to health centres. It was also found that the number of males testing at community level was slightly higher than females, suggesting that testing at community level increases the uptake of HIV testing among males. Males are usually far more reluctant than females to go for a test at standard health facilities, as highlighted earlier in this literature review. This study concluded that HIV testing through community mobilisation, combining different interventions, can significantly improve the uptake of HIV testing because it stimulates the demand for testing (Sweat et al., 2011).

2.3.7. Education, Information and discussion about HIV

It was also shown that HIV testing is possible after initiating a discussion or a conversation with parents or friends on HIV (MacPhail et al., 2009). Education and more information on HIV that increases one's knowledge of the disease have also worked positively as determinants to increase HIV testing (Sherr et al., 2003).

In another study conducted in Uganda among married men aged 15-59 it was discovered that HIV testing is associated with education and information; having a secondary or higher education and having a neighbour who knows where testing is taking place increases the uptake of HIV testing (Gage and Ali, 2005).

A cross-sectional survey of 1874 adults, of both men and women, was conducted in April - May 2007 in a rural surveillance site of Fila Bavi in Bavi district in Vietnam. The objective of the study was to analyse possible determinants of HIV testing in a Vietnamese rural area, with the goal of identifying potential barriers to HIV testing and recommending how to promote and improve HIV testing services. In this population, the prevalence of HIV testing was very low, with 8.9% of men reporting having been tested while the women's prevalence was 6.4%. The HIV prevalence was lower among women who had been recently pregnant (6%) against the prevalence of 7.5% for women who were not recently pregnant. The analysis showed that the low uptake of HIV testing was more pronounced in the sections of the population with lower economic status, living in remote rural areas of the district. It was also found that women were more likely than men to lack information on HIV testing and did not know where to ask information about HIV prevention. They did not know if the antenatal setting was the best place to get information regarding HIV testing, hence the low rate of HIV testing observed among pregnant women (Pharris et al., 2011).

Among the approaches used to bring individuals to change their behaviour towards HIV and AIDS, peer education programme has been found to be successful. The way peer educators are selected in the community is critical to the success of the programme (King, 1999). Another study conducted in Zimbabwe on counselling and testing in 40 randomised factories found that HIV incidence was lower by 34% in factories where peer education was taking place than in factories where HIV testing took place without prior peer education (Katzenstein, 1998).

2.4. Summary

In recent years, significant efforts have been made by different countries, international organisations, civil society and various donors to fight the spread of HIV and AIDS. Despite all these commitments, HIV counselling and testing, which is the main entry point to HIV prevention, treatment and care, has consistently been low as found by several household surveys conducted in various countries where HIV is still a burden (WHO, 2006). The low uptake rate of HIV testing is suffering from many barriers, as highlighted in the different studies described in the above literature review. However,

there are some enabling factors in HIV testing which allow us to make progress in the fight against HIV and AIDS. The review of the literature showed that the main barrier HIV testing remains stigma, which is cited in almost all studies. Fear of getting a positive HIV testing result is also a barrier as people see being HIV positive as a death sentence. Lack of knowledge and information regarding the process of HIV testing itself and existing settings and resources to carry out the process were also widely highlighted in the literature as barriers to testing for HIV. Poverty and inequality, intimate partner violence, compulsory HIV testing as a prerequisite to receiving other health services were also seen to stop people going to test for HIV. Enabling factors that advance HIV testing highlighted in the literature are mainly the implementation of provider initiated HIV testing, massive HIV campaigns and taking HIV testing to people via mobile testing in the communities and in the homes. Information regarding HIV testing using peer education was also found to be an inhibiting factor to increase the uptake of HV testing.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

The study is based on data collected in five areas located in four provinces where Family Health International mobile service units (MSU) provide health services. The aim of the study is to use socio-demographic characteristics of MSU clients to determine how the different categories have responded to the offer of HIV testing. The objective of the analysis is not to analyse attitudes and behavior of MSU clients with regard to HIV testing. The dataset is composed of socio-demographic characteristics of clients who sought out services at MSU. The dataset also contains other variables related to service provision. HIV testing is necessary before attempting to put in place an effective HIV prevention plan. The level of HIV testing uptake is not the same across the whole population. The literature review showed that it differs according to several factors such as age, sex, marital status and other characteristics. Categorising the MSU clients according to their socio-demographic characteristics in relation to HIV testing was therefore important to inform further HIV prevention plans. People visited MSU because they were in need of health services as there were no other providers within a 10 to 15

kilometer radius. Information about attitudes to HIV testing and other services was not collected as HIV testing was not a primary objective of the project.

The services provided in the mobile clinics are family planning, HIV counselling and testing, diagnostic and treatment of sexually transmitted infections, TB screening, TB treatment and referrals, prevention of mother to child transmission counselling and referrals, diagnostic and treatment of chronic illness (hypertension, diabetes, asthma and epilepsy), treatment of minor ailments and child immunisation.

Family Health International, the implementer of the mobile service units project, is an international non-governmental organisation which began operations in 1971. Its headquarters are in Northern Carolina in the United Sates of America. It has offices in 60 countries and provides services in health, nutrition, education, economic development, environment and research. Family Health International (FHI) started to work in South Africa in October 2003 and currently provide sexual reproductive health services in all nine provinces, palliative care services in two provinces and primary health care services through mobile clinics in four provinces. The mobile clinics used by FHI are vehicles adapted to carry medical equipments and supplies. They are also equiped with an arranged room inside and two attached tents outside, which permits them to receive three patients simulataneously with a guaranteed privacy during medical consultation.

3.2. Sites

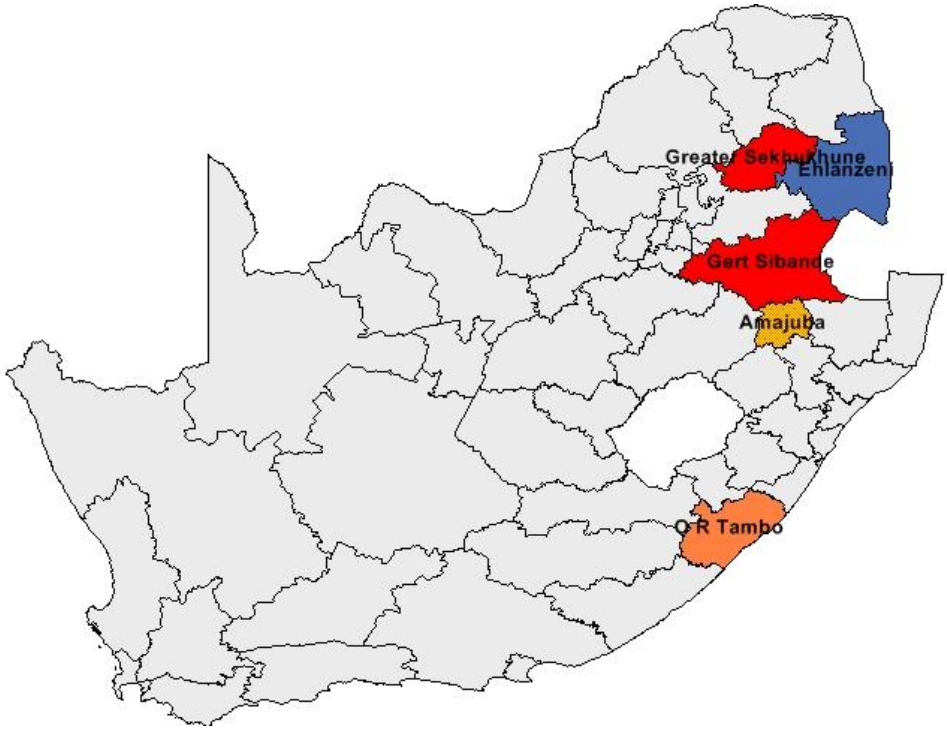
The five areas are distributed in five districts situated in four provinces of Eastern Cape, KwaZulu-Natal, Mpumalanga and Limpopo. The sites where MSUs are providing services were selected based on the fact that they are situated in remote rural areas. There are no health facilities within a 10 to 15 km radius and no other health service provider is allocated to the sites. The sites were selected by the provincial department of Health and allocated to FHI for service provision. Each MSU are allocated sites where they provide services and a schedule of visits is communicated to the community through the information provided by the local home-based care-givers, who

work closely with both MSU and the community to mobilise the population to access MSU services.

