

SEXUALLY TRANSMITTED INFECTION AS A RISK FACTOR FOR HIV –
DESCRIBING TREATMENT SEEKING BEHAVIOURS AND SEXUAL RISK
PRACTICES OF CLINIC ATTENDEES AT THE CYRIL ZULU COMMUNICABLE
DISEASES CENTRE: A POTENTIAL APPLICATION OF THE INFORMATION-
MOTIVATION-BEHAVIOUR SKILLS MODEL FOR HIV PREVENTION
INTERVENTIONS.

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Declaration

Unless specified to the contrary, this project is the result of my own work.

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Ethics Approval

Ethics approval for this study was obtained from the Nelson R Mandela School of Medicine Ethics Committee (REF: E175/02). Permission to conduct this study was given by the Ethekwini Municipality, Health, Safety and Social Services Cluster Health Unit.

Acronyms and Definitions

AIDS	Acquired Immune Deficiency Syndrome
ARV	Antiretroviral
CAPRISA	Centre for the AIDS Programme of Research in South Africa, Nelson R Mandela School of Medicine, Durban
CDC	The Prince Cyril Zulu Communicable Diseases Centre
CD4+ cells	helper T cells that are the primary targets of HIV infection in the immune system, usually reported as number of cells per mm ³
FSWs	female sex workers
GB-C	GB virus C, a member of the Flaviviridae, sometimes referred to as hepatitis G
HIV	Human Immunodeficiency Virus (also referred to as HIV-1, the dominant strain internationally)
HSV	Herpes Simplex Virus (HSV-2 is usually the cause of genital herpes)
IMB Model	Information-Motivation-Behavioural Model
incidence	number of new cases of infection in the uninfected population, usually expressed as a percentage per year
morbidity	a diseased state
MSM	men who have sex with men
prevalence	number of existing infections in a population, usually expressed as a percentage
seropositivity	a positive test for antibodies
serum	clear liquid that remains when blood clots; contains the antibodies that were in the whole blood
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
subclinical reactivation	a disease state in which the disease is active or pathogenic, but clinical symptoms are not apparent
syndromic management	treatment based on clinically linking a syndrome of symptoms to a specific aetiology and treatment and not requiring laboratory testing and diagnosis
VCT	Voluntary Counselling and Testing
viral load	a measurement of the amount of virus in the blood; in HIV this is usually measured as copies per mL

χ^2

Chi-square, a method of data analysis used on categorical data

Abstract

Co-infection with a sexually transmitted infection (STI) is both an indicator of behavioural risk, as well as an indicator of increased risk for infection with HIV. This is a cross-sectional, descriptive study. The overall aim of the study is to profile the demographic data, health seeking behaviour, sexual risk behaviour and HIV awareness and willingness to test in a sample of STI clinic attendees in order to inform intervention programmes aimed at reducing the burden of disease in this group, thereby reducing HIV risk. It is hypothesised that those individuals who are poorly informed about key prevention information (particularly regarding the biological susceptibility to HIV infection when co-infected with an STI), who are poorly motivated due to poor attitudes towards or lack of social norms in favour of prevention behaviour, and who lack some key behaviour skills (like skills for identifying STIs early, or negotiating safer sexual practises) will be less likely to be able to initiate and maintain specific prevention behaviours. Data are collected using a structured questionnaire and analysed in relation to the Information-Motivation-Behavioural Skills (IMB) model of HIV prevention behaviour. This model was specifically developed to provide a conceptual framework for the design, implementation and assessment of targeted and empirically focussed interventions to change sexual risk behaviour in HIV. Components of the IMB model that are identified as important in contributing to risk of infection in this group are identified. Finally, recommendations regarding the form and content of an intervention in this group are made. The study concludes that STI clinics may be excellent environments within which to implement HIV risk reduction behavioural interventions which currently may be missed opportunities.

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1. Introduction and Overview

Sexually transmitted infections (STIs) are an indicator of sexual risk behaviour (unprotected sex) as well as a marker of increased risk for HIV infection.

Epidemiological and biological studies have indicated that STI infection increases the risk of infection by HIV, and biological studies have indicated that concurrent STI infection leads to increases of infectiousness due to a greater shedding of HIV (CDC, 1998; Cohen, 1998). As immune system functioning becomes compromised, it is likely that a greater number of opportunistic infections could occur, including STIs. In addition to this, each infection carries with it additional risks of complications like infertility, foetal loss and still birth (FHI, 2001b). In a recent estimate, HIV infection is nearly 10 times more common in someone who has had a previous or current STI, and this risk increases with each subsequent STI episode (FHI, 2001c). Overall the risk of infection with HIV in the presence of an STI can be as much as 300 times higher than when no STI is present when having sex with an infected person (Ibid.).

Untreated STIs, in addition to increasing the risk of acquiring and passing on infection with HIV, also result in numerous reproductive health problems (FHI, 2001c). Despite the fact that these STIs can be treated at no cost at primary health care facilities and dedicated clinics in the public sector, several community based surveys demonstrate a high burden of untreated STIs (Colvin, 1998; Wilkinson et al., 1999). Limited data exists on health seeking behaviours, specifically treatment seeking behaviour, of patients with STIs which is important for controlling the further spread of STIs and ameliorating the impact of untreated STIs on reproductive health. Whilst the STI clinic attendee population represents a selected segment of patients with STIs they provide important clues to health seeking behaviours and sexual practices during an episode of infection that could inform and improve programmes targeted at improving the management and control of STIs and have the additional benefit of impacting on the HIV epidemic.

In developing countries this rapid and alarming spread of HIV/AIDS is fuelled principally by unprotected heterosexual sex. Interventions are needed to reduce risky behaviours such as frequent change of sexual partners, unprotected sex and delayed behaviour of individuals in seeking treatment for STIs (Fenton, Chinouya, Davidson, & Copas, 2002; Lamptey, 2002). Intervention studies have indicated that STI detection and treatment can reduce HIV transmission by: (1) reducing the amount and prevalence of HIV shedding in infected individuals, and, (2) by reducing the

spread of HIV through communities by reducing susceptibility in those uninfected and reducing infectiousness in those already infected (CDC, 1998).

Data from surveys of nearly half a million 10 to 19 years old students from around 5000 schools paint a frightening picture regarding attitudes towards HIV/AIDS and STIs in South Africa. 15.8% of those interviewed would have unprotected sex and a similar number, 15.7%, would deliberately spread the virus. Worryingly 33% thought they were already HIV positive, even though around half of the sample indicated that they were not yet sexually active. In terms of myths surrounding AIDS, around 12% believed that sex with a virgin could cure AIDS (Rademeyer, 2004).

Control of STIs involves not only providing effective and early treatment but also promoting safe sexual practices and behaviours to prevent infection. Educating and counselling patients on STI awareness, health seeking behaviours, risk factors and preventative behaviour is expected to result in a lowering of sexual risk behaviour and cause a more rapid and effective care-seeking behaviour (Askew & Maggwa, 2002). There is research evidence that clinic based service programmes are successful in increasing responsible sexual behaviours, including in HIV positive cohorts (Caldwell & Caldwell, 2002; Catania et al., 2002; Fortenberry, 2002; Gina M. Wingood et al., 2004). Developing and enhancing the ability of individuals to protect themselves from infection is a public health priority.

The Information-Motivation-Behavioural (IMB) Model has been used extensively to both describe behaviour change in HIV, as well as to develop and evaluate behavioural interventions in HIV (J. D. Fisher & Fisher, 2002). This model was used as conceptual framework in the analysis of the data collected for this dissertation. In its most general form, the model looks at the various elements of behaviour change that are required in order to ensure behaviour change, and the maintenance of this behaviour change over time. The overall postulate of the model is that to the extent that individuals have the correct information, are motivated to act and they can developed the behavioural skills required to do so, they will be likely to change their behaviour to consistently prevent HIV infection. Although originally conceptualised in response to HIV, this model is widely becoming seen as a general model of health promotion behaviour. One of the perceived strengths of the model is that it provides very clear means to ensure that the health information that is provided to consumers of the intervention is focussed and includes only those elements that are essential to initiate and maintain behaviour change.

An effective response to the HIV/AIDS pandemic requires that there is full and reliable data on the attitudes, behaviours, beliefs and practises of those most at risk, particularly around sexual risk behaviour (Catania et al., 2002; FHI, 2001a). STIs are a public health issue in that those infected accumulate many reproductive health problems if they go untreated, they spread infection and have increased HIV acquisition and transmission risk if they remain untreated. One of the aims of this study is to describe the treatment seeking behaviour of STI clinic attendees, as well as describing their sexual risk behaviour in order to make recommendations about potential interventions in this population.

2. Aim

The aim of the study is to survey a sample of STI clinic attendees regarding their treatment seeking behaviour, sexual risk behaviour and their HIV/AIDS attitudes and knowledge as elicitation research in order to describe the current group-specific risk profile of STI clinic attendees. Elicitation research is the phase of behavioural interventions according to the IMB model as this is the collection of data on the current risk profile of the target population. The results are described in relation to the IMB model of HIV prevention in order to suggest future directions for interventions with this particular population. Although not necessarily representative of the general population, STI clinic attendees are at high risk for HIV infection and are, thus, important targets for HIV prevention interventions and it has been suggested that specifically tailored and conceptually based interventions are most likely to succeed (J. D. Fisher & Fisher, 1992).

3. Literature Review

3.1. The International and National Burden of STIs and HIV/AIDS

"AIDS is unique in human history in its rapid spread, its extent and depth of its impact. Since the first AIDS case was diagnosed in 1981, the world has struggled to come to grips with its extraordinary dimensions. Early efforts to mount an effective were fragmented, piecemeal and vastly under-resourced... Now, more than 20 years later, 20 million people are dead and 37.8 million people (range: 34.6-42.3 million) worldwide are living with HIV. And still, AIDS expands relentlessly, destroying people's lives and in many cases seriously damaging the fabric of societies."
(UNAIDS, 2004, p.13).

There are reported to be more than 300 million incident cases of curable STIs throughout the world annually, in an international distribution that is very similar to that for HIV (Lamprey, 2002). This is not surprising given that the risk behaviours for STI infection and HIV acquisition are obviously similar (unprotected penetrative sex, multiple sexual partners etc). However, it is also becoming clear that a synergistic relationship exists between HIV and other STIs that goes beyond sexual risk behaviour and includes biological mechanisms, and this will be discussed further in this dissertation.

The annual UNAIDS report (2004) estimates that there were approximately 38 million HIV infected individuals by the end of 2003, with 4.8 million new infections for the year. Of the total infected, an estimated 25 million (range: 23.1-27.9 million) are in Sub-Saharan Africa with approximately 3 million new infections for the year. South Africa is estimated to have about 5,3 million of those who have been infected which is the largest number of any country, representing a prevalence of 21.5% of the adult population (low estimate = 18.5%, high estimate = 24.9%). Although this shows a decrease from previous estimates, this does not indicate that the spread of the infection has been slowed. Rather this is most likely to be due to adjustments in the modelling strategies being employed in these estimates (Ibid.). Some estimates of HIV prevalence in South Africa indicate that this has risen to over 30% in areas like Gauteng, which is a mainly urban area (Freedman & Mindel, 2004).

According to the UNAIDS report in Southern Africa the ratio of females to males infected is as much as two to one, particularly in younger age groups. Internationally the highest impact of the epidemic seems to be in young people with half of all new infections (more than 6000) per day occurring in the 15-24 year-olds. In Sub-Saharan Africa, approximately 6,9% of women and 2,1% of men in this age range were infected with HIV by the end of 2003. In terms of mortality, 2.9 million people are estimated to have died from AIDS in 2003. Three hundred and seventy thousand of these deaths have been estimated to have occurred in South Africa specifically.

The figures stated above are estimates for South Africa, usually based on the annual antenatal clinic survey. This data, although valuable for showing changes over time, may be biased in terms of specific estimates of prevalence. For example, these surveys do not include children or men, and exclude women who

access private health care facilities and women who are not pregnant. More recently a survey was published that gives actual data from the whole population of South Africans (Connolly, Colvin, Shisana, & Stoker, 2004). In this study 7 249 households (out of 10 197 selected for inclusion) were surveyed. This survey included anonymous testing for HIV. The HIV prevalence data, by race and gender, are summarised in Table 1:

Table 1 - HIV Prevalence by Gender and Race

	Male		Female		Total	
	%	95% CI	%	95% CI	%	95% CI
Black	10.8	9.0-12.8	14.5	12.4-16.8	12.9	11.3-14.6
White	5.2	2.6-9.8	7.0	3.6-13.3	6.2	3.7-10.0
Coloured	5.5	3.8-7.9	6.6	4.1-10.3	6.1	4.5-8.3
Indian	2.7	0.6-11.1	0.6	0.2-1.9	1.6	0.5-5.0
Total	9.5	8.1-11.2	12.8	11.0-14.7	11.4	10.1-12.7

What the data from this study suggest is that the overall prevalence in South Africa is around 11.4% of the entire population (2 - 99 years). This is lower than previous estimates based on samples of, mostly, black pregnant women. This survey also gives some of the only data for white South Africans at a population level. Although significantly lower than the levels for black South Africans, the prevalence for white South Africans (at 6.2%) is still significantly higher than North America, Europe and Australasia where prevalence is mostly below 1%. Even the level of infection in the lower prevalence groups, for example Indian males, is at 2.7% which is still alarming on an international scale. It is also clear from this data that, bar the Indian sample, women in South Africa are disproportionately affected by HIV disease burden. Although the data give differing estimates of the prevalence of HIV in South Africa depending on the samples used and the various modelling assumptions used, all estimates concur that HIV levels are very high and a real threat to the health of the country.

In 1996 a key literature review to understand the epidemiology and the data collection of STIs in South Africa was published (Pham-Kanter, Steinberg, & Ballard, 1996). The review included all literature published on the subject, from 1980 as well as personal communications and relevant unpublished data. Systematic surveillance of STIs (excluding HIV) was found to be lacking in South Africa, with most data being collected in ad hoc facilities based surveys focussing on key infections in urban areas. The review concludes

that the “disease burden of classic sexually transmitted infections has historically been heavy, and continues to be a serious public health problem in South Africa” (Ibid., p.160). Morbidity was found to be significantly high, especially in women. The major findings of the review are relevant to this dissertation and are summarised below:

- Ulcerative infections (primarily caused by syphilis and chancroid) were present in between 5-15% of asymptomatic clinic attendees
- Gonorrhoea prevalence was on average 8%
- Chlamydia infection was detected in 16% and vaginal infections were detected in between 20-49% of antenatal and family planning clinic attendees

A recent survey of STI and HIV services in the South African public sector health facilities estimates that there are approximately two million symptomatic patients treated for STIs in public health care facilities in South Africa every year (Ramkissoo et al., 2004). This constitutes an estimate of incidence (new cases for the year) of approximately 6.5% per 100 population, and is thought to be an underestimate particularly considering that as many as 50% of patients are estimated to seek out treatment in the private sector, but lack of monitoring data means this cannot be confirmed (Funani, Sonko, Marumo, Odugwu, & Hamelmann, 2004). The same survey further estimated that there were approximately 8.4 million STI infections (including chronic infections), symptomatic and asymptomatic, in South Africa in 2002 amongst the approximately 30 million strong population, 15 years or older. The survey also identified some important short-comings in the delivery of STI treatment at public health clinics in South Africa. The national guidelines on syndromic management were not consistently applied as only 50% of professional nurses at these facilities were found to have been “ever trained” (Ibid., p. VIII) in syndromic management. Factors that compromise the quality of treatment were found to include the lack of properly trained staff, and the incorrect use of the available treatments. It was found that history taking, clinical examinations, counselling and risk assessment, record keeping and monitoring and collection of information was deemed to be inadequate in about 34% of the public health care facilities surveyed. Health staffing is a general concern, with approximately 70% of all South African trained doctors currently living abroad (UNAIDS, 2004). This migration will further complicate

attempts to comprehensively tackle the burden of STIs, specifically HIV, and in the roll-out of ARV medication which has eventually begun in South Africa. The data are not encouraging if South Africa is to implement an integrated and comprehensive STI treatment as an adjunct to HIV prevention and treatment efforts.

To summarise, it is clear that the burden of STIs in South Africa is a significant public health issue. It is also clear that the provision of care and treatment for STIs has been inadequate and can only deteriorate as the impact of the maturing HIV epidemic is felt. Finally, the need for an effective behavioural intervention based on clear empiric evidence must be balanced with the real resource constraints currently being experienced in the South African health services. Any behavioural prevention intervention needs to be focussed and resource efficient if it has any chance of succeeding and the IMB model provides a framework for achieving this goal. This study aims to use behavioural risk survey in order to suggest what the form and content of an intervention with the population should be.

3.2. The synergistic relationship between HIV and other STIs

Individuals who have an STI accrue personal reproductive and other health problems but this group is even more important for public health when the synergistic relationship between STI and HIV infection is considered. The sexual risk behaviours that make a person susceptible to HIV are similar to those for other STIs. Early assessments also suggested that STIs that cause genital lesions could increase susceptibility to HIV infection, as well as increasing the number of CD4+ cells available for targeting by HIV for infection (CDC, 1998). It is also suggested that infection by other STIs could lead to increased shedding of HIV. In this way HIV may work synergistically with other STIs by increasing both the susceptibility to HIV infection as well as infectiousness of HIV in co-infected individuals (Taylor, Weaver, & Roddy, 2003). The potential mechanisms of this interaction will be further explored in the following section, with Herpes Simplex (HSV) infection as a specific case of HIV co-infection.

3.2.1. Pathogenic synergy: Herpes Simplex Virus (HSV-2) and HIV

In 2004 there was renewed research interest in the particular relationship between HIV and herpes co-infection as a specific example of the

synergistic nature of HIV and co-infection with another STI (Corey, Wald, Celum, & Quinn, 2004; Cunningham & Dwyer, 2004; Freedman & Mindel, 2004; Smith, 2004)¹.

Herpes is an infection which is chronic but frequently asymptomatic, and it is only with the advent of laboratory serological testing that the prevalence of HSV has been able to be estimated. HSV-2 is the virus most commonly associated with genital herpes (HSV-1 is most commonly associated with oral cold sores and is frequently contracted in childhood). As it is sexually contracted and recurs more frequently, HSV-2 is most often implicated in HIV transmission. HSV-2 has found be very common worldwide, although it appears to be much more common in high-risk groups, such as men who have sex with men (MSM), female sex workers (FSWs) and workers in the migrant worker system in South Africa. At the same time as HIV-1 infection continues to increase in Africa, Asia and Eastern Europe and is starting to increase again in the United States and Europe, a hidden epidemic of HSV-2 infection is also occurring. The following table summarises some of the published data on HSV-2 prevalence worldwide, showing both a very high international disease burden as well as the high variability by geographical region and risk group:

Table 2 - HSV-2 Worldwide Prevalence (data compiled from Freedman & Mindel, 2004, p.5)

Country or City and/or Cohort	Publication Date	HSV-2 Prevalence
USA - national, randomised survey	1976-1980	16%
USA - national, randomised survey	1976-1994	22%
Africa	1994-2001	
Urban Women		30% - 68%
Urban Men		12% - 36%
Rural Women		29% - 71%
Rural Men		5% - 36%
Hong Kong	1999	
Women		18%
Men		17%
Mexico City - Women	2001	30%
Oslo - Women	1998	25%
Spain	1999	
Barcelona - Women		11%
Madrid - Women		3.5%

¹ This section of the dissertation is a summary and review of the data presented in these papers.

Country or City and/or Cohort	Publication Date	HSV-2 Prevalence
London Males - random STI clinic attendees Males - MSM	1994	17% 27%
FSWs Japan Democratic Republic of the Congo Dakar (Senegal)	1991-2000 1998 1990 1990	59% - 98% 80% 82% 96%
FSWs' Clients Mombassa (Kenya) - Male truck drivers	1999	47%

HSV-2 prevalence is also high in South Africa. In this country, the acquisition rate of HSV-2 has been estimated to be 10-20% per year after sexual debut. 80% of HIV-1 infected teenagers tested are HSV-2 positive, versus only 20% of HIV-1 negative teenagers.

Herpes has been classified as an AIDS-defining illness as it is commonly seen in HIV positive patients when their immune systems become compromised and latent infection becomes symptomatic. However the relationship between HSV and HIV is more profound than this. The interaction between HIV infection and co-infection with herpes can be seen on at least three levels; in HIV acquisition and transmission, in HIV disease progression rates, and, in increasing HIV-associated illnesses.

HSV increases the transmission of HIV by two- to fourfold in areas of high HSV-2 prevalence (defined as greater than 80% prevalence). In a study in Rakai, Uganda, on discordant couples, this was observed regardless of the HIV-1 RNA (viral load) in the source partner. That is, regardless of how high or low the viral load in the source partner was, the uninfected partner had a five times higher risk of being infected if they had a pre-existing HSV-2 infection. The per-contact probability of contracting HIV has been quantified as 0.002 if the HIV negative partner is HSV positive, versus 0.0004 if the HIV negative partner is HSV negative (p=0.01). This effect was observed regardless of the gender of the susceptible (HIV negative) partner.

As many as half of all sexually acquired HIV infections in these areas may be related to HSV-2 infection. HSV may influence HIV transmission by increasing the levels of HIV in plasma, by compromising the genital mucosa and making individuals more susceptible to HIV infection. High

levels of HIV have been found in the herpetic vesicle fluid (genital herpes blister fluid) increasing transmission beyond what would be expected by the elevated HIV levels in the plasma alone. Research indicates that each successive HSV infection may increase the chances of contracting HIV, that infection with HSV is much more common in HIV positive individuals, and that each successive recurrence of herpes in infected individuals increases the likelihood that they will transmit HIV to their partners. Even subclinical reactivation of HSV-2 increases the serum HIV-1 RNA levels.

The impact of HSV-2 seropositivity can be as great as the impact of elevated levels of HIV-1 viral load. Table 3 summarises the effect of both the HIV-1 viral load in the source partner, and the HSV-2 serostatus in the susceptible partner in a HIV discordant couple study.

Table 3 - Per-Contact Probability of HIV-1 Acquisition, Stratified by HIV-1 RNA and HSV-2 Serostatus (Corey *et al*, 2004, p.438)

HIV-1 Plasma RNA in Source Partner (Copies/mL)	Per-Contact Probability in the HIV-1 Susceptible Partner	
	HSV-2 ⁺	HSV-2 ⁻
<1700	0.0001	0.00004
1700-12,499	0.0023	0.0005
12,500-38,499	0.0018	0.0002
≥38,500	0.0036	0.0007

From the data above, it is clear that HSV-2 infection in the susceptible partner increases risk of per-contact probability at all levels of the HIV-1 viral load in the source partner. What is particularly striking is that a pre-existing HSV-2 infection in the susceptible partner confers almost the same risk of infection with an HIV positive partner with very low viral load (<1700 copies/mL) as that for an HSV-2 negative susceptible partner whose HIV positive partner has an HIV viral load of between 12,500-38,499 copies/mL. That is, having an existent HSV-2 infection increased the risk of infection from exposure to a partner with low viral load to being equivalent to that of being exposed to a partner with relatively high HIV viral load.

Data examining the age-specific prevalence of HIV and HSV infection indicate that HSV is likely to be contacted at an earlier age than HIV. This

supports the notion that infection with HSV facilitates HIV infection. In terms of pathogenesis, research has shown that the cells that are associated with herpetic lesions are the CD4+ cells that are also the primary target cells for HIV infection. Increases in these cells at lesions may make someone more susceptible to HIV infection when exposed as there are more available CD4+ cells for the HIV to target. Very importantly, research has shown that the mucosal disruption and influx of CD4+ cells occurs even when this is not clinically apparent, as is the case in most reactivation of HSV-2 infection. That is, even if the lesions or mucosal disruption is not clinically symptomatic, the additional risk of HIV infection is still present. This is important as it is necessary to inform HSV-2 infected individuals that the additional risk is present even though they may not be experiencing symptoms, and it would be impossible to rely on patients to seek out appropriate treatments on their own if they are asymptomatic which has important implications for treatment seeking behaviour. Daily treatment with HSV-suppressive medication may be indicated as the most appropriate course of action.

In addition to this biological factor, the sexual risk behaviours associated with HSV and HIV infection are similar. Although HIV is most associated with homosexual behaviour in much of Europe, North America and Australia, in Sub-Saharan Africa HIV is associated with risk factors very similar for those for HSV infection. These include younger age at first intercourse, multiple sexual partners, other STI infections (concurrent or previous) and sex with FSWs.

HSV can also be viewed as an accelerant in HIV disease as it increases AIDS disease progression rates. HSV frequently manifests in transient, recurring increases in HIV viraemia, which in turn has been linked to increased rate of HIV disease progression. This effect has also been seen in placebo-controlled trials where patients receiving high-dose acyclovir for HSV infection were shown to have slower HIV disease progression than the placebo participants (Smith, 2004).

Finally, HSV increases HIV illness, or morbidity, and so could be viewed as influencing HIV disease manifestation. With the immune suppression that is caused by HIV disease, many patients exhibit repeated episodes of

HSV illness. Many of these patients exhibit large and painful herpes lesions that are resistant to treatment. Other illnesses that are particularly common in HIV and HSV or its related viruses co-infected patients include oral hairy leucoplakia and Kaposi's sarcoma. It has been recommended that, in patients who are reluctant to take their antiretroviral medication, adherence to herpes medication should be encouraged as this will improve the disease course of both illnesses in patients, as well as having the added public health benefit of reducing patients' infectivity for both herpes and HIV (Smith, 2004).

The implications for the synergist nature of the relationship between herpes and HIV infection are numerous. In HIV negative individuals, the diagnosis of HSV-2 infection is important as it is a clear indication of susceptibility HIV infection. The early treatment of HSV and counselling around sexual risk behaviour is likely to play a very important role in minimising the risk of subsequent HIV infection. In patients already co-infected, the suppression of HSV is proposed to reduce the rate of HIV disease and to reduce the likelihood of transmission of HIV to sexual partners. This is particularly important in settings where the national guidelines support delaying antiretroviral therapy until there are clear indications of immune system suppression, as they currently do in South Africa. Of particular interest is the fact that the syndromic management of STIs in South Africa has not and does not include the management of HSV-2. In effect this means that syndromic management has targeted almost everything but HSV, probably leading to a very high prevalence amongst South Africans and fuelling the rapid explosion of the HIV epidemic. Additionally, the fact that most episodes of HSV-2 are asymptomatic (but nonetheless carry the risks of increasing HIV risk) means that this illness is not amenable to syndromic management by symptom identification and requires presumptive treatment, which has not been implemented.

