# *ESTABLISHING AND EXPLAINING THE LINK BETWEEN POVERTY & HIV/AIDS: A SOUTH AFRICAN CASE STUDY*

By

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SOUTH AFRICA

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# Declaration

This dissertation represents the original work of the author, Lerato Sonia Tladi, and it has never been accepted at any University for any degree or test. Full acknowledgement is given for all the sources referred to in this dissertation.

Signature: .....

Date: 16 March 2005 .....

## Abstract

The epidemics of poverty and HIV/AIDS, whether individually or when combined, pose major threats to development both in South Africa and elsewhere in the world. However, it is when these epidemics coexist that major devastation occurs. As such exploration of the relationship between these two epidemics has been the focal point of most research on either poverty or HIV/AIDS. Through mainly the use of literature based research, studies have indicated how poverty and disease, most specifically HIV/AIDS are related. Since most of these studies have been literature based, this has resulted in a lack of sufficient empirical evidence arguing for the existence of this poverty-HIV/AIDS cycle. Providing such evidence forms the main objective of this study. This study uses data collected by the 1998 South African Demographic and Health Survey as well as existing literature on the link between poverty and disease. For purposes of this study, analysis is restricted to women in their reproductive ages (15-49).

The results indicate an increased risk of HIV infection among the poor due to poverty related characteristics of low education and low knowledge of the means of avoiding HIV infection as opposed to the non-poor. Moreover the poor and the less educated people were found to be more likely to not use condoms than the non-poor. The results do not, however, provide reasons for these relations and as such further research is required. One possible explanation was financial dependence on their partners as it was found that women who received money from their partners as well as those who came from households where hunger was a common phenomenon were more likely to not use condoms because their partners disliked condoms than those who didn't receive any money from their partners. The results also hinted on the intricacy of the poverty-HIV/AIDS relation whereby it was not only low socio-economic status that increased susceptibility to HIV infection but also high socio-economic status. This was indicated by the high odds of non-use of condoms due to low perceived risk of HIV infection among the non-poor and the White population (a race with the minority poor people). These results also hint at the prevailing stigmatization of HIV/AIDS as a disease of the poor despite efforts by prevention programmes to destigmatize this disease.

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# 1

# Introduction

## Background

It has been 23 years since HIV/AIDS was first discovered and the world is still searching for a cure. Since its inception, HIV/AIDS has left a path of destruction, claiming the lives of billions and impoverishing many areas of the world in the process. In Sub-Saharan Africa, home to the majority of HIV/AIDS sufferers, the pandemic has catastrophically deepened poverty and exacerbated myriad deprivations (UNICEF, nd). South Africa is no exception. This country has experienced one of Africa's most rapidly rising epidemics and ranks number one as the country with the largest number of HIV infections and the highest adult HIV prevalence. In 1997, an estimated 2.8 million South Africans were HIV positive. By 1999, this figure had increased to 3.5 million and at the end of 2000, it was standing at 4.7 million (van Rensburg, et al, 2002: 1). Compounding the problem in this area has been considerable ignorance and denial, mainly from the government and socio-economic and socio-cultural ramifications that together helped hasten the spread of the pandemic (van Rensburg, et al, 2002).

In the absence of a cure, prevention remains the most effective weapon against this growing epidemic. In recognition of this, most recommendations for the prevention of the spread of HIV and AIDS have included safe behavioural practices such as consistent condom use, abstinence, and serial monogamy with a seronegative partner and a limited number of lifetime sexual partners (Centre for Disease Control, 1998). However, research has shown that recommendations remain nothing more than just recommendations as unsafe sexual behavioural practices remain very prevalent, especially among the economically disadvantaged people. Why this should be is the topic of this dissertation.

## Problem Statement

There is a shared consensus among most scholars that although poverty does not directly cause HIV/AIDS, it increases vulnerability to infection and aggravates the impacts of HIV/AIDS after infection. AIDS, like most communicable diseases flourishes in conditions of poverty. As mentioned earlier, HIV can be prevented through positive behavioural changes such as condom use and having fewer sexual partners but the continual rapid epidemiological growth are evidence that such behavioural changes are yet to be adopted. This owes largely to the fact that the majority of poor people often perceive themselves as having no future or having a very bleak one, thus making them less likely to adopt such lifesaving behaviours. Prior to infection, knowledge of the pandemic and an understanding of how it can be avoided are essential in ensuring that individuals remain seronegative. This then requires a certain degree of literacy. However, since low education levels are often a characteristic of the poor, this population group often have a limited understanding of HIV/AIDS material and campaigns, thus placing them at risk of infection. For women, low education levels have also been shown to reduce the capacity to negotiate condom use, more especially in situations where the women are financially dependent on their sexual partners (Alban, 2001)

Once infected, treatment and a healthy lifestyle are required to ensure long-term survival. Implicit to treatment is the availability of proper health care facilities and good health seeking behaviour. However the majority of the poor reside in areas that lack proper health care facilities and where facilities are available, they are often very far or are characterised by long waiting times, fewer personnel and medication shortages. This then impacts negatively on the health of the poor as treatment is often delayed. For those with access to health facilities, treatment is often rendered ineffective by poor lifestyles such as lack of proper nutrition, lack of exercise and very stressful environments. Poor HIV infected pregnant women also pose a greater risk of transmitting the deadly virus to their babies before, during and after labour. This will be looked at in more detail later in the study. Despite the shared consensus regarding the

link between HIV/AIDS and poverty, there is at least one scholar who has questioned this link. Shell (2000) made an argument that if there were a link between poverty and HIV/AIDS, then the Eastern Cape would have the highest prevalence rate, as it is the poorest province in South Africa. This, Shell points out, is not the case. This argument is the very inspiration behind the work done here as it initially propelled me into attempting to disprove it. However a common theme emerging from the literature on poverty and infectious disease led to a change in intent. While existing literature on HIV/AIDS and poverty has been important in laying down a basis for understanding HIV/AIDS in the context of poverty, its ramifications have been limited. Existing literature contain very solid theoretical frameworks that argue for the existence of the link between poverty and infectious disease however quantitative studies that provide empirical evidence that directly or indirectly links poverty to infectious disease- i.e. in the case of HIV/AIDS, evidence linking risky sexual behaviour, lack of knowledge of HIV/AIDS and modes of transmission and perceived risk of HIV infection to low economic status are limited. Shell's work has been very important in shaping this research in that it led to the realization of the trap that most researchers have fallen into and has highlighted the extent of the complexity of the HIV/AIDS poverty cycle. That is, expressing the poor as a homogenous group despite the conceptualization of poverty as a multidimensional phenomenon. This then leads to the assumption that all poor people are exposed to a higher risk of disease acquisition opposed to the non-poor and to failure in recognizing that behind each poverty measure are individuals with varying socio-cultural characteristics and behaviours.

This study therefore attempts to bridge the gap in the HIV/AIDS-poverty cycle research by examining whether there is empirical evidence to support the poverty-HIV/AIDS cycle. By so doing, this study does not aim to contribute to the misconception that HIV/AIDS is a disease of the poor nor does it aim to disprove that such a link exists but rather aims to contribute to a better understanding of the link between socio-economic status and infectious disease.

## Scope of the Study

Firstly this study aims to explore the relationship between poverty and sexual behaviour so as to provide an answer to why poverty is not always associated with an increased risk of disease (HIV/AIDS) acquisition. This is done by providing a comparative analysis of the most important factors in assessing the risk of transmission such as knowledge of HIV and related risk of infection, sexual behavioural practices and breastfeeding status. Secondly it aims to provide other reasons for the rapid progression of HIV/AIDS in South Africa through an explanation of the accountability of each of these factors. The final part of this study draws on the work done in earlier chapters to provide recommendations to policy makers on how to tackle the dual problem of HIV/AIDS and poverty.

## Structure of the Research

Chapter 1 aims to situate the research problem by providing background to this problem and stating the study purpose. Also included in Chapter 1 is the theoretical framework against which the argument contained in this study is based. That is the theory adopted and how it relates to the research problem. This is then followed by a statement of the research hypotheses and a brief explanation of each hypothesis. The chapter that follows provides a general definition of poverty, which is then followed by a definition and explanation of poverty as it applies to this study. Chapter 3 provides an explanation of the concepts of poverty and HIV/AIDS in the South African context. This will begin with an explanation of the geographical and racial distribution of poverty in South Africa to enable a better understanding of this rather multi-dimensional phenomenon. Focus then shifts to the HIV pandemic, more specifically its chronology, distribution (age and provincial) and the factors responsible for the rapid spread experienced in South Africa. This is implicit in ensuring that the poor are not marginalised as "the" risk group for HIV infection and in highlighting areas that need to be addressed by policy makers aiming to provide a holistic approach to tackling HIV/AIDS in South Africa.

Chapter 4 is a critical appraisal of existing literature on poverty and disease, most specifically poverty and HIV/AIDS both in Africa and elsewhere. Since this chapter will also serve to answer the second hypothesis, it will then be divided into three sections: the first section looks at literature that links poverty and disease, and that explains how poverty increases vulnerability to disease; the second section looks at literature on how disease then aggravates poverty, most specifically focusing on how HIV/AIDS makes it harder for households to mitigate its impacts. This chapter ends by providing literature that denies the existence of the poverty/HIV/AIDS cycle. Chapter 5 explains the research methods used in answering the research question. The chapter therefore looks at how empirical and literature based research methods will be applied. Also included in this chapter is a description of the area of data collection, the sample size, the data collection strategy and tools and the variables used. This chapter is then followed by Chapter 6, the data analysis chapter which aims to explore the link between poverty and HIV/AIDS and to provide evidence for the existence or lack thereof. Data analysis is then followed by a brief discussion of the findings, conclusion as well as policy recommendations to seal the arguments contained in this study.

## Theoretical Framework and Research Hypothesis

### Theoretical Framework

The theory that I will use is the **Drive** theory. This theory arises from the idea that drives are the motivating force behind human behaviour. The theory dates back to 1930 during the heydays of behaviourism. This theory indicates that there are certain necessities of life that human beings cannot survive without, and that the drive to obtain these necessities is part and parcel of human life. Therefore when a need arises, e.g. basic survival needs like hunger and thirst, it leads people to act in ways that are aimed at satisfying that need (Jordaan and Jordaan, 1989:644.)

As applied in my study, this theory holds that I would expect my independent variable (poverty) to influence or explain the dependant variable (HIV/AIDS infection rates) because poverty deprives people of the necessities of life, e.g. food, shelter implicit to their survival thus causing them to respond in ways that, although harmful, will ensure that they obtain these necessities. The extent to which people can protect themselves from HIV infection depends on their knowledge of perceived risk and their capacity to apply that knowledge; the amount of power a person has to negotiate safer sex and the prevailing cultural and societal norms. However, I argue that although cultural and societal and religious norms have an influence on sexual behaviour, one's sexual behaviour is mostly influenced by their education levels and financial situation, both usually low in situations of poverty, thus leading them to behave in ways that they would not in the absence of poverty. This is not to say that HIV/AIDS is exclusively confined to the poor for a rise in income levels can also place individuals at a higher risk of infection. For instance when one has a good financial situation, that individual can afford to have several sexual partners thus, increasing their risk of infection. To support this theory, I will also adopt an argument contained in the United Nations Development Programme's (UNDP) concept paper titled, "Conceptual Shifts for Sound Planning: Towards an Integrated Approach to HIV/AIDS and Poverty". The argument states that sexual behaviour doesn't occur in a void but is influenced by external factors in the social, political, economic and technological environment (2002:3) and that in many instances ... the freedom of choice regarding sexual behaviour is circumscribed by external factors such as social norms and values and one's socio-economic position in the society (2002:4). Hence the unsustainability of assumptions of mutual consent and power in sexual relations made by the ABC (Abstain, Be faithful and Condomize) prevention strategy when sexual activity is a survival strategy in exchange for money, goods or survival (UNDP, 2002).

## Hypotheses

Due to the dual relationship that exists between poverty and HIV/AIDS, this study has two hypotheses. Hypothesis 1 forms the main aim of this thesis and will be tested empirically-during data analysis. To test hypothesis 2, I will draw on literature from various scholars (literature based research).

### Hypothesis 1

Poor individuals are more susceptible to HIV infection than their non-poor counterparts due to the following reasons: 1. Poverty and its associated factors such as low education reduce the chances of the poor having good knowledge of the means of preventing HIV infection. Secondly, poor women are less likely to use condoms or to negotiate condom use due to both low education levels and economic dependence on their partners.

### Hypothesis 2

Poverty exacerbates the impact of HIV/AIDS on poor individuals, households and communities, making it hard for the affected to mitigate the various impacts of the pandemic in the following ways: firstly, the poor are more likely to suffer from opportunistic infections due to a compromised immune system as a result of poor nutritional status and poor living conditions such as lack of clean water and sanitation. Secondly low income levels reduce the ability to afford the cost of treatment and care, thus reducing survival time among the infected.

HIV/AIDS on the other hands deepens poverty through the following ways: HIV related ailment can result in a loss on employment and as thus a loss of income. In the event that the infected person is a breadwinner, this would therefore greatly affect household wealth. Furthermore, even if income is not lost due to loss of employment, HIV related ailment can put a strain on household income as funds are often diverted from other household expenditures to cover the cost of treatment and care and later the funeral. The coping strategies adopted in an attempt to escape the debilitating impacts of HIV/AIDS can also deepen poverty further as some are irreversible and carry a greater toll on household wealth.

## Conclusion

This chapter has laid the foundation on which the rest of the chapters will be based. The chapters that follow are based on the two-way nature of the relationship between poverty and HIV/AIDS whereby poverty increases susceptibility to HIV infection and HIV/AIDS, when coupled with poverty makes it hard for those affected to mitigate its various impacts. However since poverty alone cannot explain the HIV pandemic in South Africa, there will also be a discussion of other factors that contribute to the scale of the pandemic. As has been mentioned earlier, this helps to avoid marginalising the poor as 'the risk population' for HIV/AIDS.

# 2

# Poverty in South Africa

## Defining Poverty

Poverty has many faces and it differs from place to place and across time (Poverty Net, nd) making it very hard to conceptualise or measure (May, nd cited in UNDP, 2002). As such, this phenomenon is best understood when viewed as having both a relative and an absolute dimension (May, 2001:26). Relatively speaking, poverty is measured from the individual's perspective by making comparisons between individuals and those around them or even with their own situation in the past. In absolute terms, poverty is then measured in terms of the capability to sustain minimum, socially acceptable living standards based mostly on nutritional requirements and other essential goods (Lok-Dessallien, 2001; May, 2001).

In most instances, poverty has been measured using income and consumption levels approach, or the "money-metric approach" as it is known. That is, people are defined as being poor if their income or consumption levels fall below the poverty line-the minimum level necessary to meet basic needs. However, poverty is more complex than that requiring a complex measure that encompasses other important factors such as social indicators for health, education and access to services and infrastructure (Poverty Net, nd). Hence the existence of much more broader, human capability approaches such as the Basic Needs Approach and the Human Capability Approach. Researchers have tended to steer clear of these approaches, as they are difficult to measure. However, Lok-Dessallein (2001) advises that while these approaches may be messier, their results are much richer and have a higher potential of influencing policy and programmes. The Basic Needs Approach defines poverty as the deprivation of requirements, mainly material for meeting basic human needs. Its measurements include access to basic necessities such as food, shelter, schooling, health services, water and sanitation. The Human Capabilities Approach, on the other hand, defines

poverty as the absence of basic human capabilities to function at a minimally acceptable level within a society. Its indicators include life expectancy, literacy rates, malnutrition, etc (Lok-Dessallein, 2001:11).While the above two definitions seem to provide a somewhat holistic definition of the poor, Kehler (2000a: 39 cited in Kehler, nd) argues that in a South African context, such definitions would suggest that limiting the access to basic services through current trends that include part-privatisation of infrastructure will increase poverty levels. For purposes of this study, poverty is defined as

> The denial of opportunities and choices most basic to human development to lead a long, healthy creative life and to enjoy the descent standard of living, freedom, dignity, self-esteem and respect from others (Hirschowitz et al, 2000:54)

However to enable ease in measurement, income levels will also be used to identify the poor. That is, the poor will be those earning below R600 per month, the very poor will be those earning between R600 and R1000 per month and those earning from R1000 above will be classified as non-poor. These figures are chosen because they are similar to those employed by Statistics South Africa in their poverty report with the exception of the fact that Statistics South Africa used "monthly expenditure" instead of monthly income in their definition of poverty[1]. In addition, the following poverty indicators will be used to identify the poor: education levels, literacy rate and access to sanitation, piped water and electricity.