The first mobile clinic renders services in Mvezo village, situated in the municipality of King Sabata Dalindyebo in OR Tambo district in Eastern Cape and serves 4 sites. The sites are also called service delivery points. In the village of Mvezo, there is no water or sanitation and the level of unemployment is very high (STASSA, 2007). HIV prevalence among women attending antenatal services reached a high 29.7% in 2009 in OR Tambo district (DOH, 2010).

The second mobile operates in all three municpalities of Amajuba district in KwaZulu-Natal province. The three municipalities are Newcastle, Utrecht and Madadeni. This mobile serves 10 sites in total. On average, 3.6% of households in Amajuba district had no toilet in 2007, with Madadeni municipality being the most deprived of this basic service (24.4% households had no sanitation). More than 15% (15.6%) of households in Amajuba could only access clean water by travelling a distance of more than 200m. In Uthrecht municipality that percentage was higher, reaching 26.9% (STATSSA, 2007). In 2009, HIV prevalence among women attending antenatal services in Amajuba was among the highest in the country, reaching 37.2% (DOH, 2010).

Figure 1: Geographical location of the five sites



Source: FHI South Africa Office internal database (2010)

The third mobile operates in the municipality of Albert Luthuli in Gert Sibande district, Mpumalanga province and serves 20 sites. The results from the Community Survey conducted by Statistics South Africa in 2007 showed that 6.5% of households had no toilet and 14.8% could only access clean water more than 200m from where they lived (STATSSA, 2007). The fourth mobile is also rendering services in Mpumalanga, in the same district of Gert Sibande in Pixley ka Seme municipality, and it serves 17 sites. The percentage of households with no toilet was 4.3% in 2007 and 11.7% could access clean water only at a distance of more than 200m from their houses (STATSSA, 2007). HIV prevalence among women attending antenatal services in Gert Sibande district reached a high of 38.2% in 2009 and was classified number seven out of the 52 health districts with regard to HIV prevalence (DOH, 2010).

The fifth mobile operates in Limpopo province, in the district of Greater Sekhukhune, in Greater Tubatse municipality and serves 10 sites. In addition to these sites this MSU serves four sites in Ehlanzeni district in Thaba Chweu municipality in Mpumalanga province which has borders with Greater Tubatse. In Thaba Chweu, 10.1% of households had no toilet in 2007 and 9.3% could only access water at a distance

greater than 200m (STATSSA, 2007). HIV prevalence in Sekhukhune district among women attending antenatal services was 16.6% in 2009 (DOH, 2010).

3.3. Study population

The population covered comprises individuals aged 18 years and older, males and females who received health services from 1 October 2009 to 30 September 2010 in the area where MSUs are providing services. The total number of individuals in the dataset is 9015. This number contains only MSU clients who came once in the period under study, a filter was applied to the dataset to exclude repeat clients. Because MSUs are not set to provide PMTCT services, pregnant women are not included in the study. MSU clients come from a catchment area that was allocated to FHI by the Department of Health in the provinces in collaboration with the district and sub-district's offices.

3.4. Instrument used to collect data

The data was collected on a daily basis in the five mobile clinics from clients that are seeking health services. It was collected using a client form which records socio-demographic charactersitics of the client as well as services provided at the MSU.

The data collection tool is structured as follows:

- Socio-demographic information: district where they come from, residential area (rural, urban, semi-urban, informal settlement), date of birth, sex, current marital status, highest level of formal education, occupation and the number of biological children;
- Services provided are gouped into the following categories:
    a) Family planning (FP) : FP counselling and methods offered which are oral pill, medroxyprogesterone, norethisterone, male condoms, female condoms, emergency contraception and referral for sterilization, IUD or other clinical method;

b) Sexual Transmitted Infections (STI): counselling, diagnosis and if partner slip is issued or not as well as referral to another service provider in case the service requested is not available;
c) Tuberculosis (TB): counselling, sputum collected and referred
d) Voluntary Counselling and Testing (VCT): pre-test, post-test, client tested, client tested positive, clients counselled/tested and received results;
e) Anti-retrovirals (ARV): potential ARV client counselled, Client referred/tested for CD4, Client referred for treatment;
f) Cervical screening: counselling, cervical smear screening for female aged 30-59 years, cervical smear referral;
g) Prostate cancer screening and referral;
h) Chronic illnesses such as diabetes, high blood pressure, asthma, epilepsy and mental illness;
i) Other services: minor ailments treatment, minor ailments referrals;
j) Immunisation of children.

3.5. Data collection

Each MSU has five staff members, one project coordinator, three professional nurses and one health promoter. The health promoter has the responsibility of opening files for new clients and maintaining the whole filing system for all patients. The professional nurses conduct medical consultations and the project coordinator oversees all the processes carried out at the MSU. The data collection is done using a client form on which information is recorded. The patient form has two sections: a section containing socio-demographic characteristics of the patient and a section where all services provided to the patient are recorded. The first section is completed by the health promoter while the second one is completed by the professional nurses during the process of providing health services to the patient. After a professional nurse finishes providing services to a patient, the form is returned to the health promoter for filing.

3.6. Data entry

The data was captured on the computer using the Census and Survey Processing System (CSPRO) software. The health promoter is the person responsible for entering

data. The data entry program was designed by the Monitoring and Evaluation officer at FHI. In designing the program, it was made sure that internal dynamic checking and validation rules are embedded in the data entry program to minimize data entry errors. In addition to that, necessary checks were made before this analysis to make sure that the dataset is free of potential inconsistencies and other errors that might have not been detected during the data entry process. CSPRO is an open source software package used to enter, edit, tabulate and map data. The development and the maintenance is handled by the US Bureau of Census with funding support from United States Agency for International Development (USAID). At the end of the month, monthly datasets from all five areas were sent via email to FHI Pretoria where further data cleanings were done. All twelve month period datasets were then merged to constitute the whole dataset, which was exported to SPSS 18.0 for analysis.

3.7. Analysis process

The analysis of data in this study was achieved using descriptive and inferential methods. Descriptive analysis used cross-tabulations to highlight the age and geographical distribution, sex, marital status, occupation, level of formal education, the number of living children a client has, and area of residence of clients visiting the mobile clinics. The outcome of the analysis is to classify individuals that accept or not to test for HIV according to their socio-demographic characteristics.

The inferential analysis was done using a logistic regression technique to establish relationships between the binary HIV testing outcome (1 being “client tested for HIV” and 0 meaning that the “client did not test for HV”) and eight independent variables, which are:

- sex (1 “male” and 2 ”female”),
- age (classified in age groups: 1 ”18-24”, 2 ”25-34”, 3 ”35-44”, 4 ”45-54”, 5 ”55+”)
- district (1 “OR Tambo”, 2 “Amajuba”, 3 “Sekhukhune”, 4 ”Ehlanzeni”, 5 “Gert Sibande”)
- marital status (1 “Never married”, 2 “Married”, 3 “Separated/Divorced/Widowed”)
- occupation (1 “Schooling”, 2 “ Employed”, 3 “Unemployed”)
- level of education (1 “None”, 2 “Primary”, 3 “Secondary”, 4 “Higher”)
- number of living children (1 “0”, 2 “1”, 3 “2”, 4 “3”, 5 “4”, 6 “5+”)

- Area of residence (1”Rural”, 2 “Urban”, 3 “semi-urban”).

The inferential analysis to determine the relationships between HIV testing (the dependent variable) and the above eight independent variables was undertaken in two steps. First, each independent varible was interacted with the dependent variable to check individual association. Then all eight independent variables were entered simultaneously in the model to check the effects of all these variables on HIV testing.

A Chi-Square test was used to determine if there is independence between the HIV testing and the independent variables. Because the dependent variable under study is nominal, Pearson’s test was used as it allows faster calculations and is suitable for big samples, which is the case for the present dataset containing 9015 individuals.

3.8. Limitation of the study

As said earlier, the current study uses secondary data collected from 1st October 2009 to 30 September 2010. The limitation of the study is to rely only on analysing the association of the uptake of HIV testing and different socio-demographic charactersistics of the population. There is no second opinion from the population under study to check the reasons why some individuals who visited MSUs declined to be tested for HIV after being offered that opportunity by nurses at MSU.