Although there is, correctly, a great deal of focus on access to antiretroviral therapy in South Africa, it is suggested in the literature that access to HSV suppressive treatment may have a large impact where antiretroviral therapy is not widely available. Given the link between HSV and susceptibility to and infectivity of HIV infection, it is also suggested

that “an effective herpes vaccine could also reduce HIV transmission rates more effectively than a partially effective HIV vaccine” (Smith, 2004, p.3). Also, prevention technologies that currently are being designed to target HIV infection (like vaginal microbicides to be used by women, for example) may benefit from an expanded focus to include the prevention of HSV-2 infection in areas of high HSV-2 prevalence.

One final consideration regarding the synergistic relationship between HIV and other STIs is the impact that these may have on estimates of behavioural risk. In a study conducted in Kenya and Zambia, young women were found to be much more likely to be HIV infected than young men (Glynn et al., 2001). Behavioural factors alone were unlikely to account for this discrepancy as young men were at least as likely to encounter a HIV positive partner according to estimates used in the study. The fact that HSV-2 infection was much more common in women than men was considered to be a major factor for this discrepancy as it increases the susceptibility of women to infection. This fact is important to consider for any research that links seroprevalence and behavioural risk, as other biological predisposing factors, including infection with HSV-2, may play a role and confound purely behavioural hypotheses.

3.2.2. Inhibition of HIV-1 replication by GB virus C

Co-infection in HIV is most likely to lead to adverse disease progression due to the deleterious effect of the virus on immune responses. However, there is at least one example of when being co-infected with another virus may actually provide a measure of protection to the HIV infected individual, and this is briefly described here to ensure a balanced view. Research data in this regard is available for HIV-1 seropositive individuals co-infected with the GB virus C (GB-C) (Xiang et al., 2004). The GB-C virus is a member of the Flaviviridae and is most closely related to the hepatitis C virus. However, unlike hepatitis C, GB-C does not cause any pathology or illness in the infected individual. The virus is fairly prevalent in the general population (1 to 8% of healthy blood donors in worldwide test positive for infection), and recent attention has been focussed on the protective effect that this virus may have for HIV infected individuals since co-infection has been found to be associated with lower mortality in HIV infected patients. GB-C infection has been shown to inhibit the replication

of several clinical and laboratory strains of HIV. Unfortunately very few studies of the natural history of HIV infection, especially of slow progressors, include routine GB-C testing. There is increasing interest in identifying the mechanisms by which GB-C inhibits HIV-1 replication as this could have important implications for the development of HIV medication, as well as for the use of a modified GB-C strain in a vaccine for modifying the natural history of HIV. Although it makes sense to assume that co-infection in HIV positive patients is usually likely to be detrimental to their health, this fairly recent development is suggestive that not all co-infections are necessarily harmful for the patient.

3.3. The heterosexual transmission of HIV

In order to collect comprehensive data on sexual risk behaviour, it is necessary to first provide an overview on the literature regarding the transmission of HIV. Just over 80% of infections in Africa have been attributed to heterosexual intercourse, with mother to child transmission and blood contamination accounting for the bulk of remaining infections (Lamptey, 2002; UNAIDS, 2004). The following list is indicative of some of the factors that are involved in the heterosexual transmission of HIV (from (Lamptey, 2002):

- Frequent change of sexual partners
- Unprotected sexual intercourse
- Presence of STIs and poor access to treatment
- Lack of male circumcision²
- Social vulnerability of women and young people
- Economic and political instability of the community

Although all of these factors are thought to play an important role, the first three factors will be the focus of this dissertation.

Researchers have tried to quantify some of the specific risk factors in HIV infection, as well as quantifying the risks of both male-to-female and female-to-male transmission by looking at HIV infected individuals and their contact partners (Edwards, 1992). This study found that the stage of HIV disease progression was a significant factor in infectiousness. 42% of the contacts of

² This factor is controversial. Currently studies are underway to assess the benefit of circumcision on HIV risk. As this factors contribution to HIV risk is controversial (Siegfried et al., 2003), it has not been included in this dissertation.

women with advanced HIV illness, versus 3% of those women with CD4+ cell counts greater than 200³, were found to be infected with HIV. Men who had sexual intercourse with women in advanced stages of HIV disease were 17.6 times more likely to be infected than those who had sex with women who were not in advanced stages of HIV disease (CD4+ > 200). Male contacts who had sex with HIV infected females during the menses were 3.4 times more likely to be infected themselves when compared to those men who did not have sexual contact with HIV infected women during the menses. It is suggested that levels of HIV viral particles are higher in blood than genital secretions and that this may lead to the elevated risk of infection during the menses. It is not common for behavioural research in South Africa to record the frequency of sexual intercourse during the menses.

In the case of male-to-female transmission, three factors were identified as being important in the likelihood of HIV transmission (odds of more than one indicate an increase in risk):

Table 4 - Risk Factors (male-to-female HIV transmission)

Risk Factor	Odds Ratio
Advanced stage of infection in men	2.7
Unprotected anal sex	5.1
Female contact older than 45	3.9

The risk of unprotected anal sex in heterosexual transmission is often overlooked, but significant (Halperin, 1999) and this dissertation will discuss this risk factor separately in the results and discussion section.

Edwards (1992) also found that male-to-female HIV transmission was almost twice as effective as female-to-male. The crude transmission rate calculated for male-to-female transmission was calculated at 20%, versus only 12% for the female-to-male crude transmission rate. The effect of the risk factors identified above on transmission rates is summarised in table 5:

³ Antiretroviral therapy is initiated in South Africa when the CD4+ count, a measure of immune system functioning, drops below 200 cells per mm³.

Table 5 - The effect of multiple risk factors on HIV transmission

Number of Risk Factors	Transmission rate
At least two of the factors	54%
At least one of the factors	31%
None of the factors	10%

The data listed above is useful in conceptualising the cumulative effect of individual risk factors listed in the study.

3.4. Health seeking behaviour

Health Seeking Behaviour may play an important role in the control of STIs. The promptness with which individuals seek out treatment, referred to as health seeking behaviour, has been found to be an important factor in explaining the rates of STIs, particularly in adolescents (Fortenberry, 1997). The longer it takes someone to seek out treatment, the more chance there is that they will suffer harmful consequences of infection and also that they will transmit the infection to someone else. The literature has put forward many different reasons for delayed health- or treatment-seeking behaviour. Some of the factors that have been found to be significant include self-perceived risk for infection, retirement status, lower level of education (Seng, Lim, Ng, Wong, & Emmanuel, 2004), race and feelings of fatalism (Plowden, 2003), and gender (Currie & Wiesenberg, 2003), although other studies have found that socio-economic status or duration of symptoms did not appear to influence health seeking behaviour (Danso-Appiah, De Vlas, & Bosompem, 2004).

For this study health seeking has been conceptualised as the duration from identifying the symptoms were present to seeking out treatment. This is consistent with the conceptualisation of health seeking behaviour used by Fortenberry. Although many reasons have been advanced for delaying treatment, one of the potential reasons that will be explored in this study is attitudes towards the provider, which has also been found to be important in other research relating to health seeking behaviour in STI patients (Traore, Mah-Bi, Konan, Ghys, & Diarra, 2004). This is in line with recent criticism of the concept of health seeking behaviour purely in terms of health-service utilisation, versus an understanding of how populations engage with services (Mackian, Bedri, & Lovel, 2004), and why/why not. Another reason put forward for delays in seeking out health care is that individuals may first try to

access traditional care or treatment by their families, followed by treatment by traditional healers and, only after those have failed, then seek out clinics or hospitals (Hatchett et al., 2004). Stigma and traditional myths about STIs may also interfere with patients coming to the clinic for treatment. Some traditional myths may actually be dangerous to the public health. A study in Kenya, for example, found that at least some STI patients believed that an STI had to be transmitted to someone else before it could be treated in the source patient (Moss et al., 1999). The use of traditional medicines is briefly assessed in this study. Although not directly addressed in this study, there is also good data to show that adolescents, particularly at risk for HIV and STIs, are more likely to seek out treatment when services are designed and delivered with them in mind in a way that has been described as 'adolescent friendly' (Mbonye, 2003).

Another aspect of health seeking behaviour that is not explored directly in this study is that of the stages of health seeking that individuals go through before they access the public health care system, particularly in Africa. In a study in Tanzania it was found that patients go through several stages of treatment and resting before accessing the public health system, often only when they are very ill (Green, 2000). This study only sampled individuals who had come to the clinic to seek out treatment, and would have benefited from a community-based sample to give a comprehensive picture. However this was not practical given the resource constraints and exploratory nature of this study. An ethnographic study of treatment seeking behaviour in relation to STIs in South Africa is a potentially beneficial line of enquiry in understanding treatment seeking behaviour in this population.

Avoiding sexual contact was also considered a health seeking behaviour as this is an attempt to prevent further infection, re-infection or transmission of the current infection. The nature of sexual contact during an STI episode and the amount of time spent with a symptom prior to seeking treatment has been linked to the social stigma attached to STIs in Zambia (Faxelid, Ahlberg, Ndulo, & Krantz, 1998).

The number and type of symptoms experienced in the year previous to the current visit are also recorded in this section. This data assist in determining the burden of STIs in the population of interest. The number of episodes of

STI symptoms in the previous year is used as a measure of disease burden in this sample, with the higher number of episodes taken to indicate higher risk individuals who have experienced more infections. Finally, participant perceptions of the treatment received at the clinic were assessed.

3.5. Population-based STI reduction interventions

Data on the success of population-based interventions for reducing STI infection, including HIV infection, are sparse and mixed. The studies that are most often referred to are the Thailand 100% condom study, the Mwanza, the Masaka and the Rakai studies (FHI, 2001b; Sangani, Rutherford, & Wilkinson, 2004).

In the Thailand study the incidence of curable STIs was reduced by more than 80% in less than five years. This was done by improving both STI treatment programmes as well as targeting commercial sex workers with a 100% condom policy. The latter was seen as being successful in this context due to the political and legal support for the policy. The reduction in the overall STI rate was also reflected in a stalling of the then rapidly expanding HIV epidemic. Recent evidence however has indicated that decreased use of brothels has led to increased extramarital and casual sex, pointing to the need to constantly monitor and assess prevention strategies in the changing sexual milieu (UNAIDS, 2004).

In the Mwanza (Tanzania) study, primary care clinics were randomised to either receive improved STI case management or not. 12 communities were paired, with one community in each pair receiving the intervention. The improved STI case management included improved access to drugs and training, increased supervision of staff and improved education regarding STIs. There was no significant reduction in gonorrhoea, chlamydial infection, urethritis or other reported STI symptoms. In this study, the adjusted relative risk of infection in the intervention versus the control groups was 0.58 (95% CI: 0.42-0.70) which amounts to a 38% (95% CI: 15-55%) reduction in new HIV infections in the intervention group. In spite of this gain, there were no measured significant differences in terms of sexual risk behaviour changes.

In the Rakai (Uganda) study, mass home-based antibiotic treatment of STIs was assessed in a randomised controlled study. Treatment was provided

every ten months, without direct diagnosis of any STIs or any symptoms necessary prior to treatment. Both the control and the active arm of the study received identical HIV prevention education, voluntary counselling and testing (VCT) for HIV, free condoms and health care. In this way, the mass treatment was provided to 80% of the adults eligible to receive this treatment. Outcomes indicated that there was no significant impact on gonorrhoea, chlamydial infection, urethritis (inflammation of the urethra) or other self-reported STI symptoms. The intervention group showed some gains in terms of the prevalence ratios of syphilis (0.8; 0.71-0.89), trichomoniasis (0.59; 0.38-0.91) and bacterial vaginosis (0.87; 0.74-1.02). However, in terms of HIV infection the intervention group showed minimal, non-significant gains, with a rate ratio of incident infection in the intervention versus the control groups of 0.97 (95% CI: 0.81-1.16). Additionally there were not any measured significant differences in terms of sexual risk behaviour changes.

In the Masaka (Uganda) study, the research participants were randomised to one of three different treatments. The first group received only behavioural interventions, including education and information. The second group received this, with an additional STI treatment intervention. The final group received the prevailing standard of care provided at government health clinics. The first and third groups were controls for the second group which received the STI treatment intervention. Outcomes indicated a significant decrease in gonorrhoea and symptomatic herpes in the group receiving the additional STI treatment intervention, and no significant decrease for Chlamydia prevalence. However, analysis showed that there was no difference in the control versus the intervention groups in terms of incident HIV infections. In terms of self-reported sexual risk, there was some improvement in reported condom use with last partner although this was not reflected in the incidence of reported genital ulcers and urethral or vaginal discharge.

The authors of the review conclude that the available evidence suggests that mass treatment programmes for STIs may be effective in impacting on the incidence of several STIs. However, the evidence further suggests that this is only likely to have an impact on an emerging HIV epidemic. In communities where the HIV epidemic is established and maturing (as in South Africa), the data suggests that STI mass treatment is only likely to have a minimal impact.

3.6. The Role of Theory in Behavioural Interventions

A theory has been described as a set of related constructs used to describe or explain, predict or control behaviour (MacNeil, 1997; Gina M Wingood & DiClemente, 1999). Each theory may include many constructs (like self-efficacy, peer norms, prevention motivation etc) and the theory usually provides the relationship between these constructs. This linkage between constructs represents a 'map' for understanding the behaviour under study. The value of a theory in behavioural interventions then is that the theory provides some guidance as to the proposed constructs that play a role in behaviour, suggests relationships between these constructs, and suggests ways in which behaviour can be changed by focussing on specific identified components of behaviour. Theories are also considered useful in determining why certain behavioural interventions may have succeeded (or failed) in specific situations (W. A. Fisher, 1996). In short, theories help to organise behaviour in such a way as to focus attention on a limited set of constructs with the highest likelihood of influencing behavioural change. One theory of behaviour change that was developed in response to the HIV epidemic is the information-motivation and behavioural (IMB) model, and this will be used as the conceptual framework for this dissertation.

3.7. The Information-Motivation-Behavioural (IMB) Model of HIV prevention

This model of health promotion behaviour change was developed in response to the persistence of risky behaviour in the face of the HIV epidemic (J. D. Fisher & Fisher, 1992; J. D. Fisher & Fisher, 2002). In a review of intervention studies, the authors concluded that interventions studies that are conceptually based and included all three of the components (information, motivation and behavioural skills) were more effective than interventions which targeted any of these components in isolation. The authors lament that all too often a gap existed between what was known conceptually to be effective in HIV prevention, and the implementation of practical HIV prevention interventions. For example, many prevention efforts centre on the provision of general information about HIV. One of the suggestions of the model is that much of what is provided as information is unlikely to be directly related to behaviour change per se. Knowing the ways in which the virus is transmitted and the

risks associated with different practises does not provide direct information on how to protect oneself, for example.

3.7.1. Empirical support for the Model

The authors indicate that the model has been empirically assessed in studies across different populations of interest and for different behaviours, mostly relating to HIV, but they also include data and empirical support for the model from work on breast self-examination and motorcycle safety to indicate the general applicability of the model in health promotion behaviour change (J. D. Fisher & Fisher, 2002; Misovich, Fisher, Martinez, Bryan, & Catapano, 2003). They also refer to research that indicates that the model has been successfully applied in interventions in HIV risk behaviour with adolescent and young people (J. Fisher, Fisher, Bryan, & Misovich, 2002; J. Fisher, Fisher, Misovich, Kimble, & Malloy, 1996), those in intimate relationships (Misovich, Fisher, & Fisher, 1997), patients with serious mental illnesses (Carey, Carey, Weinhardt, & Gordon, 1997) and injection drug users (Bryan, Fisher, Fisher, & Murray, 2000) to mention just a few of the studies that have been done.

3.7.2. The components of the Model

The general form of this model focuses on three core factors that play a role in prevention behaviour. These are the informational, motivational and behavioural aspects of any health promoting behaviour. Figure 1 summarises the essential components of the model:

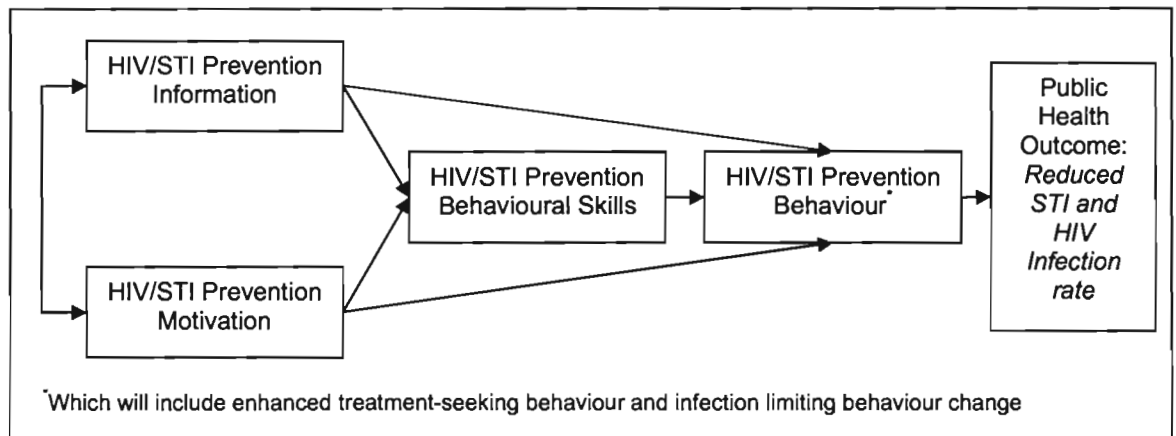


Figure 1 - The Information-Motivation-Behavioural Model of HIV Prevention Behaviour (General Model) - (adapted from Fisher & Fisher, 1992)

According to Fisher & Fisher (2002), the overall postulate of the model is that “the extent to which individuals are well informed, motivated to act, and possess the behavioural skills to act effectively, they will be likely to initiate and maintain patterns of HIV preventive behaviour” (p.45). Most importantly, the model stresses that the information that is provided needs to be “directly relevant to preventative behaviour and... be enacted easily in the social ecology of the individual is a prerequisite of HIV preventative behaviour” (Ibid., p.45). Information-based approaches to HIV prevention may fail because, although they provide a lot of good information regarding HIV infection and transmission, they do not provide facts that are easily and directly related to the specific preventative behaviours required to reduce the risk of infection. They may also not take into account the specific behavioural skills that need to be developed in order to enact the HIV prevention behaviour. The authors go on to say that problems may be encountered in translating information into action in that individuals may rely on prevention heuristics (rules of thumb that individuals use to make prevention decisions that may be incorrect) when making decisions regarding sexual risk behaviour. For example, they say that individuals may use the heuristics that monogamous sexual relations are safe relations, or that sex with known partners is safe sex, which would interfere with effective prevention behaviour (like always using condoms during sex). The information content of prevention interventions, then, needs not only to be accurate but also useful and specifically linked

to achievable prevention behaviours for specific groups of people. They argue that merely knowing that condoms help to prevent infection is not going to help someone who is unable to negotiate condom use in their current situation, for example. In addition to this, knowing a great deal about transmissions dynamics and natural history of HIV infection may not also easily be translated into specific prevention behaviour. Given that the resources in the STI clinic are likely to be already over-extended, the suggestion of this model to determine what specific information would be useful and necessary to participants in order to enact specific prevention behaviours within their own social context is considered to be a useful suggestion.

The motivation to enact specific preventative behaviours is also important. Motivation is a little less obvious than information to define (which can be equated with knowledge and tested using a 'quiz'). Fisher and Fisher (1992) reviewed literature on motivation and conclude that motivation can be determined in relation to at least three different elements. They suggest that motivation is affected by (i) attitudes towards specific prevention behaviours (for example attitudes towards condoms or abstinence), (ii) the perceived social support for the preventative behaviour, and finally (iii) perceptions of perceived personal susceptibility to HIV. That is, people are likely to be motivated to enact preventative behaviour that they have a favourable attitude towards, that they perceive others as being supportive of, and if they see themselves as being at risk for HIV infection. In theory, each of these elements can be measured or assessed in any intervention study. These elements are common to many different theories of behaviour change, including the AIDS Risk Reduction Model, the Theory of Reasoned Action, the Social Cognitive Theory, the Health Belief Model and the Stages of Change Model (Fishbein, 2000; J. D. Fisher & Fisher, 1992; MacNeil, 1997). The strength of the IMB model is that is developed specifically for HIV research, and is based on an understanding of how which components from other models are most important based on the authors of the model's review of published literature on behaviour change (J. D. Fisher & Fisher, 1992). Unfortunately few prospective studies exist in order to test this in an efficient manner, and the literature usually relies on cross-sectional studies of risk behaviour.

The third element of the model refers to behavioural skills. The authors stress that possessing relevant behavioural skills is a prerequisite for an informed and motivated individual acting on prevention behaviour. They suggest that two important factors contribute to behavioural skills, namely (i) the person's objective ability as well as (ii) their perceived self-efficacy for that specific behaviour. Self-efficacy is a concept that is central to the Health Belief Model (MacNeil, 1997), amongst others, and refers to the individual's belief that they can perform a specified behaviour in a specific situation. This suggests that the greater the perceived self-efficacy, the greater the likelihood that a person will attempt a behaviour, and the greater their objective ability, the greater the chance that the attempted behaviour will succeed. As self-efficacy relates to perceived ability, this is something that is potentially susceptible to influence through affirmation and positive information. Again this model stresses that there are many behavioural skills that may be needed to engage in general HIV prevention behaviour, but that those specific skills most directly relevant to the population targeted by the intervention need to be emphasised in any one intervention. The skills required may be different for different people in the population. The behavioural skills required to ensure the use of male condoms in sexual activity may be very different for men and women in the population, for example.

The model suggests that information and behaviour may be directly translated into behaviour. Two examples are given. In the first example, it is suggested that a woman who learns about the benefits of prenatal HIV testing may go for this testing on the basis on the information provided by her health-provider. This, the authors suggest, information has had a direct impact on prevention behaviour. In the second example given, they indicate that motivation may impact directly on prevention behaviour when someone decides to abstain from sex rather than using condoms which would require a whole set of behavioural skills relating to the acquisition, negotiation and consistent use of condoms. However, it is difficult to see that even abstinence or HIV testing for the prenatal woman would not include any specific behavioural skills, even if these are simply to avoid situations in which they may be pressured into sex, or in being able to ensure that they were able to get to the relevant clinic for testing. For this

reason, it is suggested that it is unlikely that information or motivation would impact directly on behaviour without some specific behavioural skills (however slight) coming into play.

Fisher and Fisher (2002) state that the identification of the information, motivation and behavioural skills components that are relevant for a particular population to enact specific protective behaviours is essential in both the design and implementation of a behavioural intervention which is “conceptually based and empirically targeted” (p.48), as well as in the adequate evaluation of any intervention.

3.7.3. The IMB approach to promoting prevention behaviour

The approach taken by the model indicates at least three steps in the process of changing behaviour. The first step, most relevant to the purpose of this study, is referred to as the elicitation stage of research. In this stage, research is conducted to elicit the levels of existing information, motivation and behavioural skills. Without a clear understanding of the risk profile of any specific population, it is impossible to determine which specific prevention behaviours are required, desirable and tenable for the specific population of interest. This pre-intervention assessment is also a critical element of being able to assess the effectiveness of any intervention. The authors of the model note that this pre-intervention research, which is so critical to the development and assessment of an intervention, is also most frequently missing from the process (J. D. Fisher & Fisher, 1992).

The second step in promoting prevention behaviour would be to use the data collected in the elicitation stage to implement a specific and targeted intervention, based on factors identified empirically in elicitation research, to increase relevant health information, motivation and behavioural skills to encourage the adoption of specific prevention behaviour. This means that any behavioural intervention would be highly population- and behaviour specific and designed to address any deficits detected in the information, motivation and behavioural components of the elicitation research.

Finally an evaluation should be conducted to determine the impact on the intervention on the specific IMB foci and the health outcome defined in relation to the specific intervention. The authors of the model suggest that this should be done using convergent sources of information (self-report and diagnosis of infection), and sources that individuals may not directly link to the intervention. For example, the reported use of male condoms in sexual acts may be measured in female self-report in women who did not take part in the intervention directly, but may be partners of men who did.

3.7.4. The IMB model components for this study

The model was selected for use in this study for several reasons including that it has published data to support its usefulness, it was developed to be used in HIV prevention interventions, and it includes all the components of prevention behaviour change that were found to be important in a review of prevention approaches (J. D. Fisher & Fisher, 1992). In addition to this, it is a model that has a very clearly structured approach that includes exploratory or elicitation research, design and implementation and assessment components. In this sense, then, it has been proven to be a comprehensive and coherent approach to behavioural intervention research from conceptualisation, design and implementation through to the final stage of assessment.

When using the IMB model as a conceptual framework, it is useful to look at the desired health outcomes, and work backwards to the specific informational, motivational and behavioural skills components relevant to those specific health outcomes. As described previously, this application of the framework will ideally allow for intervention implications to be drawn from the survey data collected. With this in mind, the following overview of the components of the model is presented in relation to the target population of this study, and the issue of STI recurrent infection.

Health Outcome

The desired health outcome for this study population would be a decrease in recurrent STIs which would lead to a reduction in the associated risks for HIV infection. To conceptualise the model for this study, the specific prevention behaviours required to reduce STI infection need to be identified. Once this is done, the specific behavioural skills needed to

carry out the prevention behaviour should be outlined. On the basis of these specific skills, the specific prevention information and the required prevention motivation can be outlined. Finally, these components can be compared to the data from the elicitation research to identify deficits which should be rectified in any intervention with this group.

Prevention Behaviour

This will be conceptualised in relation to the mantra HIV prevention in South Africa and across the world, which is the ABC or, more fully, the 'abstain', 'be faithful' and 'condomise' approach (Shelton et al., 2004). Abstinence can be measured as the age of first sexual intercourse as this is an indication of abstinence prior to sexual debut. Also, if participants indicate that their last sexual contact was some time ago they are indicating that they are currently abstinent. The 'be faithful' part of behavioural prevention will be assessed by looking at the nature and extent of sexual networking patterns. Finally, the use of condoms will be assessed in specific situations, including in relation to different sexual risk behaviours (including anal sex). Strategies to avoid infection or re-infection during an STI episode will also be assessed. These would include avoiding sex during an STI episode, or the use of condoms during an STI episode. Treatment seeking behaviour (assessed as the length of time it takes individuals to seek out treatment for an STI) will also be assessed, and potential factors relating to this will be explored (for example, the attitude towards providers).

Specific Behavioural Skills required

In order to be able to reduce STI infection, the participants will need to be able to adhere to the basic tenets of the "A, B, C" approach to HIV prevention. That is, they will need to abstain for as long as possible, be faithful to one partner when sexually active, and try to use condoms as often as possible (when not trying to have a child). Being able to negotiate the use of condoms is a specific skill that will require different approaches for men and women (who may not be in a position to do this easily).