## The South African Context

South Africa is now celebrating ten years of democracy; however the majority still live in poverty and under conditions that permanently threaten their well being. As in the years of apartheid, poverty in this country still reflects major racial and spatial differentials. The White population largely remains advantaged while the poor Black

[1] The problem with using monthly household income instead of monthly household expenditure is that the expenditure approach is a more reliable measure for estimating economic well-being than income. Moreover, estimating economic wellbeing using monthly household income instead of expenditure results in large differences in the proportion of those who could be regarded as poor (Alderman et al, 2000 cited in Hirschowitz et al, 2000:55).

people remain poorer despite attempts by black empowerment programmes such as Affirmative Action to improve the lives of this previously disadvantaged population group. Even within Black communities, differentials exist as illustrated by recent moves to the previous "White suburban areas" by some well-off Blacks while their more unfortunate counterparts reside in areas that lack proper sanitation, clean water and health services among other things.

## Racial and Spatial Distribution of Poverty

On the night of 9-10 October 1996, the night of the first South African census, there were a total of 40 583 673 people in South Africa (Hirschowitz et al, 2000:57). 77% of this population classified themselves as African (Black), 11% as White, 9% as Coloured, 3% as Indian/Asian and only 1% did not specify themselves under any of the recognised racial groups within South Africa. More than half of the total population (54%) lived in urban areas and this percentage differed according to racial group. Among the African population, only 43% were living in urban areas compared to 83% in the Coloured population; 97% among Indians and 91% among Whites. Then in 2001, when the second census was conducted, the South African population had increased to 44 819 778. The Black population remained the majority accounting for 79% of the total population. The figures for Coloureds, Whites and Indians were 8.9%, 9.6% and 2.9% respectively. These disparities experienced in the population distribution also reflect the wide socio-economic disparities that have existed in South Africa during the apartheid era and continue to this day (see Table 1 and 2 below).

In 1996 57% of South Africa's population was living in poverty (van Rensburg et al, 2002: 14). However this phenomenon was very unevenly distributed. A racial breakdown of poverty suggests that there were more poor Black people (>50%) in 1996 than any other racial group, followed slightly by Coloureds at almost 40%. Poverty appears to be a rare phenomenon among the White and Indian population as only less than 3% of their households were poor. In all the racial groups, the poor were

concentrated at the non-urban areas. However the urban/non-urban poverty gap was wider among Coloureds and Blacks and negligible in the other population groups. These poverty differentials are exacerbated to some extent by the high unemployment rates experienced by the Black and Coloured population groups. Looking at the results of the Labour Force Survey, it appears that 12 794 052 South Africans out of a total population of 43 496 667(29, 5%) were unemployed in 2001. The Census for the same year recorded an even higher rate (41, 6%). The differentials in the unemployment rates provided by Statistics South Africa can be attributed to the different ways in which the questions were asked as well as overestimation of the extent of unemployment on Statistics South Africa's part (Statistics South Africa, 2001: v).

Poverty differentials are not only confined to racial groups but also extend to the type of household (male vs. female headed) and provincial level. Female headed households constitute the majority of poor and very poor households in South Africa. A provincial breakdown of Table 2 according to the poor, very poor and the non-poor ranks the Free State first among the four provinces with the highest level of very poor households, followed by the Eastern Cape, Northern Cape and the North West respectively. On the other hand, the Western Cape had the lowest level of poor households (less than 20%) followed by Gauteng province. However when poverty is taken as a composite index of poor and very poor households, the Eastern Cape takes the lead whereas the Free State becomes the province with the highest level of poor female-headed households. The high poverty differentials are matched by high differentials in the human development indices. The racial groups that had high poverty levels rank low in the Human Development Index. Shifting focus to other poverty indicators also indicates wide racial and spatial differentials. When looking firstly at education, it is not surprising that Blacks constitute the majority of those with no education and that only a few make it to higher education levels. The figure is 22.3% as compared to only 8.3%, 5.3% and 1.4% for the Coloureds, Indians and Whites respectively (Statistics South Africa 2001:47). Access to piped water was also

higher in the other racial groups (more than 90%) and slightly lower among Blacks (80.3%) and so was access to a flush toilet (Statistics South Africa, 2001:86).
Only 39.4% of Black households had a flush toilet compared to 83.9%, 97.7% and 98.7% of the Coloured, Indian and White households (Statistics South Africa 2001:93)

Provided below are the tables (Table 1 and Table 2), which were referred to in the preceding discussion. Table 1 provides the socio-demographic indicators of South Africans according to their respective racial and gender groups. Whereas Table 2(which follows directly after Table 1) provides poverty distribution by province and gender of household head in that province.

Table 1: Socio-Demographic Indicators of South Africans by Population Group

| | Unemployment rate (2001) (%) | | Poverty rate (1996)[2] (%) | | | HDI Rank (1996) |
|---|---|---|---|---|---|---|
| | LFS | CENSUS | Poor | very poor | non-poor[3] | |
| *South Africa* | 29.5 | 41.6 | 16.5 | 24.9 | 58.7 | 0.702(1999) |
| Urban | | | 10.6 | 15.5 | 73.9 | |
| Non-urban | | | 25.3 | 38.9 | 35.9 | |
| *Population group* | | | | | | |
| *Black* | 35.9 | 50.2 | 21.5 | 32.4 | 46.1 | 0.500 |
| Urban | | | 16.6 | 23.8 | 59.7 | |
| Non-urban | | | 26.2 | 40.6 | 33.2 | |
| **Coloured** | 21.8 | 27.0 | 7.8 | 13.6 | 60.5 | 0.663 |
| Urban | | | 3.6 | 8.8 | 87.6 | |
| Non-urban | | | 26.1 | 34.9 | 39.0 | |
| **Indian** | 18.4 | 16.9 | 0.8 | 1.7 | 97.4 | 0.836 |
| Urban | | | 0.7 | 1.6 | 97.8 | |
| Non-urban | | | 5.3 | 7.6 | 87.1 | |
| **White** | 6.0 | 6.3 | 1.3 | 1.4 | 97.3 | 0.901 |
| Urban | | | 1.3 | 1.4 | 97.4 | |
| Non-urban | | | 1.5 | 1.5 | 96.5 | |
| **Gender (race)** | | | | | | |
| Black men | 32.2 | 43.3 | | | | |
| Black Women | 39.8 | 57.8 | | | | |
| Coloured men | 20.5 | 25.7 | | | | |
| Coloured women | 23.3 | 28.6 | | | | |
| Indian men | 14.8 | 15.7 | | | | |
| Indian women | 23.6 | 18.7 | | | | |
| White men | 4.9 | 6.1 | | | | |
| White women | 7.4 | 6.6 | | | | |

Compiled from the Statistics South Africa Census in Brief 2001; Statistics South Africa

[2] As determined by household expenditure. Those with a total household expenditure of R600 or less are regarded as very poor, whereas those with total expenditures in the range R601-1000 per month are regarded as poor and those with expenditures over R1000 are regarded as non-poor (Statistics South Africa, 2001 cited in van Rensburg et al, 2002:14)

[3] Due to rounding, percentages don't necessarily add up to 100

Table 2: Poverty Distribution by Province and gender of household head (1996)[4]

| Province & Gender of HH head | Poor (%) | Very poor (%) | Non-poor (%) |
|---|---|---|---|
| **E Cape** | | | |
| Male | 30.8 | 29.0 | 40.2 |
| Female | 39.5 | 37.8 | 22.7 |
| **Total** | **35.1** | **33.4** | **31.4** |
| **Free State** | | | |
| Male | 22.8 | 34.5 | 42.7 |
| Female | 25.1 | 47.8 | 21.7 |
| **Total** | **23.6** | **39.0** | **37.5** |
| **Gauteng** | | | |
| Male | 13.8 | 5.2 | 81.0 |
| Female | 17.7 | 8.4 | 73.9 |
| **Total** | **14.9** | **6.1** | **78.9** |
| **KwaZulu-Natal** | | | |
| Male | 21.6 | 12.5 | 65.9 |
| Female | 35.8 | 13.9 | 50.3 |
| **Total** | **27.2** | **13.1** | **59.7** |
| **Mpumalanga** | | | |
| Male | 21.4 | 13.4 | 65.1 |
| Female | 28.3 | 12.9 | 58.8 |
| **Total** | **23.9** | **13.2** | **62.9** |
| **Northern Cape** | | | |
| Male | 22.0 | 23.3 | 54.7 |
| Female | 30.1 | 18.0 | 51.8 |
| **Total** | **24.4** | **21.7** | **53.9** |
| **Limpopo** | | | |
| Male | 28.6 | 15.4 | 56.1 |
| Female | 43.8 | 15.8 | 40.4 |
| **Total** | **36.5** | **15.6** | **47.9** |
| **North West** | | | |
| Male | 27.4 | 19.7 | 52.8 |
| Female | 38.4 | 20.3 | 41.3 |
| **Total** | **31.5** | **19.9** | **48.6** |
| **Western Cape** | | | |
| Male | 10.8 | 4.8 | 84.6 |
| Female | 13.1 | 5.2 | 81.6 |
| **Total** | **11.4** | **4.9** | **83.6** |
| **South Africa** | | | |
| **Male** | **20.5** | **14.4** | **65.1** |
| **Female** | **31.9** | **19.9** | **48.2** |
| **Total** | **24.8** | **16.5** | **58.7** |

Source: Adjusted and Compiled From Statistics South Africa 2000 by Van Rensburg Et Al, 2002:14

[4] For the purposes of this table, households with a total expenditure of R600 or less per month are regarded as "very poor" whereas households with expenditures of between R601 to R1000 per month are considered poor (Statistics South Africa 2000 cited in van Rensburg et al, 2002:14)

## Conclusion

Although South Africa's apartheid system came to an end in 1994 with the democratization of the country, its legacy of poverty thrives to this day. The discriminatory laws of the apartheid system have resulted in wide socio-economic disparities that will take years to bridge. Blacks and Coloureds continue to experience high unemployment and poverty rates as opposed to Indian and White populations. Service delivery is also poor among these populations groups as only a few have access to water and sanitation as compared to Indians and Whites. Within these population groups, females are the mostly affected. Ability to bridge these wide socio-economic disparities lies in joint efforts between government and civilians as it is not only the apartheid system that is to blame for these disparities but also the various socio-cultural systems within which South Africans belong.

# 3

# HIV/AIDS in South Africa: The Chronology, Distribution and Explanation of the Epidemic

## The Chronology

The South African AIDS epidemic dates back to 1982 when the first two cases were identified among white gay men (Avert.org, nd; Whiteside and Sunter, 2001). For the first few years after its discovery, AIDS isolated itself among this population group. Consequently AIDS was termed a gay disease and as thus enjoyed very little attention from the government on the grounds that it was illegal for men to have sex together (Gow and Desmond, 2002). Then between 1982 and 1985, approximately 100 blood transfusions related infections occurred (UNAIDS & UNDP, 1998). This caught government attention and in response the government introduced a method to safeguard the national blood supply in 1995 which applied self-exclusion questionnaires and the screening of all blood samples for HIV antibodies. In the very same year, the AIDS Advisory Group, which was composed of both local and international scientists, was appointed (Avert.org, nd; Presidential AIDS Advisory Panel, nd).

In 1990, the first antenatal survey was carried out which revealed a 0.8% prevalence rate [5]among women (Avert.org; Whiteside and Sunter, 2001). At that time, between 74 000 and 120 000 South Africans were estimated to be living with HIV/AIDS. As cases of new infections continued to mount, it became inevitable that the country was heading towards a Type Two epidemic and as thus a more constructive state response was necessary (McKerrow, nd). The government's first structured approach came in the form of an AIDS unit in the Department of National Health and Population Development established in 1990 (McKerrow, nd). One of the unit's main objectives

[5] Prevalence is the absolute number of infected people in a population at a given time. The prevalence rate, on the other hand, is the percentage of the population which exhibits the disease at a particular time (Barnett and Whiteside, 2002: 49).

was to come up with a national AIDS strategy. However according to McKerrow (nd: 2) by 1992/3 when this unit was restructured, no plan had been drawn up. As if fuelled by government's failure, the HIV pandemic finally made its way to the general population in 1991 when the number of heterosexually transmitted infections equalled homosexual infections. The prevalence rate was at 1.4%. Since then heterosexual transmission has become the leading mode of HIV transmission in South Africa.

In 1992 the prevalence rate increased to 2.4%. Former president Dr Nelson Mandela launched the National AIDS Convention of South Africa (NACOSA), whose aims included the facilitation and monitoring of the national AIDS plan as well as community mobilisation in dealing with HIV/AIDS (Avert.org, nd and NACOSA, nd). A free national toll free AIDS helpline was also established by the Department of Health (DoH) in partnership with lifeline (Avert. Org, nd; Birdsall, et al, 2004). This helpline operates seven days per weeks, 24 hours a day and is available in all the 11 official languages. It provides basic HIV information, counselling and a referral to health services to its callers. The prevalence rate continued to rise despite efforts from the government to contain the disease. In 1993, the prevalence rate had risen to 4.3% and an estimated 322 000 South Africans were living with HIV (Avert.org, nd). The following year the prevalence rate was approximately ten times the 1991 rate at 7.6%. The government responded by adopting the basis of the NACOSA strategy as the foundation of the National AIDS plan. A response that was highly criticised as being poorly thought out and disorganised. Soul city, "... a dynamic and innovative multimedia health promotion and social change project" (Soul City, nd) was also launched (Avert.org, nd). In 1995, the prevalence rate was 10.4%. At this time much of the collection and publication of AIDS data ceased as the data that was being collected was not the right type of data and also due to concerns about the quality and usability of the data (Avert.org, nd; Whiteside and Sunter, 2001). In the very same year, South Africa became the first African country to host the annual international conference for People Living with HIV and AIDS. It was at this conference that the then deputy president Thabo Mbeki acknowledged the threat of HIV in South Africa.

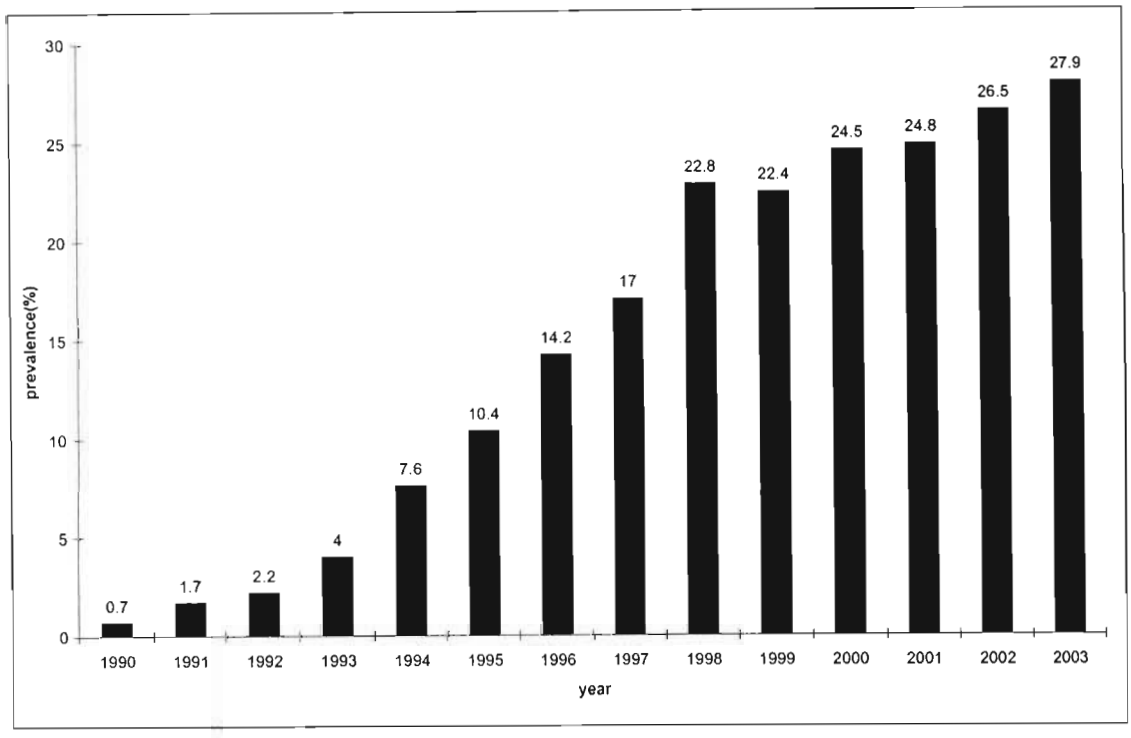
According to the Ministry of Health, the number of people living with HIV/AIDS had escalated to 850 000 (2.1% of the total population).