3.9. Ethical procedures

The mobile clinics are equipped to maintain privacy for men and women during medical consultation and HIV testing. Also, the confidentiality is assured as the clients’s files are kept in lockable cabinets after the provision of services. HIV counselling and testing was provided by professional nurses during one on one medical consultation with the clients. The time allocated to one client during the HIV counselling and testing process, from the pre-test to the post-test counselling, was approximately 45 minutes, which is in line with the South African Department of Health guidelines on HIV counselling and testing. Before each HIV test, a client signed a consent form after being given adequate information regarding the test.

For ethical consideration, the study proposal was reviewed by FHI Protection of Human Subjects Committee (PHSC) which is FHI Independent Review Board or Ethics Commitee. After PHSC has reviewed the proposal it was found that the study falls under the category of existing data and an exemption was granted so that the study can proceed. A letter of exemption is attached in the Appendix 1.

3.10. Summary

In summary, the study used secondary data from FHI mobile clinics sites. The data was collected from 1st October 2009 to 30 September 2010. The target population comprises 9015 individuals who are 18 years and older (excluding pregnant women because their needs are different compared to other people with regard to HIV testing). The analysis was undertaken using SPSS 18.0, firstly conducting a descriptive analysis of the target population based on their socio-demographic characteristics and HIV testing. A more deeper analysis using inferential method, specifically SPSS logistical regression analysis, was conducted to check the association of different socio-demographic characteristics variables with HIV testing uptake.

CHAPTER 4: DATA ANALYSIS

4.1. Introduction

The aim of the study is to use socio-demographic characteristics of Mobile Service Units (MSU) clients, as highlighted earlier, to determine how they respond to HIV testing. The study does not analyse attitudes and behaviour of MSU clients with regard to HIV testing. The dataset is composed of socio-demographic variables of clients who come to seek services at different MSUs. The clients were located in five different districts where Family Health International mobile service units provide services, as said in previous chapters.

The analysis focused on establishing relationships between the variable “HIV client tested”, which is the dependent variable and eight socio-demographic characteristics of clients who are 18 years and older and who attended mobile clinics services in areas that were specified earlier. The target category for the dependent variable is people who

tested for HIV. The eight socio-demographic characteristics of clients, which are the independent variables, are namely:

- Sex
- Marital status
- Level of education
- Occupation
- Residential area
- Age groups
- District
- Number of biological children alive

Before doing any analysis it is necessary to highlight the definitions of different variables used in the analysis. The definitions (in italics) are exactly based on Statistics South Africa Census 2011 metadata. Any variable definition deviating from STATSSA definition was done by FHI South Africa based on the objectives of the study.

- Sex*: biological distinction between males and females* (STATSSA, 2012).
- Marital status*: personal status of each individual in relation to the marriage laws or customs of a country. Customary unions are now recognised as a legal marital status. Categories under marital status include single, married, living together as a married couple, divorced, separated and widowed* (STATSSA, 2012).

  In this study, the category "married" combines "legally married under marriage laws" and "customary unions". Single is classified as never married. Widowed is combining widows and widowers.
- Level of education (or education level): *is aggregated into no formal education, primary school (grade 1 to grade 7), secondary school (grade 8 to grade 12), diploma or certificate without grade 12 (from lower to grade 11), diploma or certificate with grade 12, degree and other post-degree* (STATSSA, 2012).

  In the current study, individuals who never attended school were classified in the "None" category. MSU clients who finished primary school and those who finished some primary were grouped together. Those who finished secondary school with a grade 12 certificate were also grouped together with individuals who have some

secondary education. Clients who achieved any diploma or degree after grade 12 were classified under higher.

- Occupation*: the type of work a person does according to the South African Classification of Occupations, irrespective of the industry* (STATSSA, 2012).

- Residential area was classified in this study into three categories: rural, urban and semi-urban areas
    - Rural area: *any area that is not classified urban. Rural areas may comprise one or more of the following: tribal areas, commercial farms and informal settlements*
    - Urban area: *a continuously built-up area with characteristics such as type of economic activity and land use. Cities, towns, townships, suburbs, etc. are typical urban areas. An urban area is one which was proclaimed as such (i.e in an urban municipality under the old demarcation) or classified as such during census demarcation by the Geography department of Stats SA, based on their observation of the aerial photographs or on other information* (STATSSA, 2012).
    - Semi-urban: any area located near an urban area with mixed characteristics of both urban and rural area such as economic activity and building environment (definition in the context of this project).

- Age groups: *Age is the interval of time between the day, month and year of birth and the day and year of occurrence of the event expressed in the largest completed unit of solar time such as years for adults and children and months, weeks, days, hours or minutes of life, as appropriate, for infants under one year of age* (STATSSA, 2012).
  For the purpose of this study, age has been classified into five age-groups of 10 years interval except the first group where age is from 18 to 24 years.

- District: *the area of jurisdiction of the third sphere of government, after national and provincial* (STATSSA, 2012). In this study, it is the third sphere of government (after national and provincial) in which the MSU client considers as his permanent residence.

- Number of biological children alive: *all children ever born alive to a woman and whether living or dead* at the time of the visit to the MSU. In case the client is a male, it is the number of children born alive in any marital union he may have or has had with one or more partner. This definition is an adaptation from Statistics South Africa definition to the context of the study to check if HIV testing varies according to the number of biological children per client.

The analysis to determine HIV testing was undertaken in two steps. The first step is a descriptive analysis of HIV testing based on the above eight independent variables and secondly the logistic regression was used to determine effects of different independent variables on HIV testing (the dependent variable). Chapter 5 starts with a simple descriptive analysis to see if there is any association between HIV testing and the different independent variables. Logistic regression method was used to analyse the outcome of people who tested for HIV, based on their socio-demographic characteristics. Let us first provide a snapshot of the socio-demographic characteristics of individuals who attended MSU services during the study period, which is October 2009 to September 2010.

4.2. Sample characteristics

Individuals that constitute the population under study came from five catchment population areas located in five districts (OR Tambo, Amajuba, Gert Sibande, Ehlanzeni and Sekhukhune) which were allocated to FHI by the provincial Department of Health in collaboration with the districts and sub-district. These individuals came to seek services at MSU's service delivery points on a daily basis from Monday to Thursday.

Table 4.1: Socio-demographic characteristics of MSU clients (October 2009 – September 2010)

Variables	%
Sex (N=9015)	
Male	22.9
Female	77.1

Age group (N=9015)	
18 - 24	17.7
25 – 34	18.1
35 – 44	14.8
45 – 54	17.3
55+	32.0
Marital status (N=8848)	
Never married	36.8
Married	45.3
Divorced/Separated/Widowed	17.8
Education level (N=8812)	
None	56.0
Primary	21.0
Secondary	18.7
Higher	4.3
Occupation (N=8850)	
Schooling	8.1
Employed	12.9
Unemployed	78.9
District of Residence (N=9015)	
OR Tambo	20.1
Amajuba	17.7
Gert Sibande	39.2
Ehlanzeni	5.7
Sekhukhune	17.3
Type of residence area (N=9014)	
Rural	88.1
Urban	5.6
Semi-urban	6.3
Number of living children (N=8655)	
0	15.1
1	17.3
2	15.7
3	11.9
4	10.4
5+	29.6

The socio-demographic characteristics of MSU clients (aged 18 years and plus) show that the majority of MSU clients are women (77.1%). Individuals over 55 years constitute an important proportion (32%) of clients who visited MSUs. More than a third (36.8) of clients had never been married and 45.3% were married either legally,

traditionally married or living in partnership. The rest is composed of those who are separated, divorced and widows totalling 17.8% of clients.

The majority of MSU clients or 56.0% have no education at all and just one in five has at least a primary education level. Only 18.7% have attained secondary education level and very few (4.3%) have gone beyond matric level.

Unemployment is very high among the population under study and almost four out five (78.9%) clients had no job during the period under study. Only 12.9% are employed and the rest are students. Close to two thirds of clients come from two districts of Gert Sibande (Mpumalanga) and OR Tambo (Eastern Cape) and almost 90% of the population stay in rural areas. A small proportion live in urban and semi-urban areas. In these five areas, the highest proportion of clients (29.6%) have five children or more and 15.1% have no children.