Patients who are visiting the STI clinic are not likely to have been successful in their implementation of the abstain strategy of prevention, but this may be suggested as a way forward. They should certainly

attempt to abstain when they have an STI, or to use a condom consistently if this is not possible. In relation to STI patients specifically, they will need to seek treatment as quickly as possible for STIs as well as adjusting their behaviour during an STI episode to reduce the risk of re-infection or of infecting their partners.

Prevention Information

In order to develop the behavioural skills outlined above, participants will need to know the specific relationship between STIs and HIV, including information regarding the biological susceptibility that they accrue. They will need to know that it is essential to seek treatment as soon as possible, and to be able to self-identify symptoms early on in infection. They will also need to know which behaviours are considered risky and, specifically, which behaviours are more risky than others (if they are to decide to take adequate and appropriate precautions in specific situations).

Prevention Motivation

Prevention motivation has been described as being essentially composed of attitudes towards the prevention behaviour and the social norms that support prevention behaviour. In terms of attitudes it will be important that participants have a favourable attitude towards infection avoidance behaviours (attitudes to condom use, abstinence, and attitude towards the provider and its relationship with early treatment seeking behaviour), belief that negative outcomes can be avoided by adopting prevention behaviours, and the sense that they are personally affected by an increased risk for HIV infection. The social norms refer to the perceptions of significant others' support for treatment and infection avoidance. For example, it will be important to have some understanding of the extent to which partners support each other during an infection and how widely partner notification is used and accepted.

The general model that will be explored in this study is diagrammatically illustrated in the figure 1. The specific IMB model that is developed in relation to the elicitation research in this study will be outlined in the discussion section of this dissertation. The model illustrated here forms the basis on a more detailed reworking, illustrated in the discussion

section as figure 20. The literature review forms the basis of the details of the components of this model, and these details are further outlined in the methods section where the literature is linked to the content of the research questionnaire.

4. Methodology

This is a cross-sectional, descriptive study. The overall aim of the study is to profile the demographic data, health seeking behaviour, sexual risk behaviour and HIV awareness and willingness to test in a sample of STI clinic attendees in order to inform intervention programmes aimed at reducing the burden of disease in this group, thereby reducing HIV risk. It is hypothesised that those individuals who are poorly informed about key prevention information (particularly regarding the biological susceptibility to HIV infection when co-infected with an STI), who are poorly motivated due to poor attitudes towards or lack of social norms in favour of prevention behaviour, and who lack some key behaviour skills (like skills for identifying STIs early, or negotiating safer sexual practises) will be less likely to be able to initiate and maintain specific prevention behaviours. By targeting identified gaps in the informational, motivational and behavioural skills components for intervention, it is proposed that a conceptually based and targeting intervention programme may be developed.

A convenience sample of clinic attendees was recruited for participation in this study. Data were collected from consenting patients in the waiting area in the clinic using a structured questionnaire (Appendix A). The questionnaires were verbally administered by two fieldworkers (a male and a female medical school student) to ensure that the questions are clearly understood by respondents. A total of 98 interviews were conducted between May and September of 2003. All patients of the STI clinic were eligible for this study. The data collection was conducted in a private consulting room, or away from any other patients waiting to be seen at the clinic. Training was provided to the fieldworkers prior to administration of the questionnaire, and meetings were held during the data collection phase to identify and remedy any data collection difficulties. This methodology is consistent with other, similar, research in the area of STIs and risk for HIV spread (Behets et al., 2001).

4.1. Ethics Approval

Prior to data collection, written informed consent was obtained from patients (Appendix B). Patients were told that they were to be asked questions that they might find embarrassing, and reassured both about the confidentiality of responses and the scientific aims of the study. Ethics approval for the study, and the information to patients and informed consent forms was obtained from the research ethics committee of the Nelson R Mandela School of Medicine (Ref: E175/02, Appendix C) and permission to conduct the study was obtained from the Ethekwini Municipality Health, Safety and Social Services Cluster Health Unit prior to study initiation (Appendix D). As the interviews were conducted while patients would ordinarily be waiting to be seen by the clinic staff, no compensation was paid for participation.

4.2. The Setting⁴

The Prince Cyril Zulu Communicable Diseases Centre (CDC) is located in central Durban, adjacent to the Warwick Triangle market area. The triangle is at the centre of the transport services in Durban, with the central bus, 'mini-bus' and rail station all within 500 metres of the clinic. This means that the clinic is very accessible, often more so than clinics in the areas of residence of participants. The majority of patients visiting the clinic are self-referred, either symptomatic with genital ulceration or discharge syndrome, or as sexual contacts of patients diagnosed with an STI. It is estimated that this clinic sees around 40 000 patients a year, around 36 000 of which are presenting with new infections. These patients are an important group as they are at increased risk of contracting and transmitting HIV. The CDC consists of two levels. The lower level is made up of the reception area where all patients arrive and are processed, and the TB clinic where X-Rays, sputum collection and TB therapy consultations are done. This lower area also houses the pharmacy. The upper level of the centre is the location of the sexually transmitted infection (STD or STI) clinic. The clinic is divided into two waiting areas, one side for male patients and the other for female patients. The two waiting areas are separated by consultation rooms which are positioned along the central axis of the area. Laboratories are also housed in this central area. Patients enter the centre on the first floor, report to the reception area where

⁴ This description of the CDC is in part based on a description developed and provided to me in a personal communication by Dr Ayesha Kharsany at CAPRISA (Centre for AIDS Programme of Research in South Africa), Nelson R Mandela School of Medicine

they are logged and given a clinic card. They then proceed to the STI clinic area where they wait in the one of the two waiting areas. Once seen by the nurse, they proceed back down to the ground floor where they can receive medication from the pharmacy, if prescribed. The interviews for this study were conducted either in a consultation room at the STI clinic, or in a section of the waiting area, away from other patients. The latter strategy was used in deference to some of the participants' wishes who did not want to be interviewed out of sight of the waiting area for fear of losing their place in the consultation and treatment queue.

4.3. The Questionnaire

The assessment tool for this study was a structured questionnaire that was developed from other existing tools, as well as a review of the literature on risk factors for sexually transmitted infections, as outlined above. The questionnaire was piloted in student work in the department of community health and supervised by the author of the current study in the year preceding data collection for this study. The questionnaire was organised around four sections:

Section 1: Demographic Information.

The purpose of this section is to describe the demographic characteristics of the sample of patients interviewed. In addition to this, the demographic variables are designed to yield data on the utilisation of the clinic in relation to the target population for this public health facility. Data collected in this section include age, gender, relationship status, occupation, observed race and residence during or the week and on weekends. The literature review has clearly indicated that HIV affects men and women differently with women experiencing greater disease burden and the role of gender was specifically explored in the analysis of the data.

Section 2: Health Seeking Behaviours.

For this study health seeking has been conceptualised as the duration from identifying the symptoms were present to seeking out treatment. It is also conceptualised in terms of whether or not the participants have come to the clinic before, as well as their perceptions of provider care and the availability and usefulness of 'western' medicines versus traditional

treatments (especially in relation to HIV/AIDS). This is consistent with the conceptualisation of health seeking behaviour used by Fortenberry (1997, 2002) as well as other factors identified and explored in the literature review.

Section 3: Sexual Risk Behaviour.

Although the factors that place individuals at risk are well known, and safer-sex is widely advocated, it should be noted that sexual behaviour is not completely under volitional control as it usually requires the cooperation of at least two individuals. Also this behaviour takes place in private and is sometimes taboo and, therefore, self-report data is often the only means of assessing this behaviour. Age of sexual debut, sexual risk behaviour (condom use, anal sex, partner acquisition) and partner notification were explored in this section. All of these factors have been found to be important in understanding sexual risk for the contraction of STIs, including HIV (ReproLine, 2003). Partner notification is part of the national treatment guidelines for STIs. In this way patients are encouraged to inform their partners of their own STIs so that partners can also seek out diagnosis and treatment, if necessary. As the IMB model being developed for this study focuses on the A, B, C of prevention, information regarding abstinence (both in terms of sexual debut and in terms of behaviour during an STI episode), partner acquisition and patterns, and the use of condoms in different situations was explored.

Section 4: Perceived risk of HIV infection and willingness to be screened for HIV.

This section deals with several issues relating to HIV/AIDS. The first section dealt with perceptions about the spread of HIV and the risk of infection. Finally participants were asked if they knew their HIV status and about their willingness to test for HIV. The willingness to test for HIV will be analysed in relation to motivation regarding behaviour change in HIV as individuals who are willing to be tested are likely to both see themselves at risk, as well as having some sense of being able to do something regarding their infection risk. These are both elements of behaviour change identified by the health belief model, as well as the IMB model (J. D. Fisher & Fisher, 2002).

Clinical Assessment

The final page of the questionnaire was detachable and it was given to the participants to take into the consultation with the nurse. This form included the capture of information regarding the nurse's perception of the presenting symptoms, as well as the treatment provided (including the standard of care STI treatment options, as well as partner notification, condom use advice and condoms provided options). The purpose of this section is to allow the researchers to compare the nurse's symptoms with self-report symptoms to see how easily participants are able to identify meaningful symptoms, as well as to provide an indication of how closely the treatment guidelines are being adhered to in terms of medicines prescribed, partner notification cards and condom use advice and provision.

4.4. Data Capture

Data was captured off the questionnaires into forms set up in EpiInfo 3.0 (Centres for Disease Control, USA, www.cdc.gov/epiinfo). Example pages from EpiInfo are included as Appendix E. The use of EpiInfo forms allowed for the data to be entered in a way that was consistent with the questionnaire format, minimising potential data-entry errors. For questions that required one of a set of predetermined response categories to be selected (Yes/No/Refused, for example), tables were created that allowed the data to be captured from a drop-down list. All data for one questionnaire was entered into the database sequentially. It is suggested that double-entry and the automated EpiInfo 'Data Compare Utility' are used to ensure that data is not incorrectly entered, however this was not possible within the scope and resources of this study.

4.5. Data Coding

The questionnaire was transformed into forms in EpiInfo for data capture. In the process of doing this some standard data coding capacity was incorporated. For the entry of numbers, no coding was required. Open-ended questions were captured in free text fields. For certain options on the questionnaire a limited number of responses was possible. These questions would include "Yes/No/Refused" questions, as well as any other question for which specific categories existed to be selected (for example, race or options like "No/Only Sometimes/Definitely Yes/Unsure"). For these questions,

numerical coding was used where the numbers were assigned according to the position on the questionnaire. That is, the first option on the questionnaire was assigned 1, the second 2 and so on. When this data were imported into SPSS, the data were already coded and the values assigned were also entered into the 'values' tables in SPSS. This allowed the data to be analysed in the coded categories, but to be labelled according the options originally used on the questionnaire. In SPSS this also allowed for the data to both be displayed as numerical categorised data, or with the value labels displayed which facilitated working with the data in SPSS.

Qualitative data, or open-ended responses, are particularly useful when researchers need to determine quickly what behavioural practises are, or when existing information regarding sexual behaviour is available (FHI, 2001a). Qualitative data collection involves the collection of all data that is not directly quantifiable. Qualitative data usually involves the analysis of texts or symbols that represent actions or people, or events in social life (Neuman, 2000). Although predetermined categories allow for the rapid and efficient collection and analysis of data, open-ended questions allow for the accurate collection of data when pre-determined categories are not available, or research suggesting the most likely options is not available. Due to the lack of data in this regard, many open-ended questions were included in this study. Open-ended questions are also seen as a critical element of the elicitation research required for the IMB model (J. D. Fisher & Fisher, 1992). That is, in order to develop an appropriate intervention that is group-specific, elicitation research should be conducted to determine what the current risk profile is of the group targeted for intervention. The risk profile should include a profile of current risk behaviours, as well as some understanding of current knowledge and motivation (as indicated by attitudes towards behaviour change and social support for this change). The authors suggest that open-ended responses are more likely to elicit the information, motivation and behavioural skills that are meaningful and accessible to the target population, allowing for an intervention to be designed specifically targeted to augment or correct these factors.

The responses were not intended to be comprehensive or recorded verbatim, but rather to allow respondents to indicate their behaviour beyond what would be possible with predetermined categories. It is anticipated that the analysis

of the data from this questionnaire would facilitate the creation of predetermined categories for some of these items in future research. That is, it is anticipated that the data from this study would form the basis of empirical evidence for the use of predetermined categories in future studies on sexual risk behaviour conducted at the CDC.

The qualitative data collected within the context of this study should not be confused with, or equated with the richness of 'true' qualitative data. That is, the data collected in this study was not intended to be rich and detailed, nor to be subjected to subtle and nuanced discourse analysis. Rather the data collected was intended to be a quick and reliable means of getting answers from participants for activities not well enough understood from the outset to provided predetermined categories of response. Two factors prevent the in-depth or nuanced analysis of the qualitative data in this study. Firstly, the responses are recorded on questionnaires in limited spaces on the questionnaires. The responses are not recorded verbatim, not is the space generous enough to allow for nuanced and complete responses to the items. Secondly the responses were recorded by interviewers and are not the verbatim or direct responses of the participants themselves (as they would be if they were transcriptions of tape recordings of interviews), but written down by the interviewers who also translated from isiZulu whilst writing out the responses. Any attempt, therefore, to analyse the open-ended responses in an in-depth way would be unjustified. The only justifiable analysis is to code statements for general content, and to analyse the codes using counts.

In order to do this in the most systematic way, an iterative process of open, axial and selective coding was implemented (Neuman, 2000). In open coding, the open-ended statements were read for their essential meaning, and a code was developed to capture the essence of what each participant said. Codes were developed as new statements were read that did not fit with the existing codes. Once all statements were read, these preliminary codes were checked to see that they were sufficiently comprehensive to account for all statements, but specific enough to be different from each other. This form of coding allows for the data to generate coding schemes, and also allows for themes to emerge from the data, something that would not happen if the coding scheme was predetermined. In the second round of coding, axial coding, the data were read with the existing codes in mind and an attempt was made to see if

any existing coding could be combined into meaningful clusters and to see if coherent themes underlie the initial codes developed. This stage allows for the reorganisation of the codes used to see if coherent organisation underlies the preliminary coding. During this stage codes may be combined or related to each other, less descriptive or meaningful codes deleted and new codes could be created. In the final stage of coding, selective coding, the themes and coding structure was already established and the data were scanned for cases that were illustrative of the themes developed. For example, those cases that were illustrative of attitudes towards treatment at the clinic were identified to be incorporated into the table 16, Coding Scheme for Patients' Responses. This table should also be considered for examples of the original statements, and the codes assigned during coding.

4.6. Data Analysis

The data file was imported into SPSS 11.0.1 for analysis. The analysis plan was developed in accordance with established practice (Hair, Anderson, Tatham, & Black, 1995; Howell, 1997, 1999; Siegal & Castellan, 1988). Once the data had been imported into SPSS, data cleaning was conducted. This was done by requesting frequencies and descriptive statistics for the data, where appropriate. The graphical distribution of variables was also examined. This allowed for the identification of unexpected values, or values that did not appear to fit the data. Any such values were checked against the original questionnaires to determine the correct values.

For continuous or measurement variables, descriptive statistics used would include the mean and the standard deviation. Where data were deemed to be significantly skewed, the median and inter-quartile range was reported. The distribution is determined to be positively skewed when the ratio of skewness to the standard error of skewness is greater than 2⁵. If the data were to be analysed using parametric statistics, the assumption of normality was tested using the Kolmogorov-Smirnov test for normality. As repeated measures or matched-samples were not used and only two groups were compared, the t-test for independent samples was used. The assumption of homogeneity of variance was tested using Levene's test for the equality of variances. Where

⁵ SPSS 11.0.1 online help

variances were found to be heterogeneous, the t-test for heterogeneous samples was examined and interpreted.

For data that do not meet the assumptions for the t-test, the Mann-Whitney U for two independent samples was used and tested at the 5% level of significance. The Mann-Whitney U is reported, as well as the number of observations/ranks used in the analysis and the corresponding p value for significant results (Siegal & Castellan, 1988).

For categorical data, frequencies and percentages were utilised as descriptive statistics. For statistical analysis Chi-square was used. In order to determine which cells contributed significantly to a significant Chi-square, the standardised adjusted residuals were examined. The standardised adjusted residual is calculated by subtracting the observed value from the expected value and dividing by the square root of the expected value (Becker, 1999). The purpose of this is to determine which specific cells in the cross-tabulation were statistically significantly different from the null. The standardised adjusted residuals can be viewed as any other standardised scores and values greater than ± 2.00 are usually considered statistically significant. Chi-square was frequently not possible as low expected frequencies would invalidate the interpretation of test results. In the case of low expected frequencies and two-by-two tables, Fisher's exact test was utilised (Norman & Streiner, 1997). However, it should be noted that Fisher's exact test is a conservative test and so should only be used when Chi-square is not appropriate as it may fail to find a true difference in some cases (Norusis, 2002). In the case of low expected frequencies and where it was conceptually possible, categories were collapsed or combined to remove categories that had low expected frequencies.

In order to determine the relative importance of the many variables measured, a set of multiple regression models was explored. A multiple regression is a multivariate procedure that allows for the exploration of the simultaneous influence of multiple independent variables (predictors) on one dependent variable (criterion) (Hair et al., 1995; Howell, 1997; Kerlinger, 1992). For the purposes of this study, the number of reported STI symptoms in the previous year was taken to be an indicator of sexual behaviour risk, and was used as the criterion variable in the regression analysis. Variables collected in the

questionnaire that theoretically predicted behavioural risk were entered into an overall regression model to determine the relative importance of these predictors in describing behavioural risk. A revised model was developed that included the most important factors and this was analysed separately for the male and female participants.

All statistical analyses were tested at the 5% level of significance, and exact p values are reported where relevant.

5. Results and Introductory Discussion

The results of this study will first be described in terms of descriptive and univariate analyses, then in terms of a regression model to describe risk factors for repeat STI infection. As this is an exploratory and descriptive analysis, it is difficult to separate results and description, or to structure the reporting around specific hypotheses. For this reason, the results will be described with brief discussion where necessary. The discussion section will integrate the results, and provide an overview of the findings.

5.1. Response Rate

Even though the sample was a convenience sample, a log was created to record and characterise reasons for non-participation and to determine whether the sample showed any obvious response biases. Although data from convenience samples cannot be generalised beyond the pool of participants sampled, all research participation is voluntary and as long as care is taken not to sample only some participants (only those who are very eager, for example) this data can have value (Mertens, 2005). The form recorded the date, the age, gender, race and a reason for non-participation. Twenty three refusals were recorded which represents a response rate of 80.9% (98 out of 121). The refusal log gives no indication that the convenience sample recruited does not adequately represent clinic participants. Response rates are important in survey data as they indicate how much the sample is likely to represent the population of interest. For example, it is possible that people with strong views regarding the survey topic are more likely to respond meaning that the strength of attitudes measured on surveys may be out of proportion to the attitudes held by the general population (Ibid). In the case of a survey regarding sexual risk it is possible that the individuals who feel most comfortable answering questions

regarding sexual behaviour may not necessarily be those who are most representative of the population. Although there are many opinions on adequate response rates, if the rate is below 75% there may be significant differences between the answers provided on the survey and those that would have been recorded had everyone answered (Neuman, 2000). From this perspective, the response rate for this survey may be deemed to be good, although a response rate in excess of 90% would have been deemed to be excellent.

The use of a modest monetary reward would have been the most effective means of increasing the response rate, and this has established beneficial effects, but this was not considered necessary or possible within the resource constraints of this study. Additionally, this was problematic from an ethics perspective as it was anticipated that participants would answer the questionnaire in the time that they would ordinarily be waiting to be seen by clinic staff and compensation may have been viewed as undue inducement to take part in the study.

In order to determine how representative the sample is, the data collected is summarised in table 6:

Table 6 - Demographic Data (refusals)

Gender	Mean Age (SD)	Median Age	Modal Age	Age Range	Race
Male (n=15)	31.36 (8.47)	26.5	21	19 - 45	100% African
Female (n=8)	24.20 (7.98)				

Although nearly twice as many men refused as women, age and race were not significantly different to the respondents. It is possible that women experience more difficulty in taking time off work to attend the clinic, and this is reflected in the reasons given for refusing to take part in the study.

Time pressure was the most common reason given for non-participation, and this is summarised in table 7:

Table 7 - Reasons for Non-participation

	Frequency	Percent	% of Men (n=15)	% of Women (n=8)
Too many questions	3	13.0	13.3	12.5
Not enough time	7	30.4	20.0	50.0
Not feeling well	3	13.0	13.3	12.5
Don't feel like I know enough	4	17.4	26.7	0.0
Not comfortable with the questions	2	8.7	0.0	25.0
No reason given	3	13.0	20.0	0.0
Can't sign things I don't understand	1	4.3	6.7	0.0
Total	23	100.0	100.0	100.0

When considered in light of the gender of the respondents, it is clear that women were more likely to give time constraints as a reason for not taking part, with 50% of the women who responded giving this as their reason. Only 20% of men gave this as their reason. Men were more likely to indicate that they did not know enough about the subject to respond (26.7%), whereas none of the women gave this as their reason. Finally, whereas 20% of the men gave no reason for their non-participation, none of the women did so.

5.2. Demographic Data

A total of 98 interviews were conducted between the 12th of May and the 1st of September 2003. Fifty of the participants were male (51.0%) and the remaining 48 were female (49.0%). A total of 97 (98.9%) of the participants were black, with 1 male Indian participant. The participants ranged in age from 17 years to 47 years old. The mean age was 27.1 years (SD=6.7), with a median of 26 years old. The average age of men in the sample was 28.3 (SD=6.6) and slightly higher than that of women at 25.9 (SD=6.62), but this was not statistically significant. This is diagrammatically illustrated in figure 2.

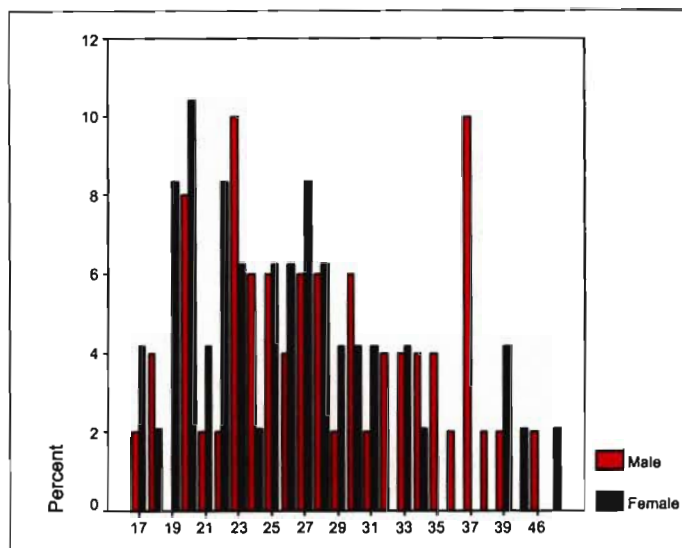


Figure 2 - Age by Gender

In terms of employment, the largest group of individuals was unemployed (41.8%). Students made up an additional 12.2% of the sample, and were not included in the unemployed count as they were occupied even if they were not directly earning a salary. The categories of employment that account for the majority of the sample are summarised in table 8 (unless indicated, the split for gender was similar):

Table 8 - Employment categories

Category of Employment	Frequency	Percentage, % (N=98)
Unemployed	41	41.8
Student	12 (10 female)	12.2 (83.4% female)
Sales	7	7.1
Police/Security	7 (6 male)	7.1 (85.7% male)
Hospitality	5	5.1
Temporary Employment	4	4.1
Total:	76	77.4

The remaining participants were employed in labour-related employment such as harbour or factory labour. The fact that the largest proportion of participants was either unemployed or studying is consistent with expectations of who would access public health services in South Africa, as these facilities are geared to servicing low income or unemployed individuals.

Participants were questioned regarding their place of residence during the week, versus their place of residence over the weekend. This question was included to ascertain the extent to which patients migrate for work, and also the extent to

which the clinic is serving the needs of people who live in Durban. This information is summarised in the table 9:

Table 9 - Residence Category

Residence Category	% During Week (N=97)	% Weekends (N=97)
Durban/Durban Suburb	42.3	44.3
Durban Township	44.3	44.3
Durban Rural Area	6.2	6.2
Not in Durban	7.2	5.2
Total:	100%	100%

The data indicated that nearly 90% of patients at the clinic live in and immediately around Durban, and that there is very little migration in this patient population.

Current partnership status was assessed by asking participants to indicate which of the following categories was most indicative of their current primary relationship status: no partner, married, and stable partner. When the sample is taken as a whole, 74.5% of participants indicated that they were in stable partnerships, 16.3% indicated that they had no primary partner and the remaining 9.2% indicated that they were married.

When analysed for the effect of gender, a significant relationship is found. χ^2 analysis was conducted on the data, and it was found that men and women reported significantly different primary partnerships. This data are summarised in table 10:

Table 10 - The Interaction between Gender and Primary Partnership

			Relationship Status			Total
			No Partner	Married	Stable Partner	
Gender	Male	Count	13	4	33	50
		% within Gender	26.0%	8.0%	66.0%	100.0%
		Adjusted Residual	2.6	-.4	-2.0	
	Female	Count	3	5	40	48
		% within Gender	6.3%	10.4%	83.3%	100.0%
		Adjusted Residual	-2.6	.4	2.0	
Total		Count	16	9	73	98

The standardised adjusted residuals revealed that men were much more likely to indicate that they had no primary partner (26.0%) and far fewer men than expected indicated that they had stable partnerships (standardised adjusted

residuals > +2.00). The opposite was true for the women in the sample with women indicating more often that they were either married (10.4%) or in stable partnerships (83.3%) and this was statistically significant ($\chi^2_{(2)}=6.994$, $p=0.03$). This is illustrated in figure 3.