Three years later (1998), the prevalence rate had reached a staggering 22.8% with a daily incidence rate of 1500 new infections. Approximately 50% of all medical transmissions in hospitals in the Gauteng province were AIDS related (Avert. Org, nd). Nonetheless the government was still refusing or rather claiming inability to provide antiretroviral treatment to HIV positive people. This gave rise to the protest group Treatment Action Campaign under the leadership of HIV positive activist Zackie Achmat which advocated for the rights of HIV positive people (Avert. org, nd). The then deputy president Thabo Mbeki also launched the Partnership against AIDS. It was in this year on the 1st December that it became evident how stigmatized the disease was in South Africa when HIV positive activist Gugu Dlamini was stoned to death by her neighbours after publicly disclosing her status. In 1999 there was a slight decline in the prevalence rate (22.4%). Lovelife, a youth targeted safe sex campaign was launched (Avert. org, nd). Still in 1999, the government in partnership with Eskom and the Medical Research Council established the South African AIDS Vaccine Initiative (SAAVI). Its main objective was to coordinate the development and testing of HIV vaccines (Tucker & Mazithulela, 2004). In 2000 the prevalence rate soared again (24.5%). The International AIDS Conference was held in Durban. It was at this conference that South African president Thabo Mbeki made his very controversial speech that poverty and not HIV was the cause of AIDS. In support of this controversy the President appointed AIDS dissidents, whose role was to look into the problem of AIDS in South Africa (BBC News, 2000).

Between 1997 and 2001, HIV/AIDS was the third underlying cause of death among men and women (Statistics South Africa, nd). In 2001, when the prevalence rate was at 24.8% the South African high court ordered the government to provide nevirapine to HIV positive pregnant mothers. However, the government refused to provide drugs on a large scale citing expense of treatment and the ineffectiveness of treatment in the

prevention of MTCT (Avert.org, nd; BBC News, 2000). The pandemic therefore continued to rise reaching a high 26.5% in 2002. By the end of 2003, the country's prevalence rate was a high 27.9 %( see Figure 1).

Figure 1: HIV Prevalence among Antenatal Clinic Attendants, South Africa, 1990-2003.




Source: Department of Health, 2003

## The Distribution of HIV in South Africa

The distribution of HIV in any given region is determined by that area's political, social and economic vulnerability factors among others things. Hence the uneven distribution of the pandemic worldwide. In the case of South Africa, the legacy of apartheid of high racial discrimination, social dislocation and physical separation is to blame for these regional discrepancies (Gow and Desmond, 2002, Whiteside and Sunter, 2001 and UNAIDS & UNDP, 1998). Discriminatory apartheid laws such as the one that forbid Black male migrants to bring their families with to their destination areas created a culture of urban and rural wives and prostitution whereby male migrants found other partners in urban areas and their wives who were back in the rural areas also found

other partners not necessarily for money but mainly as a survival strategy (Whiteside and Sunter, 2001). This system of family break-ups and adoption of new partnerships created the ideal situation for sexually transmitted infections, including HIV to flourish, contributing to the racial differentials in STI and HIV prevalence levels. While it would be desirable to provide racial distribution of HIV/AIDS in South Africa that cannot be accomplished as the data available doesn't allow for such a distinction to be made. [6]

Provincial distribution of HIV

A comparison of provincial HIV estimates indicates large geographical variations, with KwaZulu Natal consistently reflecting the highest prevalence rate and the Western Cape remaining the lowest. In 1995, KwaZulu Natal had a prevalence rate of 18, 2% compared to just 1.7% in the Western Cape. The 1996 and 1997 prevalence rates for KwaZulu Natal were 19.9% and 26, 9% while Western Cape experienced prevalence rates of only 3, 1% and 6.3% comparatively. Mpumalanga ranked second highest at 16.2%, 15.8% and 22.6% respectively.

Studies conducted elsewhere in the continent seem to suggest that the African HIV/AIDS epidemic has a natural ceiling of around 30% for the adult prevalence rate (Whiteside and Sunter, 2001: 50). An observation of Table 4 below then confirms that while Mpumalanga was at the ceiling in 1998 and KwaZulu-Natal had already broken through the ceiling, three other provinces were well on their way. This was indeed the case in 2001 when the Free State caught on and Gauteng and the North West moved a step closer. Even with the slight decline experienced in KwaZulu-Natal in 2001, the province remains over the ceiling. In fact, KwaZulu-Natal's prevalence rate is expected to peak at 40%(10% above the natural ceiling) in 2003/2004 before declining due to rising AIDS mortality rates (Bisseker, 2001:34 cited in van Rensburg, 2002:23).

[6] Results from antenatal surveys only provide the age, provincial and national distribution of HIV prevalence rates.

While the data contained in the table below does not allow for rural and urban comparisons, it has already been indicated elsewhere that while the rate at which the epidemic progresses is similar in urban and rural areas, the epidemic continues to be ahead in urban areas (UNAIDS & UNDP, 1998). This can be attributed to a larger extent to the labour migrant system whereby the majority of rural dwellers leave their homes in search for greener pastures and some die while in urban areas thus exaggerating the extent of HIV in urban areas. However the reverse could also be true whereby urban dwellers return to the rural areas to die.

Table 3: Provincial Progression of HIV/AIDS in Women Attending ANCs in S.A (%), 1994-2003

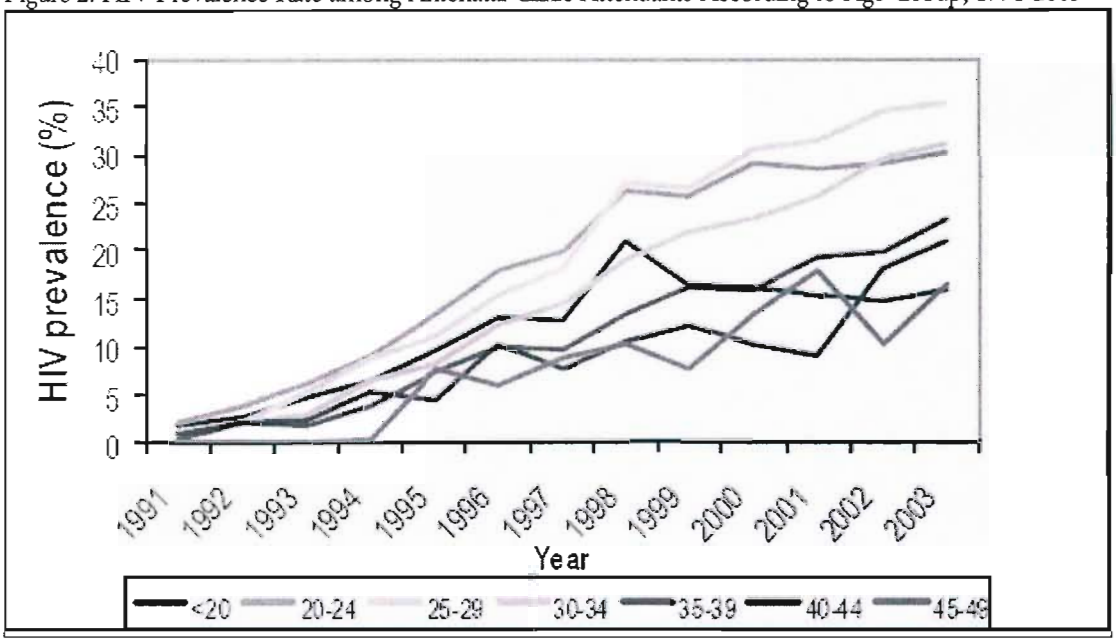
| Province | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|---|---|---|---|
| KZN | 14,4 | 18,2 | 19,9 | 26,9 | 32,5 | 32,5 | 36,2 | 33,5 | 36,5 | 37,5 |
| Mpumalanga | 12,2 | 16,2 | 15,8 | 22,6 | 30,0 | 27,3 | 29,7 | 29,2 | 28,6 | 32,6 |
| Free state | 9,2 | 11,0 | 17,5 | 20,0 | 22,8 | 27,9 | 27,9 | 30,1 | 28,8 | 30,1 |
| Gauteng | 6,4 | 12,0 | 15,5 | 17,1 | 22,5 | 23,8 | 29,4 | 29,8 | 26,2 | 29,9 |
| North west | 6,7 | 8,3 | 25,1 | 18,1 | 21,3 | 23,0 | 22,9 | 25,2 | 31,6 | 29,6 |
| E. Cape | 4,5 | 6,0 | 8,1 | 12,6 | 15,9 | 18,0 | 22,2 | 21,7 | 23,6 | 27,1 |
| Limpopo | 3,0 | 4,9 | 8,0 | 8,2 | 11,5 | 11,4 | 13,2 | 14,5 | 15,6 | 17,5 |
| W. Cape | 1,2 | 1,7 | 3,1 | 6,3 | 5,2 | 7,1 | 8,7 | 8,6 | 15,1 | 16,7 |
| N.Cape | 1,8 | 5,3 | 6,5 | 8,6 | 9,9 | 10,1 | 11,2 | 15,9 | 12,4 | 13,1 |
| **South Africa** | **7,6** | **10,4** | **14,2** | **17,0** | **22,8** | **22,4** | **24,5** | **24,8** | **26,5** | **27,9** |

**Source: Department Of Health, 2001, 2002 and 2003.**

## The Age Distribution of HIV/AIDS

There has been a substantial increase in the level of HIV infection among all age groups in South Africa in the period 1991 to 2003, with the exception of those aged less than 20 years. However the experienced increases in the HIV prevalence rates vary greatly when broken down according to age group (see Figure 2 below)

Figure 2: HIV Prevalence Rate among Antenatal Clinic Attendants According to Age Group, 1991-2003




In the period 1991 to 1997 the population aged 20-24 had the highest HIV prevalence rate, followed closely by those aged 25-29. Then from the end of 1997 onwards, the HIV prevalence rate for those aged 25-29 overtook that of 20-24 year olds, becoming the first highest HIV prevalence rate in the country. What appears most interesting is the HIV prevalence for those aged between 45 and 49 years. While HIV appeared to not be a problem (0% prevalence rate) in the early half of the twentieth century (1991-94), there was a sudden upsurge from mid 1994 leading to a prevalence rate of more than 5% in mid 1995. since prevalence rates provides a measure of existing cases and not of new cases, it is possible that the experienced upsurge in the prevalence rates are for people who were aged 40-44 prior to 1994 and had advanced to older ages at the time of the survey. Also worth noting is the different trends of HIV prevalence rates of different age groups. Almost all age groups have experienced fluctuations in their HIV prevalence rates, with the exception of the age groups 30-34 years whereby prevalence rates appear to have increased exponentially.

Different factors are to blame for the different trends of HIV prevalence rate experienced by the different age groups. Factors common to all age groups are mainly sexual behavioural factors such as condom use, number of sexual partners and

frequency of sexual intercourse. All these factors are very important in assessing the risk of acquiring HIV as they indicate the number of potential exposures to the virus. In a national survey on adolescent sexual behaviour, 48% of youth aged below 20 years reported ever having had ever sexual intercourse (anal sex included). Among these, 81% had had sex in the 12 months preceding the survey. However there were variations in the frequency of sexual intercourse. 46% had had sex about 1 to 5 times whereas 6% had had sex more than 5 times. There were also variations in the number of sexual partners where 47% had only 1 lifetime sexual partner; 20% had 2, 24% had between 3 and 5; 6% had between 6 and 10 and only 1% had more than 10 lifetime sexual partners (Pettifor et al, 2004). Furthermore, more females had had sex in the 12 months preceding the survey than males (40% versus 36%).The high levels of sexual activity were not quite matched by equally high levels of condom use. Among males who had had sex, 14% of those who reported having had one sexual partner also reported condom use during their last sexual encounter compared to 19% of females who had one sexual partner in the same period. Six percent of males and 2% of females aged 15-19 who reported having more than one sexual partner had not used a condom last sex (Pettifor et al, 2004: 49) The experienced low increase (as compared to age groups 20-29 and 30-39) in the level of HIV infection can be attributed to the increase in the age of sexual debut over the years. In previous studies, 3% of youth reported having had their first sexual experience before the tender age of 12 and almost 20% had sex before 16 (CASE cited in van Rensburg et al, 2002). Recent studies indicate a median age of sexual debut of 17 (Pettifor et al, 2004).

Other factors that might be responsible for the experienced increases in the HIV prevalence rates among different age groups will be discussed in the subsequent section.

## Factors Driving the South African HIV/AIDS Epidemic

HIV/AIDS is a very complex pandemic whose understanding lies in the exploration of various factors with which this pandemic is suspected to be related so as to contribute to a better understanding of the epidemic and the driving forces behind it in order to enable better informed prevention programmes. This sections looks at some of the factors responsible for the scale of the South African HIV/AIDS epidemic. It is important to note at this stage that the exclusion of other factors that may as well have played a role in the progression of the South African AIDS epidemic is not to undermine their importance.

### Mother to Child Transmission

Mother-To-Child Transmission is the second most important cause of HIV infection in South Africa, following heterosexual transmission. According to Coovadia (2004), the overwhelming majority (90-95%) of HIV positive infants are infected by their mothers. Mother to child transmission can occur at three levels: prenatal, during labour and delivery and through breastfeeding and the risk of transmission varies accordingly (see Table 5). In the absence of known effective interventions MTCT carries an overall transmission risk rate of between 25%and 45% in Africa (Coovadia, 2004) compared to 10-30% in industrialized countries.

During pregnancy MTCT may occur in the early stages (nearer to the second trimester) or during the last few months before delivery where the risk is much greater. After labour the risk of transmission exists among those mothers who opt to breastfeed their infants. The most important factors influencing mother to child transmission are the mother's viral load, the route of delivery (caesarean section vs. natural birth) and the frequency of breastfeeding. A higher viral load carries a much greater the risk of HIV transmission to the child (Coovadia, 2004; Whiteside and Sunter, 2001) however infection can also occur when the mother's viral load is low. A low CD4 count is also associated with greater risk of HIV transmission (Whiteside and Sunter, 2001).

Table 4: Timing and Risk of MTCT

| | Transmission rate |
|---|---|
| During pregnancy | 5-10% |
| During labour and delivery | 10-20% |
| During breastfeeding | 5-20% |
| Overall without breastfeeding | 15-30% |
| Overall with breastfeeding until 6 months | 25-35% |
| Overall with breastfeeding until 18-24 months | 30-45% |

Source: de Cock, JAMA (2000) in Coovadia, 2004

Randomized controlled trials conducted among pregnant women have found antiretrovirals to be an effective means of reducing the mother's viral load and of inhibiting viral reproduction in the infant, thus reducing the risk of mother to child transmission. Such studies are currently underway in South Africa. In South Africa, where the government has been firstly in denial of the link between HIV and AIDS, and secondly in the effectiveness of antiretrovirals as a means of preventing mother to child transmission of HIV/AIDS, it is likely that there are hundreds if not thousands such transmissions that could have been avoided. Although the treatment rollout has begun in most provinces, access remains partial and slow and as thus resulting in more infections.

Therefore, it would be naïve to ignore the importance of such infections in the explanation of the rapid epidemiological progress experienced. For mothers who have already given birth, formula feeding can help prevent mother to child transmission. However, this is often not possible as it is dependent on many factors, namely the availability of the product (milk formula) and a baby feeding bottle; access to clean water; the means to boil the water and the know-how of preparing the formula (Whiteside and Sunter, 2001). While these may appear trivial to some individuals, they may as well be luxuries to those mothers with a low financial status. Firstly these mothers may not have the money to purchase the formula. Secondly, the environment they reside in may not have clean water or the fuel needed to boil the water. In these instances, formula feeding is no longer an option for these mothers. In South Africa, there are a significant number of women who fall into this unfortunate category and

are therefore forced to breastfeed their children despite knowledge of the risk of transmitting the virus to their infants.