4.3. Descriptive analysis

Table 4.2 on the next page shows that from all clients aged 18 years and older who attended MSU services only 34.7% tested for HIV. All MSU clients received group HIV counselling and were invited by nurses to test for HIV. Although on average the level of HIV testing is low in all the five districts, the proportion of individuals who tested varies across the districts. A higher proportion of individuals who tested for HIV is found in Amajuba (45.8%), followed by Sekhukhune (34.0), Ehlanzeni (33.8%), Gert Sibande district (31.9%) and lastly OR Tambo with 31.2%. The relatively higher response from Amajuba is due to the outreach to farms and construction areas reaching more men.

The cross tabulation of different independent variables with the dependent variable (HIV testing) by sex shows that there is a big difference between males and females across all variables regarding HIV testing, with more males testing for HIV than females. Overall, among the total number of males (2067) who received MSU services, 49.6% tested for HIV while the proportion of females who attended the same services and who tested for HIV is 30.3% (N=6948). The proportion of males who tested for HIV is particularly high in Amajuba (66.0%) compared to other districts because males were

reached in the construction and farms areas where more men are working during the day, as highlighted above.

For males, HIV testing is higher in the category 18-24 years; it starts to decrease in the age category 25-34 years and gradually decreases as people become older. Females also show the same pattern with age, except in the age category 25-34 where the testing for HIV was lower than the age category 35-44.

Marital status shows a significant association with HIV testing. The proportion of individuals who are not married and who tested for HIV is higher than individuals who are married, especially for males. The latter group's proportion who tested is also higher than the group of divorced / separated / widowed. Although females who never married tested for HIV higher than females who are married, the difference is not large.

Individuals with no education at all or just who have primary level education responded in lower proportions than individuals who attained secondary or higher education levels. As the education level goes higher (from secondary to higher education level), the proportion of individuals who test for HIV increases. The difference in proportion between males and females is particularly high at secondary and higher levels of education, showing that males test for HIV more than females when education is taken into consideration.

Table 4.2. Proportion of MSU clients who tested for HIV by some socio-demographic characteristics and sex

Variables	% of MSU client tested					
	Male		Female		Total	
	Total clients	% tested	Total clients	% tested	Total clients	% tested
Total	2067	49.6	6948	30.3	9015	34.7
District of residence						
OR Tambo	382	45.8	1430	27.3	1812	31.2
Amajuba	547	66.0	1050	35.3	1597	45.8
Gert Sibande	713	45.4	2824	28.5	3535	31.9
Ehlanzeni	123	36.6	389	32.9	512	33.8
Sekhukhune	302	40.1	1255	32.6	1557	34.0
Age groups						
18 - 24	390	71.3	1209	40.0	1599	47.6
25 – 34	363	63.4	1273	34.4	1636	40.8
35 – 44	264	56.1	1070	36.4	1334	40.3
45 – 54	309	51.5	1250	28.7	1559	33.2
55+	741	28.5	2146	20.1	2887	22.3
Marital status						
Never married	809	62.4	2451	33.9	3260	41.0
Married	1037	39.5	2974	30.2	4011	32.6
Divorced/Separated/ Widowed	149	32.2	1428	19.8	1577	21.0
Education level						
None	1145	44.2	3789	27.5	4934	31.4
Primary	409	41.8	1438	25.8	1847	29.3
Secondary	288	52.4	1363	32.3	1651	35.8
Higher	153	85.0	227	64.3	380	72.6
Occupation						
Schooling	234	70.1	487	47.8	721	55.1
Employed	537	69.3	608	43.3	1145	55.5
Unemployed	1231	34.7	5753	26.2	6984	27.7
Type of residential area						
Rural	1655	42.5	6284	27.3	7939	30.5
Urban	181	84.5	324	67.9	505	73.9
Semi-urban	230	73.5	340	48.8	570	58.8
Number of living children						
0	478	52.9	827	31.3	1305	39.2
1	242	52.9	1253	32.2	1495	35.5
2	288	51.4	1074	31.6	1362	35.8
3	224	48.2	809	31.3	1033	34.9
4	172	44.8	729	27.2	901	30.5
5 and +	496	31.0	2063	23.2	2559	24.7

It was noted earlier with the age groups that younger individuals tend to test for HIV more often than when they become older. It was also noted that individuals still in school are young and responded more positively to HIV testing than unemployed individuals. Occupation variable shows that employment plays a big role in people deciding to go for HIV testing as the employed category has the highest proportion of individuals who tested for HIV for both males and females, particularly higher for males.

Studies suggest that individuals test in higher proportion when they stay in urban areas than in rural areas. (Mutale et al., 2003; Larose et al., 2011) They also respond better to HIV testing when they live in a semi-urban area as opposed to a rural area. Again in general, this study shows that males are more likely to test for HIV than females in any living environment (urban, semi-urban or rural).

A question regarding the number of living children was put to clients and Table 4.2 above shows that in general males are more likely test for HIV when they do not have children. Most males with no children are still young and respond better to HIV testing than other groups as observed earlier. The proportion of males who test decreases as the number of biological children increases. For females there is little difference in the proportion of females who test for HIV when comparing females with no children and those who have one to three children. The proportion of females who test for HIV decreases further when they have four or more children.

After this short descriptive analysis, logistic regression is used to investigate first the individual association between the variable “HIV client tested” (dependent variable) and the different independent variables. And later all independent variables will be included in the model simultaneously to assess their combined effect on HIV testing.

4.4. Inferential analysis

4.4.1. Introduction

Logistic regression is a statistical analysis method used to predict the occurrence of an event which has only two options: the event is happening or not. It is generally coded 1

“event occurring” and 0 “event not occurring”. In this study the logistic regression predicts the outcome of HIV testing, whether an individual coming to visit MSU and offered to test for HIV will take the test or not. There are influencing factors which come into effect to make the event happening or not. These influencing factors are called independent variables, or predictors, while the event itself is called dependent variable. The logistic regression method used in this study is called binary logistic regression, which is used when the dependent variable takes 1 (event happening) or 0 (event not happening), while the independent variables take any value.

As highlighted earlier, the dependent variable is HIV testing and the independent variables are Sex, Marital status, Level of education, Occupation, Residential area, Age groups, District and Number of biological children alive. The logistic regression will help to predict the value of HIV testing based on the different independent variables listed above. The prediction of the event to take place is estimated by the logistic regression using what is called odds. Odds are ratios of probabilities of the event happening (Individual taking an HIV test) to probabilities of the event not taking place (individual not taking an HIV test). The change or the prediction of the event is measured by using a mathematical model. In this model the logistic regression estimates the outcome of the event by using the natural log of the odds to show which values are taken by the dependent variable (Chao-Ying et al., 2002).

4.4.2. Logistic regression analysis with individual predictors

Logistic regression analysis with individual predictors is summarised in Table 4.3 below. Tables 4.3, 4.5, 4.6, 4.7, 4.8 and 4.9 show output of different logistic regression at different level interaction between the dependent variable and independent variables. They have the same format and all have four columns. The first column lists all the independent variables (predictors) included in the logistic model. The second column indicates the likelihood which is a probability (varies from 0 to 1) indicating that the values of the dependent variable can be estimated or predicted based on the independent variable. Hence this indicates that there is a statistically significant association between the predictor and the dependent variable. Association between the dependent variable and any independent variable is statistically significant when $P<0.05$. Given the level of association one wants to show, it can be increased to 0.01.

The third column shows the values of the odds ratios when each independent variable is introduced into the model to measure the effect of a particular predictor on the dependent variable. The last column indicates the interval boundaries in which the odds ratios vary with 95% confidence interval.

Starting with the predictor “residential area” and comparing the first two categories (rural and urban) with the last one (semi-urban) with regard to HIV testing, the logistic regression shows that there is an overall statistical significant association between the residential area and HIV testing with X^2 (2) = 468.91, P < 0.01. The logistic regression also shows the scores for comparing urban and rural with semi-urban. The comparison shows that the odds of testing for individuals living in rural area were 3 times lower than individuals living in semi-urban area and the odds of testing for HIV were almost double for individuals living in urban area than individuals staying in semi-urban area.

The independent variable “district” shows a significant association with HIV testing (X^2 (4) = 108.48, P < 0.01). The district of reference being Gert Sibande, the different scores show that the odds of testing for HIV are a little higher in two districts (Ehlanzeni and Sekhukhune) compared to Gert Sibande and lower in OR Tambo. Amajuba district shows a bigger difference in HIV testing when compared to other districts, with the odds of testing for HIV in this district being almost two times higher than in Gert Sibande.