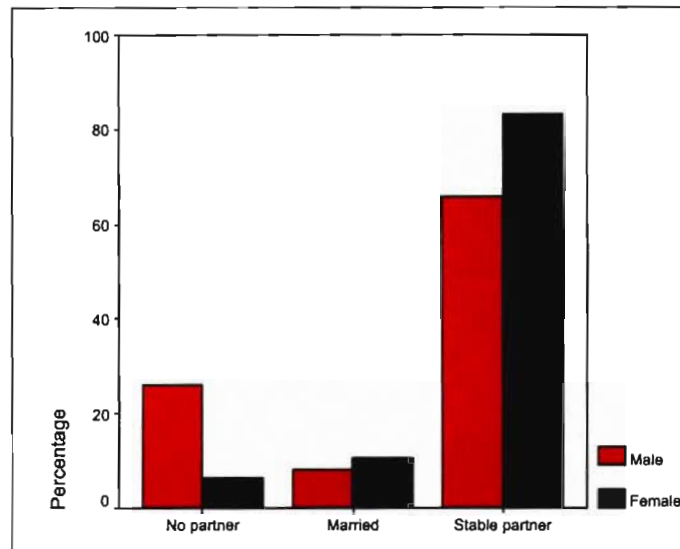


Figure 3 - Primary Relationship for Men and Women

5.3. Health Seeking Behaviour

Participants were asked whether or not they had attended the Prince Cyril Zulu STI clinic before. Of the 98 participants 65.3% indicated that they had been to the clinic before. There was no effect for gender ($\chi^2_{(1)}=0.022$, $p=0.883$). Repeat clinic attendance is an indication of repeated STI infection and, as repeat STI infection is a risk factor for HIV, this population is clearly at high-risk and should be targeted directly for HIV prevention interventions.

Patients were asked to list the number of instances of various symptoms indicative of an STI infection they had in the twelve months prior to the interview. Only 7.1% of participants reported no symptoms in the previous twelve months. The mean number of different symptoms was 3.02 (SD=1.844). The median and mode were also 3. That is, the respondents listed, on average, that they had experienced three different symptoms in the previous twelve months.

The specific symptoms checked, and the percentages of participants listing at least one episode of these in the last twelve months are summarised in table 11:

Table 11 - Symptoms (previous twelve months)

Symptoms	% of total (n=98)	% Men (n=50)	% Women (n=48)
Discharge (urethral/vaginal)	53.1	46.0	62.5
Burning urination	52.0	52.0	54.2
Itchiness of privates (pruritis)	43.9	46.9	47.9
Genital ulcer/sore	37.8	52.0	27.1
Genital warts	23.5	29.8	18.8
Pubic lice	22.4	30.0	18.8
Pain in lower tummy	36.7	26.0	54.2
Pain during intercourse	25.5	30.0	27.1
Any Symptom	79.6	90.0	68.8

Overall a high proportion of participants report a history of STI signs and symptoms over the previous year, as indicated in the table above. A discharge syndrome, lower abdominal pain and genital pruritis were reported by 62.5%, 54.2% and 47.9% of the women respectively. Genital sores were reported more frequently amongst men (52.0% versus 27.1% in women). Previous history of STI symptoms are risk factors for future infection, including HIV infection, and so this high proportion of participants reporting symptoms is important. When categorised into those who have and have not experienced STI symptoms in the past year, men are more likely than women to report that they have experienced at least one episode of STI in the previous year (90.0% versus 68.8% of women). This is significant when tested using Chi-square analysis on the count data ($\chi^2_{(1)}=6.808$, $p=0.009$).

When the data is analysed for the number of episodes of STI symptoms experienced, it is clear that most of the men report only one instance of each symptom over the year whereas some of the symptoms recur more frequently in women. The STI symptoms reported in the previous twelve months for women are reported in table 12.

Table 12 - STI Symptom episodes for Women (previous twelve months)

Symptoms (n= number of women who listed this as a symptom)	% with one episode	% with two episodes	% with three episodes	% with > three episodes
Discharge (n=30)	46.7	23.3	20.0	10.0
Burning urination (n=26)	42.3	34.6	11.5	11.6
Itchiness of privates (n=23)	56.5	21.7	8.7	13.1
Ulcer/sore (n=13)	69.2	15.4	–	15.4
Warts (n=9)	88.9	11.1	–	–
Pubic lice (n=9)	77.8	–	22.2	–
Pain in lower tummy (n=26)	57.7	7.7	–	34.6
Pain during intercourse (n=13)	61.5	23.1	7.7	7.7

In order to describe what symptoms participants are most likely to seek out treatment for, participants were asked both which symptom they were presenting with at the clinic, as well as which symptoms they have had in the past that they would not find serious enough to seek out treatment for.

Seventy six (77.5%) of the participants responded to these symptom questions, 32 of which were male participants, and 44 female. Participants would often list several symptoms as their presenting condition. This data are summarised in table 13:

Table 13 - Self-reported symptoms participants presented with at the clinic

	Frequency	Percent
Discharge	17	22.4
Warts	9	11.8
Ucler/Sore	7	9.2
Pain in Lower Tummy	5	6.6
Burning Urination and Discharge	5	6.6
Discharge and Pain in Lower Tummy	5	6.6
Itchiness and Ulcer/Sore	4	5.3
Pap smear results	3	3.9
Partner Notification	2	2.6
Other	2	2.6
Discharge and Itchiness	2	2.6
Burning Urination and Itchiness	2	2.6
Itchiness and Pain in Lower Tummy	2	2.6
Ulcer/Sore and Warts	2	2.6
Discharge and Ulcer/Sore	2	2.6
Burning Urination	1	1.3
Itchiness of private parts	1	1.3
HIV test results	1	1.3
Burning Urination and Ulcer/Sore	1	1.3
Pain in Lower Tummy and Ulcer/Sore	1	1.3
Burning Urination and Pain in Lower Tummy	1	1.3
Discharge and Warts	1	1.3
Total	76	100.0

Participants were most likely to report discharge (22.4%), then warts (11.8%), ulcer/sore (9.2%), pain in lower tummy (6.6%), burning urination and discharge (6.6%), and discharge and pain in lower tummy as their reason/symptom for attending the clinic on the day they were interviewed. Interestingly only two participants indicated that they were at the clinic due to receiving partner notification cards. This is in keeping with literature that indicates that the partner notification system, and particularly the tracing and treatment of partners of those infected with STIs, is currently inadequate in South Africa (DOH, 2004; Funani et al., 2004).

A cross-tabulation of the abovementioned symptoms by gender indicates that few of the symptoms are differently reported by gender. Pap smears results were, obviously, only reported by female participants and the one HIV test result being received was reported by a male participant. The only two participants at the clinic due to partner notification cards were also male. Due to the low expected frequencies, it was not possible to test these differences statistically.

Participants were asked what symptoms they had in the past that they would not think of as serious enough to seek out treatment for. This was asked to determine whether there were some symptoms, potentially health-threatening, that were perceived as being less serious by the lay public. The results are summarised in table 14:

Table 14 - Symptoms not thought serious enough to seek treatment

	Frequency	Percent	Valid Percent
None - all would be serious	46	46.9	59.0
Discharge	11	11.2	14.1
Burning Urination	2	2.0	2.6
Itchiness of private parts	4	4.1	5.1
Ucler/Sore	4	4.1	5.1
Pubic Lice	2	2.0	2.6
Pain in Lower Tummy	4	4.1	5.1
Pain during Intercourse	1	1.0	1.3
Other	4	4.1	5.1
Total	78	79.6	100.0
Missing (did not respond)	20	20.4	
Total	98	100.0	

59.0% of the participants who responded to this question indicated that there were no symptoms that they experienced in the past that they would feel were not serious enough to seek out treatment. That is, they indicated that they would seek out treatment for any symptom that they had. The impact of social desirability should not be discounted (Neuman, 2000). That is, the participants were at the STI clinic seeking treatment, and they may well have been motivated to present as 'good patients' who would not ignore symptoms. The next most common category listed was discharge (11.2%). It should be noted that in 6 of these 11 participants the term discharge was qualified as being either mild,

odourless, clear or premenstrual, indicating that they would not ignore all discharges that they might experience.

When the data were stratified by gender, the results summarised in table 15 were found.

Table 15 - Symptoms not thought serious enough to seek treatment by Gender

Note: Only symptoms that have a frequency of 4 or greater are shown.			Gender		Total
			Male= 34	Female= 44	
Symptom not serious enough	None - all would be serious	Count	27	19	46
		% within Gender	79.4%	43.2%	59.0%
	Discharge	Count	0	11	11
		% within Gender	.0%	25.0%	14.1%
	Itchiness of private parts	Count	0	4	4
		% within Gender	.0%	9.1%	5.1%
	Ulcer/Sore	Count	3	1	4
		% within Gender	8.8%	2.3%	5.1%
	Pain in Lower Tummy	Count	0	4	4
		% within Gender	.0%	9.1%	5.1%

In order to determine how soon patients seek out medical services for an STI, participants were asked how long they have had the symptoms that they are seeking treatment for at the current visit. This can be conceptualised as 'treatment latency' and how soon patients seek out treatment for a current infection or suspected infection is an important aspect of health seeking behaviour. The distribution of responses, in days, is indicated in figure 4. When analysed for gender, no significant effect was found.

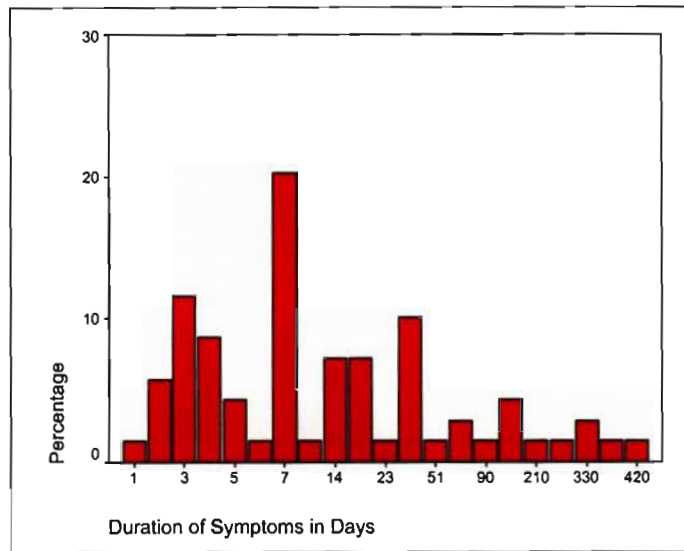


Figure 4 - Duration of Symptoms

The data are strongly positively skewed. That is, the patients reporting a long duration of symptoms are skewing the distribution. This can be illustrated another way, by looking at the cumulative percentages graphed in figure 5.

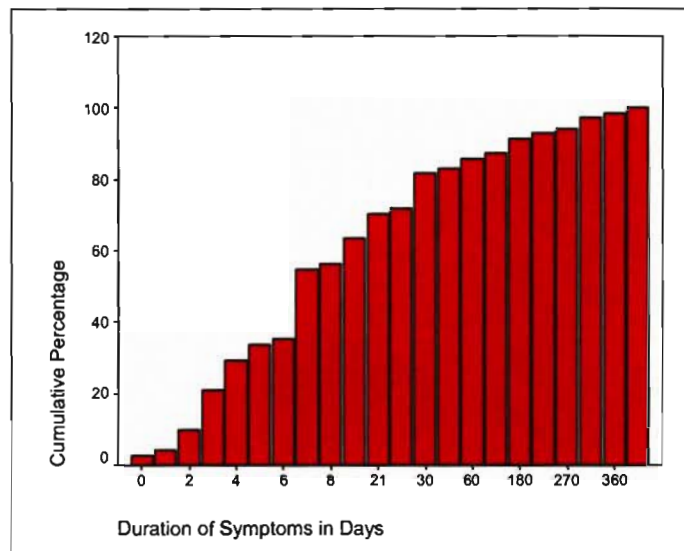


Figure 5 - Duration of Symptoms (Cumulative Percentage)

Examining figure 5 it is clear that the vast majority of participants (81.7%) report a duration of symptoms at 30 days or less.

This skewness is also indicated when comparing the mean, median and mode of the duration of symptoms. The mean duration is 46.7 days, the median duration and the modal duration is 7 days. It is likely that the participants indicating very

long duration of symptoms are relating chronic conditions that have received treatment over time, especially given that two of the participants listed symptoms lasting more than a year. Unfortunately the instrument used was not capable of making this distinction, and this should be done in future research. Given that the median is a better indicator of central tendency in skewed data (Howell, 1997), it is more likely that 7 days is more representative of the amount of time that the average participant is likely to wait to seek treatment for an acute STI. It is important to note the distribution of duration of symptoms is for a sample of people who have sought out treatments and does not represent the treatment seeking behaviour in the general population, since those individuals who never sought treatment would not be included in this sample. Importantly, this sample does not include those individuals who are living with chronic infections for which they have not received any treatment.

It is assumed for the purposes of this dissertation that an important aspect of health seeking behaviour relates to the service offered at the clinic, and patient perceptions of how they are treated which in turn will influence treatment motivation. It is suggested that patients who do not view the health-provider in a positive light may well be reticent to seek out treatment due to lowered motivation to act. STIs carry stigma and are a sensitive subject. In order to achieve disclosure, build trust and ensure patients return for treatment, the clinic needs to attend to the participants' perception of how they are treated by clinic staff. Participants were asked to indicate how they felt they were treated at the clinic. These open-ended responses were coded to indicate whether they were positive, mixed, negative or if it was the patient's first time at the clinic. Examples of the coding scheme are provided in table 16:

Table 16 - Coding Scheme for Patients' Responses

	Example statements (participant ID in brackets)
Positive (70.5%)	I felt welcome and I was free to talk to them and they explain everything to us. (119) They are good people and they treat people with dignity and love. (123)
Mixed (10.3%)	At the reception where they take the cards they don't respect us they don't respect our privacy. We have to shout when we talk to them about our diseases and there are people at the back who are also waiting so they can hear what we say and the language they use to us is not proper. The nurses upstairs are fine and they treat us with respect and dignity. (164) Sister at reception is not receptive, she treats people badly but sister[s] in the STI clinic are fine and very patient. (211) It differs with people some are good and some are bad it just depend on what kind of person [you] have got. (303)

	Example statements (participant ID in brackets)
Negative (7.7%)	They don't treat me with the respect that I deserve. Because I am young so they were swearing at me. [17 year old male] (139) The nurse was not good to me. She was fighting me and shouting at me. I really didn't like the way the nurse treated me (155)

On the whole positive statements related to being treated well, that the staff were patient and treated the patients with respect. Mixed statements tended to be statements that patients were treated well, but had to wait a long time for this treatment or the way in which they were treated was inconsistent. Negative statements related to where patients indicated strongly that they did not like the way they were treated.

Of the 78 participants who answered this question, 70.5% indicated that they were treated well or very well, 10.3% had mixed feelings about their treatment, and only 7.7% had negative feelings about their visit. In addition to this 11.5% of the respondents indicated that this was their first visit. It should be noted that men were more likely to be negative about their experiences (14.3%) than the women in the sample (6.1%) however, given the low expected frequencies due to the low number of negative and mixed responses, it was not possible to test this difference statistically.

Although small in number, the reasons given for the negative experiences should be noted. Two participants indicated that they felt that the nurses were rude, one further indicating that the nurses were shouting and fighting with him. One participant indicated that they did not like being exposed to students at the clinic. Another participant felt that the nurses were not serious about their work, and took too long seeing patients. Finally, one participant felt very strongly that, although the sisters in the clinic were good, the way in which patients were treated at the clinic reception was very poor. Although only a few complaints were made in this sample indicating that clinic is serving the community well, and has managed to treat the patients with respect, it would be advisable to implement actions to rectify potential negative experiences. For example, it is conceivable that although the nurses treat patients well the receptionist may be less sensitive to the STI clinic attendees than to the TB patient attendees. Sensitivity training in this regard may be required.

5.4. Sexual Risk Behaviour

Patients were then asked some questions about their sexual risk behaviours, some of which are summarised here. Sexual risk behaviour includes any sexual activity that places the individual at risk for infection.

5.4.1. Age at First Sexual Contact

Early exposure to sexual contact has been identified as a risk factor for STIs. In this sample the age of sexual debut ranged from 6 years to 28 years old. The mean age was 17.4 (SD=2.79) and the median and modal age was 18. However this obscures the fact that the age of debut for some of the participants was significantly earlier, with 23.1% (21/91) of all participants experiencing sexual debut at age 15 or younger. 36.4% of the male participants and 10.7% of the female participants indicated that their age at first sexual contact was 15 years and younger. Also noteworthy is that 12.0% (6) of men but only 2.1% (1) of women refused to indicate their age of sexual debut. The age of first sexual contact by gender is illustrated in figure 6.

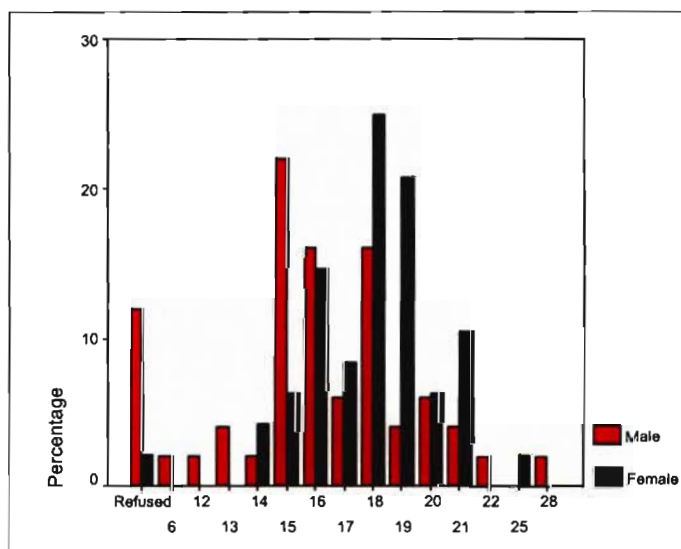


Figure 6 - Age of First Sexual Contact by Gender

Age of first sexual contact was slightly later for women (mean=18.1; SD=3.26) than for men (mean=16.7; SD=2.12) and this was statistically significant (independent samples t -test₍₈₉₎=2.333, p =0.022). Although statistically significant at the 5% level of probability, this finding does not really appear to be practically significant, something which should always

be considered when interpreting statistically significant results (Howell, 1999). That is, in practical terms it does not really appear to be that significant that men have a self-reported sexual debut at around 17, whereas women in this sample appear to report a sexual debut closer to 18.

5.4.2. Sexual Partnering Patterns

Another risk factor for HIV infection is the number of sexual partners that a person has. The HIV pandemic would not exist were it not for multiple partnerships facilitating the rapid spread of the disease. In order to determine how sexually active the participants are, they were asked to indicate how long ago their most recent sexual contact was, the number of casual and steady sexual partners they had in the last three months, as well as lifetime sexual partnerships. Data from Uganda suggest that encouraging people to reduce the number of sexual partnerships they have rather than relying on abstinence or condom use has had a marked impact on the spread of HIV (Shelton et al., 2004; Stoneburner & Low-Beer, 2004).

Last Sexual Contact - Participants were asked to indicate how recently their last sexual contact was. This is important both because it is an indication of frequency of sexual relations, as well as how recently the patient has had sexual contact, which is important in determining the risk of transmission to a partner during a current STI episode. The distribution is positively skewed with the mean number of days being 35.4, and the median number being 8. A number of participants (8 out of the 93 who responded) also endorsed 30 days, as this reflects all the participants who estimated that their last sexual contact was a month ago. Half of all participants indicated that their most recent sexual activity was 8 days and fewer previous to coming to the clinic. This is diagrammatically illustrated in figure 7.

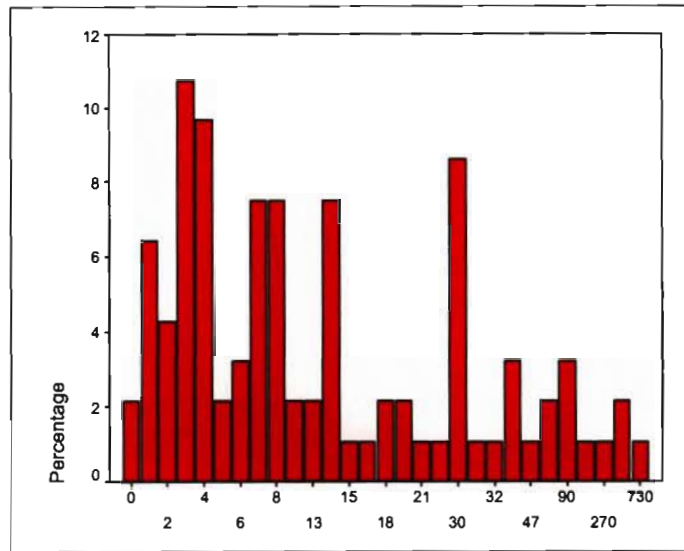


Figure 7 - Time Since Last Sexual Contact, in Days

The participant who indicated that their last sexual contact was 730 days prior also indicated that they were not here for an STI visit, although the specific reason for the visit was not noted. If the descriptive statistics are drawn for those participants who indicated that they were at the clinic for an STI-related visit, the mean number of days since last sexual contact drops to 24.7, and the median remains 3 days. When analysed for only those participants who indicate that they are at the clinic for an STI-related visit, the cumulative percentage graph is illustrated in figure 8.

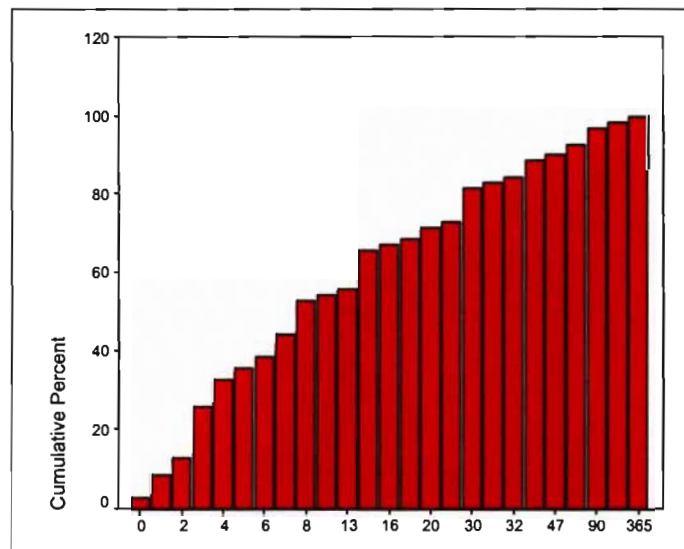


Figure 8 - Last Sexual Contact, in Days (Cumulative Percentage)

Steady Partnerships - 96 of the participants provided an estimate of their steady partnerships over the last three months, and 88 provided an estimate for lifetime steady partnerships. The distribution of reported steady partnerships is positively skewed. That is, relatively few participants report many steady partnerships, with medians of only 1 in the last three months, and 3 as a total lifetime number.

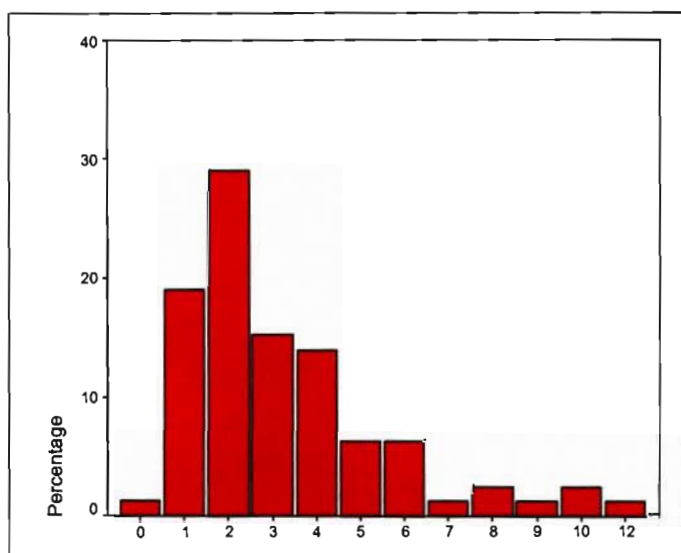


Figure 9 - Lifetime Steady Partners

This data can also be summarised by gender, as gender differences in the number of partnerships has been found to be significantly different in other studies (Shelton et al., 2004). The median data are presented in table 17 as the data are skewed.

Table 17 - Steady Partnerships by Gender

	Median Steady (Lifetime)	Median Steady (Last 3 Months)
Male	3.0	1.0
Female	2.0	1.0

As the data for number of partnerships are positively skewed and non-normal (Kolmogorov-Smirnov Z gives p values < 0.01 for all the variables), Mann-Whitney non-parametric analysis was done to test for statistical significance. No statistically significant associations were found in this data (all tests gave p values > 0.05).

Casual Partners - The distribution of reported casual partnerships is also positively skewed with a median of 0 for both the last three months as well as lifetime, and this was not different for males or for females. This very low reported casual partnerships seems to indicate, perhaps, that the term 'casual partner' has been inadequately defined, or that participants were reticent to report casual partnership. This area definitely requires further investigation, particularly in a cohort that consists predominantly of repeat STI clinic attendees, with the high number of reported STI symptoms in the previous twelve months (as reported earlier). It would be interesting to conduct some more in-depth qualitative research into the terminology and practise around the definition of casual and regular sexual partnerships. It was the impression of the students conducting the interviews that the terminology might be confusing participants. It would have been interesting to ask this question in a slightly different way. That is, it would have been preferable to ask first for the number of sexual partners (lifetime and past three months), and then to ask somewhat later in the questionnaire for the number of regular and casual partners. It would then be possible to see if numbers correspond, which type of partnership number corresponds most closely to the estimated total, and which of the partnerships mentioned correlate to other measures of risk (for example, self-reported number of STI symptoms over the last year, or the number of clinic visits in the past). This would make it clear which of the ways of asking for partnership data is likely to yield the most accurate and useful data.

Although the median and modal values for males and females are identical, this obscures that the distributions of the numbers of casual partners is not the same for males and females. This difference is illustrated in the figure 10.

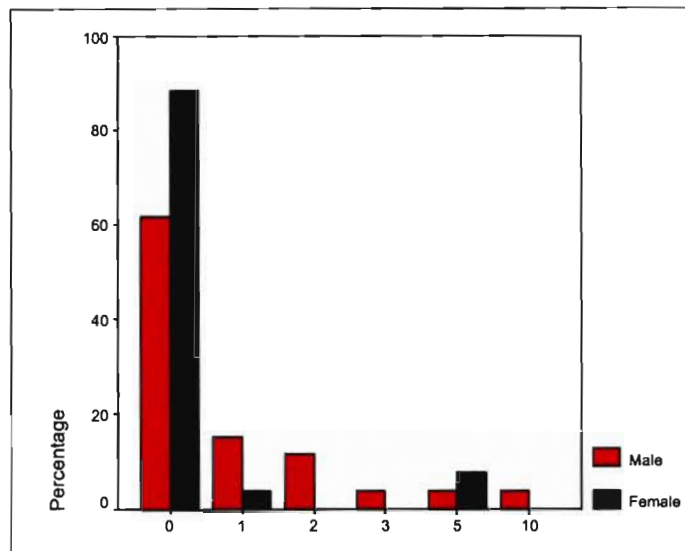


Figure 10 - Number of Casual Partners (Lifetime) by Gender

As the data are positively skewed and non-normal (Kolmogorov-Smirnov Z gives p values < 0.01 for all variables), Mann-Whitney non-parametric analysis was done to test for statistical significance, and this was significant (Mann-Whitney U=251.0, N=52, p=0.036). From the distribution above, it is clear that men are more likely to report casual partnerships than women are, and that this difference is statistically significant.