## Sexual Networking and Patterns of Sexual Contact

Sexual networking patterns refer to the number and type of people that an individual has sex with (Whiteside and Sunter, 2001). Therefore they are important in the determining the rate of STI progression and the distribution of the STI in the population. This is especially the case at the early stages of the epidemic when only a few people are infected than in the later stages when the disease is widespread (Williams et al, 2002). At the beginning of an epidemic, a smaller circle of partners is more favourable to ensure slow epidemiological progression. In the later stages of the pandemic abstinence, long term monogamy with a seronegative partner, a limited number of lifetime and sexual partners and consistent condom use are the best preventive measures. However, in South Africa, abstinence is not widely practised and factors such as poverty and labour migration make it highly impossible for people to remain monogamous or to have a limited number of sexual partners. Condom use differs with the type of relationship. While one would expect consistent condom use among individuals in casual relationships, existing literature suggests otherwise (Department of Health, 2002 and Williams et al, 2002). Take the example of the mineworkers and the sex workers discussed earlier. The migrant workers may acquire HIV from the sex workers or vice versa and they may both transmit it to other sexual partners. The wives or other female partners of the male migrants may also act as facilitators of the virus. A study by Dladla et al (2001 cited in van Rensburg et al, 2002) among the female partners of migrant workers found that it is common for these women to have multiple partners for both financial reasons and also sexual gratification. The women reported that the long spousal absence aided the existence of these unions by ensuring that they remained clandestine. This then results in an even more intricate web of HIV transmission.

## Male Circumcision

Male circumcision is the surgical removal of the foreskin of the penis. In South Africa, this procedure is often done for religious, cultural and sometimes even medical reasons. There is ongoing debate on the link between male circumcision and HIV, which dates back to 1986 when the New England Journal of Medicine published a letter from the late Aaron J. Fink, MD, a circumcision advocate in which he maintained that the foreskin increased the risk of HIV infection (CIRP, nd). Studies have reported on men who have been circumcised to have lower levels of HIV infection as compared to their uncircumcised counterparts (Siegfried et al, 2003). However, to date, no randomised controlled trials have been conducted in assessing the effectiveness of male circumcision as an HIV preventive measure in heterosexual men. Therefore, the assumption of an association between circumcision and low HIV infection rates is based on the evidence available from observational studies. These studies are usually fraught with limitations, as circumcision did not occur as part of the study nor did it occur as a direct reason for preventing HIV infection.

One such study is the Auvert 01 study, a cross-sectional study conducted in a township in northwest Carletonville, Gauteng province, South Africa (Siegfried et al, 2003). This study was carried out in August 1999 among 559 sexually active men aged 14-24 years. The major limitations of this study were that it relied on self-report of circumcision status and that only men who reported to be sexually active were included in data analysis (Siegfried et al, 2003). Data for this study was not presented by circumcision status, making it impossible to interpret the results (Siegfried et al, 2003). Others studies that have be done include a cohort study of 5516 men and 14 other cross-sectional studies (see appendix for a list of the studies). The cohort study revealed a statistically significant difference in HIV transmission between uncircumcised and circumcised men. The odds of being infected with HIV were 0, 58 times higher in uncircumcised men than in circumcised men. The 14 cross-sectional studies had inconsistent results (Siegfried et al, 2003). Eight favoured circumcision while six were in the direction of harm, with odd ratios ranging between 0.28 and 1.73. The effectiveness

of male circumcision as an HIV prevention strategy also lies on the assumption of the utilisation of a sterile surgical blade for every individual procedure. However, in South Africa, where a significant amount of the population undergoes circumcision for cultural reasons, this ritual can do more harm than good. For example in the event that the same surgical blade is utilised on different individuals, the HI-virus can be transmitted from one person to the next if either of the individuals being circumcised is infected.

### The Presence of Sexually Transmitted Infections

Sexually transmitted infections (STIs) are extremely common in developing countries, more especially in sub-Saharan Africa (World Health Organisation, 1999). South Africa is no exception. According to Sonko et al (2003), an estimated 11 million STI cases occur in South Africa annually. In Hlabisa, a district in rural KwaZulu Natal, 52% of the 321 women attending antenatal clinics in that district were found to have at least one STI (gonorrhoea, Chlamydia or syphilis) and 18% had more than one infection (Sonko et al, 2003). It has been argued that sexually transmitted infections and HIV/AIDS are interdependent. That is, frequent unprotected sexual intercourse with different partners places an individual at a risk of both STIs and HIV and some bacterial and viral sexually transmitted infections have been shown to increase the risk of HIV infection (Whiteside and Sunter, 2001, Wilkinson D and Rutherford G, 2003). Therefore a high STI prevalence is the most significant biomedical factors driving the epidemic (Gow and Desmond, 2002).

Several observational studies have demonstrated a strong association between ulcerative and non-ulcerative STIs and HIV infection (Cameroon, 1989 and Laga, 1993) and there is biological evidence that the presence of an STI increases shedding of HIV and that STI treatment reduces HIV shedding (Cohen, 1997 and Robinson, 1997 cited in Wilkinson and Rutherford G, 2003)[7]. According to Robinson (1997 cited in

[7] HIV/AIDS can aggravate a sexually transmitted Infection, making it very hard to treat (see appendix).

Wilkinson D and Rutherford G, 2003), up to 90% of new infections may be attributable to sexually transmitted infections as co-factors in the early phase of an HIV epidemic. In this scenario, effective HIV prevention strategies are dependent on early recognition of symptoms and good treatment seeking behaviour and screening and adequate mass treatment for asymptomatic STIs (Sonko et al, 2003). In recognition of this, the South African National Department of Health (DoH) has advocated for STI control as one of the main strategies for HIV control (DoH, 2001). However, this is fraught with challenges. A 1996 study among 55 974 women aged 15-49 residing in the Hlabisa district, northern KwaZulu-Natal, South Africa found that 75% of the women had no STI and 25% had at least one STI on any given day. Of the 25% who were infected, 48% were asymptomatic[8] (Wilkinson et al, 1999; Sonko et al, 2003). Almost all of the symptomatic women (98%) did not recognise their symptoms and as a result, did not seek treatment. Among the 2% who recognised their symptoms and sought treatment, only 65% received adequate treatment (Wilkinson et al, 1999).

Recognition of symptoms and good treatment seeking behaviour are dependent upon an individual's level of education and literacy levels as they determine the extent to which one will be able to understand IEC material. Access to facilities is also an important factor for the effective management of STIs. However rural areas like the Hlabisa district are usually characterised by low educational and literacy levels, and poor health facilities thus increasing the residents' chances of HIV infection. The Hlabisa study also found that pregnant women were much more likely to have an asymptomatic STI than non-pregnant women (17% vs. 59%). This is a cause for concern considering the link between STIs and risk of HIV infection, which then implies that these women run the risk of also infecting their unborn children with the HI-virus.

[8] That is, their infections had no visible symptoms.

## Opportunistic Infections and HIV/AIDS

The issue of the presence of opportunistic infections in facilitating the spread of HIV/AIDS is deeply rooted in two theories: the Cofactor Promoted Theory and the Cofactor Required Theory (Root-Bernstein cited in residential AIDS Advisory Panel, 2001). The former states that while HIV causes AIDS, it is the presence or absence of specific cofactors which determine the rate at which the disease will progress from HIV infection to full blown AIDS. Cofactors may be other viral, bacterial or parasitic infections, malnutrition, STD, tuberculosis (TB) or any other thing that might have a profound effect on the immune system. These cofactors assist disease progression by stimulating potential T-cells that would act as hosts for HIV infection (Root-Bernstein cited in Presidential AIDS Advisory Panel, 2001). The latter argues that in the absence of cofactors people can neither be infected with HIV nor can the virus regenerate inside the human body once infection has occurred. Therefore the elimination of cofactors would be as effective as treatment since the virus is dependent on the presence of these cofactors.

Tuberculosis is the most important opportunistic infection associated with HIV/AIDS in East and Southern Africa (Lachman, 2000; Williams et al, 2002). This owes to the fact that people infected with HIV/AIDS, infection with *Mycobacterium TB* can result in a rapid progression to active disease, which is more difficult to diagnose and even more complicated to treat (Lachman, 2000). Also TB is now the leading cause of death among HIV infected people, killing one in every 3 people. Active TB infection has also been argued to increase the rate of progression from HIV to AIDS (Presidential AIDS Advisory Panel, 2001).

In 1996 South Africa had an estimated 158 689 cases of tuberculosis (Lachman, 2000) and at least 27% of the TB patients were estimated to be infected with HIV (Weber, 1997 in Lachman, 2000). 4% of these TB cases were multiple drug resistant thus translating into a health crisis of staggering dimensions (Lachman, 2000).

## Migration & HIV/AIDS

Several studies have demonstrated the link between population mobility and various infections disease (du Guerny, 2001; International Organisation for Migration & Care, 2003; International Organisation for Migration, 2003; du Guerny et al, 2003; Hsu et al, 2003, among others). In South Africa, such studies date as late back as 1949 when Kark (cited in Williams et al., 2002) suggested that the widespread prevalence of gonorrhoea and syphilis in both urban and rural areas of South Africa were a consequence of the labour system. Jochelson (2001 cited in Williams et al, 2002) suggested that the migrant labour system was to blame for the transmission of venereal and endemic syphilis to new regions and to communities with no previous exposure to the disease. A confidential survey conducted in the Khutsong district of Carletonville in August 1998 among 1185 men and women aged 15-59 years stratified by housing type, 899 mineworkers stratified by hostels and 145 sex workers living in informal settlements or hotspots screened the blood and urine samples of the participants for HIV, HSV, syphilis, gonorrhoea and Chlamydia. This study found the prevalence of infection to be 39% for women aged 20 years and only 8% in men of the same age. The peak prevalence of infection was 58% among women at 24 years and 45% among men at 32 years.

Another important study highlighting the risk of infection among highly mobile population is that conducted by the Medical Research Council (MRC) between August 1996 and June 1998. This study was part of research by the MRC, which started in 1982 and focused on sex workers operating at truck stops on the national highway in the KwaZulu-Natal Midlands between Durban and Johannesburg. The study's sample size constituted 477 sex workers from five truck stops, 10 of whom were later trained as field workers to collect socio-demographic data and saliva samples from their clients and 320 truckers. Seventy percent of the men interviewed had wives or regular girlfriends. However 37% of the truckers reported always stopping for sex on the route, thus implying that some of the married men and even those with regular girlfriends had casual sex with the sex workers. The level of STI infection was also

high, 60% of the men reported having had an STI in the previous six months thus implying inconsistent condom use. 29% of the men reported never using condoms with sex workers and only 13% had ever used condoms with their wives. This then creates a possible route of HIV transmission from the sex workers to their clients and from the clients to the wives and even children in the event that the wives fall pregnant.

Anal sex was also common among the sex workers and their clients. About 49% of the sex workers had had anal sex with their clients and among these only 23% reporting using condoms. This then creates a fertile terrain for the facilitation of the HIV virus considering the fact that anal sex carries a much higher risk of HIV transmission than vaginal sex. It is thus no wonder that more than half of the truckers (56%) were HIV positive and these infection rates varied according to truck stops. For instance Warden had a 52% infection rate while Newcastle had a catastrophic 95% prevalence rate (Williams et al, 2002). The same applied with the sex workers. Warden had a 74% prevalence rate while Newcastle's prevalence rate was ten percent lower.

These high and complicated levels of sexual networking among migrants and sex workers, coupled with inconsistent condom use and high HIV prevalence rate indicate a very low level of self perceived risk of infection among these population groups thus implying a low level of knowledge of HIV/AIDS transmission and preventive behaviour. This then calls for a definite cause for concern if the pandemic and other sexually transmitted infections are to be effectively controlled. Therefore there exists an urgent need for further research that would aid the understanding of these rather complex and high-risk sexual networks and the education of these high-risk groups so as to improve their knowledge of how to prevent infection and to hopefully encourage them to adopt safer sexual behaviours.

## Gender based violence & HIV/AIDS

Gender based violence refers to

> Any act of verbal or physical force, coercion or life threatening deprivation directed at an individual woman or girl that causes physical or psychological harm, humiliation or deprivation of liberty and that perpetuates female subordination (Heise, 1994 in Jewkes and Christofides, 2004).

Examples of gender-based violence include among others rape and sexual assault, child sexual assault, forced first intercourse and intimate partner violence, all of are associated with a higher risk of HIV infection. In South Africa, this type of violence is so common that rape and gang rape have become potent methods of spreading HIV (van Rensburg, et al 2003). Incapacitating sexual taboos such as the belief that sleeping with virgin cures HIV/AIDS have also contributed to the increase in child rapes. In 1999 alone, there were 51, 249 reported rape cases in South Africa. Considering the fact that only a small percentage of rape incidents are reported, this number is likely to be an underestimate of reality. Whiteside and Sunter (2000) estimate that only one in twenty rape cases are reported to the police and attributes this to leniency in the justice system in dealing with rapists, among other things. The results of such sexual offences are not only physical harm, i.e. scarring of the vagina or psychological harm, but also HIV infection. Whiteside and Sunter (2000 cited in van Rensburg et al, 2003: 32) argue that rape is associated with an increased likelihood of HIV transmission since the victim is more likely to bleed as a result of being forcibly violated. Intimate partner violence is also a risk factor for HIV infection as it is usually associated with less consistent condom use; may influence the frequency of sexual intercourse and reduces a woman's sexual negotiation power, i.e. condom use, all of which are high risk factors for HIV (Jewkes and Christofides, 2004).

## Deadly Myths

Myths regarding the transmission and treatment of HIV/AIDS are very profound in South Africa to the extent that they have been considered as crucial reasons for the rapid spread of the pandemic. These myths are more prevalent in the rural areas of South Africa. The most common are witchcraft instigated by a jealous neighbour; a

curse inflicted upon by the ancestral spirits; a conspiracy by the white population to wipe out Blacks. These myths have also been provided as reasons for not adopting safer sexual practices especially condom use. It is common belief among some Blacks that condoms, most especially government condoms, carry germs that spread HIV/AIDS.

There is also a widespread belief that African traditional healers have the ability to cure AIDS. A belief that is deeply entrenched in the actively propagated message by the traditional healers in which they claim to have the ability to cure AIDS (van Rensburg et al, 2002). A study by Tillotson & Maharaj (2001 cited in van Rensburg et al, 2002) found that some respondents believed that the African potato is a cure for AIDS. As mentioned earlier, the most debilitating of all is the belief that sleeping with a virgin cures AIDS (van Rensburg et al, 2002). While the scale of these myths has not been established, their contribution to the spread of the HIV pandemic, however big or small, cannot be ignored. Therefore there is an urgent need for further research in order to bring more light into the extent of these myths in order to enable HIV interventions to "identify their falsity and danger to ... people before they grow stronger and become the basis for future attitudes, perceptions and risk practises of people regarding sex and HIV/AIDS (van Rensburg et al, 2002)

## Conclusion

This chapter has introduced the most important concepts in this study, mainly poverty and HIV/AIDS. More importantly the chapter has set them into context to enable a better understanding of their distribution which is essential prior to an exploration of the eminent relationship that exists between the two. Poverty has always been and persists to be a problem for the majority of South African's, even more so for Blacks as opposed to other racial groups.

HIV/AIDS is yet another problem and while the entire population is affected, the severity of the pandemic differs according to race, space and economic status as the

different factors that drive this pandemic, whose importance cannot be disregarded, also vary accordingly. It became slightly evident while discussing the factors that are responsible for the AIDS pandemic that the two concepts of poverty and HIV/AIDS are related. The chapter that follows dwells more on the exploration of this eminent relationship by critically reviewing some of the work that has already done on this subject.