The predictor “sex” is significantly associated with HIV testing with X2 (1) = 16.43 and P < 0.01 Comparing males to females and how they tested differently, the odds scores show that males tested for HIV slightly higher than females (18% higher).

Education level has also a significant association with HIV testing with X^2 (3) = 263.83 and P < 0.01. “Higher” category being the category of reference, the logistic regression shows that the odds of HIV testing are far lower for “None”, “Primary” and Secondary” categories when compared to “higher” category. It shows that the odds of HIV testing increase as the level of education increases.

The independent variable “Age group” shows a significant association with HIV testing with X^2 (4) = 350.21, P < 0.01. Comparing the different age group categories with the age group “55+”, the logistic regression shows that the proportion of individuals testing

for HIV at young age (18-24 years) is about 3 times higher (OR=3.17) when compared to the category 55 years and plus. HIV testing decreases gradually as people become older.

The logistic regression also shows that there is a significant association between marital status and HIV testing with X^2 (2) = 187.94, P < 0.01. When comparing “never married” and “married” categories to the category “separated/divorced/widowed”, it is noted that the proportion of individuals “never married” that tested for HIV was 2.6 times higher than individuals who were separated/divorced/widowed. It was also almost double (OR=1.82) for married category when compared with “separated/divorced/widowed” category.

Occupation variable is also a predictor of HIV testing as shown by the Chi square and statistical significance (X^2 (2) = 476.02, P < 0.01). When comparing the last category in the list (unemployed) with the other two categories of this independent variable (schooling and employed) it is shown that the odds of testing for HIV for people who are employed are almost the same as people who are still going to school (OR=3.19 and 3.25 respectively). The logistic regression shows that individuals who are still going to school and those who are employed are testing for HIV with almost three times greater frequency than individuals who are unemployed.

The logistic regression shows that “number of living children” is statistically significant with HIV testing but the odds of testing for HIV for all categories of this independent variable are very close, suggesting that having few or many children does not influence people to test for HIV.

Table 4.3: Logistic regression for individual independent variables

Categorical predictor	LR test	OR for HIV testing	95% CI for OR
Residential area			
Rural vs. Semi-urban	X^2 (2) = 468.91,	0.31	0.26 – 0.37
Urban vs. Semi-urban	P < 0.01	1.98	1.53 – 2.57
District			
OR Tambo vs. Gert Sibande	X^2 (4) = 108.48,	0.97	0.86 – 1.09
Amajuba vs. Gert Sibande	P < 0.01	1.81	1.60 – 2.04
Sekhukhkune vs. Gert Sibande		1.10	0.97 – 1.25
Ehlanzeni vs. Gert Sibande		1.09	0.90 – 1.33
Sex	X^2 (1) = 16.43,		
Male vs. Female	P < 0.01	1.19	0.09 – 1.29
Education level	X^2 (3) = 263.83,		
None vs. Higher	P < 0.01	0.17	0.14 – 0.22
Primary vs. Higher		0.16	0.12 – 0.20
Secondary vs. Higher		0.21	0.16 – 0.27
Age groups	X^2 (4) = 350.21,		
18 – 24 vs. 55+	P < 0.01	3.17	2.78 – 3.61
25 – 34 vs. 55+		2.41	2.11 – 2.75
35 – 44 vs. 55+		2.36	2.05 – 2.71
45 – 54 vs. 55+		1.74	1.51 – 1.99
Marital status	X^2 (2) = 187.94,		
Never married vs. Separated/Divorced/Widowed	P < 0.01	2.61	2.27 – 3.02
Married vs. Separated/Divorced/Widowed		1.82	1.58 – 2.09
Occupation	X^2 (2) = 476.02,		
Schooling vs. unemployed	P < 0.01	3.19	2.73 – 3.73
Employed vs. unemployed		3.25	2.86 – 3.69
Number of living children	X^2 (5) = 113.39,		
0 vs. 5 and +	P < 0.01	1.96	1.70 – 2.27
1 vs. 5 and +		1.68	1.46 – 1.93
2 vs. 5 and +		1.69	1.47 - 1.95
3 vs. 5 and +		1.63	1.40 – 1.91
4 vs. 5 and +		1.34	1.13 – 1.58

Now that all eight independent variables have been found to be associated with HIV testing when considered individually, the next step is to put all of them together in the model and to estimate their effects simultaneously. Males and females will then be analysed separately to check how gender may play a role in shaping the different responses to HIV testing based on the different socio-demographic characteristics in the model.

4.4.3. Logistic regression with all predictors simultaneously

Using SPSS, a logistic regression model accounting for the effects of all eight independent and explanatory variables is fitted by including all of them in the covariate list of the logistic regression dialogue and Table 4.5 is an output which provides a test showing the effect of all independent variables included in the model simultaneously. The total number of cases included in this analysis is 9015 with 6948 females and 2067 males.

After including all variables in the model, SPSS produces a classification table (Table 4.4 below) which shows the predicted probabilities of HIV testing when independent variables are included in the model. The two rows “HIV Client Tested “Yes” and “No” are the two possible occurring events, and the two columns under the heading “Predicted” represent the predicted probabilities based on the cut-off point of 0.5 which classifies that HIV testing is happening if the probability is higher than the cut-off point, and HIV testing not happening if the probability is lower than that value.

Table 4.4. Observed and predicted frequencies of HIV testing by logistic regression

		Predicted		
		HIV Client Tested		
Observed		Yes	No	% correct
HIV Client Tested	Yes	766	2015	27.5
	No	402	5412	93.1
Overall %				71.9
Sensitivity=766/ (2170+766) =27.5; Specificity=5412/ (5412+402) =93.1.				

The cutoff value=0.50

Table 4.4 allows us to calculate the proportion of individuals misclassified as HIV tested (as in they did not test), and those misclassified as not HIV tested when they really tested. Those misclassified as tested without testing for HIV are equal to 402/(402+766)=34.4 and the misclassified as non-testing while they tested for HIV equal to 2015/(2015+5412)=27.1. The overall prediction after inclusion of all

independent variables is equal to 71.9%, which shows that nearly 72% of predictions are accurate when the eight independent variables are simultaneously included in the model.

Table 4.4 shows that the prediction of individuals who did not test for HIV was more accurate than individuals who did test as explained by the specificity and sensitivity of the model. Sensitivity measures the proportion of correctly predicted events (individuals who tested for HIV) while specificity measures the proportion of predicted non-events (individuals who did not test for HIV) (Chao-Ying et al., 2002).

According to Landau and Everitt (2004), the SPSS output does not supply an LR test for the effect of each variable when added to a model containing all explanatory variables, rather the Wald test is provided by default to show the effect of all explanatory variables simultaneously. Hence Table 4.5 displays the Walt test instead of the LR test and now shows the effect of all independent variables. It is noted that when all variables are included in the model, 3 out of 8 variables are no longer associated with HIV testing and prevent any predictability in testing for HIV. These three independent variables are education (educat with P=0.01), marital status (V11A with P=0.83) and number of living children (nbchild with P=0.24). In this scenario, most of the categories of all independent variables are also not showing any statistical significance in the prediction of HIV testing, suggesting that this model containing all eight independent variables is not a good prediction of HIV testing.