5.4.3. Behaviour Change during an STI Episode

Participants were asked if their sexual behaviour changed during an STI episode. This question was asked to explore the extent to which participants changed their sexual behaviour in response to an STI in the light of the amount of time taken to seek out treatment, as described earlier. In addition to this participants were asked if they changed their behaviour from when symptoms were first felt, or only from when they began treatment. This was asked to try and determine how many participants waiting until they had sought out treatment to initiate behaviour change.

Of the 93 participants who answered this question, 81 (87.1%) indicated that their behaviour did change during an STI episode, 11 (11.8%) said it did not, and 1 refused to respond. Of these 81, 77.5% indicated that their behaviour changed when they first felt the symptoms, 13.8% when they began treatment, 8.8% indicated 'Other' and 1.2% (1) refused to answer.

Of those endorsing 'Other', 4 (57.1%) indicated that they always used or tried to always use condoms anyway, and the balance indicated that they changed their behaviour inconsistently (had sex when it was not painful, for example). 56.7% of participants indicate that their behaviour includes abstinence or attempts to abstain, with the balance indicating that they use condoms during an STI. The majority of participants have indicated, by self-report, that they altered their sexual behaviour when they suspected a STI from the time that they first detected the symptoms. Although this is not a certain way of avoiding re-infection or transmission of infection, it is an attempt to limit infection and should be considered as positive.

5.4.4. Disclosure to Partners

In order to ensure complete recovery and successful treatment it is essential that patients reveal their STI diagnosis to partners. Participants in this study were asked whether or not they would reveal their infection to the partners. 97 of those interviewed responded to these questions. 88.8% indicated that they did have a steady current partnership, 69.7% of whom indicated that they have told their current sexual partner about their symptoms. There was no effect for gender and disclosure to steady partners ($\chi^2_{(1)}=0.026$, $p=0.872$). Of those who said they would not tell their partners, 37% would not do so because they were parted from the partners, or lived far away. By contrast, only 13.3% of respondents indicated that they would tell their casual partners. However, around 63% of these participants will not tell their casual partners because they do not have casual partners, they use condoms or they have been separated from their partners. That is, they have reasons for non-disclosure which do not suggest high risk for disease transmission.

Given the reasons for non-disclosure relate to not being at high risk of infecting their partners, disclosure in this group seems to be high.

Partner Referral - The referral of partners' of patients for diagnosis and treatment is a central strategy in the government's strategic STI/HIV treatment plan (DOH, 2004). Participants were asked that if they received treatment at the clinic would they encourage their partners to go for treatment and, if they would not, to provide a reason why they would not

(referral is the usual process and only a negation of this was thought to be important). An equal number of men and women totalling 88 of the participants answered this question with 79.5% indicating that they would encourage their sexual partners to go for treatment. The numbers of men and women indicating they would and would not encourage partners to seek out treatment were identical. Of the 18 participants who would not encourage their partners to get treatment, only 1 indicated that his was because they were afraid to, and 2 because they did not feel like it affected their partner or they did not feel like they had to. Of the balance, 4 indicated that they were at the clinic for reasons other than an infection (pap smear results, for example), 3 indicated that their partners had already been to the clinic for treatment, and 2 indicated that they abstain from sex during an STI.

The ability to seek out help or to change sexual risk behaviour in relation to an STI is likely to be affected by the partner's attitude towards the infection. For this reason, participants were asked how their partners treated them when they had an infection. 47 of the men and 43 of the women responded. The many responses were coded, and the results are summarised in table18.

Table 18 - Treatment by Partners when infected with an STI

			Gender		Total
			Male (47)	Female (43)	
How do your partners treat you when you have an infection?	I didn't tell	Count	9	2	11
		% within Gender	19.1%	4.7%	12.2%
	Angry/Fighting	Count	4	3	7
		% within Gender	8.5%	7.0%	7.8%
	Sad/Worried	Count	12	2	14
		% within Gender	25.5%	4.7%	15.6%
	Encouraged to get treatment	Count	5	1	6
		% within Gender	10.6%	2.3%	6.7%
	Not Worried/Doesn't Care/No Problem	Count	7	12	19
		% within Gender	14.9%	27.9%	21.1%
	Supportive	Count	4	16	20
		% within Gender	8.5%	37.2%	22.2%
	Don't have a partner	Count	2	2	4
		% within Gender	4.3%	4.7%	4.4%
Other	Count	4	5	9	
	% within Gender	8.5%	11.6%	10.0%	
Total	Count	47	43	90	

The differences for gender could not be analysed statistically due to the low expected frequencies and no logical justification for collapsing categories. However the cells in which the responses were most different for gender have been indicated in bold. Men were much more likely than women not to disclose their infection, to indicate that their partners encouraged them to get treatment and to report that their partners felt sad or worried. Unexpectedly, many more women than men indicated that their partners were supportive. However this needs to be seen against the fact that very few women did not tell their partners about their infection as opposed to men. Also a large number of women (27.9%) indicated that their partners did 'not care'. From many of the responses it is impossible to determine whether the 'not caring' was benign (i.e. not worried or upset), indifferent or malicious (i.e. deliberate withholding of concern).

5.4.5. Condom Use

As a memory assist and to lead into the question assessing condom use, participants were asked if their last sexual act was with their regular or steady partner, or with a casual partner. This was cross-tabulated to see if women or men were more likely than expected to have had sex with one

or the other type of partner most recently, and the data are summarised in the table 19.

Table 19 - Type of Last Sexual Act (Regular or Casual) by Gender

			Gender		Total
			Male	Female	
3.12 Was your last sexual contact with regular or casual?	Regular	Count	38	45	83
		% within regular or casual?	45.8%	54.2%	100.0%
		% within Gender	84.4%	97.8%	91.2%
	Casual	Count	7	1	8
		% within regular or casual?	87.5%	12.5%	100.0%
		% within Gender	15.6%	2.2%	8.8%
Total	Count	45	46	91	

From the data above it is clear that only a small number of participants (8.8%) indicated that their last sexual act was with a casual partner. This is consistent with the low reported number of casual partnerships reported earlier, but may be due to social desirability, especially in the light of the large number of participants reporting STI symptoms in the previous twelve months. As the expected frequencies are too low to legitimately use Chi-square analysis, Fisher's exact test is used. In this case the test results in a significant result ($p=0.03$)⁶. Men were statistically significantly more likely to report that their previous sexual encounter was with a casual partner.

In order to determine the extent of condom use, participants were asked if they used a condom at their last sexual act (which is easier to recall accurately than the more abstract question "Do you use condoms"). Of the 92 participants who responded to this question, only 57.1% indicated that a condom was used. The reasons of the 55 who indicated why they did not use a condom are summarised in table 20.

⁶ This is not that different from the $\chi^2_{(1)}=5.08$, $p=0.024$. The fact that Fisher's exact frequently gives similar p values to the Chi-square even when expected frequencies are low, has been taken to be evidence for the fact that the injunction against the use of Chi-square for low expected frequencies may be a very conservative approach (Altman, 1991).

Table 20 - Reasons for non-use of Condoms

		Frequency	Percent	Valid Percent
Valid	We both know our status	2	2.0	3.6
	Drunk	1	1.0	1.8
	He did not want to	15	15.3	27.3
	Don't know/Just don't use them	9	9.2	16.4
	Did not know about disease	3	3.1	5.5
	Didn't feel like it/Don't like them	3	3.1	5.5
	Condoms not available	4	4.1	7.3
	Long relationship/Trust	15	15.3	27.3
	Married/About to be married	3	3.1	5.5
	Total	55	56.1	100.0
	Refused	43	43.9	
Total		98	100.0	

Most of the participants indicated that they were in a trusting relationship, or were women that indicated they did not use condoms because the male partner did not want to (27.3% in both cases). 16.4% of participants did not have a good reason for not using condoms, and only 7.3% indicated that they did not use condoms because they were not available and even fewer indicated that they did not use them because they don't like them/did not feel like using them (5.5%). The three participants who indicated that they did not use condoms because they don't like them were all male.

Gender plays a role in the decision to use a condom. There is a statistically significant interaction between gender and condom use at last sexual act. More women than expected (71.7% versus 50% of men) indicated that a condom was not used ($\chi^2_{(1)}=4.563$, $p=0.033$).

Finally, participants were asked how easy it was for them to insist on using a condom if they wanted to with their regular and casual partners. This question is designed to determine self-perceived ease of negotiating condom use, and the data are summarised in tables 21 and 22.

Table 21 - Ease of Condom Use - Regular Partner

		Frequency	Percent	Valid Percent
Valid	Easy	50	51.0	54.3
	Sometimes	6	6.1	6.5
	Difficult	20	20.4	21.7
	Impossible	4	4.1	4.3
	No partner	1	1.0	1.1
	Don't use at all	11	11.2	12.0
	Total	92	93.9	100.0
	Did not reply	6	6.1	
Total	98	100.0		

Table 22 - Ease of Condom Use - Casual Partner

		Frequency	Percent	Valid Percent
Valid	Easy	23	23.5	25.6
	Sometimes	4	4.1	4.4
	No partner	59	60.2	65.6
	Don't use at all	4	4.1	4.4
	Total	90	91.8	100.0
	Did not reply	8	8.2	
Total	98	100.0		

It should be noted in both instances above, that no participants indicated that it was 'Impossible' to use condoms with their partners. In terms of regular partners, 54.3% of respondents indicated that they found it 'easy to' use condoms, with 21.7% indicating that it was 'difficult' to do so. In terms of casual partners, no one indicated that they found it 'difficult' to use condoms, and only 4.4% indicated that condoms were not used with casual partners at all. However, in keeping with reported numbers elsewhere in this study, 65.6% of participants indicated that they did not have casual partners at all. If these 59 participants are excluded from the analysis, 74.1% (23/31) of those participants remaining found it 'easy' to use condoms, and 12.9% (4/31) indicated that they did not use condoms at all with casual partners. It seems, then, that overall participants find it easier to use condoms with the casual partners that they do have, although few casual partnerships are reported.

In order to understand whether or not it was easier for women or men to negotiate condoms use, specific analysis was done to determine if gender

played a role in how easy it was for participants to insist on condom use with their regular partner. Chi-square analysis was initially not possible due to low expected frequencies if the data were used as collected. However, to facilitate analysis the following categories were combined: “Easy” and “Sometimes” were conceptually similar and combined, “Difficult” and “Impossible” were also combined (the proportions of each gender endorsing each category were similar for both of these options and they were considered to be conceptually similar). The one participant who responded that they did not have a regular partner, and those 11 participants who indicated that they did not use condoms at all were also excluded as they did not contribute to an understanding of how easy it is to negotiate condom use (also, in the latter case, there was not much difference in terms of men and women who indicated this; 5 versus 6, or 11.4% versus 12.5% of each gender). This data are summarised in table 23.

Table 23 - Ease of Condom Use by Gender

			Gender		Total
			Male	Female	
3.14.a. How easy to insist on condom - regular partner?	Easy and Sometimes	Count	36	20	56
		% within 3.14.a. How easy to insist on condom - regular partner?	64.3%	35.7%	100.0%
		% within Gender	92.3%	48.8%	70.0%
		% of Total	45.0%	25.0%	70.0%
	Difficult and Impossible	Count	3	21	24
		% within 3.14.a. How easy to insist on condom - regular partner?	12.5%	87.5%	100.0%
		% within Gender	7.7%	51.2%	30.0%
		% of Total	3.8%	26.3%	30.0%
Total	Count	39	41	80	
	% of Total	48.8%	51.3%	100.0%	

Significantly more men than expected report that it is easy to use condoms, and more women than expected indicate that it is difficult to impossible to do so ($\chi^2_{(1)}=18.033$, $p < 0.001$). For men using a condom is a concrete behaviour, but for women this requires negotiation with their partner.

5.4.6. Anal Sex

Anal sex is an area that seems to be under-researched in South Africa and the heterosexual population in general, perhaps because the prevalence and risk are underestimated. Participants were asked whether or not they had engaged in anal sex. Of the 94 respondents who answered this question 19, or 19.4% indicated that they had and 4 (4.1%) refused to answer this question. Of those who indicated that they had experienced anal sex, 50% indicated that a condom was used. Although this is less than the 57% who indicated condom use at last sexual act, it is not as great a drop as expected. However, the fact that over 19% of respondents indicated that they had engaged in anal sex indicates that this is an area that would benefit from further research, and should be included in HIV/AIDS prevention education. This number is similar to a study conducted in America where 20% of a convenience sample of University students indicated that they had engaged in anal sex (Civic, 2000). One of the most common reasons for not using condoms during anal sex in that study was that pregnancy was no longer a concern with anal sex. Whatever the reason for not using condoms is in the current study, it seems important that the increased risk of infection by HIV through anal sex should be emphasised in safer sex messages. Current research being conducted at the Centre for the AIDS Programme of Research at the University of KwaZulu-Natal is being done to determine the perception of risk for this practice versus other sexual practises.

5.5. HIV/AIDS Knowledge and Attitudes

Participants were asked if they knew about HIV/AIDS. Of the 92 participants who responded to this question, 90 (97.8%) indicated that they did, and only 2 (2.2%) indicated that they did not.

In order to determine a basic understanding of HIV risk, and to see to what extent participants correctly viewed themselves at risk for HIV infection, they were asked "What kinds of people were most likely to get HIV/AIDS?". None of the participants indicated that someone with an STI would be more likely to be at risk for HIV, although some related factors were mentioned. 64 participants gave a total of 114 different 'types'. 21.1% indicated that they thought 'Anyone' could get HIV, with 60.5% indicating that unprotected sex or multiple partners (or a combination of these factors) increased risk of HIV

infection. 6.1% indicated that women were more likely to be infected, and 4.4% indicated that 'youth' were more likely to be infected. Examples of the reasoning for this are given below.

"As women because of the way that we are built anatomically and the fact that we do not have much control over our bodies." - participant 227, female

... "but mostly girls if you promise them nice... they just give [you their] body so they are more vulnerable." - participant 129, male

"Youth, they do not believe AIDS exists, they always experiment and believe [only] when a person is very sick." - participant 230, female, 22 years old

The reasons that women are seen to be more at risk relate both to the fact that they are sexually 'receptive', as well as because they are vulnerable to the advances of men. Youth usually seen as more susceptible because they tend to experiment more, are more sexually active and do not believe that HIV exists or that it can be contracted from someone who looks well.

Only 2 participants (1.8%) indicated specifically that they thought prostitutes were more likely to get HIV. Prostitutes have been thought to play a very central role in the rapid spread of HIV. In September and October 2004, 220 female sex workers were screened for HIV to recruit HIV negative high-risk woman in Durban. Of the 220 screened, 75.5% (166) were found to be already infected with HIV (CAPRISA, 2004).

Participants were asked whether they felt that an individual was at greater risk of contracting HIV if they were already infected by another STI. As outlined in the introduction to this paper, concurrent and repeat STI infection is a risk factor for HIV infection. Participants do seem to be aware of this as 60.4% of respondents indicated that they endorsed this statement strongly. Only 34.1% indicated that they disagreed with the statement, with the remaining participants either unsure or indicating 'only sometimes'. Participants who indicated that STIs do not increase the risk of HIV infection were strongly of the opinion that this is because HIV does not choose (25.8%) or that anyone

who is exposed to HIV can get it, regardless of other infections (61.3%). This is in keeping with public health messages that echo these views. However, research is clear that STI infection greatly increases the chances of HIV infection, and this message needs to be reinforced and given prominence, particularly in the context of STI clinics. The reasons given by those participants who did feel strongly that STI infection increases the chances of HIV infection are summarised in table24.

Table 24 - Reasons given that STIs increase HIV risk

	Frequency	Percent	Valid Percent
Valid			
Anyone can get HIV if exposed	3	5.5	5.8
Already exposed to STIs	2	3.6	3.8
Indicates no condoms/risk behaviour (same route)	18	32.7	34.6
Easy to get HIV if you have STI (immune, ulcers)	18	32.7	34.6
Must get STI treated (longstanding = HIV)	8	14.5	15.4
Don't know why	3	5.5	5.8
Total	52	94.5	100.0
No Response	3	5.5	
Total	55	100.0	

The data are clear that the majority of participants, when prompted about the association, understand that STIs are a risk factor for HIV infection both because they indicate that risk behaviour is taking place, as well as the fact that STIs increase the physiological receptiveness to HIV infection. There is also the perception that a long-standing STI infection leads to HIV which seems to be another way of conceptualising the idea that STIs increase the physiological chances for HIV infection. Further work needs to be done to ensure that those participants who are aware of the increased risk due to behavioural factors are also aware of the increased physiological risks. The potential exists for these individuals to not see themselves at increased risk as they may feel that they are reducing their risk behaviour by having sex with only their primary partner and not realise that they are at greater risk for physiological reasons.

In order to assess understanding, knowledge and attitudes to the possible means of HIV prevention, participants were asked in what ways HIV could be prevented.

Of all the participants asked 90 responded to this question, 58 provided more than one reason with 13 providing up to three different means of preventing infection, for a total of 161 ways of preventing infection. Essentially this question was included to determine to the extent to which knowledge about HIV prevention has permeated this high-risk population. 87.6% of these responses directly the ABC mantra of prevention widely publicised by the government, or a combination of abstain, be faithful or condomise as the primary means of prevention. 2.5% of the responses related to using gloves for blood contact or clean needles in the clinic, and 1.2% of respondents endorsed testing for HIV or safer sex (unspecified) as ways to prevent HIV infection. Only 1.2% of respondents indicated that they did not know how to prevent HIV infection, and no participants gave an incorrect response, or something that might indicate any misunderstanding regarding HIV prevention. The high number of reported STI symptoms in the previous year, and the fact that the majority of participants were at the clinic due to STIs indicates that knowledge of prevention does not translate very directly into action.

Participants were asked if they thought HIV could be treated and, separately, if they thought HIV could be cured. The distinction between the two concepts was emphasised by the interviewers. That is, the participants were told that treatment meant that you could be made to feel better even though you still had the illness, and cured meant that you would no longer have the illness. 92 of the participants responded to the question regarding the possible treatment of HIV. 67.4% responded, correctly, that HIV could be treated, 15.2% responded, incorrectly, that HIV could not be treated and 17.4% were unsure. 68 participants listed at least one way in which HIV could be treated, 20 of these reporting two ways, and 4 of these three ways in which HIV could be treated. This means that out of a total of 68 participants who responded to this question, 92 ways of treating HIV were reported. Of these 92 reasons, 57.6% could be coded as relating to 'Pills, ARVs, or Western Medicines', 21.7% could be coded as referring to 'Diet, Vitamins, Immune Boosters or Exercise', 4.3% could be coded as referring to the 'Treatment of Opportunistic Infections' and the balance were coded as 'Other'. Given the government's strong emphasis on the alternatives to 'western' medicine (as satirised in figure 11), and specifically to ARVs, it is comforting for the roll-out of ARV treatment to see that these given by participants as a secondary rather than major means of treating HIV. The majority of respondents

replying indicated that they were aware of HIV medicines, many referring to them as antiretrovirals directly.

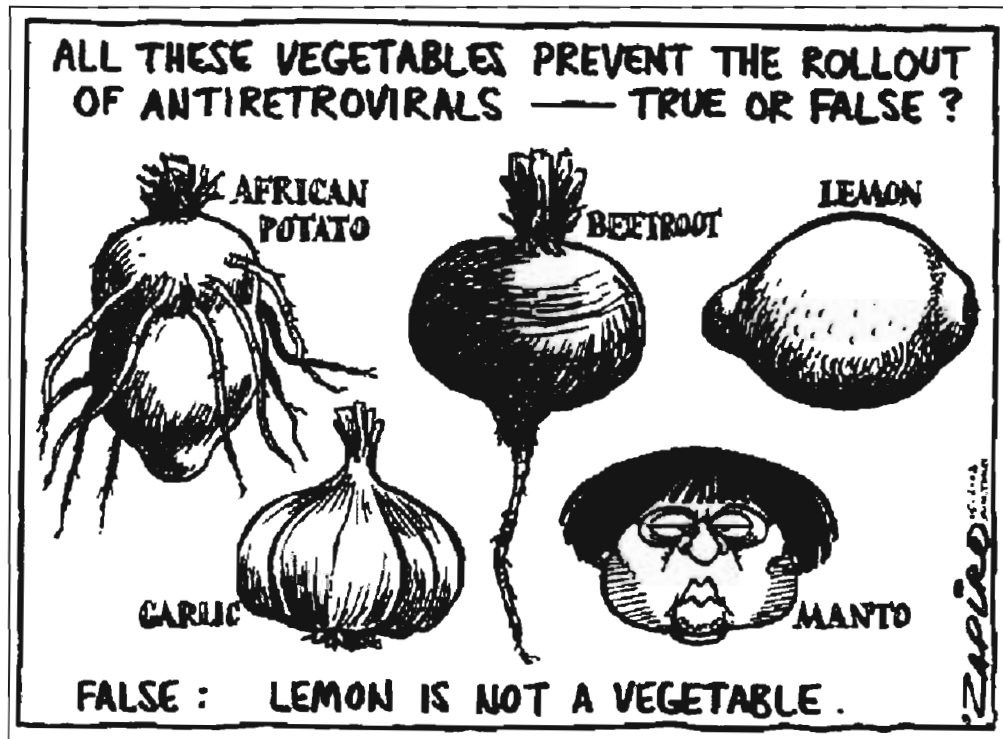


Figure 11 - Zapiro Cartoon Illustrating the Health Minister's emphasis on 'alternative' treatments for HIV (Sunday Times, 15-02-2004)

When asked if they thought that HIV could be cured, 91 participants responded with 13.2% saying, incorrectly, that it could be cured, 78.0% that it could not and 8.8% replied that they were unsure. Most of the reasons given for how HIV could be cured included references to treatment suggesting that the interviewers did not make the distinction between treatment and cure clear enough. However three are noteworthy responses:

"I do believe that God can cure it" - participant 150

"I've heard that there is a medication that can help but it is worth R2000 for one treatment" - participant 160

"By traditional herbs" - participant 167

It is reassuring that so few participants felt that HIV could be cured outright, and that what might be potentially widespread myths (religious cures, traditional medicinal cures and other mysterious but expensive cures) seem to be very limited in this sample.

5.5.1. HIV Status and Willingness to Test

Participants were asked whether or not they knew their HIV status, which is a prerequisite for seeking treatment and protecting others from infection. 70.7% of respondents indicated that they did not know their status, 4.3% that they were unsure and 25% indicated that they did know their status. Of the 25% who indicated that they did know their status, 43.5% said this because they had tested within the last year. 13% indicated that they knew their status because they had tested in more than a year previously. It is important that patients at the clinic are encouraged to test more regularly than this, particularly since they are at higher risk for HIV infection than the general population. In addition to this 13% indicated they knew their status because they had tested but did not provide a timeframe for when they were tested. Determining the frequency of testing in this population amongst those who test must be built into future research studies in this area. 8.7% of these respondents indicated that they knew they were negative because they had seen no symptoms. Patients need to be reminded that physical symptoms in HIV infection may go undetected.

Of those participants who said that they did not know their status, 29.2% correctly indicated that this was because they had never tested for HIV with no further reason given. 32.3% indicated that they did not know their status because they were too afraid to test and 10.8% did not want to know their status. As the latter two categories account for 43.1% of this sample, these two related reasons for not knowing ones HIV status would be good areas to target in education programmes in the clinic.

When asked if they would take an HIV test if offered, only 39.3% of those who did not know their status would be prepared to do so. 52.4% indicated that they were unwilling, and 8.3% were unsure. Not surprisingly, of those who were unwilling to test, 66% did not want to do so because they were afraid of testing positive. Participants also indicated

that they did not want to know as the knowledge would create stress that would cause them to become ill more quickly.

When cross-tabulated with gender, it is clear that willingness to test is not related to gender in any meaningful way ($X^2_{(1)}=0.245$, $p=0.832$). In order to avoid low expected counts and to legitimately conduct Chi-Square analysis, the 'Unsure' category was collapsed into the 'No' category as both of these categories relate to a lack of willingness currently to test. This data are summarised in table 25.

Table 25 - Willingness to test cross-tabulated with Gender

			Gender		Total
			Male	Female	
Would you be willing to take an HIV test if it were offered to you?	Yes	Count	15	18	33
		% within Gender	36.6%	41.9%	39.3%
	No	Count	26	25	51
		% within Gender	63.4%	58.1%	60.7%
Total	Count	41	43	84	
	% within Gender	100.0%	100.0%	100.0%	

A similar cross-tabulation was done to see if willingness to test was related to the number of different STI symptoms experienced over the previous year (as a marker for risk of infection), with no statistically significant association being found. That is, risk of infection does not appear to influence willingness to test.

5.6. Clinical Assessment

Of the 98 interviews conducted, 77 (78.6%) of the clinical assessment forms given to participants were returned completed to the study team. Of these 70 (90.9%) indicated that the visit was for an STI, 4 (5.2%) indicated that the visit was not for an STI and for 3 forms (3.9%) there was not enough data to determine the reason for the visit. For the STI visits, 46 (64.8%) of the forms indicated that partner notification cards were given to participants. When analysed for relationship type, 55.6% (5) of those with no partner were given notification cards and 57.1% (4) and 67.3% (37) of those who are married or in stable partnerships were given partner notification cards. Although men were more likely to receive their notification cards than women (73.7% of men

vs. 54.5% of women), this was not statistically significant ($\chi^2_{(1)}=2.836$, $p=0.092$).

The 70 forms which indicated an STI clinic visit were given to Dr Ayesha Kharsany of CAPRISA (the Centre for the AIDS Programme of Research in South Africa), seconded from Medical Microbiology, to assess in terms of whether or not the treatment given was adequate and in line with treatment guidelines. 64.3% (45) of the forms indicated that correct treatment was administered, and 10.0% (7) indicated that the incorrect treatment had been administered. 8.6% (6) indicated that partial treatment had been provided for genital ulcers, and 10.0% (7) indicated that partial treatment had been given for discharge. In 5 (7.1%) of the cases, not enough data was provided on the form to make a determination.