# 4

# Literature Review

## Poverty and Disease

That poverty and disease are inextricably linked is widely accepted as can be seen in the mounting evidence on the subject (Heinzel-Gutenbrunner, 1998; Bloom & Lucas, 1999; Whiteside and Sunter, 2000; Alban, 2001; Barnett and Whiteside, 2002; Benns, 2003 and Williams et al, 2002; Plant, nd; Cohen, nd; among others). Recent research has tended to extend this link to HIV/AIDS. However there still exists huge and disgraceful lacuna in what is known on this link both in terms of how the epidemic aggravates poverty and vice versa (Barnett and Whiteside, 2002). Attempts to explain the dual link between disease and poverty have employed either of the following approaches: the behavioural or lifestyle approach and the material or structural conditions approach. Scholars subscribing to these schools of thought argue that different levels of poverty (individual, household and community) and their related characteristics : low education levels, poor health, low marketable skills, lack of knowledge or information regarding the risk of infection and the lack of resources on how to act on this knowledge, lack of capacity to negotiate safer sex and high population mobility create a "fertile terrain" for HIV/AIDS to flourish at the different stages of infection -from stage 1: not yet infected to stage 4:AIDS related death (Alban, 2001; Cohen, nd; Whiteside, 2002: Whiteside and Sunter, 2002; Williams et al, 2002; UNDP, 2002.). The four stages of HIV/AIDS that are related to different levels of poverty, that is individual, household and community poverty are as follows (UNDP, 2000):

- Stage 1: not yet infected, therefore a stage of vulnerability
- Stage 2: infected but asymptomatic
- Stage 3: infected and symptomatic
- Stage 4: AIDS-related death

- Stage 5: impact of AIDS deaths on survivors

The logic behind distinguishing between the different HIV/AIDS stages is that it makes it easier to "identify the specific nature of the relationship between poverty and HIV/AIDS at different levels [and] also allows us to see the interconnectedness between the three levels of poverty" (UNDP, 2002:3).

At stage 1, poverty is used in the context of a lack of knowledge or information about the risk of HIV infection and how to prevent it, a lack of resources on how to act on this information (for example a lack of money to purchase condoms) and a lack of skills and power to negotiate safe sex (UNDP, 2003: 3). It is through these factors that individual poverty works to enhance vulnerability to HIV/AIDS. The argument is that since life for the poor is often a struggle for survival, they may not be concerned about the long term "invisible threat" of the disease or death thereof. This argument is supported by a study by Booysen and Summerton (nd), titled, 'HIV/AIDS, Poverty and Risky Sexual Behaviour: Evidence from South Africa', which was aimed at exploring the relationship between poverty, knowledge of HIV/AIDS and risky sexual behaviour. This study employed the 1998 South African Demographic and Health Survey (SADHS) data, which included data for 12 247 households and 11 735 women of reproductive age (15-49 years). To measure socio-economic status, the asset index approach to the measurement of poverty was applied and the variables used included ownership of consumer durables, access to services and aspects of housing infrastructure[9].This study employed data from the 'AIDS' and 'marital and sexual relations' modules of the women's questionnaire to investigate the link between poverty, HIV/AIDS and risky sexual behaviour. Women were said to be involved in risky sexual behaviour if they had had their last sexual intercourse with a casual acquaintance, someone they had just met or a commercial sex worker and they had not used a condom despite knowledge of HIV/AIDS and its means of transmission.

[9] Due to space constraints, the asset index approach will not be explained here. For a thorough explanation of the asset index approach, see Booysen and Summerton, nd.

The findings indicated while knowledge of HIV/AIDS and of the sexual means of transmission was high, as was the percentage of women involved in risky sexual behaviour. More than 96% of 11 384 women had heard of AIDS whereas nearly 95% knew the sexual transmission routes of HIV/AIDS but knowledge differed according to socio-economic status, favouring those in the highest quintile (99.8%) as opposed to those in the lowest quintile (92.3%) (Booysen and Summerton, nd: 8). However while only a small percentage of women (5.1%) had had sex with a casual acquaintance, someone they had just met or commercial sex worker, a high percentage of these women (76.3%) had not used a condom (Booysen and Summerton, nd: 7-8) . Furthermore involvement in risky sexual behaviour varied according to economic status whereby women in the lowest wealth quintile were more likely than women in the highest wealth quintile to have had risky sexual behaviour.

Household poverty plays a role by constraining mothers from purchasing substitute milk for their babies in order to reduce the risk of mother-to-child transmission. Household poverty also becomes a factor when mothers and daughters engage in commercial sex work as a survival strategy to overcome household poverty, thereby increasing their risk of infection. The argument is that commercial sex work " flourishes in settings were women are poor, marginalised and unskilled and selling sex may be their only way of supporting themselves (Williams et al, 2002:9)" and also that poor women may provide sex in exchange for a range of commodities including food, shelter, support and protection. This argument can be supported by evidence from studies conducted in Africa and elsewhere in the world. In a study that sought to understand sexual behaviour across Africa, respondents were asked about the social causes of prostitution (Carael et al., 1991 cited in Webb, 1997:143). Poverty or the need for money was ranked the highest and compounded by other factors such as lack of

education and poor family background (Webb, 1997). In Lebowa[10], the economic causes of prostitution included lack of employment opportunities, among other things as indicated by the following statement by a 28 year old female respondent from that area who was quoted saying that "Prostitution is the most important employment (Webb, 1997: 144)". In Soweto, women involved in commercial sex work could be classified into two categories: adolescent girls who went out with sugar daddies seeking wealth and status; single parents or divorced women who were often uneducated and as thus unable to find employment. Often these women would have a string of boyfriends who provided for their needs, such as food, clothing and money for their children's school fees (Webb, 1997). Because this type of sexual activity is often characterised by unequal power relations, it renders women and girls powerless in negotiating safe sex, thereby increasing their risk of infection. The high price associated with unsafe sex also serves as a disincentive against condom use.

Community poverty is important at all stages of infection as it is associated with a lack of education, resources and facilities necessary to knowing risky behaviours and avoiding such high-risk behaviours or even providing treatment after infection. In communities where there is a lack of health facilities, the risk of transmission is higher. For example the lack of caesarean section services for HIV-positive pregnant women increases the risk of mother-to-child transmission (UNDP, 2002). The risk of mother-to-child transmission is also enhanced in situations where there is no clean water for mothers to prepare substitute milk formula, thus forcing them to breastfeed their babies. A lack of health services for sexually transmitted infections, often a characteristic of poor, remote areas, also increases the chances of transmission as it may allow the virus to go undetected for a while (Alban, 2001). Community poverty is also seen as a factor when lack of employment opportunities persist in a community, thus forcing people, especially young able-bodied people, to migrate into areas lacking

[10] Lebowa was a Bantustan located in Transvaal (now made up of Mpumalanga, Limpopo, Gauteng and part of the North-West Province) in north eastern South Africa. On 2 October 1972, Lebowa was granted internal self-government and was ruled by Cedric Phatudi for much of its existence. Then later on in 1994, Lebowa was incorporated into South Africa

services and infrastructure-"informal settlements or overcrowded compounds", which also offer no security or legal and police protection thus increasing their risk of infection (Gutenbrunner-Heinzel, 1998;UNDP, 2002:10).

Once in urban areas, men who are lucky enough to find employment find themselves in very stressful and risky jobs such as mine work while the women are often concentrated in the SALEP (Shunned by All Nations Except the very Poor) and the 3-D (Dirty, Difficult and Demeaning) jobs such as sex work, domestic work, waitresses and garment making (Lim 2003 and Kawa, 2003). Most of these jobs that migrant women find themselves in are usually not covered by the host country's or area's social protection policies. This then places the women at risk of contracting HIV/AIDS through job-related sexual harassment and abuse. Female migrants who find themselves unemployed in the destination areas can be divided into two categories: those who were just not lucky enough to find employment and those who were victims of scams that promised them non-existent work (Lim 2003 and Kawa, 2003). The former are at risk of contracting HIV/AIDS as their desperate economic substances might force them into prostitution while the latter are at a higher risk as they are often sold as sex slaves (Lim, 2003 and Kawa, 2003).

The psychological and chemical stresses related to the type of employment opportunities that most men find themselves in have also been shown to result in immune-suppression, thus placing them at a risk of being infected with HIV/AIDS ( Presidential AIDS Advisory Group,2001; Williams et al, 2002). This is often compounded by the fact that employment often means that these men are unable to visit home for long periods of time thus causing them to seek solace from other sexual partners, most often commercial sex workers (UNAIDS & UNDP, 1998; Whiteside and Sunter, 2001; van Rensburg et al, 2002; Williams et al, 2002). Very often in these types of unions, condom use is very inconsistent. This then opens a window of vulnerability not only between the migrant workers and the sex workers but also the partners of both (Williams et al, 2002). Those left behind (in rural areas) are also placed

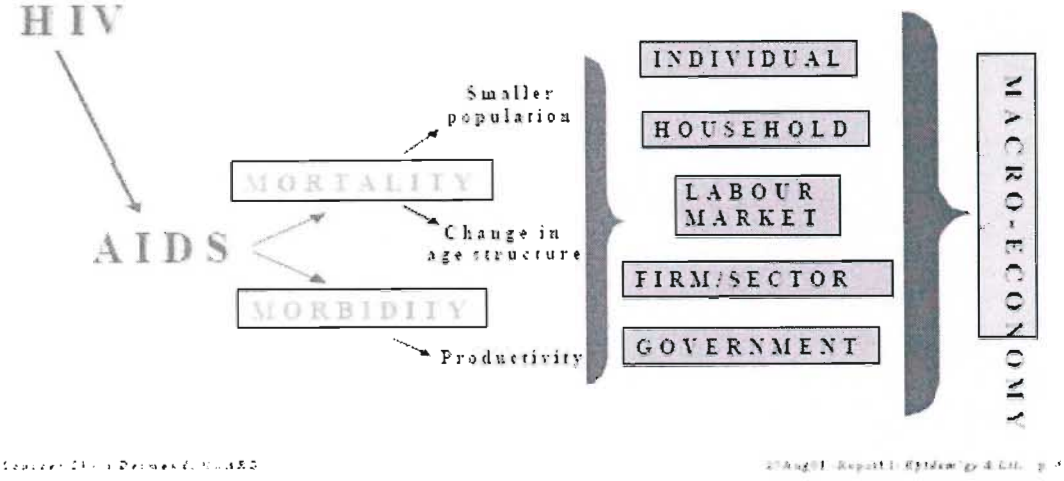
at high risk of HIV infection as they are often left poor and unsupported forcing them to either go into commercial sex work or to have multiple sexual partners who take care of their needs (Webb, 1997; Williams et al, 2002). This has been confirmed by a study on sexual behaviour conducted in Lebowa which found inadequate remittances from migrant husbands to be one of the economic reasons why women go into prostitution (Carael et al., 1991 cited in Webb, 1997).

## How HIV/AIDS Aggravates Poverty

The second wave of studies on poverty and disease has centred upon explaining how disease aggravates poverty by making it difficult for the poor to mitigate its impacts. The common thread that runs through these studies is that they are based on the argument that because in most instances HIV/AIDS claims the lives of those aged between 25 and 45 years, the very people that work to support families, their ailment and later death can have a very negative impact not only on the economy (through lost productivity) but also on the household as funds become depleted as they are diverted from saving to paying for the care of the sick and later for funeral costs.

HIV impact can occur at various levels: the individual, the household, the community, production unit/institution, sector and nation (Barnett and Whiteside, 2002) and the time at which impact occurs as well as the degree of the impact varies accordingly. The pathway to the economic impact of HIV/AIDS is illustrated in Figure 3 below. HIV related mortality has altered the age structure of many populations by reducing life expectancy and resulting in slower population growth (due to reduced fertility and increased mortality). This coupled with the fact that the majority of those affected are the economically active youth affects both the supply and demand side of the economy, thus carrying very negative consequences for the economy at the levels (Ford et al, 2002).

Figure 3: Pathways to the Economic Impacts of HIV/AIDS




Source: Barnett and Whiteside, 2002: 6

The impact occurs firstly and most severely at the first three levels (individual, household and community). However due to space constraints and lack of quantifiable data studies on the impact of HIV/AIDS at the community level, discussion will be limited to the impacts at the individual and household level. According to Barnett and Whiteside (2002) the degree of the impact of HIV/AIDS at these two levels is determined by the number of infected people, their position in society as well as the resources available at their disposal; the socio-demographic characteristics of the infected individual (i.e. their age, gender, income and cause of death); the structure of the household (composition); the community in which the affected families belong and the broader resources available for assistance to households, i.e. state resources (social support grants) or Community Based(CBOs) or Non-governmental organisations (NGOs).

The individual level is the first level at which the impact of HIV/AIDS is felt. It is from this level that the impact at other levels is generated. HIV infected individuals (both poor and non-poor) are firstly confronted with an impact on their health due to HIV related ailment. For the poor, the health impact of HIV/AIDS arises earlier due

to a wide range of poverty related factors. Firstly the poor lifestyles that characterises the lives of many poor people such as inactivity, lack of a proper diet (or in the case of HIV/AIDS, special diet); alcohol and substance abuse can have very negative health effects. This coupled with the stresses associated with the environments within which the poor reside, unemployment and the resultant inability to afford treatment and care place a further strain on the HIV infected poor individuals' health as they tend to increase the frequency, duration and severity of illness.

With continued ailment of an individual, it becomes inevitable that the impacts will be felt at the household level. Firstly as the dual epidemics of HIV/AIDS and poverty continue to compromise individual health, he/she might be forced to firstly switch physically demanding jobs such as construction work to other less demanding jobs. While this might have benefits on individual health, there is a trade off in that service oriented jobs are usually low paying, therefore resulting in income reduction. Furthermore household income will be diverted from saving to covering the immediate costs of treatment and care in an attempt to restore the ailing person's health. With the progression of illness, the ability of the AIDS sick individual to work diminishes, and as thus they might be forced to be absent from work very often. At this stage, the AIDS sick individual will require care and most often this responsibility is shouldered by females (both young and old, depending on household structure) (Soul City Institute for Health and Development Communication & Khomanani, 2004). If the carer is a young female, they might have been forced to leave school in order to care for the ailing family member and in the event that the caregiver is an adult female, they might have to take time off work. Either scenario carries the threat of further entrenching household poverty. Firstly loss of schooling reduces the chances of acquiring the skills necessary to obtain employment whereas absenteeism from work might result in further income loss.

Prolonged illness on the other hand might result in the loss of employment, thus depriving families of their source of income. It is important to note however that the

threat of HIV/AIDS is not only isolated to those employed in income generating jobs but also poses a threat among subsistence and small-scale farmers and their families. As with those involved in income generating activities, HIV related morbidity also results in decreased productivity among subsistence and small scale farmers as they are too ill to carry out farming activities. This then implies that farmers can only farm small portions of land or are forced to switch to less labour intensive crops, thus compromising household food consumption which then increases the likelihood of hunger and famine (Soul City Institute for Health and Development Communication & Khomanani, 2004). Evidence of the impact of HIV/AIDS on both individuals and households is contained in the case studies that follow. One such study has been that by Steinberg (et al, 2002) conducted in selected provinces (Gauteng, Mpumalanga, Free State and KwaZulu-Natal) in South Africa. The study titled, 'Hitting Home: How Households Cope with the Impact of the HIV/AIDS Epidemic' employed a sample of 728 households, which constituted households where there was an AIDS-sick member or where someone had recently died of HIV/AIDS. Since the study was examining the financial implications of HIV on already poor households, the sick person had to be between 15 and 60 years of age, that is, the economically productive years. The mean age of the study participants was 33 years for women and 37 years for men. The median age was 33 years for both genders. The major limitation of this study is that it lacked generalisibility as it sampled households that were recipients of some form of assistance from NGOs, thus making them better off than other poor households.

Almost half (44%) of households in this study had an income of less than R1000, and as thus can be classified as poor (see section on poverty in South Africa). In about two thirds of households, income was lost due to AIDS. Firstly the increasing expenditure on medical care and later the high cost of funerals contributed to the financial burden. About two third of households spent a third of their income on health care, while more than half (53%) carried the full burden of funeral costs (Steinberg et al, 2002:19) This was in turn aggravated by loss of income due to absenteeism for care giving purposes. In more than 40% of the households, the primary care giver had taken time off from

formal or informal labour or schooling to take care of the ailing person (Steinberg, et al, 2002). The households reported that on average the sick person was chronically ill for a year before passing on. Considering the number of paid leave days that an employee is entitled to per year, such ongoing ailment is guaranteed to result in loss of income, thereby resulting in a further decline in household income. The loss of schooling, on the other hand, further reduces the chances of alleviating household poverty by resulting in a loss of both the education and skills vital to gaining employment.