Table 4.5: Predictor of HIV testing based on 8 independent variables [1]

Categorical predictor	Wald	Sig	OR for HIV testing	95% CI for OR
District	37.19	P<0.01		
OR Tambo vs. Gert Sibande	17.69	P=0.07	0.74	0.64 – 0.85
Amajuba vs. Gert Sibande	3.28	P=0.01	0.86	0.74 – 1.01
Sekhukhkune vs. Gert Sibande	7.19	P=0.01	1.21	1.05 – 1.40
Ehlanzeni vs. Gert Sibande	0.01	P=0.91	0.99	0.80 – 1.22
Sex				
Male vs. Female	101.70	P<0.01	1.85	1.64 – 2.08
Education level	11.67	P=0.01		
None vs. Higher	8.40	P=0.01	0.65	0.49 – 0.87
Primary vs. Higher	5.48	P=0.02	0.70	0.52 – 0.94
Secondary vs. Higher	10.76	P=0.01	0.61	0.45 – 0.82
Age groups	103.56	P<0.01		
18 – 24 vs. 55+	85.32	P<0.01	2.68	2.17 – 3.30
25 – 34 vs. 55+	60.56	P<0.01	2.06	1.71 – 2.47
35 – 44 vs. 55+	56.16	P<0.01	1.91	1.61 – 2.26
45 – 54 vs. 55+	36.33	P<0.01	1.60	1.37 – 1.86
Marital status	0.36	P=0.83		
Never married vs.	0.33	P=0.56	1.05	0.88 – 1.26
Separated/Divorced/Widowed	0.29	P=0.59	1.04	0.89 – 1.22
Married vs. Separated/Divorced/Widowed				
	81.49	P<0.01		
Occupation	0.59	P=0.44	1.09	0.87 – 1.36
Schooling vs. unemployed	81.38	P<0.01	1.97	1.70 – 2.28
Employed vs. unemployed				
	6.73	P=0.24		
Number of living children	0.75	P=0.39	1.08	0.90 – 1.31
0 vs. 5 and +	0.30	P=0.58	0.95	0.79 – 1.14
1 vs. 5 and +	0.57	P=0.45	1.07	0.90 – 1.27
2 vs. 5 and +	3.08	P=0.08	1.17	0.98 – 1.39
3 vs. 5 and +	1.03	P=0.31	1.10	0.92 – 1.31
4 vs. 5 and +				
	226.88	P<0.01		
Residential area	36.87	P<0.01	0.50	0.40 – 0.63
Rural vs. semi-urban	45.13	P<0.01	2.73	2.04 – 3.67
Urban vs. semi-urban				
	7.84	P=0.01	0.57	
Constant				

The three independent variables which are not statistically significant in relation to HIV testing will be dropped one by one from the model. Table 4.6 displays now the effects of all the remaining seven independent variables on HIV testing after dropping the number of living children. It shows that when the independent variable "number of living

[1] The format of this table which shows the prediction of HIV testing by different independent variables is taken from A handbook of Statistical analyses using SPSS / Sabine Landau / Brian Everitt, 2004 by Chapman & Hall CRC Press LLC, 2000 N.W. Corporate Blvd., Boca Raton, Florida 33431. Similar format presentation is found in Norusis, Marija. 2003. Logistic regression analysis. In SPSS 12.0, Statistical procedures companion, Pp 321 – 361.

children" is dropped from the model, "district" and "marital status" do not show a good prediction of HIV testing as indicated by the statistical significance of the different categories of these two variables in Table 4.6.

Table 4.6: Prediction of HIV testing based on 7 independent variables

Categorical predictor	Wald	Sig	OR for HIV testing	95% CI for OR
District	36.47	P<0.01		
OR Tambo vs. Gert Sibande	17.51	P<0.01	0.74	0.64 – 0.85
Amajuba vs. Gert Sibande	1.99	P=0.16	0.89	0.77 – 1.04
Sekhukhkune vs. Gert Sibande	6.80	P=0.01	1.21	1.05 – 1.39
Ehlanzeni vs. Gert Sibande	0.09	P=0.76	0.97	0.78 – 1.20
Sex				
Male vs. Female	117.70	P<0.01	1.90	1.69 – 2.14
Education level	34.45	P<0.01		
None vs. Higher	30.49	P<0.01	0.47	0.36 – 0.62
Primary vs. Higher	22.78	P<0.01	0.50	0.38 – 0.67
Secondary vs. Higher	33.18	P<0.01	0.44	0.34 – 0.59
Age groups	119.79	P<0.01		
18 – 24 vs. 55+	101.70	P<0.01	2.65	2.19 – 3.20
25 – 34 vs. 55+	71.06	P<0.01	2.07	1.75 – 2.45
35 – 44 vs. 55+	61.75	P<0.01	1.94	1.65 – 2.30
45 – 54 vs. 55+	36.33	P<0.01	1.60	1.37 – 1.86
Marital status	0.39	P=0.82		
Never married vs.	0.33	P=0.56	1.05	0.88 – 1.26
Separated/Divorced/Widowed	0.07	P=0.79	1.02	0.87 – 1.19
Married vs. Separated/Divorced/Widowed				
	70.78	P<0.01		
Occupation	7.15	P=0.01	1.33	1.08 – 1.63
Schooling vs. unemployed	68.70	P<0.01	1.85	1.60 – 2.15
Employed vs. unemployed				
	257.18	P<0.01		
Residential area	70.05	P<0.01	0.40	0.33 – 0.50
Rural vs. semi-urban	31.16	P<0.01	2.22	1.68 – 2.94
Urban vs. semi-urban				
	0.000	P=0.01	1.00	
Constant				

The Wald tests generated by the model show that there are changes in the prediction to test for HIV as shown in Table 4.6 when compared to the tests generated in Table 4.3 (when the independent variables were included in the model individually).

For the district variable there is no statistically significant difference between districts when it comes to HIV testing, except between OR Tambo and Gert Sibande. Taking Gert Sibande as reference, the model shows that there is no district that has a specific influence on HIV testing as shown by the Wald tests and the odds of testing for HIV.

Individuals behaved the same way across all districts in relation to HIV testing suggesting that this variable should also be dropped from the model.

Regarding the variable sex, there is a significant difference between males and females when they decide to test for HIV and it was found that males respond better than females with regard to HIV testing, even though the number of men who attended MSU services was lower than the number of women. The odds for testing for HIV are almost double for males compared to females.

Education is statistically significant across all categories (none, primary, secondary, compared to High) regarding HIV testing. It was observed that with higher levels of education, individuals test almost two times more for HIV than other categories. However, the influence of education in HIV testing loses its strength when confounded with other variables than when it is alone (comparing education odds ratios in Table 4.3 and in Table 4.6).

The variable age group is statistically significant with regard to HIV testing across all its categories. Individuals in the age group 18 - 24 test 2.6 times more than the older group (55+); the group 25-34 test two times more than the older group as well. For this independent variable in general, the odds of testing for HIV shows that individuals test for HIV in higher proportions when they are still young and the response to HIV testing offer decreases gradually as people become older and older.

The independent variable “marital status” continued to show a non-statistically significance when it comes to HIV testing and will be dropped from the model.

The variable “Occupation” has a statistically significant contribution in the prediction for HIV testing. The odds of testing for HIV show that individuals who are employed test almost two times more than the unemployed. Even students respond better to HIV testing offers than the unemployed.

For the “Residential area” variable with three categories (rural, urban and semi-urban), the model taking semi-urban as a reference category, it is shown that there is a statistically significant difference between individuals living in a rural area and

individuals staying in a semi-urban area regarding testing for HIV. The odds of testing for HIV were almost two times higher for people staying in a semi-urban area than individuals living in a rural area. When comparing individuals staying in an urban area and those living in semi-urban area, the model shows no statistical difference, suggesting that there is very little difference when considering the odds of testing for HIV in an urban area and in semi-urban areas.

The two independent variables “district” and “marital status” are dropped from the model because they are not statistically significant in the prediction of HIV testing. With the remaining five independent variables (sex, education, age group, occupation and residential area), all categories of the remaining independent variables are statistically significant with regard to HIV testing.

The final main model that contributes significantly at the level of 95% confidence to explain testing of HIV has five variables: education, age, sex, occupation and area of residence which are statistically significant regarding HIV testing (Table 4.7).

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Table 4.7: Prediction of HIV testing based on 5 independent variables

Categorical predictor	Wald	Sig	OR for HIV testing	95% CI for OR
Sex				
Male vs. Female	119.93	P<0.01	1.89	1.69 – 2.12
Education level	33.32	P<0.01		
None vs. Higher	28.62	P<0.01	0.49	0.37 – 0.63
Primary vs. Higher	23.01	P<0.01	0.50	0.38 – 0.66
Secondary vs. Higher	32.88	P<0.01	0.45	0.34 – 0.59
Age groups	171.49	P<0.01		
18 – 24 vs. 55+	135.78	P<0.01	2.73	2.31 – 3.23
25 – 34 vs. 55+	98.95	P<0.01	2.15	1.85 – 2.51
35 – 44 vs. 55+	76.12	P<0.01	2.01	1.72 – 2.35
45 – 54 vs. 55+	40.58	P<0.01	1.62	1.39 – 1.88
Occupation	69.59	P<0.01		
Schooling vs. unemployed	7.16	P=0.01	1.32	1.08 – 1.63
Employed vs. unemployed	67.55	P<0.01	1.84	1.59 – 2.12
Residential area	293.87	P<0.01		
Rural vs. semi-urban	81.29	P<0.01	0.42	0.35 – 0.50
Urban vs. semi-urban	32.35	P<0.01	2.22	1.69 – 2.93
Constant	0.19	P=0.67	0.93	

One of the important variables in a population study is “sex”, which shows gender differentiation. In the previous tables, it was noted that males were more likely to test for HIV than females. Let us now analyse the responses to HIV testing, separating males and females, to see if there is any difference for each sex category when it comes to HIV testing.