5.7. Regression Model

In order to determine the impact of the various factors on the risk for STI infection, a multiple regression model was explored. A multiple regression model can be used to determine the effect of many independent variables on one dependent variable. In the case of the regression, the outcome variable was taken to be the number of STI symptoms that participants reported in the previous year. The higher the number of reported symptoms in the previous year, the higher risk the participant was presumed to have. The intention of the regression analysis is not to develop a regression equation to predict risk on the basis of a weighted linear combination of risk factors, but rather to determine within this exploratory sample the relative contribution of various supposed risk factors to overall risk. A regression analysis of this data also allows for the identification of variables that are hypothesised to contribute to understanding risk, but do not in this sample.

The number of symptoms in the previous twelve months ranged from 0 to 34, and the data were positively skewed with a mean value of 6.07, and a median of 4.00. This distribution can be seen in figure 12:

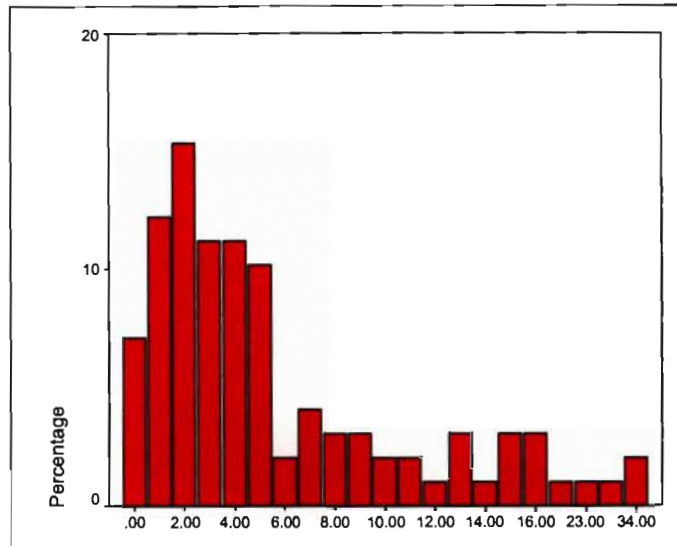


Figure 12 - Number of Symptoms in the Previous Year

As the data are skewed and not normally distributed (Kolmogorov-Smirnov gave a $p < 0.001$)⁷, the Mann-Whitney U for independent samples was calculated to test for the effect of gender on the number of symptoms. The mean rank for the male data was 44.04 and the mean rank for the women was 55.12 and this was just not significant ($p=0.051$). That is, women were more likely than men to report a high number of symptoms (median of 5 versus a median of 3 for men), but this was not statistically significant.

The regression model is exploratory and variables were included as potential predictors if they were theorised to contribute to behavioural risk. Variables with many missing values were not included. Variables included were either continuous measures or binary categorical variables. Categorical variables with more than two categories were transformed into binary categorical variables by collapsing categories and coding with 1's and 0's with 1 being the presence of something or 'yes' and 0 being the absence of something or 'no' (Howell, 1997, 1999; Norusis, 2002). Variables were also selected if they were theorised to contribute to behavioural risk. The variables included in the original model are (the number of valid observations for each variable is given in brackets):

⁷ Although the assumption of normality is made in regression analysis, departures from the assumption are often not serious (Howell, 1997). Here the distribution is bell-shaped, even though it is skewed but for this exploratory analysis, this should be adequate.

Demographic

- Gender (98)
- Age (98)
- Employed (Yes/No)⁸ (97)

Abstain

- Age of first sexual contact (91)
- Days since last sexual contact (93)

Be Faithful

- Whether or not the participant had a stable partner/was married (98)
- Number of casual partners in the last 3 months⁹ (88)
- Number of steady partners in their lifetime (79)

Condomise

- Whether a condom was used at the last sexual contact (92)
- Whether it was easy to use a condom with their steady partners¹⁰ (80)

Other

- Whether or the participant has had anal sex (91)
- The number of different symptoms experienced in the previous year¹¹ (98)
- Whether or not they have told their partners about their symptoms (disclosure) (89)
- Whether or not the participant had been to the clinic before (98)
- Duration of current symptoms (71)
- Whether or not behaviour changed during an STI episode (92)
- Knowledge of the link between STI and increased HIV risk¹² (91)

⁸ For the purposes of creating a binary variable, students have been categorised as Unemployed for this analysis.

⁹ This is used rather than the lifetime estimate due to fewer missing data cases. Steady partners is analysed using lifetime as this provides a better spread of values and steady partnerships are more likely to take a long period of time not well accounted for in the previous three months

¹⁰ This was used rather than with casual partners due to the low number of reported casual partners.

¹¹ This is related to, but not identical, to the outcome as this refers to the number of different types of symptoms and is therefore more a measure of the number of different types of infection, rather than the number of infections per se.

¹² 'No' and 'Unsure' collapsed to 'No', and 'Only Sometimes' and 'Definitely Yes' collapsed to 'Yes'.

- Willingness to test for HIV (84)

5.7.1. Overall Model Performance

The variables listed above were entered into the model with the a priori assumption, based on the literature, that they are likely to contribute to the prediction of risk (as indicated by the number of symptoms of STI in the previous year). The overall performance of the model is clearly indicative of the fact that, in combination, the variables listed do in fact account for a large proportion of the variance in number of symptoms in the previous year in this population. Two measures are important in this determination, the amount of variance accounted for (R Square) and the overall significance of the model (F) and these are included in table 26.

Table 26 - Regression Model Summary and Model Significance

Model Summary

Model	R	R Square	Adjusted R Square
1	.931	.867	.628

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1879.384	18	104.410	3.630	.021
	Residual	287.650	10	28.765		
	Total	2167.034	28			

The R Square statistic indicates how much of the variance in the difference in the criterion is explained by the combination of the predictor variables in the model, and the ANOVA (F) indicates whether or not the overall regression is statistically significant. The significance of each predictor can be assessed separately by examining the t-test values for each coefficient, although it is the amount of variance explained by the overall combination of these variables (the regression itself) that is most important (Hair et al., 1995; Howell, 1999; Kerlinger, 1992; Norusis, 2002).

In this case the model accounts for 86.7%¹³ (R Square multiplied by 100) of the variance in the number of symptoms in the previous year, and the model is statistically significant ($F=3.295$, $p=0.025$)¹⁴. As predicted by theory, the combination of predictors allows us to predict at a significantly greater than chance level what the number of symptoms in the previous year was. That is, we can accept that the variables listed above contribute significantly to the prediction of risk of infection overall. However, when the individual variables are considered in this model, none of the individual predictors are significant (as indicated by none the t-tests being significant and only one of the t values being greater than ± 2.0 ¹⁵ - see Appendix F). The part correlations are also listed as these indicate the contribution of each predictor variable to the outcome variable, once the impact of all of the other predictor variables has been taken into account (Kerlinger, 1992). That is, part correlations are an indication of each individual variable's contribution to the prediction of the criterion when the effect of all the other variables is taken into account. As can be seen from Appendix F, these are highest for those criterion variables that have the highest t values and those variables that approach statistical significance.

Very high significance (p) values, and low t values, indicate variables that contribute little to the model. Some of these are surprising and were then analysed separately to find out why they did not contribute significantly to the overall model. The variable summary is given, as well as a boxplot for the variable in relation to the criterion. In order to obtain the boxplots for only those observations entered into the regression, the 'Explore' function was used to examine the effect of all the predictors on the criterion variable simultaneously. A boxplot displays important information about the distribution of a variable, not just the measures of central tendency.

¹³ In this case the low number of observations (<200) indicates that the adjusted R Square (0.582) is probably a better indication of variance explained (Kerlinger, 1992). This is also considered in relation to the number of observations per independent variable, where the lower the number of observations per independent variable, the more accurate the adjusted R Square is likely to be particularly if the ratio approaches 4 to 1 (Hair et al., 1995).

¹⁴ Power would a consideration if this was not significant. If the model were not significant, it would be necessary to calculate the power (the probability of correctly rejecting the null) in order to determine whether the not significant result was not due to low power due to small sample size (this regression is only based on 29 participants who have all the variables assessed, as can be seen from the total degrees of freedom, 28). Power may play a role, however, in that the individual predictors are not significant. Those that are relatively important would be more likely to be statistically significant at higher sample sizes.

¹⁵ SPSS 11.0.1 Online Help

The line through the centre of the box will indicate the median, the boxes on either side of this line indicate the interquartile range, and the whiskers will indicate the extents of the distribution with extreme values (more than 1 ½ box lengths out of the rest of the distribution) indicated as points (Norusis, 2002).

Age at First Sexual Intercourse

The standardised Beta coefficient for this variable is -0.026, the t is -0.096 which has a p of 0.925. This indicates that the variable is not individually significant in this model. Examining the boxplot indicates why:

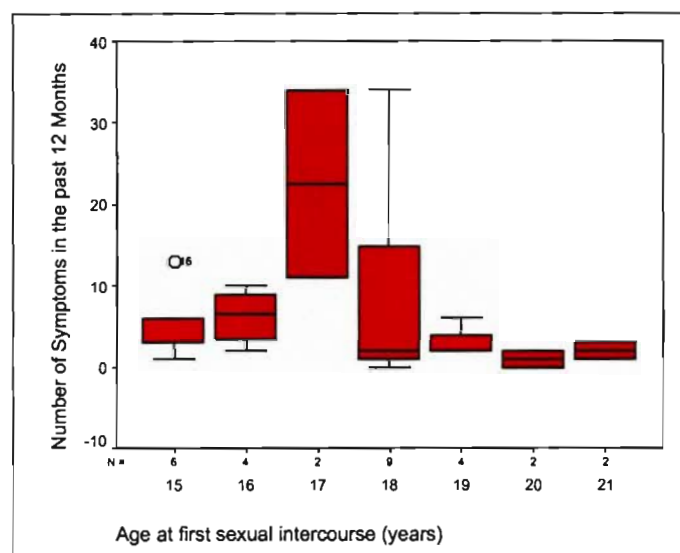


Figure 13 - Age of First Sexual Intercourse by Number of Symptoms in the Previous Year

From this boxplot it is clear that the age of first sexual intercourse is not related to the measure of risk in this model. Due to missing data in other variables, only participants between 15 and 21 years of age are entered into the model. If this portion of the distribution is considered, it is clear that there is an increasing risk of infection from 15 to 17 years, and then a gradual decrease to around 20 years old. For effective use in a regression model, the relationship should be linear, and it is not in this case.

Casual Partners in the last three months

The standardised Beta coefficient for this variable is 0.041, the t is 0.203 which has a p of 0.843. This indicates that the variable is not individually significant in this model. Examining the boxplot indicates why:

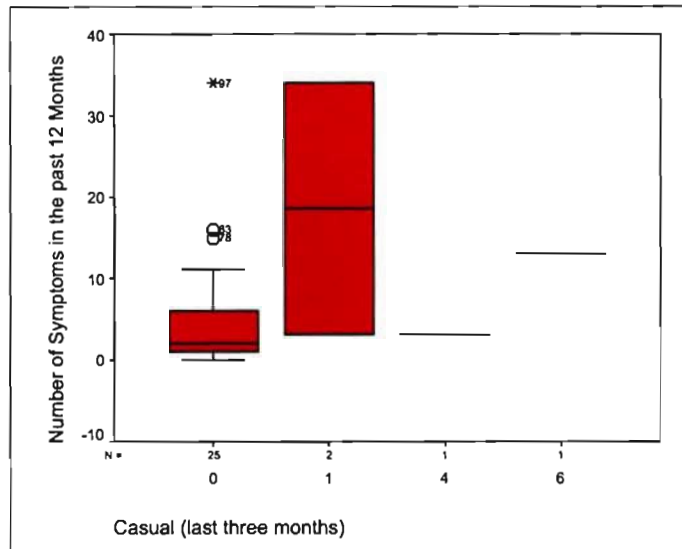


Figure 14 - Casual Partners (last 3 months) by Symptoms in the Previous Year

From this boxplot it is clear that the measure of risk (number of symptoms in the previous year) is not related to the reported number of casual partners in the previous three months. Although there is an elevated risk for those reporting 6 casual partners, the mean number of reported symptoms in the previous year is very similar for the other groups, and there is not a linear increase as the number of reported casual partners increases.

Steady Partners (lifetime)

The standardised Beta coefficient for this variable is -0.015, the t is -.068 which has a p of 0.947. This indicates that the variable is not individually significant in this model. Examining the boxplot indicates why:

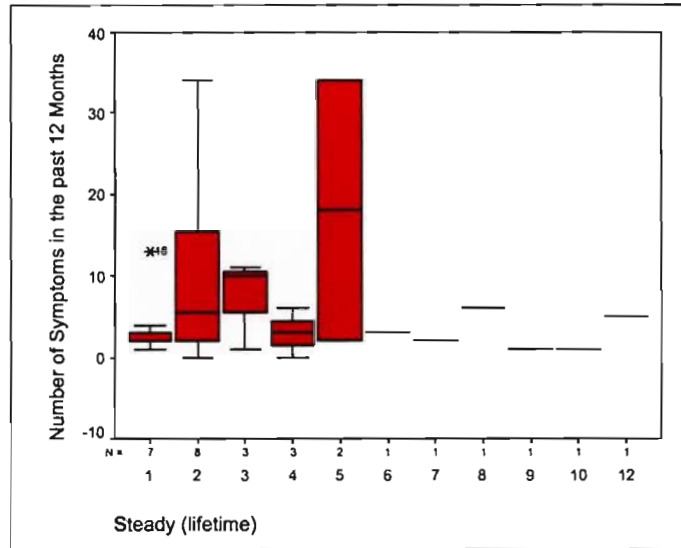


Figure 15 - Number of Steady Partners (lifetime) by Number of Symptoms in the Previous Year

For this variable to be useful in regression analysis, the presumed linear relationship (as the number of reported partners increases, the number of reported symptoms in the previous year should increase linearly, or nearly linearly). This is not the case, as there is no discernable increase in risk with an increase in partners and there is a fair amount of variation.

Condom Use (last sex act)

The standardised Beta coefficient for this variable is -0.007, the t is -0.046 which has a p of 0.964. This indicates that the variable is not individually significant in this model. Examining the boxplot indicates why:

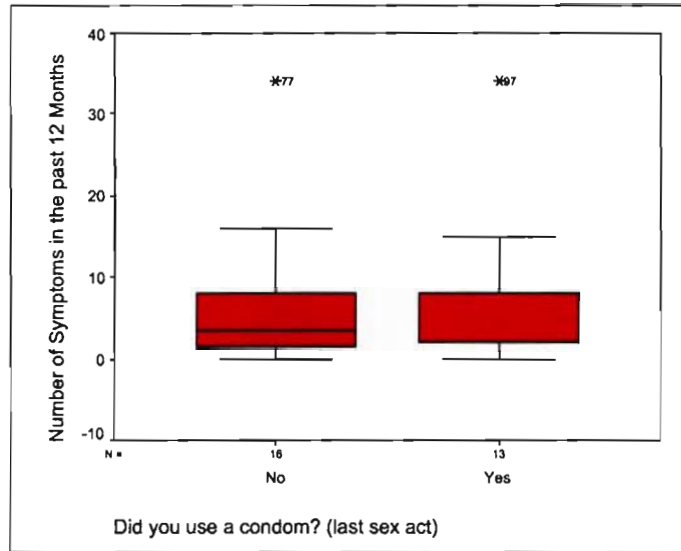


Figure 16 - Condom Use (last sex act) by Number of Symptoms in the Previous Year

Although there is more variation in risk of infection for those individuals who indicated that they did not use a condom in their last sexual act, there is no marked increase in the number of reported STI symptoms for those who indicated that they did not use a condom in their last sexual act.

Anal Sex

The standardised Beta coefficient for this variable is -0.055, the t is -0.306 which has a p of 0.766. This indicates that the variable is not individually significant in this model. Examining the boxplot indicates why:

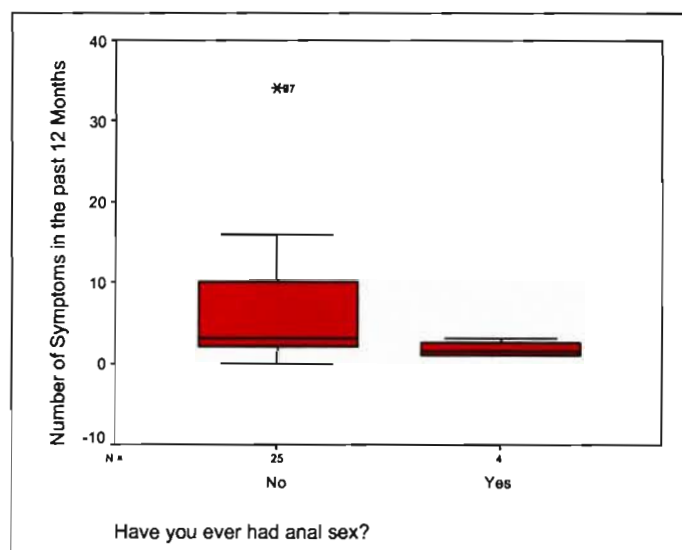


Figure 17 - Anal Sex by Number of Symptoms in the Previous Year

Contrary to the research evidence that suggests that individuals who report that they have had anal sex are also more likely to have unprotected sex and therefore be at greater risk for infection, this is not reflected in this data set. In this sample, those who indicated that they had not had anal sex reported greater variation in the number of STI symptoms experienced, as well as a higher number of STI symptoms (mean rank of 47.15 versus 41.63 in those who report anal sex). This is not statistically significant (Mann-Whitney $U=601.0$, $p=0.416$). The negative Beta coefficient and t-statistic indicate that 'No' is associated with lowered risk in this sample.

Treatment latency

The duration of symptoms prior to seeking treatment is taken to be 'treatment latency'. The standardised Beta coefficient for this variable is 0.304, the t is 1.76 which has a p of 0.110. This indicates that the variable is not individually significant in this model, but as predicted it is relatively important in predicting behavioural risk (it is the second most important factor when considering both the size of the t-value, the significance value and the part correlation). Participants who took longer to seek out treatment were also more likely to indicate that they had more STI episodes in the previous year. As this is not a prospective study it is impossible to infer causation but this is some support for the notion that recurrent STIs, particularly if untreated, may increase susceptibility to future infections. What is clear is that the longer participants take to seek out treatment for their symptoms, the more likely they are to fall into the higher risk group.

5.7.2. Revised Regression Model

The regression was repeated, but all the variables with p values of greater than 0.7 were removed from the model as they are not individually contributing significantly to the model. This resulted in eight variables being dropped from the analysis. The resulting model retained the following variables:

Demographic

- Employed (Yes/No) (97)

Abstain

- Days since last sexual contact (93)

Be Faithful

- Whether or not the participant had a stable partner/was married (98)

Condomise

- Whether it was easy to use a condom with their steady partners (80)

Other

- The number of different symptoms experienced in the previous year (98)
- Whether or not they have told their partners about their symptoms (disclosure) (89)
- Whether or not the participant had been to the clinic before (98)
- Duration of current symptoms (71)
- Whether or not behaviour changed during an STI episode (92)
- Knowledge of the link between STI and increased HIV risk (91)

The model summary and the significance of the revised model are provided in table 27.

Table 27 - Revised Regression Model Summary and Significance

Model Summary

Model	R	R Square	Adjusted R Square
1	.820	.672	.590

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2074.511	10	207.451	8.196	.000
	Residual	1012.470	40	25.312		
	Total	3086.980	50			

From this revised model it is clear that the reduced number of variables account for less of the total variance (now 59.0% interpreting the adjusted R Square) but the model is overall more clearly significant (F=8.196,

$p < 0.001$). This is to be expected when a model is created that uses fewer but better predictors (Howell, 1997; Kerlinger, 1992; Norusis, 2002). The model now accounts for less of the variance in the criterion variable, but it does so more accurately (hence the improved significance of the model). The statistics for the individual predictors are listed in Appendix G.

In this revised model, three of the variables are significant contributors to the overall model. They are the number of different symptoms experienced in the previous year ($p < 0.001$), knowledge about the link between STI infection and HIV risk ($p = 0.012$) and duration of symptoms prior to seeking treatment ($p = 0.035$). These variables also have the largest part correlations as this indicates the amount that they predict the criterion when the effect of the other variables is taken into account. The relationship between the number of different symptoms in the previous year and the number of symptoms in the previous year is not surprising. Those participants who knew there is a link between STI and HIV infection were more likely to report more symptoms in the previous year. It is also possible, however, that those participants who had the most symptoms in the previous year had more opportunity to become aware of the link between STIs and HIV. The information may also have had higher salience for them as they may have been more aware of the personal risk that they were

One variable that seems, theoretically, to be important but is not significant, is that of ease of condom use with regular partners. The boxplot was generated to explore this relationship:



Figure 18 - Ease of Condom Use (regular partner) by Number of Symptoms in the Previous Year

Examining the boxplot it seems clear that those participants who indicate that they found it difficult or impossible to insist on condom use were more likely also to report a larger number of STI symptoms in the previous year. This is also statistically significant (Mann-Whitney $U=437$, $p=0.013$).

Another variable that would seem to be important but is not in this model is whether or not a condom was used in the last sex act. The boxplot for this relationship was examined, and is included as figure 19.

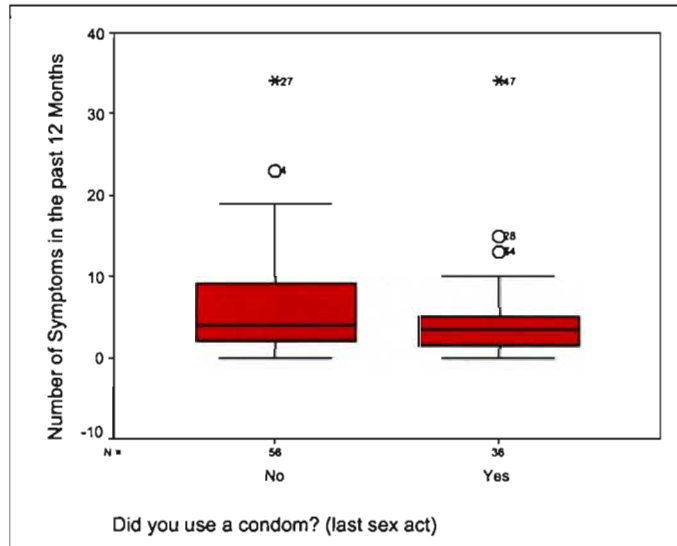


Figure 19 - Condom Use (last sex act) by Number of Symptoms in the Previous Year

From the boxplot it seems clear that participants who did not report using a condom at their last sex act were also more likely to report a larger number of STI symptoms in the previous year. This was, however, not statistically significant (Mann-Whitney $U=835$, $p=0.164$).

One last set of variables that it was theorised would be related to each other are the measures of promiscuity. That is, it was thought that the number of partners (steady and casual) would be related to each other and also associated with risk of STI infection in the regression. The degree of correlation between the variables was assessed, and this analysis is included as table 28.

Table 28 - Correlation Matrix for Theoretically Important Variables

Correlations					
		No. diff symp 12 months	Number of Symptoms in the past 12 Months	3.3. Casual (last three months)	3.4. Steady (lifetime)
Number of different symptoms in the previous year	Pearson Correlation	1	.662**	-.113	-.082
	Sig. (2-tailed)	.	.000	.293	.473
	N	98	98	88	79
Number of Symptoms in the past 12 Months	Pearson Correlation	.662**	1	-.006	-.079
	Sig. (2-tailed)	.000	.	.953	.490
	N	98	98	88	79
3.3. Casual (last three months)	Pearson Correlation	-.113	-.006	1	.255*
	Sig. (2-tailed)	.293	.953	.	.030
	N	88	88	88	73
3.4. Steady (lifetime)	Pearson Correlation	-.082	-.079	.255*	1
	Sig. (2-tailed)	.473	.490	.030	.
	N	79	79	73	79

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).

From table 28, it is clear that the number of symptoms experienced in the previous year and the number of different symptoms experienced are related ($p < 0.01$). The number of casual partners in the last three months is also related to the number of lifetime steady partners ($p < 0.05$), but this is not related to the outcome measure (the number of symptoms in the previous year)¹⁶.

It should be kept in mind that in multivariate analysis the simultaneous influence of multiple predictors on the criterion is being assessed and it is difficult to predict from univariate analysis how predictors will behave in multivariate analysis.

As gender has been shown to play such an important role in HIV infection risk, the regression model was run separately for men and women to see if it behaved significantly differently, even though gender as a variable did

¹⁶ If anything this relationship is a weak negative one (the larger the number the partners, the lower the risk) but this does not approach statistical significance at all and so cannot really be commented on here as this could simply be due to 'natural' variance.

not contribute significantly to the overall model. The results indicate that the model does behave differently for men and women, and that the individual factors that play a role in predicting risk are different.

The model summary, F and significant variables are summarised in the following table:

Table 29 - Revised Regression Model Summary and Significance (by Gender)

	R Square	Adj. R Square	F	Sig. (F)	Variables (p)
Female	0.722	0.550	5.182	p=0.001	Number of different symptoms in the previous year (p=0.002)
Male	0.581	0.232	1.666	p=0.199	None

What is clear from the above is that the regression is not the same for each gender. The revised model is still significant for the female participants with one significant variable, but it is not significant for the males. This further underscores and supports the contention that risk factors are different for men and women when it comes to STI and HIV risk.

6. Discussion

6.1. Introductory comments

As has been described previously, it is estimated that the majority of HIV infections may be attributable to having STI infection as a co-factor, particularly in the earlier stages of the HIV epidemic (Robinson, Mulder, Auvert, & Hayes, 1997). Data is sparse and mixed as to the impact of STI control and treatment on the HIV infection rate. Very few large-scale, intervention-based studies have been done to assess this impact directly. The studies that are most often referred to are the Thailand 100% condom study, the Mwanza, the Masaka and the Rakai studies, as discussed in the literature review of this dissertation (FHI, 2001b; Sangani et al., 2004). The current controversy in the effectiveness of mass STI treatment in controlling HIV, particularly in mature HIV epidemics as in South Africa, is a further indication that prevention of infection should remain a goal, within the larger endeavour of HIV infection control. The IMB model offers a conceptually grounded and empirically-based framework for conceiving, implementing and assessing such an intervention. The standard ABC message of 'abstain, be faithful and condomise' was incorporated into the IMB model, and

this is illustrated in figure 20. Other factors that were found to be important in the literature review of behavioural risk (anal sex, gender, employment, health/treatment seeking behaviour, motivation to test, sexual partner networking) were included in a regression analysis of the data. Key results from all the preceding analysis are highlighted and outlined in relation to the IMB model of behaviour change.