Household poverty is further aggravated by the fact that more than half the households (60%) had to take time off other housework or gardening activities. The latter would then affect the households' ability to generate (grow) food for either consumption or sale (Steinberg et al, 2002). The results were not only further loss of income but also an increased likelihood of malnutrition, leading to increased susceptibility to other infectious and parasitic diseases such as diarrhoea. Almost half of the households reported having insufficient food at times.

Poverty also increased the likelihood of households suffering from chronic poverty by increasing orphanhood status. Approximately 22% of all children aged 15 and below had lost one or both parents to AIDS. This, coupled with the fact that 64% of AIDS-sick individuals were females aged 33 years (on average) leads one to ask, 'Who takes care of the children and even the household when the mother is sick and the other parent is dead? In more than one in three households, the primary caregiver was the sole caregiver and in another 8% the sick had no one looking after them (Steinberg et al, 2002: 15). In 7% of the households the primary caregiver was a child aged below 18 years and in more than 60% of the households (68%), the caregiver was present most of the time while in the remaining 22% of households, the caregiver was only available some of the time. This unavailability of the caregiver can be very problematic considering the fact that approximately one in six individuals were unable to control their bowels (16%), 17% had lost control of their bladder and 17% needed help when

using the toilet. Moreover 52% of the AIDS sick suffered from chronic diarrhoea (Johnson et al, 2002: 207). Compounding to these problems was the lack of clean water and proper sanitation in most households. Only 20% of rural households had a flush toilet as compared to 75.5% in urban areas (Steinberg et al, 2002:14) and while in terms of access to portable water(tap), less than half the households(43%) had a tap in their homes (Steinberg et al, 2002:15).

Another study which explored the extent to which HIV/AIDS can aggravate poverty is that by Booysen (2002), titled, 'HIV/AIDS and Poverty: Evidence from a Household Impact Study conducted in the Free State Province, South Africa'. This study assessed the impact of HIV/AIDS on households by comparing a cohort of households affected by HIV/AIDS with a control group of households not currently affected by the epidemic. The survey took place in two communities in the Free State, namely Welkom (an urban area) and QwaQwa (a rural area). As with the previous study, this study sampled households that were connected to some non-governmental organizations (NGOs) and other organizations involved in HIV/AIDS care and counselling. Furthermore the households had to either have at least one member who was HIV/AIDS positive or had currently (in the past 6 months) died of AIDS. The control group was households living within close proximity to the affected households excluding those with persons suffering from chronic HIV related diseases such as tuberculosis. The results of the study were based on data collected from 387 households interviewed in May/June (wave I) and November/December 2001(wave II). Since the focus of the study was on the household impact of HIV/AIDS, poverty was measured at a household rather than an individual level. As such poverty was interpreted in terms of the command over commodities that resources afford people via income and consumption (Lipton and Ravallion, 1995: 2553-2567 cited in Booysen, 2002: 5)". Poverty data was collected from one informant regarding employment income, non-employment income and receipts of remittances for the members of the particular household (Booysen, 2002: 5)".

The results indicated depreciation in the adult equivalent per capita income of HIV affected households that had experienced illness or death as opposed to affected households that had not experienced HIV related illness or death. Furthermore the study reported pronounced differences in the extent of income inequality between households that had experienced illness or death and those that had not. The head count poverty indices and the poverty gap indices in wave I were 48.85, 20.93 and 26.11, 15.71 for affected households suffering illness or death and affected households suffering no illness or death respectively and 27.98, 12.44 for non-affected households that had suffered no illness or death (Booysen, 2002: 11). However the study also found a larger proportion of non-affected households (56.5%) remained in poverty as compared to 41.4% of affected households. Similar results were obtained when comparing across affected households that had experienced illness or death and those that had not experienced illness or death. Almost forty percent (36.8%) of affected households that had experienced illness or death remained in poverty as compared to more than half (58.3) of households that had not experienced illness or death. This not only confirms the complexity of the HIV/AIDS poverty relation but also suggests that while HIV/AIDS might be pushing households into poverty, at least in the short term, households are also moving out of poverty following illness or death (Booysen, 2002: 20). Booysen (2002 cited in Booysen 2004) suggests that further work is needed to determine reasons why households move in and out of poverty.

The multiple regression results found access to medical aid to be the single most strongest predictor of poverty status, serving to increase the odds of being non-poor 26 times in wave I and 11 times in wave II, owing possibly to the role of medical aid on the avoidance of medical expenditures. Households with larger dependency ratios were more likely to be classified as non-poor owing possibly to the uptake of social welfare grants, especially old age pensions and child support grants (Booysen, 2002). Affected households with at least one HIV positive member in wave II were more likely than

non-affected households to be classified as poor[11]. As were households that had experienced a larger number of recent deaths (deaths occurring between wave I and wave II). Perhaps the most important question at this point is, 'how do households cope?' The study reported that most households sold their assets to raise funds if they became desperate. For instance one household had reported selling the shoes of a child who could not afford school fees. While selling assets might be effective in the short term, how will these households cope in the long run? What strategies would then be adopted?

## Coping With HIV/AIDS and Poverty

The strategies that families adopt in an attempt to mitigate the impact of the dual epidemics of poverty and HIV/AIDS are not unique to HIV/AIDS but are applicable to other crises, whether natural or man-made. Such strategies are often predictable and can be broken up into three stages, each stage relating to the size and scope of the loss as well as the initial stability of the household economy (Donahue, 1998:5). Stage I comprises a reversible set of strategies which have little or no impact on the household's future income-earning or production capacity; Stage II strategies are difficult to reverse and often provide temporary and inadequate relief. As such Stage II strategies can undermine the households' future capacity to generate income and produce food. The final stage, Stage III, comprises strategies which can be referred to as "last resort options" as they are strategies that are adopted when families are destitute. Not all households go through all these three stages. However their ability to avoid Stages II and III depends on the resiliency of Stage I strategies, which in turn depends on the success of risk reduction activities (Donahue, 1998). The three most important coping strategies in Africa as provided by the World Bank (op. cit cited in Topouzis, 1999: 15) and Desmond et al (nd: 10-11) are *altering household composition* (i.e. sending one or more children to live with relatives), *drawing down savings or selling assets (i.e.* durable goods, livestock etc*), utilising assistance from other households and from other*

[11] Poverty in this case is defined relative to the guideline of R800 per household per months... (Booysen, 2002: 25)".

*informal rural institutions*. However coping strategies are not limited to these three and broad range of strategies that may be adopted is given in Table 5. These are provided in terms of their impact on household resources, ranging from low to high (top of sketch to bottom) and their related degree of reversibility, also ranging from lowest to high(reading from bottom of sketch up). Each of these strategies carries long term implications on the long term welfare of the family (Teljeur, 2002). As mentioned earlier adoption of strategies relies on the state of the household economy at any given time.

Table 5: Household Coping strategies to HIV/AIDS

| Stage | Loss-Management Strategies |
|---|---|
| I. Reversible Mechanisms and Disposal of Self-Insuring Assets | ✗ Seeking wage labour or migrating temporarily to find paid work<br>✗ Switching to producing low-maintenance subsistence food crops(usually less nutritious)<br>✗ Liquidating savings account or stores of value (jewellery/livestock but excluding draught animals)<br>✗ Tapping obligations from extended family or community members<br>✗ Soliciting family or marriage remittances<br>✗ Borrowing from formal or informal sources of credit<br>✗ Reducing consumption<br>✗ Reducing spending on education, non-urgent health care or other human capital investments. |
| II. Disposal of productive assets | ✗ Selling land, equipment or tools<br>✗ Borrowing at exorbitant interest rates<br>✗ Reducing amount of land farmed and types of crops produced |
| III. Destitution | ✗ Depending on charity<br>✗ Breaking up the household<br>✗ Distress migration |

Source: Donahue J, 1998: 6

Most often when a poor household is faced with chronic HIV/AIDS morbidity, their pre-emptive strategies include: seeking employment locally or to migrate in search of greener pastures; changing farming methods; adopting labour saving techniques or leaning on family or the community for support. However as time passes and this range of coping strategies is exhausted, families are forced to adopt other coping strategies which not only carry a higher impact (negative) on household resources but also provide temporary or inadequate relief and prove to be unsustainable (World Bank, 2000: 158 cited in Teljeur, 2002). Such include spending less on children's education or de-registering them from school; using up of savings to cover the cost of treatment and care; breaking down of household cohesion as some family members may be sent to live with relatives or borrowing from formal or informal sources of credit. In due course, families forced to either depend on charity or distress migration to ensure survival.

Studies have indicated that when people reach the point of destitution, the range of strategies that they may adopt no longer becomes predictable. One such study is that conducted in South Africa by Nattrass (2004) which illustrated how destitution as a result of a combination of HIV/AIDS, high poverty and unemployment rates can lead people to behave in ways that they would not adopt in different circumstances. As has been indicated earlier, unemployment is very high in South Africa and even higher among the youth-the group most devastated by HIV/AIDS (Nattrass 2002 cited in Nattrass 2004). The unemployed rely on government grants for survival. So do those suffering from HIV/AIDS. People living with AIDS older than 18 years are eligible for a government disability grant of a maximum of R700 per month. There is also a caregiver grant for those taking care of HIV infected children. According to Simkins (2003:11 cited in Nattrass, 2004), there has been an increase in the number of child-care dependency grants between April 2001 and June 2002, indicating an emergence of claims for children seriously ill due to HIV/AIDS. This, Simkins (2003:9 cited in Nattrass, 2004) argues will have serious financial implications by resulting in an increase in the government expenditure from R6.4 billion to R9.5 billion. To remain eligible for

this grant, those living with HIV/AIDS have to be ailing or "disabled". However, since the government has made highly active antiretroviral treatment (HAART) available, eligibility is threatened for those who have access to this treatment. According to Nattrass (2004:95), those who have access to HAART and respond well to it will in many cases no longer be eligible for a disability grant-although this varies across the country. While this might result in a decline in the projected increase in government expenditure, it will have serious financial implications for those living with HIV/AIDS. Nattrass (2004) argues that, because welfare transfers are important components of household income, especially among the poor, loss of such grants will threaten treatment. This is illustrated in the following quote:

> I love this HIV, now at least with the grants I'm trying... I get the disability grant and the child support grant ... before I was staying with my mother and father and my sister, they didn't work... the only thing that what helping was my grandmother's pension. Concerning the illness, our lives [have] changed completely... I applied for another grant ... but they were asking too many questions ... so I cancelled it (female respondent, Steinberg et al, 2002:29)

While it is not known how apparent this situation is, it has definitely caught the attention of many South Africans to the extent that it was debated upon on a programme that was aired on SABC 1 (SABC 1, 25 July 2004). The programme, which is called The Chatroom, posed the following question: 'Should we sympathise with people who deliberately acquire HIV in order to qualify for the government grant?' While this might seem as a straightforward question, the answer is more complicated than a simple yes or no. It is apparent that the disability grant is a lifeline for the majority of the poor who are living with HIV/AIDS. Depending on how desperate people's situation of poverty is, they may put themselves at risk of infection just so they can be eligible for the grant. Since eligibility does not always ensure provision of the grant, people may in fact be risking their lives for nothing and instead increasing the burden on household economy (as a result of changes in household expenditure to cover the cost of their treatment and care and later funeral costs). In the study provided earlier by Steinberg et al(2002: ii-iii), it was found that while all of the households sampled were eligible for at least one form of government grant, less than 16% were

recipients of government grants of any kind. And those already affected and receiving the grant may choose not to take their treatment to ensure that they remain eligible for this grant. This might then result in a never-ending HIV/AIDS pandemic in South Africa. Nattrass suggests that instead of reducing or removing the grant as a result of HAART, the government should introduce basic income grant (BIG) for all South Africans. By so doing, the government would ensure that those who are equally poor but are not HIV-positive are not discriminated against.

## Denial of HIV/AIDS -Poverty Cycle

As more research is written on a particular subject, in this case HIV/AIDS and poverty, it can get to a point where researchers feel that the area has been over researched and therefore more research might not be needed on the subject. Alternatively researchers may search for loopholes in existing researchers and plan their research accordingly. In other cases, researchers may try to disprove an existing theory. That has certainly been the case with research on HIV/AIDS and poverty. While it is evident that a relationship exists between poverty and HIV/AIDS, it has also been noted that the relationship is not clear-cut. That is, although high prevalence rates have been shown to be a characteristic of low per capita income countries, high per capita countries can also have high prevalence rates. This, Whiteside (2002) and others have attributed to the fact that rapid economic growth can bring about disruption, disease and death as people are slow to wake to the changes. Shell (2000), on the other hand, has attempted to disprove that such a link exists. In his study on AIDS in the Eastern Cape, Shell (2000) makes an attempt to draw attention to what he referred to as the under researched hypothesis linking HIV to poverty in the Eastern Cape. He challenges the link between poverty and HIV/AIDS by arguing, "If HIV were closely related to poverty, the province [Eastern Cape] should have the highest prevalence since it has been classified as the poorest province... But that is not the case (Shell, 2000:3)". Shell also tries to provide reasons why poverty should not be equated with HIV/AIDS, warning that treating AIDS indirectly, i.e. through poverty alleviation might have little impact while resulting in high and unnecessary expenditures.

For analytical purposes, he used case level data on HIV positives instead of antenatal data or the prevalence figure. Shell (2000) attributed his choice of data to the problems associated with both antenatal data and prevalence figures. The argument is that national assumptions based on antenatal data are suspect due to the unequal distribution of antenatal clinics between rural and urban areas and also due to the fact that the data only favours pregnant women visiting antenatal clinics since infants, pre-teens, men, young adolescents and women beyond their childbearing years are only included in these studies through assumptions that are not included in the annual antenatal clinic reports (Shell, 2000). Although I have no qualms with Shells' choice of data as I find the reasoning behind his choice valid, I disagree with his argument on the link between HIV/AIDS and poverty. To question the link between HIV/AIDS and poverty is almost similar to questioning the link between HIV and AIDS. The reasons behind this argument have already been provided earlier in this section. On the basis of the arguments provided on the link between HIV/AIDS and poverty, it would not be wise to disregard poverty as a cause, though indirect, and facilitator of HIV/AIDS. Therefore, any study that attempts to provide an understanding of the pandemic without drawing on this link, or any programme that attempts to provide solutions to the problem of HIV/AIDS without tackling poverty would be incomplete and ineffective. However despite the shortfalls inherent in Shell's work it conveys two important messages: firstly the need to recognize the heterogeneous nature of the poor and to therefore take that into account when attempting to establish the link between poverty and some disease or any other condition. By failing to do as such researchers not only run the risk of marginalizing the poor but also of providing results that will only serve to misinform policy. Secondly Shell's work has been important in highlighting the multifarious nature of the relationship between poverty and HIV/AIDS. That is, low socio-economic status is not always related to increased risk of disease acquisition. This has also been the case in the Northern Province, one of South Africa's rural and poor regions where the HIV/AIDS prevalence levels are relatively low.

## Conclusion

Chapter 4 has successfully accomplished one of the major objectives of this study, that is, the provision of literature based evidence in support of the second hypothesis. Hypothesis 2 states that poverty exacerbates the impact of HIV/AIDS on poor individuals and households, thus making it hard for the affected to cope with the various impacts of the pandemic. From this chapter, it is evident that poverty works firstly through the constrained knowledge base to increase susceptibility to HIV infection. By limiting the amount of HIV prevention information accessible to the poor through low education and literacy levels as well as through lack of or poor access to media, poverty renders the poor more vulnerable to HIV infection since prevention relies heavily of knowledge of risk. Secondly poverty works through the constrained resource base to increase susceptibility to HIV infection. For example financial dependence on a partner reduces the capacity to negotiate and in terms of commercial sex workers, the high price paid for unprotected sex is a disincentive for condom use. Moreover poor people are less likely to afford to purchase condoms, for example poor women who want to protect themselves against HIV infection may not afford to purchase female condoms thus placing them at risk of infection if their partners refuse to use condoms.