4.4.4. Logistic regression analysis of HIV testing by sex

The descriptive analysis based on Table 4.2 showed that there is a difference between males and females with regard to HIV testing. Males were more likely to test for HIV in higher proportion than females, and all independent variables were showing the same pattern.

Table 4.8: Prediction of HIV testing for females based on 4 independent variables

Categorical predictor	Wald	Sig	OR for HIV testing	95% CI for OR
Education level	24.39	P<0.01		
None vs. Higher	22.92	P<0.01	0.46	0.34 – 0.63
Primary vs. Higher	19.73	P<0.01	0.47	0.33 – 0.65
Secondary vs. Higher	23.36	P<0.01	0.45	0.32 – 0.62
Age groups	83.42	P<0.01		
18 – 24 vs. 55+	55.96	P<0.01	2.09	1.72 – 2.54
25 – 34 vs. 55+	46.92	P<0.01	1.84	1.54 – 2.18
35 – 44 vs. 55+	53.01	P<0.01	1.92	1.61 – 2.29
45 – 54 vs. 55+	16.72	P<0.01	1.43	1.20 – 1.69
Occupation	21.35	P<0.01		
Schooling vs. unemployed	10.56	P<0.01	1.48	1.17 – 1.87
Employed vs. unemployed	13.35	P<0.01	1.42	1.18 – 1.72
Residential area	198.27	P<0.01		
Rural vs. semi-urban	40.78	P<0.01	0.47	0.37 – 0.59
Urban vs. semi-urban	27.29	P<0.01	2.40	1.73 – 3.33
Constant	0.00	P=1.00	1.00	

Comparing females (Table 4.8) with males (Table 4.9) behavior with regard to HIV testing, the two tables show that education is statistically significant in all categories of the variable for females only. There is no statistical significance for education for males with regard to HIV testing. The model shows that education does not matter for males

when it comes to HIV testing in these five areas; having no education or having attained a tertiary level does not influence males to test for HIV. For females, the odds of testing for HIV for individuals who have a higher education level are twice as high as individuals with no education, at primary and secondary levels.

With the age group variable, there is a statistically significant difference between all categories when it comes to HIV testing for both females and males. For females the odds of testing for HIV show that HIV testing is higher in the younger group (18-24) than any other group category; the same observation is true for males. It has been observed earlier that HIV testing decreases as people become older; this pattern is still observed within females, with a little deviation for the age group category 35 - 44 which tests a little bit higher than the age group category 25 – 34 - but the testing decreases again in the older group.

The above pattern observed with females in relation to age also applies to males, with younger males testing for HIV in higher proportions than older males. The only exception is that the odds of testing for the last category (55+) are higher than the age category 45 - 54. When females and males are compared with regard to the odds of testing for HIV, females in the age group category 18 - 24 test twice as high as the age group category of reference (55+), while for males it is 6.5 times higher. This implies that age is an influencing factor to test for HIV, with young males testing in higher proportion compared to old males. In all other age categories, the odds of testing for HIV are also higher for males than females and this suggests that age difference is less of an influence for females than males in the decision to test for HIV.

The association between occupation variable and HIV testing is statistically significant for females across all categories of this independent variable, while for males only the category “employed” is statistically significant. For males, there is no difference in the decision to test for HIV between people who go to school and those who are unemployed, but there is a difference in that decision between employed and unemployed, and the odds ratios show that the difference is much higher with males than females as shown by the odds ratios (1.4 for females and 2.6 for males). This means that females who were going to school, both employed and unemployed, reacted differently with regard to the offer of HIV testing service by MSU service providers. It is

not the case for males for whom only employed individuals responded positively in high proportion to HIV testing offer.

There is a statistically significant difference between individuals staying in rural areas and those staying in semi-urban areas regarding testing for HIV for both sexes. The odds for testing for HIV are almost three times higher for people staying in semi-urban than in rural area for males and close to twice as high for females. There is no statistically significant difference between urban and semi-urban areas with regard to testing for HIV for males.

Table 4.9: Prediction of HIV testing based on 6 independent variables for males

Categorical predictor	Wald	Sig	OR for HIV testing	95% CI for OR
Education level	14.04	P=0.003		
None vs. Higher	9.58	P=0.002	0.44	0.26 – 0.74
Primary vs. Higher	6.80	P=0.009	0.48	0.28 – 0.83
Secondary vs. Higher	13.68	P<0.001	0.35	0.20 – 0.61
Age groups	113.80	P<0.001		
18 – 24 vs. 55+	96.67	P<0.001	6.51	4.48 – 9.45
25 – 34 vs. 55+	54.22	P<0.001	3.22	2.36 – 4.40
35 – 44 vs. 55+	16.13	P<0.001	1.99	1.42 – 2.79
45 – 54 vs. 55+	27.49	P<0.001	2.25	1.66 – 3.04
Occupation	64.26	P<0.001		
Schooling vs. unemployed	1.04	P=0.307	0.80	0.51 – 1.23
Employed vs. unemployed	57.37	P<0.001	2.59	2.02 – 3.31
Residential area	99.48	P<0.001		
Rural vs. semi-urban	40.17	P<0.001	0.33	0.23 – 0.46
Urban vs. semi-urban	8.05	P=0.005	2.17	1.27 – 3.70
Constant	3.30	P=0.07	1.74	

The analysis by sex showed that females and males react differently to HIV testing. Education is found to be an important factor with females but not for males when males are considered alone.

4.4.5. Summary

Out of eight independent variables that were initially included in the logistic regression model, only five (sex, education, age, occupation and residential area) emerged as

good predictors of HIV testing. When MSU clients are classified into the different categories of these five variables, they show different behaviours when it comes to testing for HIV. In the next chapter we discuss in detail the different findings and how males and females react differently to HIV testing based on socio-demographic characteristics that were found to be statistically significant in relation to HIV testing.

CHAPTER 5. DISCUSSION

As highlighted in the introductory and methodology chapters, the study objective was to analyse the HIV testing uptake by individuals aged 18 years and older using the data collected between October 2009 and September 2010 in five areas located in five districts (OR Tambo, Amajuba, Ehlanzeni, Gert Sibande and Sekhukhune) of South Africa. The data relates to clients who received health services from Family Health International (FHI) mobile clinics. Because there was no other study conducted to determine the attitudes and behaviors of clients with regard to HIV testing, the conclusions on barriers and facilitators of HIV testing are only based on socio-demographic characteristics of these clients. Recommendations will then be given on where to focus to increase the uptake of HIV testing in these five areas.

This study showed that HIV testing uptake was low among these FHI mobile clinics clients. Although health services offered at these mobile clinics are more of a routine nature, there are a number of clients who tested for HIV. Even though the uptake of HIV testing was generally low, with 34.7% testing rate among all individuals, it differs according to the socio-demographic characteristics of individuals.

The data showed that the level of education of clients attending MSU services is generally very low. Only 21% of clients aged 18 years and older have a primary level of education while 56% have no education at all. In these five areas, unlike females, males were not influenced by education to go for an HIV test. The analysis showed that there is a difference in deciding to go for HIV testing between females who have a higher level of education and females who have either secondary, primary or no education. Fewer females reached a higher education level, which indicates that education does not influence the majority of females to test for HIV in these areas, but different studies

showed that HIV testing increases with the level of education (Sherr et al., 2003; Gage and Ali, 2005). This study also found that females go for an HIV test when they have reached a higher level of education. Increasing the level of education in these areas by means of formal training, as provided in schools, may not be the right method and could even be described as unrealistic. Instead increasing the knowledge by awareness campaigns, including door to door, and intensive health education may lift the knowledge of MSU clients in HIV testing. When FHI started to provide health services in these five areas, one of the objectives was to link local home and community-based care organisations with the mobile clinics so that they can work together in mobilising individuals to come and get health services, including HIV services, from the mobile clinics. Home community-based care organisations, using their caregivers, were supposed to provide support to health promoters from FHI, in the door to door education campaigns regarding HIV and family planning issues. A number of caregivers from some local home- based care organisations were trained in HIV prevention and family planning, but were not used thereafter to support the project. This may explain the low uptake in HIV testing for people who live in these rural areas and women in particular, due to insufficient exposure to education and information with regard to HIV.