6.2. Demographic profile of STI clinic attendees

The average clinic participant is a black (African) person (98.9%) resident in Durban (nearly 90%), with a median age of 26 and who is unemployed or currently studying (54.0%) and is currently in a stable partnership (74.5%). Women were statistically significantly more likely to report unmarried but stable partnerships (83.3% versus 66.0% in men). Another way of putting this is that men were more likely than women to indicate that they had no stable partner (26.0% versus 6.3% of women). Men also had more casual partners in their lifetime, and this was statistically significant ($p=0.036$). More men than women refused to be interviewed, but there is no way of determining if this reflects a gender imbalance in clinic participation, or in participation in the survey.

6.3. Regression Analyses

Two major regression analyses were conducted in this study. This analysis was not done to develop an equation to predict risk, but rather to try and understand the relative contribution of the various variables measured to understanding risk of infection in this sample. In this case the criterion was the number of STI episodes in the previous year (an indicator of risk) and the predictors were a series of variables considered to be theoretically important.

The variables that were included in the model were structured around the ABC approach to HIV prevention advocated internationally as the standard approach. They included, therefore, variables that related to abstinence, fidelity and condom use. Other variables that were shown to be important in the literature were also included, focussing on issues like the prevalence of anal sex, disclosure to partners, sexual risk behaviour change during an STI episode, knowledge of the link between STIs and HIV, and length of time taken to seek out treatment. All of these variables also play a role in the overview of prevention information, motivation and behavioural skills outlined in figure 20.

The overall regression model indicated that the variables used could account for nearly 63% of the variance in the number of STI episodes in the previous year (with an adjustment for the low number of observations per predictor), and that this was statistically significant ($F=3.630$, $p=0.021$). When the table of coefficients was examined, none of the individual variables had significant t tests although this may have been due to the low number of observations per predictor (of which there were 18) which affects statistical power. In order to try and increase the power of the analysis and to remove variables that were relatively unimportant, all variables with p values greater than 0.7 were removed from the analysis, leaving 10 predictors in a revised regression analysis. This model accounted for slightly less of the variance (59.0% when examining the adjusted R square) but it was statistically more strongly significant as indicated by a greater F and lower p value ($F=8.198$, $p<0.001$). This is to be expected because, although there are fewer variables and hence less of the variance is accounted for, the variables that are included contribute more accurately to the regression and, hence, it is better able to account for the variance that it does explain. Put another way, the regression accounts for less of the variance, but it does so in a better way.

In this revised regression, three predictors were significant when the table of coefficients was examined. The most significant (with the lowest p value, $p<0.001$) was the number of different types of STI symptom in the previous year. It is not surprising that those individuals who had the most number of different symptoms in the previous year were also likely to have the highest number of reported STI episodes in the previous year. This indicates that individuals with the most episodes of infection also suffered from the largest number of different symptoms. The next most significant variable was whether or not the participants knew that having an STI increases HIV risk ($p=0.016$). It is hypothesised that those individuals with the higher number of STI episodes in the previous year also were more motivated to take to heart the personal risk they were placing themselves under. Finally, the duration of the symptoms prior to seeking treatment (treatment seeking behaviour) was also significant ($p=0.035$). Those individuals with the longer treatment seeking delays were also more likely to be those individuals with the highest risk. This may support the contention that individuals who do not seek treatment are biologically more susceptible to re-infection over time.

One final important point in the regression analysis is that although gender was not a significant variable on its own in the analysis, when the revised regression model is analysed separately for men and women the outcome is very different. The revised regression model is not significant when analysed for men only ($F=1.666$, $p=0.199$) and does not account for much of the variance in the number of STI symptoms in the previous year (adjusted R square=0.232). For women alone the regression accounts for more than double the variance (adjusted R Square=0.550), and this is a statistically significant amount ($F=5.182$, $p=0.001$). This supports the literature that indicates that the factors that influence risk for men and women in relation to STI and HIV are different, and an intervention developed for use in this population needs to acknowledge this difference.

6.4. The IMB Model for STI patients at the CDC

The IMB model components relevant to this dissertation were illustrated in figure 1. When determining the nature and content of an intervention, it is useful to work backwards from the desired outcome to the specific content required to achieve the desired end. In this case, the desired health outcome has been listed as a reduction in the STI infection rate and, consequently, a reduction in the HIV risk in this population. In order to do this, it is suggested that individuals need to engage in specific prevention behaviour, including abstinence, partner reduction and the consistent use of condoms (the standard ABC approach). In addition to this, participants need to be able to reduce the risk of co-infection with an STI by seeking treatment early and modifying their sexual behaviour during an STI episode (either by abstaining, or by using barrier methods or sexual practises that reduce the risk for themselves and their partners). It is further suggested that in order to do these things, participants must possess or develop specific behavioural skills. Minimally, participants need to develop the necessary skills to negotiate safer sex practises (including the skills required to acquire and correctly use condoms, as well as being able to negotiate less risky sexual practises) and to be able to identify and seek treatment for STIs early.

The data collected in this elicitation research will be briefly synthesised around the major prevention behaviours outlined above and the revised IMB model is outlined in figure 20. This is based on the basic elements shown in figure 1.

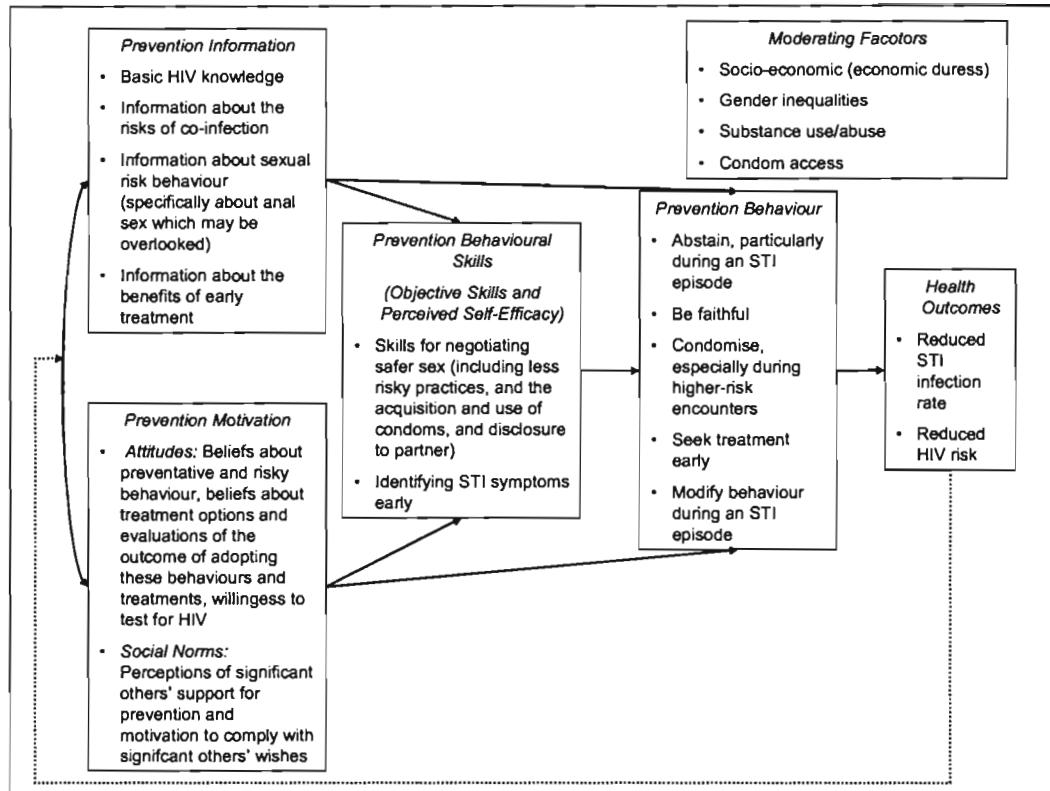


Figure 20 - IMB Components for this Study

Prevention Behaviours:

Abstain

As indicated in the literature review, early sexual debut has been proposed to contribute to risk for HIV infection. In this high-risk cohort the age of sexual debut ranged from 6 to 28, with more men (36.4%) than women (10.7%) indicating that they first had sex when they were younger than 15 years. The relative contribution of this variable to risk in the regression model was not significant, indicating that this factor was relatively unimportant in understanding risk of infection in this population. This is possibly due to the fact that only high-risk participants are sampled. It is possible that including lower-risk participants may have allowed for an association between later sexual debut and lowered risk to emerge. The days since the last sexual contact were recorded as an indication of current abstinence. The median number of days reported was 8, and this variable was also not individually significant in the overall regression model, although it was relatively more significant in the model than age of sexual debut (as indicated by a higher t-test score, and a lower p value).

Even if not usually abstinent, it is hoped that participants would attempt to be abstinent whilst infected with an STI. This does seem to be prevalent with 56.7% of participants indicating that they abstain or attempt to abstain during an episode of STI, and the balance indicating that they use condoms during an STI.

Be Faithful

Given that this is a high risk cohort of STI clinic attendees, the number of sexual partners reported in this sample is not high. The participants report a median of 3 lifetime steady partners, and a median number of 0 casual partners over the lifetime of participants. Even though the median number of reported casual partners was 0, men reported more casual partnerships, and this was statistically significant. However, the number of steady or casual partners was not found to be important relative to other factors in the overall regression model that was developed for this study. As outlined in the literature the partner reduction strategy has not been fully explored in STI prevention and control and there have been calls to renew focus on this aspect of the ABC of HIV prevention.

Condomise

Early reviews of behavioural change in Africa in the face of the HIV epidemic indicated that the self-reported behavioural change was widespread, and that the most common reported change was a decrease in the number of partners or a more circumspect attitude towards sexual partnerships (Cleland, Cara, Deheneffe, & Ferry, 1992). At that early stage in the epidemic, however, the authors noted that it would be difficult to consistently make sex unpopular and that the low levels of reported condom use would be affected by social marketing campaigns that would make condoms more accessible and socially acceptable. The consistent use of condoms is one of the most effective means of reducing the risk of infection by HIV or another STI (Civic, 2000). In South Africa there has been a consistent increase in condom distribution in order to make male condoms more accessible. It is estimated that in 2002, 190 million male condoms were distributed in South Africa by the state (Funani et al., 2004). However this may still be an inadequate number when translated into number of condoms per male (≥ 15 years of age), which translates to 4.3, 5.6 and 6.4 in the years 2000 to 2002 respectively. Many factors make it difficult to determine exactly how many condoms per male on average need to be distributed per year, and it is difficult to determine exactly how many condoms are privately purchased and used, but there is consensus that the current distribution numbers are too low. Until

condoms become more widely available, it should be no surprise that they are not used consistently.

There is also data from South Africa that indicates that although many adolescents indicated that they felt favourably towards condom use, substantial numbers indicated that they felt there were problems with their use which included that they took the fun out of sex, or that their use may harm the body (James, Reddy, Taylor, & Jinabhai, 2004). Given that positive sexual practises may be instilled early on, particularly during adolescence, it should not be surprising that condoms are not consistently used despite widespread understanding of their usefulness and their increased availability given the concerns expressed above. The authors conclude that the positive attitude towards condoms needs to be harnessed, and that the slogans and distribution needs to be backed up by demonstrations of correct use and information to dispel myths about the perceived harmful effects of condoms on the body. There is also clear data to indicate that condoms are more likely to be used by individuals who are exposed to branded condom adverts, than those individuals who have been exposed to generic 'use condoms' health-promotion advertising (Agha, 2003). Branded condom advertising did this by increasing feelings of personal relevance of the messages, and by increasing the sense of self-efficacy of the individuals to actually be able to use condoms in a sexual act, whilst also decreasing the sense of embarrassment around condom acquisition.

In the sample for this study, only 57.1% of participants responded that a condom was used in their last sexual contact. For 50.0% of people this last sexual contact was 8 days and less prior to their clinic visit. Although it is not surprising that patients at the STI clinic are not using condoms consistently, it is worrying that many participants are clearly at high risk for re-infection and for infecting their partners. Whether or not the participant used a condom in their last sexual encounter was not, however, closely related to the number of symptoms in the previous year and did not contribute to the overall regression model in a marked way (see Appendix F). Figure 16 shows that there is no relationship between condom use at last sexual contact and risk of infection. Although last sexual act is thought of as being representative of sexual risk and easily remembered and therefore reliably reported, this study supports the notion that the 'last sex act' methodology may be flawed and not representative of the risk of an individual over numerous sexual encounters (Catania et al., 2002).

Reasons for non-use of condoms are interesting with 27.3% of those giving a reason for not using condoms being women who say that their male partners do not want to use them. An equal percentage of participants indicate that they do not use condoms because they are in long-standing, trusting relationships. Only 4.1% indicated that they did not use condoms because they were not available, indicating that access to condoms (a potential moderating factor in the IMB model proposed for this study) is not a limiting factor in their use. Clearly women are not empowered to insist on condom use and issues of trust rather than like or dislike seem to dominate the decision to use a condom. It would be futile to continue to distribute large numbers of condoms to women if they are unable to insist on their use. Also, the risk that condom use may have become stigmatised (i.e. that it suggests a lack of trust) needs further study and a re-education programme. Certainly this needs to be reinforced in any behavioural intervention that includes condom use. Additionally whereas for men using a condom may be a concrete behaviour, for women this usually includes negotiating with their male partner to use a condom and is, therefore, a prevention goal for women rather than a concrete behaviour (Fishbein, 2000). The skills required would differ. For men this would include the skill to be able to use condoms consistently and correctly (including the acquisition and storage of condoms) but for women this would predominantly entail skills around the negotiation of safer sex practices. The fact that women are more likely than men to report that a condom was not used is empirical support for the notion that the latter skill is more difficult to exercise. Men were also more likely to report that it is easy to use condoms, and this was statistically significant. A generic 'use condoms' message is not likely to be sufficient for both genders.

The nature of the relationship is also likely to affect condom use. A small majority of individuals (54.3%) indicated that it is easy to use condoms with their regular partners versus 74.1% who said it was easy to use condoms with the casual partners that they have. It may be that using condoms with casual partners may be less stigmatised and less insulting than using them with regular partners where condoms have come to symbolise a lack of trust.

Seek Treatment Early

The majority of participants in this sample (92.9%) indicated that they had symptoms of an STI in the previous year. The median duration for seeking out

treatment for current symptoms is 7 days, with 81.7% of the participants taking less than 30 days to seek out treatment. One of the factors that was thought to influence treatment seeking behaviour was a favourable perception of the clinic and the treatment received there. Most of the participants (70.5%) indicated that they were treated favourably at the clinic, with twice as many men as women indicating negative perceptions. Early treatment seeking behaviour needs to be reinforced and the value of it needs to be made explicit to clinic participants. Participants who have long treatment latencies should be identified at the clinic for particular attention.

Data from another study indicate that other reasons for long treatment delays may include lowered self-efficacy in relation to responding to an STI, as well as higher perceived seriousness of the infection and a history of previous infections (Fortenberry, 1997). An intervention with this group needs to target these factors by providing clear information regarding symptom self-identification and treatment options (to increase self-efficacy), and information regarding the prevalence of infection (to counter potential stigma). Symptomatic women may have much greater difficulty in distinguishing normal from abnormal genital discharges, for example, but this is not evident in this group as there is no significant effect for gender on the length of time taken to seek out treatment. Something that should be explored in future research in this group is the reasons for not seeking treatment in the long-term treatment avoiders to determine if the same factors are barriers to treatment seeking behaviour in South Africa.

Modify Behaviour during an STI Episode

Just over 87% of participants indicated that they changed their behaviour during an STI episode, with nearly 78% of these indicating that they did so from when they first felt the symptoms. Successful modification of behaviour would decrease the risk of re-infection or of infection of the partner and this is considered to be significantly positive in this sample of participants. Modification would also, in part, depend on being able to disclose to sexual partners as they would need to go along with behaviour changes. In this sample nearly 70% of the participants who had a steady partner were able to disclose their infection to their partners, but only 13.3% indicated that they would disclose to their casual sexual partners (largely because they were unlikely to encounter these partners again). Almost 80% of participants indicated that they would refer their partners for treatment, further indication that disclosure amongst this group is high, and that prevention

motivation (the perception that significant others support for prevention) may also be high in this group. Finally, it was noted that the reaction of partners to the news of an infection was generally positive, with low levels of non-disclosure or specifically negative responses. The generally positive response to disclosure is likely to improve motivation to share information about an STI with a partner.

Prevention Information

A basic understanding of HIV is a pre-requisite for protection, and for being motivated to avoid infection. This sample indicated a very high degree of knowledge around HIV. Only 1.2% of individuals sampled indicated that they did not know how to prevent HIV infection, or gave a response indicating that they did not know. 87.6% of the sample gave a means of prevention that related to the ABC prevention message.

In addition to this, 32.7% of those responding knew that it is easier to get HIV if you have a concurrent STI and the same percentage knew that having an STI was an indication of behavioural risk for HIV infection. A further 14.5% of participants indicated that they felt that someone with a longstanding STI would develop HIV.

Anal Sex (Frequently overlooked, but potentially important)

The HIV/AIDS epidemic in Southern Africa has been explosive and unprecedented, exceeding the numbers that have been modelled based on estimates of the risk of peno-vaginal sex alone (Brewer et al., 2003). Heterosexual unprotected anal intercourse has been implicated as a significant risk factor for HIV infection. It has been suggested that in Africa particularly that, besides potential exposure to unclean medical practises, penile-anal intercourse may be underestimated and underreported risk factor in HIV infection (Brody & Potterat, 2003). For this reason the prevalence of anal sex, and the use of condoms during anal sex, was specifically explored in this study.

Far from being an uncommon practice, heterosexual anal intercourse is widely reported (Halperin, 1999)¹⁷, and some of this data will be summarised here. Although unprotected heterosexual anal sex presents a significant risk for HIV infection, most HIV prevention education and materials geared towards

¹⁷ This entire section references this review, unless specifically noted otherwise in the text.

heterosexual risk prevention remain silent about this practice. The most important consequence of this is that the reported rate of condom use for heterosexual anal sex is almost always lower than that for vaginal sex, and even lower than the rate for anal sex between MSMs. Anal intercourse is frequently characterised as a male homosexual practice but it should be remembered that, in terms of absolute numbers, anal sex is practised by far more heterosexuals, and many homosexual men do not engage in this practice at all. It is estimated, for example, that approximately one million men in the United States regularly practise receptive anal sex, versus the estimated four million women who do the same. It is further estimated that approximately 50% of MSM who practise anal sex use condoms consistently, versus only 10% of women who do so. This practice may also be more common in traditionally identified high-risk groups. US surveys of FSWs for example indicate that between 30-74% of sex workers report practising heterosexual anal intercourse.

Data from Africa are less readily available. Anal sex is rarely openly acknowledged, and so the prevalence of this practice in these areas is difficult to determine. Although several surveys in central and eastern African countries indicate that 4-8% of female AIDS patients reported having engaged in anal sex, this low number is most probably due to under-reported of a secret and highly stigmatised practice. A cohort of FSWs at truck-stops along the N2 have been followed-up and reported on in several studies, including a WHO sponsored microbicide trial. One of the studies used a comparison of a coital diary method and a self-reported questionnaire to determine the type and frequency of sexual contacts in this cohort (Ramjee, Weber, & Morar, 1999). When the diaries were assessed the researchers found that the women reported five times as many anal sex acts as when they were asked to recall on a questionnaire, with 43% of the women reporting that they commonly practised anal intercourse (Abdool Karim & Ramjee, 1998). Self-reported anal sex in these areas may under-represent the true frequency of this practice as well as the proportion of women who experience it. Given that anal sex is absent from the education message and materials in South Africa, it is critical that we determine the extent to which the general population is at all aware of the risks of this practice for HIV and other STI infection.

Traditionally many cultures have engaged in anal sex as a means of avoiding pregnancy, or in order to avoid the loss of virginity status. Although this has not

been clearly established, there is a growing sense that the increasing emphasis on virginity testing in more traditional African cultural groups in South Africa may be, inadvertently, encouraging the risky behaviour of unprotected anal intercourse. The fact that condoms and anal sex are associated as forms of contraception may also go some way to explaining why condom use during heterosexual anal intercourse is reported to be so low. In addition to this, the practice of anal sex is more stigmatised, further reducing the likelihood that women will be able to talk about or negotiate the use of condoms for anal penetration. Halperin (1999) also describes how in many cultures anal sex is associated with masculine power as something that men want and women provide in order to satisfy their men. In South Africa unpublished interviews indicate that rape in South Africa, always increasing in frequency, often includes anal penetration (Ibid.).

More recent research has shown that anal sex may be associated with additional behavioural risk, and that actual prevalence of heterosexual anal sex may be greater than previously measured (Gross et al., 2000). Most importantly, this study of 1268 sexually active women in the United States showed that women who reported engaging anal sex were also more likely to report that they did not always use condoms (including for vaginal sex), a higher median frequency for vaginal sex, as well as an increased likelihood of a report of an episode of STI in the previous year. This indicates that women who report engaging in anal sex were more likely to have a higher frequency of unprotected vaginal sex episodes. Studies assessing the impact of anal sex on HIV acquisition need to control for the frequency of unprotected vaginal intercourse, shown to be higher in those women who report engaging in anal sex.

The data collected in this current study suggests that anal sex is widely practised in the heterosexual population of South Africa, particularly in the current high-risk cohort, and should be studied further. Research is required to determine if the perceived risk of HIV infection for this practice is higher or lower than the perceived risk of other sexual practises. Some of this research is currently being conducted on high-risk cohorts at the Centre for the AIDS Programme of Research in South Africa in response to the data obtained in this study.

In order to act on prevention behaviour, individuals must develop specific behavioural skills. The IMB model postulates that these are both objective

abilities as well as perceived self-efficacy. In terms of this dissertation, the specific skills required include skills for negotiating safer sex practises, and skills for identifying STI symptoms early. In order to develop these skills, individuals need to have certain information and be motivated to act on it. The informational and motivational aspects will be described here, as these are the points at which it is possible to intervene and, theoretically, to impact on prevention behaviour.

Prevention Motivation

Motivation is conceptualised as consisting of both attitudes and beliefs about prevention information, as well as perceived support from significant others through social norms.

Attitudes

In order to motivate individuals to engage in preventative behaviour, beliefs about preventative and risky behaviour need to be understood. That is, participants need to have favourable beliefs about preventative behaviour, and believe that risky behaviours put them at risk. They need to feel that risk behaviours are not desirable, but that safer behaviours are. Attitudes towards preventative and risky behaviours were not directly assessed in this study. However attitudes and beliefs regarding treatment options and a willingness to test for HIV were. It was felt that individuals who believed that treatment for HIV was available and who were motivated to protect themselves and others might express that motivation through a greater willingness to test for HIV. 67.4% of participants indicated that they believed that HIV could be treated, with 15.2% indicating that they did not believe that it could be treated. The rest of the participants were unsure. It is hypothesised that if more individuals were made aware of the current treatment options available for HIV and STIs, the more motivated individuals would be to seek out treatment early. 52.4% of individuals who do not know their HIV status were nevertheless unwilling to take an HIV test if it was offered with 8.3% indicating that they were unsure. 66.0% of those who would not test, did not want to test because they were afraid of testing positive. Given the very high HIV prevalence in South Africa and the particular risk profile of participants in this study, that is not surprising. However, if individuals are going to be motivated to protect themselves and their loved ones, they will need to be encouraged to get tested, and to test regularly. As the understanding that there is treatment for HIV that is effective spreads, it is expected that willingness to test may also increase.

Social Norms

As outlined previously, levels of disclosure and a lack of negative reactions to disclosure seem to indicate that patients at the STI clinic value prevention behaviour and are, on the whole, supported in their attempts to engage in protective behaviour. Again it should be noted that we are only surveying those individuals who have sought out treatment and this sample does not include those who may be living with chronic infection who do not feel confident in seeking out treatment or disclosing to their partner. A social norm for partner reduction should be encouraged by emphasising the value of partner reduction in reducing both STI infection and HIV risk.

Moderating Factors

The factors listed in this box are not directly measured in this study, but are theorised to play a role in moderating the impact of the information, motivation and behavioural skills on prevention behaviour. Socio-economic factors are likely to play a role. Individuals under economic duress are less likely to be able to seek out treatment, and less likely to be able to avoid abusive or sexually unsafe situations. Employment has also been linked to health seeking behaviour in the literature, as mentioned in the literature review. Gender inequalities exist in terms of risk for HIV infection. This is most clearly seen to be true in that the revised regression equation is significant for women, but not for men. Women also frequently indicate that they do not use condoms because their male partners do not want to. Substance use or abuse is likely to compromise prevention behaviour efforts by reducing inhibitions and undermining attempts to follow through with prevention intentions. Although this is not explicitly explored in this study, it is mentioned in order to develop a model that takes moderating factors into account, and any intervention should assess substance use or abuse and attempt to reduce this also. Finally, condom access may moderate prevention attempts. In this study, however, very few of those individuals not using condoms indicated that they did not do so for reasons of access. For this group of individuals condom access appears to be good. However it cannot be assumed that this will be the case for those who are not currently using condoms for other reasons. That is, a high proportion of individuals indicated that they did not use condoms because their male partners did not want to or because they were in trusting relationships and it cannot be assumed that these individuals will be able to access condoms easily should they feel encouraged to adopt condom use in the future.

7. Limitations of this study

7.1. The sampling strategy

This study is based on a convenience sample of STI clinic attendees. Although analysis of non-participation indicates that there is no reason to believe that this sample does not represent clinic attendees at the Cyril Zulu clinic (the target population for this study), the statistical and explanatory power of the study would have been greatly enhanced by the inclusion of a comparison group. Looking at only the high-risk individuals is a form of range restriction which impacts negatively on correlations which are also the basis for the regression modelling technique employed in this research (Howell, 1997). This reduces the probability that the study would be able to find many significant predictors of risk in the regression model, even though the overall model was able to account for a substantial amount of the variance in risk of infection.

Although the aim of the study was to profile the risk behaviours of this particular group, the inclusion of a comparison group would help to establish ways in which this group differs significantly from the general population, as well as ways in which they are similar. This could have been achieved at the clinic by including a sample of TB clinic attendees. In this way, the ways in which the STI patient group differs from the general population could guide the development of an IMB-based behavioural intervention in this specific group.

Also the use of a comparison group would have increased the sample size. The predictors in the regression model would also have benefited from a larger sample size which would have ensured greater power by including more observations per predictor (Ibid). This was not possible within the resource constraints of this study, however.