Poverty is also important after infection has occurred as it determines both the ability of the individual to cope with illness as well as the degree of the impact of HIV related morbidity and mortality on both the individual and their respective households. Poverty increases the frequency and duration of illness thus threatening household resources since prolonged ailment often results in loss of employment and consequently loss of household wealth. Furthermore HIV related morbidity puts a strain on resources as funds are diverted from other important things such as savings, education, and expenditure on food or income generating activities to settle the cost of treatment and care of the AIDS sick individual. Further income or future prospects to generate income are threatened as people are forced to leave school or work to care for ailing relatives. More disconcerting in the HIV and poverty relationship are some of the

measures adopted in an attempt to ensure survival. That a person can deliberately acquire a deadly and incurable disease just to be eligible for a grant that would enable them to "escape" their situation of poverty is not only disheartening but also goes to show just how inseparable poverty is from any disease. Perhaps even more disturbing is that one can argue against the existence of a relationship between poverty and HIV/AIDS when evidence of such a relationship is so rife. This chapter forms the backdrop against which data analysis will be based.

5

# Research Methods

The study employs both empirical and literature-based research methods to answer the research question. Hypothesis 1, which forms the main aim of the study, will be tested empirically during data analysis. In chapter 4, I have already provided literature that supports hypothesis 2 (literature based research). Other areas worthy of being discussed in this chapter are as follows.

## Area of Data Collection and Sample Size

The 1998 South African Demographic and Health Survey (SADHS) survey covered the population living in private households. This survey employed a probability sample of approximately 12000 women aged between 15 and 49 were selected from all nine provinces in South Africa. The sampling frame constituted a list of approximately 86 000 enumeration areas created by Statistics South Africa for the 1996 Census. The size of the enumeration area was measured according to the number of households in that enumeration area. These enumeration areas ranged from about 100-250 households and were stratified according to province, urban and non-urban residence and by type of Enumeration area, with the exception of the Eastern Cape, which was stratified according to its five health regions and urban and non-urban areas within each region. There were a total of 16 sampling strata for the eight provinces and a further 10 sampling strata for Eastern Cape, resulting in 26 sampling strata in total. Within each stratum, a two-stage sample was selected. Primary sampling units (PSUs) corresponded to enumeration areas and were selected with a probability proportional to size, the size being either the number of households in that enumeration area or the number of census visiting points in the enumeration areas. Where available, the listing of the visiting points and the households found in that visiting point or alternatively a map of the enumeration area which showed the households was used as the sampling frame

for the second stage sampling to select households to be visited by the SADHS interviewing team for the main part of the survey.

A total of 972 PSUs were selected-690 in urban areas and 282 in non-urban areas. In urban enumeration areas, a total of 10 households were selected and in non-urban enumeration areas, a total of 20 households were selected. A total of 12860 households throughout the country were selected and every second household was selected for the adult health survey-systematic sampling. In these households, in addition to interviewing all women aged 15-49; all adults aged 15 and above were also interviewed.

Data Collection Tools and Strategy

Three questionnaires were used: a household questionnaire, a woman's questionnaire and an adult questionnaire. The questionnaires were originally developed in English and later translated in all South Africa's 11 official languages. The questionnaires were then pre-tested in a pilot study whereby 150 interviews were conducted in several of the nine provinces under the supervision of staff from the Medical Research Council (MRC) and Macro. After the pilot study, the questionnaires were revised and translated based on the discussions that were held with the pilot field staff. For the main survey, a total of 175 candidates were selected for fieldwork based on their education, maturity, field experience and fluency in the language required to conduct interviews in a given province. These fieldworkers then underwent training on questionnaire administration and field training, which was conducted by the MRC, The Human Sciences Research Council (HSRC), Free State University and Macro International. Overall, 33 interviewing teams, with three teams per province with the exception of KwaZulu Natal and the Eastern Cape, which had seven teams, and five teams respectively carried out fieldwork. Each team had 2-5 female interviewers, a supervisor and field editor. Team leaders were also appointed to supervise the teams. Two centrally located editors were appointed per province for screening of questionnaires before submission to office for processing. Fieldwork commenced in late January and was completed in September 1998.

## Selected variables

This section is subdivided into different sections according to the part of analysis where the data belong. The first section aims to familiarize the reader with the data. To do as such, respondents' background characteristics are provided. However before doing so, the variables that were used are listed in the Table 6 below.

Table 6: Variables Used for Providing the Respondents' Background Characteristics and their Measurement Levels.

| Variable | Measurement level | Categories | Number of cases N=11674 | % of cases |
|---|---|---|---|---|
| Race | Categorical | Black | 8993 | 77 |
| | | Coloured | 1533 | 13 |
| | | White | 755 | 7 |
| | | Indian/Asian | 393 | 3 |
| Marital status | Categorical | Never married | 5785 | 50 |
| | | Married | 3929 | 34 |
| | | Living together | 987 | 9 |
| | | Widow | 295 | 3 |
| | | Divorced | 233 | 2 |
| | | Living alone | 445 | 4 |
| Place of residence | Categorical | Urban | 6482 | 56 |
| | | Non-urban | 5192 | 45 |
| Educational attainment | Categorical | No education | 805 | 7 |
| | | Primary school | 3121 | 27 |
| | | Incomplete Secondary | 5148 | 44 |
| | | Higher education | 2600 | 22 |
| | Minimum | Maximum | Mean | Std. Deviation |
| Age | 15 | 49 | 29 | 9.7 |

## Background Characteristics

**Respondent's current age**: This variable is included here to allow an observation of the distribution of respondents according to age group. Although it is beyond scope of research to assess the influence of age on sexual behaviour, its importance is worth noting. The respondent's age greatly influences their knowledge and sexual behaviour

and should be included as an explanatory variable. Women in the teens are likely to behave very differently from those aged 20 and above and vice versa. Therefore this variable is likely to be a confounder and as such it has to be included in analysis.

**Type of place of residence:** most research seems to suggest huge differentials in knowledge and sexual behaviour among urban and non-urban dwellers of which the latter are deeply entrenched in the socio-cultural and socio-economic structures that exist in these communities. This variable will not only be used as a background characteristic but will also be employed in data analysis.

**Educational variables:** education has an indispensable role in both knowledge of HIV and the respondent's sexual behavioural practices and is therefore worth examining. In most instances, education level differs according to economic status with the poor accounting for the majority of those with low education levels. In recognition of this and in allowing for the assessment of the importance of poverty in educational attainment and consequently in reducing the risk of HIV infection and transmission, the respondents' highest level of education will be provided as a background characteristic and will also be used as a predictor variable during data analysis.

**Current marital status:** the importance of this variable lies in the fact that a person's marital status often influences their sexual behaviours. That is the type of sexual partners (regular vs. non-regular) and the number thereof. Therefore it is important that this variable be provided firstly as a background variable and secondly as a predictor when assessing the role of poverty on sexual behavioural practices since marital status influences one's sexual behaviour by influencing the type of sexual partner/s one has as well as whether a condom is used during sex.

**Race**: Due to the historical significance of racial class on many aspects of the daily lives of South Africans, more especially on the distribution of poverty and inequality it is essential that this variable be incorporated. Secondly the South African HIV pandemic

varies according to different racial classes. Therefore race will not only be used as a background variable but will also as a predictor variable during data analysis

Subsequent to the provision of the background characteristics is the provision of the socio-economic indicators by income status. This is carried out firstly to allow for an examination of group dynamics and secondly to allow for comparison with the poverty measures provided in an earlier chapter. Also, since poverty is one of the variables of interest, it is important that its distribution in the research population be examined prior to it being used in analysis. The variables that were used together with their associated measurement levels are provided below.

### Poverty Measures

**Unemployment**: poverty and employment status are closely related for an individual's employment status determines their level of poverty. That is when one is unemployed, then they might not have any income and as thus they can be seen as being very poor. This is not to say that when one is employed then they are automatically non-poor for the classification in varying poverty levels is dependent upon income.

**Poverty status:** this variable is used to distinguish between the poor, very poor and non-poor. The distinction between the different economic groups was made in compliance to the definition of poverty provided earlier. That is those earning between R0-600 per month are classified as very poor, R601-1000 per month as poor and those earning above R1001 per month are classified as non-poor. Initially, the variable was continuous, with values ranging from 0 to R2212800 per annum. A range that was too broad and would make it hard to interpret the results to suit the research question. Therefore the variable had to be recoded to fit in with the research agenda. The technique that was employed is as follows: respondents earning between 0-R7200 were classified as being very poor, those earning between R7224-R12000 per annum as being poor while those earning from R12012-2212800 as being non-poor. In each of these categories, dividing the upper bound by 12 justifies inclusion into each respective

category(i.e. dividing 12000 by 12 gives 1000, therefore income group, R7224-R12000 per annum can be classified as poor).

**Basic services**: Type of toilet facility, source of drinking water and electricity. These variables were included not only in aligning with the theoretical framework but also in avoiding falling in the trap of using the money-metric definition of poverty as used in many studies. In addition to having low annual incomes, the poor will also be those without basic services.

**Affordability of household:** this variable looks at the frequency of hunger in the respondents' households and is therefore also important in identifying the poor. The variable has four categories: 1=often; 2=sometimes; 3=seldom and 4=never. Respondents who fall into the first two categories can be seen as being poor while those who fall into the remaining two categories constitute the non-poor.

**Education variables:** while both the highest level of education and literacy are included as background statistics, only highest level of education will be used as a predictor during data analysis. This is done firstly to avoid collinearity and also due to the fact that literacy levels are generally very high, thus making literacy levels a less useful predictor compared to level of education.

Table 7: Poverty Indicators

| Variable | Measurement level | Categories | Number of cases | % of cases |
|---|---|---|---|---|
| Source of drinking water | Categorical | Not piped[12] | 4485 | 38.4 |
| | | Piped | 7112 | 60.9 |
| | | Total | 11597 | 99.3 |
| | | Missing | 77 | .7 |
| Type of toilet facility | Categorical | Flush toilet(own) | 4976 | 42.6 |
| | | Flush toilet (shared) | 385 | 3.3 |
| | | Bucket latrine | 789 | 6.8 |
| | | Pit latrine | 3913 | 33.5 |
| | | No facility | 1538 | 13.2 |
| | | Total | 11601 | 99.4 |
| | | Missing | 73 | .6 |
| Has electricity | Dichotomous | No | 4196 | 35.9 |
| | | Yes | 7416 | 63.5 |
| | | Total | 11612 | 99.5 |
| | | Missing | 62 | .5 |
| Household affordability | Categorical | Often | 1427 | 12.2 |
| | | Sometimes | 4001 | 34.3 |
| | | Seldom | 558 | 4.8 |
| | | Never | 5511 | 47.2 |
| | | Total | 11497 | 98.5 |
| | | Missing | 177 | 1.5 |
| Husband provided money | Dichotomous | No | 3949 | 33.8 |
| | | Yes | 923 | 7.9 |
| | | Total | 4872 | 41.7 |
| | | Missing | 6802 | 58.3 |

## HIV Risk Assessors

The risk of HIV infection and transmission is measured at two levels: the knowledge base and the sexual behavioural level. The variables that were used are provided according to their respective sections.

[12] Piped refers to those who had a tap on site/dwelling as well as those who had access to a public tap. Not piped constitutes those who relied on a borehole/well, water carrier/tanker, rain water, bottle water or other sources for drinking water.

## Poverty and Knowledge of HIV/AIDS

Knowledge of the pandemic is important if one is to protect themselves from infection hence the need to examine the link between knowledge and economic status. The dependent variable that will be used is HIV knowledge. An explanation of how this variable was derived is provided below.

- **Dependent variable: HIV knowledge**: this variable is a composite index of the different variables measuring knowledge of means of avoiding HIV/AIDS. To create this variable, the following procedure was applied. Firstly I constructed an HIV score using the variables "AIDS: Safe sex", "AIDS: use condoms during sex", "AIDS: injections with clean needles", "AIDS: touching person with AIDS"; "AIDS: avoid mosquito bites", "AIDS: having a good diet"; "AIDS: avoid public toilets", "AIDS: avoid sharing food with infected person" and "AIDS: avoid sharing razor blades". For each variable where a "yes response" is true (e.g. AIDS: safe sex) I added 1 to HIV score and for each variable where a "yes" response is wrong, I subtracted 1 from the HIV score. Initially all the variables that were used to create the variable "HIV knowledge had three response categories: Yes, No and "Don't know".

Table 8: Variables Used in Computing the Dependent Variable HIV Knowledge (HIV Score)

| Variable | Measurement level | Categories | Number of cases | % |
|---|---|---|---|---|
| AIDS: safe sex | Dichotomous | No | 1492 | 12.8 |
| | | Yes | 9706 | 83.1 |
| | | Total | 11198 | 95.9 |
| | | Missing | 476 | 4.1 |
| AIDS: condom use | Dichotomous | No | 1491 | 12.8 |
| | | Yes | 9693 | 83.0 |
| | | Total | 11184 | 95.8 |
| | | Missing | 490 | 4.2 |
| AIDS: inject with clean needle | Dichotomous | No | 1345 | 11.5 |
| | | Yes | 9849 | 84.4 |
| | | Total | 11194 | 95.9 |
| | | Missing | 480 | 4.1 |
| AIDS: avoid sharing razor blades | Dichotomous | No | 1775 | 15.2 |
| | | Yes | 9402 | 80.5 |
| | | Total | 11177 | 95.7 |
| | | Missing | 497 | 4.3 |
| AIDS: touching someone with AIDS | Dichotomous | No | 9340 | 80.0 |
| | | Yes | 1827 | 15.7 |
| | | Total | 11167 | 95.7 |
| | | Missing | 507 | 4.3 |
| AIDS: avoid public toilets | Dichotomous | No | 8855 | 71.4 |
| | | Yes | 2339 | 24.3 |
| | | Total | 11194 | 95.7 |
| | | Missing | 480 | 4.3 |
| AIDS: have a good diet | Dichotomous | No | 8855 | 75.9 |
| | | Yes | 2339 | 20.0 |
| | | Total | 11194 | 95.9 |
| | | Missing | 480 | 4.1 |
| AIDS: avoid mosquito bites | Dichotomous | No | 6837 | 58.6 |
| | | Yes | 4321 | 37.0 |
| | | Total | 11158 | 95.6 |
| | | Missing | 516 | 4.4 |
| AIDS: avoid sharing food with an infected person | Dichotomous | No | 9070 | 77.7 |
| | | Yes | 2093 | 17.9 |
| | | Total | 11163 | 95.6 |
| | | Missing | 511 | 4.4 |

As I was only interested in the first two response categories (Yes and No), I recoded the variables and included those who respondent "Don't know" into the "No" category. My argument is that if the respondents' knew the means of avoiding HIV/AIDS, they would have responded "Yes" instead of giving a "Don't know" response, which reflects uncertainty. The procedure used to compute HIV knowledge score is illustrated by the following equation:

$$\textbf{HIV score(Y)} = X_1 + X_2 + X_3 + X_4 + X_5 - X_6 - X_7 - X_8 - X_9 - X_{10}$$

Where $X_1$ = AIDS: Safe sex

$X_2$ = AIDS: use condom during sex

$X_3$ = AIDS: injection with clean needle

$X_4$ = AIDS: avoid sharing razor blades

$X_5$ = AIDS: touching person with AIDS

$X_6$ = AIDS: avoid mosquito bites

$X_7$ =AIDS: having a good diet

$X_8$ = AIDS: avoid public toilets

$X_9$ = AIDS: avoid sharing food with an infected person

After computing this variable, a frequency procedure was done to investigate the distribution of cases across categories. The results of the frequency procedure are provided in Table 9 below. It is evident from this frequency distribution table that most respondents had a score greater than -2. Only 1.1% had a score below -1. Following this frequency distribution, the variable HIV knowledge score was categorised into two groups: Good knowledge and Poor knowledge. Respondents with a score ranging from -4 to 2 were considered as having low knowledge of HIV/AIDS and therefore classified as "Poor" whereas those with an HIV knowledge equals to 3 or 4 were classified as "Good". This was done in order to enable binary logistic regression analysis.

Table 9: Frequency Distribution of HIV Knowledge Score

| HIV knowledge score | Frequency | Percent |
|---|---|---|
| -4.00 | 2 | .0 |
| -3.00 | 25 | .2 |
| -2.00 | 89 | .8 |
| -1.00 | 628 | 5.4 |
| .00 | 1172 | 10.0 |
| 1.00 | 1238 | 10.6 |
| 2.00 | 1916 | 16.4 |
| 3.00 | 3023 | 25.9 |
| 4.00 | 2898 | 24.8 |
| Total | 10991 | 94.1 |

The resultant variable, along with its levels of measurement as well as associated statistics is provided in Table 10 listed below.