The level of unemployment is very high in the five areas, particularly in rural ones where the majority of MSU clients live. Those who are employed have to travel to either semi-urban or urban areas to find jobs in mining or construction industries. The analysis showed that the HIV testing response is higher in urban and semi-urban areas as compared to rural areas. This may explain the high response to HIV testing by employed individuals because they are more exposed to information regarding the benefits of HIV testing than individuals who stay in rural areas. Individuals who are employed are also generally better educated than the unemployed and understand the benefits of HIV testing better than individuals who remain in rural areas, who are typically less educated and not exposed to services and information. It is, however, necessary to highlight that there is a limitation of data with regard to employment, as there is no information collected on the type of employment, whether it was professional, semi-skilled or unskilled.

There is an interesting aspect noted with regard to HIV testing in these areas concerning individuals who are still attending school. It was found that, when females

and males are analysed separately, females are willing to test in higher proportions than males. This may confirm again the tendency for females to go for an HIV test if they are more exposed to education and information because they understand the risk of not knowing their HIV status and take the decision accordingly.

Regarding the difference in HIV testing between males and females where males test for HIV in higher proportions than females, it was found that in some areas such as Zambia, Tanzania, Nigeria, males were found to show more positive behavior patterns with regard to HIV testing than females (Glick and Sahn, 2007). The nationally representative HIV study conducted by HSRC in South Africa (Shisana et al., 2005) showed that more females were testing for HIV than males. A study conducted by Snow et al. (2010) in Mpumalanga province also found that the female/male ratio was 3:1 regarding HIV testing. Due to lack of supplementary studies to establish the reasons behind this fact in these five areas of the study, only questions can be generated for now and responses may be obtained with further investigation. Perhaps males test for HIV in higher proportions than females due to their cultural dominance, the male dictates the way to go with regard to HIV testing whereas females have to seek permission before going for a HIV test? Is it because most females remain behind while males went to look for jobs in urban areas where HIV testing is happening more frequently than in rural areas? Or it is because females do not see the necessity of going to test for HIV while their men are absent from home due to work in other areas? Because this analysis is based on secondary data with no other studies conducted in an effort to answer these questions, further investigation would be needed to give more information on the observed HIV testing between males and females. Again the analysis showed that a female's education can make a difference in the decision to go for HIV testing. Another factor to consider in this scenario where males are more likely to test for HIV than females is that pregnant women were excluded from this analysis. Pregnant women normally test for HIV in high numbers when they seek antenatal care services. Pregnant women who visited MSU in these areas came for reasons of primary health care as these mobile clinics do not provide antenatal care services. The majority of pregnant women prefer to go to clinics and hospitals where adequate set-ups for antenatal care services exist and are consistently provided in the context of PMTCT. It is necessary to indicate that the proportion of unknown HIV status was 70% for males and 60% for females during the period under study. When HIV negative individuals, who

did not test in the last three months and who were sexually active in that period, are included that rate was 95% for males and 94% for females.

The area of residence variable has shown to be an influential factor in the decision to go for an HIV test when individuals stay in urban areas or semi-urban areas. Even though the dataset showed that few people come from those two areas, staying in urban areas is a strong enabling factor to test for HIV. Similar findings are highlighted in a study conducted by Mishra et al. (2006) which shows that the positive response to test for HIV from single individuals who live in urban areas is high.

The response to HIV testing was far higher among individuals who are in the age category 18 - 24 years than any other age category beyond 25 years. Most people in this study come from rural areas, which are among the previously disadvantaged areas where education was not provided. Only young people are more likely to be educated and understand better the advantages of HIV testing. It is encouraging to see in these areas under study that this age group category (18 - 24) is testing better so that people can know their HIV status. The annual antenatal care study conducted by the Department of Health has shown that HIV prevalence is the highest among women attending antenatal care in this age category (DoH, 2008, 2009, 2010). This will help providers of health services in these areas to plan better for implementing HIV prevention.

In summary, it emerged from the analysis that out of eight independent variables included in the module, sex, age, occupation, area of residence and education of females are the main factors that influence individuals in the decision to test for HIV in the five areas under study. Females were found to be less responsive to HIV testing offered in the mobile clinics than males. Individuals in the middle age and older categories were also not coming in high numbers to test for HIV. Unemployment was another factor that keeps people at home and not exposed to more aggressive information regarding HIV testing, as opposed to people who are employed. Living in urban areas and being educated was found to be enabling factors for women to test for HIV.

CHAPTER 6. CONCLUSION / RECOMMENDATIONS

HIV testing in the five areas under study is still low and does not inform adequately the implementation of HIV prevention and treatment as it is difficult to plan while a high number of people do not know their HIV status. The analysis has categorized individuals into different groups based on their socio-demographic characteristics and showed how each one responded to HIV testing offered in the mobiles service units.

Based on this study, HIV testing uptake was lower for women than men. HIV testing decreases with age and this may be linked to sexual activity, but a further study could confirm this. As highlighted in the analysis, HIV testing is higher in urban than rural areas mainly because of exposure to information and service provision. The level of education in these five areas is very low (56% have no education) due the geographical location of the areas covered (remote rural and previously disadvantaged communities). Unemployment is also another barrier to HIV testing as the majority of clients are unemployed and were found to be less likely to test for HIV than employed individuals.

HIV testing uptake did not differ according to geographical location due mainly to the fact that the majority of clients who visited the mobile clinics came from remote rural areas with the same characteristics such as a high number of uneducated and unemployed people. This fact was confirmed by the logistic regression model when all variables were interacting to predict HIV testing. The only difference was in Amajuba where MSU staff went extra mile to look for men in construction and farming areas.

The results of this study are similar to some of other studies that were conducted in South Africa. Peltzer et al. (2009) found that education levels play an important role regarding HIV testing and access to HIV counselling in rural areas. Improving the education of individuals living in rural areas would increase the uptake of HIV testing.
Another study conducted in Eastern Cape, South Africa, by Hutchinson & Mahlalela (2006) found that voluntary counselling and testing was still low but was positively associated with age, education and socio-economic status. These findings are similar to findings highlighted in this current study. In Hutchinson & Mahlalela (2006), the socio-economic status indicator is represented by income, while in this current study, employment (a category of occupation variable) leads to a source of income and it was

found that the uptake of HIV testing is higher in individuals who are employed than those who are unemployed.

One can then say that the findings of this study fit in the empirical framework drawn earlier. Education (especially for women), age, area of residence and occupation (employed category) were found to be good predictors of HIV testing.

This study was useful as it allowed us to highlight the situation of HIV testing in the five areas and to indicate where needs are for intervention to increase the uptake of HIV testing in order to plan for a better implementation of HIV prevention programmes in these areas.

The findings of this study would suggest that the main areas of intervention should be the education of women with a focus on rural areas in an aggressive HIV and AIDS campaign, similar to the massive HIV awareness campaign undertaken by government in 2010. FHI should work with local home-based carers to educate the community members on HIV and AIDS. A joint door-to-door campaign conducted by MSU staff and home-based carers will make a difference in educating and mobilising individuals to test for HIV.

FHI should also intensify the group health education which is given every morning before individual's service provision starts. The talk is normally provided in a group early in the morning and is not repeated during the day. Because all clients do not come at the same time, people who come after the morning talk do not get the message and rely only on short HIV counselling which is given by nurses during their daily medical consultation.

The health education by health promoters should also be extended to the community as health promoters are normally tasked to dedicate some days during the month to meet individuals in their homes and provide door-to-door education regarding HIV testing and other health education needs. This will help to properly target groups that were identified as not responding in high numbers to HIV testing. The home visits can better target individuals such as unemployed, especially women, the middle aged and those aged 55 years and over.

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