7.2. The reliability and validity of self-report data for sexual risk behaviour

The reliability and validity of self-report data for sexual risk behaviour has been controversial since the original Kinsey reports regarding human sexual behaviour were published in the United States in the 1940's and 1950's. Reliability refers to the consistency or precision of reporting these private events, both at different time points as well as when reported in the same administration but in response to slightly different probing (Gregory, 1996). Validity is usually taken to refer to the faith that can be expressed that the instrument accurately measures what it sets

out to measure. In the case of sexual risk behaviour, concerns are raised as to how accurately individuals report their private sexual behaviour (Myer, Morroni, & Link, 2004). Concerns have been raised that, since sexual behaviour is not value-free, participants may be motivated to misrepresent their behaviour to researchers as much as to themselves, perhaps explaining some of the observed discrepancies between the reported sexual behaviour (particularly in relation to the number of sexual partners and to participation in oral and anal sex) between men and women surveyed (Ochs & Binik, 1999). Concerns raised regarding this type of data include the research evidence that stigmatised behaviours may be under-reported, normative behaviours may be over-reported, recall may be inaccurate and that intentional misrepresentation by participants may all but make this kind of data completely worthless or largely invalid (Catania, Gibson, Chitwood, & Coates, 1990; Weinhardt, Forsyth, Carey, Jaworski, & Durant, 1998).

Understanding sexual risk behaviour remains central both to describing the rapid spread of HIV, but also in interventions to reduce the spread of infection. Sexual behaviours remain problematic to observe directly, for obvious ethical and practical reasons as they are private, and no indirect physiological measures exist to determine the frequency or nature of specific sexual practises and so researchers have continued to rely on self-reported behaviour. Where possible measures should include estimates of reliability (either internally by including several items that measure the same behaviour to assess consistency, or test-retest reliability should be assessed to estimate stability of the measure over time) and validity (which can be done by using more than one method to measure behaviour, or by comparing self-reported risk behaviour with, for example, biological measures of risk such as diagnosis of STIs). Data on the validity of self-reported STI history have indicated that participants may consistently under-report STI infection either due to deliberate misrepresentation or due to non-deliberate process such as recall bias or misremembering, strongly suggesting the need to ensure that biological indicators (laboratory diagnoses of infection) be used to assess and monitor the validity of self-reported STI infection (Harrington et al., 2001). This finding was also repeated by researchers in a study of sexual risk behaviour in sero-discordant couples after VCT for HIV in Lusaka, Zambia where it was found that individuals tended to underreport unprotected sex (Allen et al., 2003). Although in the case of this study the use of biologic measures was

not possible due to cost and resource constraints where possible this should be done.

A clear finding from the literature is that the means of presentation or administration of the instrument do influence the quality of the data collected. Of particular interest has been the finding that using technological advanced means of administration (computer or audiotape versus written or researcher-administered) has tended to yield more consistent results. For example a US research study on anal sex used audio computer-assisted self-administered interviews (A-CASI) as the method of obtaining sexual risk behaviour data (Gross et al., 2000). The purpose of this was to increase the validity of self-reporting for sensitive sexual information. The results for this study (32% of women reported engaging in anal sex in the previous 6 months) indicate that the women were much more likely to report anal sex when the data was collected using the A-CASI versus the standard self-report data, whether collected by self-administration or interviewer administered questionnaires (OR=9.00, [CI] 1.14-71.0).

It is suggested that other less expensive and resource/technology intensive means of assessing risk behaviours should be explored, and data collected to establish the most valid and reliable method. Coital diaries have been mentioned previously, and have been assessed. These are clearly most appropriate for longitudinal or cohort studies, where there is ongoing contact with participants. A method that may be more appropriately applied in a survey such as the one described in this dissertation is the 'unmatched-count technique' (LaBrie, 2000). This technique allows for the participants to report on sensitive behaviours, without having to report exactly and explicitly on their own personal behaviour. The technique calls for the generation of two sets of statements; one which includes several, non-sensitive statements (called Form A) and a second set which has the same set of statements with the addition of the sensitive item (Form B which has one more statement than the first set and for this example I will assume this item confirms that the participant has had anal sex). Participants are asked to indicate how many of the statements apply to them, but do not have to indicate specifically which of the statements in the set apply.

The two forms are given randomly to the study participants who are asked how many of the items apply to them. The average number of items for each of the

forms are used to determine the proportion of individuals that endorse the sensitive behaviour. For example, if the mean of responses for Form A above was 1.65 and the mean for form B was 2.35, then the estimated of the number of individuals in this population who have had anal sex in the last year would be 70% ($2.35-1.65=0.7$). It is suggested a study like this be conducted in public health facilities in order to determine the accuracy of self-reported sexual, sensitive or risk behaviours. Where possible techniques such as this should be combined with others (like coital diaries) in an attempt to determine which of the techniques is most likely to produce accurate and reliable estimates of private sexual risk behaviour.

In South Africa it will be very important to develop reliable and valid measures of sexual risk behaviour in relation to HIV infection in order to explain those risk factors for which race remains an indirect measure (Connolly et al., 2004). As there are no known biological reasons for the fact that race remains highly predictive of HIV infection in South Africa, different behavioural risk profiles by race are likely to play an important but as yet not well understood role.

It should also be noted in defence of self-report for sexual risk behaviour, that individuals do not inevitably lie about these behaviours (Pisani, Brown, Saidel, Rehle, & Carael, 1998). Where the relatively simple precautions of ensuring confidentiality and encouraging disclosure (by, for example, ensuring that interviewers are of the same sex and similar age) are implemented, there is little reason to believe that self-report is inappropriate.

7.3. STI and HIV Status

Although risk of STI infection was taken to be a risk factor for HIV in this study, no STI or HIV testing was possible to confirm this relationship. Although the treatment administered for an STI confirms a high likelihood of infection in this group confirmation of infection by testing would have increased the validity of the self-report for sexual risk behaviour, but this was not practical within the resource constraints of this study.

8. Conclusion and Recommendations

The data collected in this study and the IMB model outlined in figure 20 should be used to design, implement and assess an intervention with STI clinic attendees.

8.1. What an intervention should include

According to the IMB model outlined in this dissertation, an intervention with this population needs to include specific information and motivation that would facilitate the implementation of specific behavioural skills.

It is the recommendation of this study that the following information needs to be included:

- The biological susceptibility to HIV when co-infected with an STI, especially HSV-2, needs to be explicitly explained.
- The fact that HIV infection can be treated needs to be included in prevention information. Currently 15.2% of the sample did not know that HIV could be treated, and a further 17.4% were unsure about this. It is hypothesised that feelings that HIV cannot be treated may lead to a fatalism which has been shown to impact on health seeking behaviour (Plowden, 2003). If people know that HIV can be treated, they may be less likely to avoid seeking out care for STIs in general.
- The correct use of condoms needs to be demonstrated, and the relative risks of sexual practises needs to be outlined. Additionally the skills required to obtain and store condoms should be explored. Women need to be given strategies for negotiating the use of condoms, and be given information on the relative risk of behaviour so that they can negotiate lower risk behaviour (where possible).
- Specifically, this information needs to include information about the risk of anal sex, and the need for the use of protection when engaging in anal sex. This information is not often included in risk-reduction information, yet the practice is prevalent and often protection is not used during this practice.
- Participants need to have reinforced that there are clear benefits to seeking early treatment, and be given information to assist in symptom self-identification. 8.7% of individuals felt that they did not have HIV infection because they could see no symptoms in themselves. The flu-like symptoms of acute HIV infection should be outlined, and the

asymptomatic phase described so that individuals do not discount their own personal risk.

Informed individuals need to be motivated in order to act on prevention information. It is the recommendation of this study that the following motivational components be emphasised in an intervention with this population:

- The early use of proven effective medical treatments for STIs and HIV infection need to be reinforced, and the benefits for both the patient and public health should be underlined. Data indicates that decreased self efficacy with regard to STI treatment may delay treatment seeking behaviour in this regard (Fortenberry, 1997). One of the reasons given by the participants in this study for not wanting to know their serostatus is the belief that the knowledge of being HIV positive would lead to additional stress which would cause participants to become ill more quickly. This perception needs to be countered by reference to the available treatments, and to the benefit of their use.
- Social support networks should be elicited from the participant, and should be encouraged to participate in treatment and maintenance of prevention behaviour. The social norm for partner reduction (the B, or be faithful of the ABC) should also be elicited and emphasised as it has been suggested that this is the underestimated factor in the ABC approach to prevention (Shelton et al., 2004). Certainly partner reduction is more likely to be a tenable goal, relative to abstinence or the consistent and correct use of condoms.

8.2. Concluding comments

This dissertation sets out to explore the demographics of patients at the clinic, their health seeking behaviours, their sexual risk behaviours and their knowledge about HIV and willingness to test. This information can be used to identify gaps in the information and motivation required to enact specific behavioural skills required to avoid STI and HIV infection.

Given the increased risk for HIV infection, it is important to note that uptake of counselling and testing in this sample was very low. The major barrier to testing is fear and 'just not wanting to know' their HIV status. With the imminent scaling up

of the roll-out of antiretrovirals it is essential that testing and counselling be offered more aggressively to this high-risk population and that the benefits of testing early be outlined more clearly. In addition to this, it is suggested that the biological susceptibility of persons infected with an STI to HIV infection be emphasised. Patients understand that STI infection indicates behavioural risk, but evidence suggests that the actual risk is greater than just this. Patients may, for example, limit their number of partners during an infection but not realise that their risk of contracting HIV during and after an STI episode from just one partner also increases due to their biological susceptibility increasing. The converse of this is also true. That is, it is currently unclear what proportion of individuals who present for HIV testing are counselled to receive testing for other STIs in addition to HIV. Given the relationship between HIV and other STIs, and the benefits of treatment, it is suggested that individuals who volunteer for VCT should be counselled to receive STI screening as syndromic management rather than screening is the norm in South Africa (Leaity et al., 2000).

Although STI treatment and control has the potential to substantially impact on the HIV pandemic worldwide by facilitating prevention, the data are mixed as discussed above. Unfortunately the data collected on the burden of STIs in South Africa has been poor in the past, and the level of training, expertise and drug supplies to treat STIs has not been satisfactory (Ijumba, Day, & Ntuli, 2004; Ramkissoon et al., 2004). STI patients are at particular high risk for HIV infection both due to behavioural risk factors as well as biological susceptibility. Those attending public health clinics are logical targets for specific behavioural interventions. These interventions must be targeted and brief, and the IMB model provides a very useful conceptual framework for determining the exact content of a focussed intervention. It is hoped that the description of the sexual risk profile of this population in this study, as well as the IMB model outlined in figure 20, will assist in the development and implementation of a behavioural intervention in this group. It has been suggested that clinic-based programs to increase sexually responsible behaviour have great potential as clinic patients often are at increased risk, the clinic staff could be viewed as the correct authoritative sources of relevant information, and, finally, the clinic visit itself may be an important cue to change behaviour that may not be present if the intervention was run at a school, for example (Fortenberry, 2002). If behavioural interventions are not implemented in this context, this will remain a missed opportunity.

9. References

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10. Appendices

Appendix A: Behavioural Instrument

Appendix B: Informed Consent Form

Appendix C: Research Ethics Committee Approval (Nelson R Mandela School of Medicine)

Appendix D: Permission to Conduct a Study, Ethekewini Municipality

Appendix E: Sample Data entry forms: EpiInfo 3.00

Appendix F: Coefficients in the Overall Regression Model (Significance and Part Correlations)

Appendix G: Coefficients in the Revised Regression Model (Significance and Part Correlations)

Date of interview: ____ \ ____ \ 2003

Interviewer: _____

QUESTIONS FOR CDC PATIENTS**Section 1: Demographic Information**

This information will help us understand who comes to this clinic:

1. Age: Years
2. Gender: Male Female
3. Relationship Status: No Partner Married Stable partner
4. Occupation:

5. [Observed] Race:
White Coloured Black Indian Other
[Race is recorded to assess the representation of the population in the sample]
6. Where do you reside during the week?

7. Where do you reside on weekends?

Section 2: Health Seeking Behaviours and Clinic Visits

1. This information will help us to understand why people visit this clinic:

	Yes	No	ii: No. of times	iii. What treatment did you receive, and where did you receive the treatment (if any):
i. During the last 12 months have you Experienced any of the following?				
a. Discharge				
b. Burning urination				
c. Itchiness of private parts				
d. Ulcer/sore				
e. Warts				
f. Pubic lice				
g. Pain in lower tummy				
h. Pain during intercourse				

2. Have you come to **this** clinic before? Yes No - go to question 3.

(a) If “yes”, when last did you come to the clinic?

Days: _____ Weeks: _____ Months: _____ Years: _____

(b) How often have you come to the clinic in the last:

3 Months: _____ 6 Months: _____ Year: _____

3. What symptoms do you have **today** that have made you come to the clinic?

4. How long have you had the symptoms:

[] Months [] Weeks [] Days

5. What symptoms would **always** make you come to the clinic?

6. What symptoms have you had in the past that you have felt were not serious enough to come to the clinic for treatment?

7. How do you find you are treated at the clinic by the staff here (*get patients to explain*)?

Section 3: Sexual Behaviour

We would like to ask you about your sexual behaviour in the recent past.

1. Age at first sexual intercourse: [] Years

2. Last sexual contact: [] days ago.

3. Number of sexual partners in the last 3 months: Steady [] Casual []

4. Total lifetime sexual partners: Steady [] Casual []

5. Do you currently have a steady sexual relationship? Yes [] No [] -

go to c

a. Have you informed your regular sexual partners about your symptoms?

Yes [] No []

b. Why?

c. Do you inform your casual sexual partners about your symptoms?

Yes [] No []

d. Why?

6. Are you going to inform your sexual partners of the treatment you may receive from the clinic if you receive treatment today? Yes [] No []

a. Why?

7. If you receive treatment today, will you encourage your partner to go for treatment?

Yes [] No []

a. If 'No', why?

8. Does your sexual behaviour change while you have symptoms or are being treated for a sexually transmitted infection? Yes [] No []
Refused []

If "Yes" to behaviour change:

a. In what way does your sexual behaviour change (*probe*: regular versus other sexual partners, probe condom use)

b. Does your behaviour change from when you first feel you have symptoms, or from when begin your treatment?

First feel symptoms [] Begin treatment [] Other []

[Other]: _____

9. How do your partners treat you when you have an infection?

10. When you **do not** have symptoms, do you insist on using condoms during sex with:

a. Your regular partner? Yes [] No [] No regular partners []

b. Why? _____

c. Your casual partners? Yes [] No [] No casual partners []

d. Why? _____

11. When you **do have** symptoms, do you insist on using condoms during sex with:

a. Your regular partner? Yes [] No [] No regular partners []

b. Why? _____

c. Your casual partners? Yes [] No [] No casual partners []

d. Why? _____

12. Was your last sexual encounter with a regular or 'casual' partner?

Regular [] Casual []

a. Did you use a condom? Yes [] No []

b. Why? _____

13. Have you ever had anal sex (where the penis entered the anus):

Yes [] No [] Refused []
a. Was a condom used? Yes [] No [] Refused []

14. How easy is it for you to insist on using a condom if you want to:

a. With **regular** partner?
Easy [] Sometimes [] Difficult [] Impossible []

a. With **casual** partners?
Easy [] Sometimes [] Difficult [] Impossible []

Section 4: HIV/AIDS

These questions will help us understand how much people know about HIV/AIDS:

1. Have you heard about HIV/AIDS? Yes [] No [] Don't Know []

2. How do you think HIV/AIDS is spread?

3. What have you heard about HIV/AIDS?

4. What kinds of people are most likely to get HIV/AIDS?

5. If you have a sexually transmitted infection, do you think you are more likely to get HIV/AIDS than someone who does not have an infection?
No [] Only Sometimes [] Definitely Yes [] Unsure []

a. Why? _____

6. In what ways can HIV/AIDS infection be prevented?

(Probes – explore understanding of condom use, availability and abstinence in prevention)

7. Do you think that HIV/AIDS can be **cured**? Yes [] No []
Unsure []

a. If “Yes”, how? _____

8. Do you think that HIV/AIDS can be **treated**? Yes [] No []
Unsure []

a. If “Yes”, how? _____

9. Do you know your HIV/AIDS Status? Yes [] No [] Unsure []

10. Why/Why not?

If “No” to know status:

11. Would you be willing to take an HIV test if it was offered to you?

Yes [] No [] Unsure []

a. Why? _____

(If yes to be tested, please refer the patient to the downstairs VCT facility at the clinic)

Thank you for your time and effort in helping us learn more about the people who come to this clinic, as well as about what people know about HIV/AIDS.

The last page of this questionnaire is a form that the doctor or clinic nurse will fill in to let us know if you have an infection and what that infection is. This is important because we want to compare this information to the description of why you came to the clinic. Your form will only have your number on, not your name, and we will not be able to know who you are by the form that is returned to us.

If you do not want to have this form filled in, please tell us and we will record your reason for not wanting the form to be filled in.

If “No”, record reason:

Clinical Assessment: Please detach and leave with patient.

Patient Number:

Attention: Medical/Nursing Staff

This patient has agreed to be interviewed for a study being conducted here at the clinic. In order to complete our study, we need to record the patient's diagnosis. Please could you fill this in, and hand it to Sister Jeanne Liebertrau to return to study team. Many Thanks.

This information will help us make sure we have correctly linked interview and clinical data:

Age: _____ Gender: _____

Client History:

Please could you record, briefly from patient examination [please tick the appropriate box]:

Female	Y	N
Vaginal discharge		
Genital ulcers		
Cervicitis		
Any cervical excitation tenderness		
Lower abdominal pain		
Clinically PID		

Male	Y	N
Urethral discharge		
Genital ulcers		

Treatment given [Please tick]

Benzathine Penicillin (LA) 2.4 Mu imi stat	Ciprofloxacin 500mg p.o stat	Doxycycline 100mg p.o daily for 7 days
Erythromycin 500mg p.o. QID for 5 days	Canestan	Metronidazole 2g p.o stat
Clotrimazole	Ceftriaxone	Metronidazole 400mg p.o bd x 7 days
Partner notification card?	Condoms use advice?	Condoms?

Other, Please specify:

Informed Consent form for Screening STI Questionnaire:

Title of the Research: **SEXUALLY TRANSMITTED INFECTIONS AS A RISK FACTOR FOR HIV - UNDERSTANDING HEALTH SEEKING BEHAVIOURS AND SEXUAL PRACTICES OF CLINIC ATTENDEES AT THE CYRIL ZULU COMMUNICABLE DISEASES**

Principal Investigator: Francois van Loggerenberg: CAPRISA
Nelson R Mandela School of Medicine
Umbilo Rd: Durban 4001

Telephone No: 031 - 2604564

INTRODUCTION

This document gives you information about the study that will be discussed with you by the interviewer or clinic nurse. Once you understand the study and agree to take part, you will be asked to sign the informed consent sheet, or make a mark in front of a witness. You should not agree to take part unless you are completely happy with the study, and you feel that you understand the information that has been given to you. Participation in this study is completely voluntary. Researchers from the University of Natal's Nelson Mandela School of Medicine are doing this study.

By taking part in this study, you are helping us understand more about the types of behaviour of the patients of the clinic. This will not benefit you directly, but will help the clinic staff to improve the services that are offered.

YOUR PARTICIPATION IS VOLUNTARY

- Your participation is entirely voluntary.
- You can refuse to continue to take part at any time without this affecting the care that you would receive at the clinic.
- You can refuse to answer any questions that you find too embarrassing or personal.

PROCEDURES

We would like you to answer some questions about your visit to the clinic, other sexually transmitted infections you may have had, and your knowledge about and willingness to have an HIV test. We would also like you to answer questions about your sexual behaviour. This questionnaire should take about half an hour to complete.

You do not have to answer any of the questions that you would prefer not to talk about, feel free to say, "PASS". If you do not wish to continue, you are free to stop the interview at any time. We will record your reason for not wanting to continue to help us understand why people did not want to complete the interview.

After you have answered the questionnaire, you will be given a form that the doctor or clinic nurse will fill in to let us know if you have an infection and what that infection

SIGNATURES

If you have read this consent form, or had it read and explained to you, and you understand the information, and you voluntarily agree to take part, please sign your name or make your mark after reading the statements below:

- I hereby consent to the procedures as outlined in the Informed Consent document being conducted on myself.
- I acknowledge that I have been informed by the fieldworker concerning the possible advantages and possible adverse effects which may result from my involvement in the study.
- I acknowledge that I understand the contents of this form, including all the information regarding the procedures and purpose of the study.
- I have been given the time to ask questions about anything I don't understand.
- I am aware that I may withdraw my consent at any time without affecting access to further care.

Signed: _____
Participant

Date:

Signed: _____
Fieldworker

Date:

For illiterate subjects:

Mark with an 'X': _____

Independent Witness: _____

Date:

Title and Name: _____

Telephone Number: _____

Appendix C: Research Ethics Committee Approval (Nelson R Mandela School of Medicine)

MEMORANDUM

To : Mr F van Loggerenberg
CAPRISA : Room 219 Main Building
Nelson R Mandela School of Medicine

From : Professor J Moodley
Chairman : Research Ethics Committee
Nelson R Mandela School of Medicine

1 April 2003

PROTOCOL : Sexually transmitted infections as a risk factor for HIV - Understanding health seeking behaviours and sexual practices of clinic attendees at the Cyril Zulu Communicable Diseases Centre. F van Loggerenberg, Community Health. Ref.: E175/02.

The Research Ethics Committee considered the above protocol and made various recommendations. These recommendations have been addressed and the protocol was approved by consensus at a full sitting of the Research Ethics Committee on 1 April 2003.


PROFESSOR J MOODLEY
Chairman : Research Ethics Committee

Appendix D: Permission to Conduct a Study, Ethekewini Municipality

ETHEKEWINI MUNICIPALITY
Health Department

P O Box 2643
Durban 4000
Tel: (031) 300 3911
Fax: (031) 300 3000
www.durban.gov.za



Our Ref:
Your Ref:
Enquiries:

PERSONAL HEALTH SERVICES
(Dr R Gajee)
Telephone : 300-3179

2003-05-02

Mr Francois Van Loggerenberg
Room 219
Mandela School of Medicine
719 Umbilo Road
DURBAN
4001

Dear Mr Van Loggerenberg

RE: CAPRISA: STIs AS A RISK FACTOR FOR HIV - UNDERSTANDING HEALTH SEEKING BEHAVIOUR AND SEXUAL PRACTICES

Final approval has been granted for the above study to be conducted at Prince Cyril Zulu Communicable Disease Centre. As you are aware, you will be required to share the same space that has already been allocated to CAPRISA and ensure that your study does not coincide with any other studies undertaken by CAPRISA at the same venue.

Please find attached our indemnity form which needs to be filled in by all research workers who will be at the research site.

Please contact Jeanne Liebetrau (3003140) or Surie Chinappa (3003122) before you commence with the study.

Yours faithfully


U. Sankar
HEAD : HEALTH

PP

C:\c:\app\lms\lms\c\lms\lms\Personal Health\Letter\002L.mxd 13

Address correspondence to the Director: Health



2003

Records

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Appendix E: Sample Data entry forms, EpiInfo 3.00

ID

Patient Number:

Date of Interview: Interviewer:

QUESTIONS FOR CDC PATIENTS

1. Age (years):

2. Gender (M or F):

3. Relationship Status:

4. Occupation:

5. Race (observed):

6. Where do you reside during the week?

7. Where do you reside on weekends?

Microsoft Excel
Clinic_data MDB - STIbehaviour PID Number 888 Required - Mx:enter

Section 3: Sexual Behaviour

We would like to ask you about your sexual behaviour in the recent past.

1. Age at first sexual intercourse (in years)

2. Last sexual contact (in days)

3. Number of sexual partners in the last 3 months: Steady Casual

4. Total lifetime sexual partners: Steady Casual

5. Do you currently have a steady sexual relationship?

If yes: a. Have you informed your regular sexual partner about your symptoms? Why

c. Do you inform your casual sexual partner about your symptoms? Why

6. Are you going to inform your sexual partners of the treatment you may receive from the clinic if you receive treatment today? Why

7. If you receive treatment today, will you encourage your partners to go for treatment? Why

8. Does your sexual behaviour change while you have symptoms or are being treated for a sexually transmitted infection?

If 'yes' to behaviour change:

a. In what way does your sexual behaviour change?

b. When does your behaviour start to change?

9. How do your partners treat you when you have an infection?

Microsoft Excel
Clinic_data MDB - STIbehaviour N31AgeAtF:1 Number 888

Appendix F: Coefficients in the Overall Regression Model (Significance and Part Correlations)

Coefficients					
Model		Standardized Coefficients	t	Sig.	Correlations
		Beta			Part
1	(Constant)		.290	.778	
	2. Gender	-.073	-.346	.736	-.040
	1. Age in Years	-.061	-.309	.764	-.036
	Are you employed?	-.130	-.741	.476	-.085
	3.1. Age at first sexual intercourse (years)	-.026	-.096	.925	-.011
	3.2. Last sexual contact (days ago).	.089	.608	.557	.070
	Do you have a stable partner?	-.194	-.942	.368	-.109
	3.3. Casual (last three months)	.041	.203	.843	.023
	3.4. Steady (lifetime)	-.015	-.068	.947	-.008
	3.12.a. Did you use a condom? (last sex act)	-.007	-.046	.964	-.005
	3.14.a. How easy to insist on condom - regular partner?	-.454	-1.486	.168	-.171
	3.13 Have you ever had anal sex?	-.055	-.306	.766	-.035
	No. diff symptoms/year	.398	1.538	.155	.177
	3.5.a. Have you told your regular partner about your symptoms?	.306	2.046	.068	.236
	2.2. Have you come to this clinic before?	-.187	-.992	.345	-.114
	Duration of Symptoms in Days	.304	1.756	.110	.202
	3.8. Does your sexual behaviour change while you have symptoms...	.162	.971	.354	.112
	If you have an STI are you at greater risk for HIV?	.182	.837	.422	.096
	Would you be willing to take an HIV test if it were offered to you?	.057	.244	.812	.028

Appendix G: Coefficients in the Revised Regression Model (Significance and Part Correlations)

Coefficients				
Model	Standardized Coefficients	t	Sig.	Correlations
				Part
1	(Constant)	-.936	.355	
	Are you employed?	-.061	.635	-.057
	3.2. Last sexual contact (days ago).	.048	.467	.042
	Do you have a stable partner?	.031	.333	.030
	3.14.a. How easy to insist on condom - regular partner?	-.171	-1.569	-.142
	No. diff symptoms/year	.571	5.441	.493
	3.5.a. Have you told your regular partner about your symptoms?	.152	1.594	.144
	2.2. Have you come to this clinic before?	-.199	-1.916	-.173
	Duration of Symptoms in Days	.202	2.188	.198
	3.8. Does your sexual behaviour change while you have symptoms...	.122	1.254	.114
	If you have an STI are you at greater risk for HIV?	.251	2.507	.227