Table 10: Dependent Variable (HIV Knowledge)

| | Measurement level | Categories | Number of cases | % |
|---|---|---|---|---|
| HIV knowledge | Dichotomous | 0=Poor | 5070 | 43.4 |
| | | 1=Good | 5921 | 50.7 |
| | | Total | 10991 | 94.1 |

Note: there are 683 missing cases[13]

**Independent variables**: the independent variables that will be used in establishing the link between poverty and HIV/AIDS at level I (the knowledge base) are Poverty status, level of education, media exposure; employment status, place of residence and age of respondent. The reason for the inclusion of poverty status and level of education has already been provided earlier. The variable "media exposure" is employed in analysis due to the important role that media plays in educating people about HIV/AIDS and the ways of protecting oneself from infection. Employment status is included not only due to its relation to poverty but also due to the relationship between HIV knowledge and employment status. With the mainstreaming of

[13] for an explanation on how missing cases were handled, see section "Missing cases"

HIV/AIDS into employment sectors, those who are employed are likely to have a high advantage of knowing about HIV/AIDS than those who are unemployed. Studies have shown that knowledge of HIV/AIDS varies with age and according to place of residence, hence the inclusion of the variables "place of residence" and "Age".

Poverty and Sexual Behaviour

This section focuses on the influence of economic status on the "adoption" of safer sexual behavioural practices. To date, condoms are the most effective means of avoiding HIV infection, in the absence of abstinence. While the number of sexual partners is an important risk factor for HIV infection, I argue that even when the number of sex partners is high, the risk is significantly reduced with consistent condom use. Moreover the inclusion of the variable "men had sex with in the past 12 months" would not yield valuable results as the majority of respondents (72%) reported having had sex with one partner in the 12 months preceding the survey. Therefore emphasis will be on the effect of economic status on condom use. The variables that will be used are "condom use last sex", didn't use: low risk and "didn't use: partner disliked".

Table 11: Dependent Variables Used in Assessing the Sexual Risk of HIV Infection and Transmission

| Variable | Level of measurement | Categories | Number of cases | % |
|---|---|---|---|---|
| Condom use at last sex | Dichotomous | No | 8039 | 68.9 |
| | | Yes | 999 | 8.6 |
| | | Total | 9038 | 77.4 |
| | | Missing | 2636 | 22.6 |
| No condom: low risk | Dichotomous | No | 7396 | 63.4 |
| | | Yes | 569 | 4.9 |
| | | Total | 7965 | 68.2 |
| | | Missing | 3709 | 31.8 |
| No condom: partner dislike | Dichotomous | No | 5511 | 47.2 |
| | | Yes | 2454 | 21.0 |
| | | Total | 7965 | 68.2 |
| | | Missing | 3709 | 31.8 |

Independent variables used in establishing the link between poverty and risky sexual behaviour: Poverty status; Level of education; Employment status; Marital Status; Extent of household hunger; Husband provided money; Age and Place or residence.

## Missing values

Missing values can result from non-response, an invalid response, a "don't know or no opinion response" or failure of the person collecting data to record the response and are therefore an unavoidable reality in research. In instances where the question is a filter question those who that question does not apply to, are bound to be missing. Missing values are a major concern in data analysis and the dilemma is whether or not they should be included in analysis.

Either decision is fraught with problems. As de Vaus (2002:64) warns, the inclusion of missing cases confuses real responses with non responses; can distort results; can inflate or deflate summary statistics or scale scores and can also destroy the ordinal and interval character of any variable. Excluding missing cases, on the other hand, can introduce bias into the sample and if a large proportion of cases are excluded due to missing values, the sample size can be reduced to unacceptable levels that may affect the precision of any sample-based statistics(de Vaus, 2002: 66)". Furthermore while the number of missing cases per variable may be low and therefore seem unimportant, the cumulative effect of missing cases across variables may result in all cases being excluded from analysis in the event that multivariate analysis is carried out.

Most statistical textbooks advise that one ascertain that missing cases are randomly distributed prior to deciding on what to do with the missing cases. This is because failure to ascertain randomness will results in biased statistical results as a result of the effect of the missing cases.

There are several recommended ways of dealing with missing cases, the default being to delete subjects with missing data. The disadvantages of deleting cases have already been mentioned.

Another option is to delete cases where the missing values occur in the dependent variable of a statistical analysis (Hair et al, 1995 cited in Newton and Rudestam, 1999:158-9). The last option is to replace missing values by means of imputation. In this study missing cases were excluded from analysis. This was done by assigning them a code, then declaring them missing to ensure their exclusion from data analysis. While this might have affected data reliability, opting to impute would have also introduced bias to the study. I therefore argue that it is best to exclude the missing cases from analysis than to exaggerate the correlation between poverty and HIV/AIDS that might result if missing cases are replaced through data imputation

## Data Analysis Procedures

Crosstabulations were used for the first part to present respondents' background characteristics. Thereafter binary logistic regression was used for the first part of data analysis (poverty and HIV knowledge) as well as in the second part (poverty and sexual behavioural practices). Employing binary logistic regression analysis in the second part owes to the fact that all the dependent variables in this data analysis section (HIV knowledge, condom use last sex, didn't use: low risk, didn't use: partner dislike) are dichotomous variables.

6

# Research Findings

It is very important that the respondents' background characteristics be provided before carrying on with serious analysis so as to allow the reader to identify group dynamics. These are given in Table 12 (below)

Table 12: Percent Distribution of Respondents' Selected Background Characteristics by Place of Residence, 1998

| | Urban (%) | Non-urban (%) |
|---|---|---|
| *Age group** | | |
| 15-19 | 18 | 23 |
| 20-24 | 17 | 19 |
| 24-29 | 15 | 15 |
| 30-34 | 15 | 12 |
| 35-39 | 15 | 13 |
| 40-44 | 11 | 10 |
| 45-49 | 9 | 8 |
| *Race group*** | | |
| Black | 66 | 91 |
| Coloured | 18 | 7 |
| White | 10 | 2 |
| Indian | 6 | 0.2 |
| *Marital status**** | | |
| Never married | 50 | 49 |
| Married | 34 | 34 |
| Living together | 7 | 10 |
| Widowed | 2 | 3 |
| Divorced | 3 | 1 |
| Living alone | 4 | 3 |
| *Highest education***** | | |
| None | 4 | 11 |
| Primary | 20 | 34 |
| Incomplete secondary | 46 | 42 |
| Higher | 30 | 13 |
| *Employment status****** | | |
| Working | 38 | 22 |
| Not working | 62 | 78 |
| Total | 100 | 100 |

* ($\chi2=84.408$, $p<0.001$); **($\chi2=1086.497$, $p<0.001$); ***( $\chi2=76.279$, $p<0.001$); ****( $\chi2=717.763$,$p<0.001$)*****( $\chi2=365.307$,$p<0.001$). Since all p-values are less than 0.001, the observed differences are statistically significant.

When firstly looking at the results of Table 12 according to age group, there seems to be no major urban-rural differentials of respondents according to their respective age

groups (that is, almost the same amount of people belonging to each age group are found in either place of residence). However major differentials occur when breaking down the results according to racial group whereby the highest percentage of those residing in non-urban areas (90%) are Black compared less than 10% of Coloureds, 7% Whites and less than a percent of Indians. Even in urban areas, Blacks are the majority population (66%), followed by Coloureds (less than 20 %, then Whites and lastly by Indians. These results are quite expected considering the fact that almost 80% of the survey respondents were Black as compared to 13% Coloureds, 7% Whites and only 3% Indians.

As with age group, there seems to be no major differentials in marital status between urban and non-urban dwellers. Half of respondents in both urban and non-urban areas had never been married ,35% had been married, fewer than 10% were cohabiting and a further 10% or less were either divorced, living alone or separated. As was expected, there is variation in the highest level of education by place of residence. The highest majority of those with no education were concentrated in the non-urban areas (11%) as compared to only 4% in the urban areas. Furthermore while the percentage of those with incomplete secondary education is almost similar between urban and non-urban areas, only a few (13%) of those residing in non-urban areas had attained a higher education as compared to 30% of urban dwellers. With these observed differentials in educational attainment between urban and non-urban dwellers, it is not surprising that only 22% of non-urban dwellers were employed at the time of the survey as compared to almost 40% of urban dwellers. Having provided respondents background characteristics, it seems logical to now provide the various economic indicators before carrying out data analysis. These are provided in Table 13, which is listed below.

Table 13: Selected Poverty Indicators by Poverty Status (%)

| | Very poor | Poor | Non-poor |
|---|---|---|---|
| *Source of drinking water** | | | |
| Piped | 62 | 79 | 88 |
| Not piped | 38 | 21 | 12 |
| *Type of toilet facility*** | | | |
| Flush toilet (own) | 39 | 62 | 79 |
| Flush toilet (shared) | 4 | 6 | 3 |
| Has electricity *** | 63 | 84 | 90 |
| *Literacy**** | | | |
| Easily | 74 | 88 | 94 |
| With difficulty | 14 | 8 | 5 |
| Not at all | 12 | 4 | 1 |
| *Educational attainment***** | | | |
| None | 11 | 3 | 2 |
| Primary | 39 | 25 | 9 |
| Incomplete secondary | 37 | 46 | 29 |
| Higher | 13 | 26 | 60 |
| *Employment status****** | | | |
| Working | 83 | 92 | 95 |
| Not working | 17 | 8 | 5 |
| *Extent of household hunger******* | | | |
| Often | 12 | 6 | 3 |
| Sometimes | 32 | 26 | 15 |
| Seldom | 5 | 7 | 5 |
| Never | 51 | 61 | 77 |

*($\chi2$= 294.507 p<0.001); ** ($\chi2$=577.327 p<0.001) *** ($\chi2$=345.734 p<0.001) **** ($\chi2$= 264.329, p<0.001) ***** ($\chi2$= 1007.577, p<0.001) ****** ($\chi2$= p<0.001) ******* ($\chi2$= 269.144, p<0.001). Since all p-values are less than 0.001, the observed differences are statistically significant.

The availability of drinking water and proper sanitation varied across economic group. Only 62% of the very poor and 80% of the poor had access to piped water as compared to almost 90 percent (88%) of the non-poor. Availability of a flush toilet in the house was approximately 39%, 62% and 79% for the very poor, the poor and the non-poor respectively. As with access to piped water and a flush toilet, there were huge differentials in access to electricity between the different economic groups, whereby only about 63% of very poor households had electricity compared to more than 80% among the poor and the non-poor. While literacy levels were not too low for all

economic groups (more than 70%), educational attainment varied greatly. Less than 4% of the poor and non-poor had no education at all as compared more than 10% of the very poor. Moreover for the majority of the very poor and the poor, the highest level of education attained is incomplete secondary whereas the majority (60%) of the non-poor had a higher education. The figures are 37% and 46% for the very poor and the poor respectively. These low literacy and education levels can be attributed to the environments within which the majority of the poor and the very poor populations reside. High levels of education are dependent on high literacy levels which are then influenced by environmental factors. With the majority of households lacking proper sanitation, it is likely that they also cannot afford the cost of education. The lack of electricity on the other hand exacerbates the problem as it probably disables many from studying or simply reading. People may be busy assisting their families on farms or carrying out other household chores by day therefore they may not be able to spare time for learning. At night those without electricity might have to either study by candlelight or not study at all as the use of the candle for reading might be seen as a waste in scenarios with tight financial situations.

Surprisingly, the low levels of education among the very poor and the non-poor are not matched by high unemployment rates. Only 17% of the very poor and 8% of the poor were not working as compared to 5% of the non-poor. These low unemployment levels can be attributed to the fact that all types of employment (formal/informal and cash/kind) are included in this category. However despite these low unemployment rates, hunger was a common phenomenon for more than 40% of the very poor and 32% of the poor but appears to be infrequent among the non-poor (18%).

### The Poor as Determined by Monthly Income

Having provided some of the respondents' important background statistics and selected poverty indicators, it is important at this point to therefore provide the final poverty indicator before resuming analysis. In previous sections the poor were defined as those with monthly income levels between R601 and R1000, the very poor as those

earning below R600 and the non-poor as those earning from R1000 and above. This definition of the poor is adhered to in this section.

Table 14: Crosstabulation of Economic Status by Race

| | Very poor | Poor | Non-poor | Total |
|---|---|---|---|---|
| Black | (1378) | (362) | (731) | (2471) |
| | 56% | 15% | 30% | 100% |
| Coloured | (274) | (92) | (283) | (649) |
| | 42% | 14% | 44% | 100% |
| White | (87) | (47) | (334) | (468) |
| | 19% | 10% | 71% | 100% |
| Indian | (32) | (21) | (105) | (158) |
| | 20% | 13% | 67% | 100% |
| | (1771) | (522) | (1453) | (3746) |
| Total | 47% | 14% | 39% | 100% |

Note: figures in parentheses refer to the actual number of people in each category ($\chi 2 = 370.234$ $p < 0.001$) thus the observed relationships are statistically significant

Table 14 provides the distribution of poverty according to racial group. Overall there were more respondents who were very poor as opposed to the non-poor, the figures being 47% and 39% respectively. As expected, Blacks and Coloureds constitute the majority of the very poor (more than 40%) as compared to approximately 20% for Whites and Indians whereas Whites and Indians constitute the majority of the non-poor (more than 60%). These figures are somewhat consistent with those mentioned earlier.

## SECTION 2: ESTABLISHING THE LINK

This section is divided into two parts: the first part explores the relationship between economic status and knowledge of HIV/AIDS. Thus this part seeks to determine whether low economic status is associated with low knowledge of the means of avoiding HIV/AIDS. The second part examines the relationship between economic status and high HIV risk related sexual behavioural practices. This question seeks to

determine if low economic status is indeed a driving force behind risky sexual behavioural practices.

## Part I: Exploring the Influence of Economic Status on Knowledge of HIV/AIDS

Table 15 below examines the relationship between knowledge of HIV/AIDS and various socio-economic indicators. To test this relationship, poverty status was first entered into the model, followed by other variable that were thought to be likely to influence the relationship between knowledge of HIV/AIDS and economic status. These variables are educational attainment, media exposure, race and place of residence. Furthermore two models were produced: Model 1 and Model 2. In Model 1 the last category for the variables "poverty status" and "educational attainment" is the reference category whereas in model category, the first category is the reference category. This was done to allow thorough testing of the hypothesis that that was stated earlier which states that the poor are less likely have good knowledge of the means of preventing HIV infection than the non-poor thus increasing their risk of HIV infection.

Table 15: Odds of Having Good HIV Knowledge by Selected Socio-Economic Indicators

| | Model 1 | Model 2 |
|---|---|---|
| Constant | 2.307*** | .260*** |
| *Poverty* | *** | *** |
| Very poor | .685*** | |
| Poor | .680*** | |
| Non-poor | | 1.461*** |
| *Educational attainment* | *** | |
| None | .164*** | |
| Primary | .295*** | 1.792** |
| Incomplete secondary | .510*** | 3.100*** |
| Higher | | 6.079*** |
| *Media exposure* | | |
| Reads newspaper | 1.398*** | 1.398*** |
| Watches TV | | |
| Listens to radio | | |
| Has radio | | |
| Has TV | 1.249* | 1.249* |
| *Racial Group* | *** | *** |
| Coloured | .456*** | .456*** |
| Indian | | |
| White | | |
| Model chi-square | (546.368)*** | (546.368)*** |

*Significant at 10% level; ** significant at 5% level *** significant at 0.1% level

The model chi-square for the regression model testing the relationship between poverty and knowledge of HIV/AIDS is significant at a 0.1% significance level thus indicating the overall importance of the set of predictors in predicting the log odds of having good knowledge of HIV/AIDS. Overall poverty has a significant effect on the odds of having good knowledge of HIV/AIDS however it is only in Model 1(reference category =the non poor) where the effects of different components of poverty contribute to the prediction of the outcome variable. Being very poor and non-poor have the same effect on the odds of having good knowledge of HIV/AIDS serving to increase the odds by a factor of 0.68, at a 99% level of certainty, controlling for the effects of education, media exposure and racial group. Being non-poor, on the other hand, has a higher effect on the odds of having good knowledge of HIV/AIDS,

increasing the odds by a factor 1.461 as compared to the very poor, controlling for the effects of education, race and media exposure.

A comparison of the results of Model 1 and Model 2 highlights the importance of economic status further. This is illustrated by the effects of educational attainment (an indicator of economic status) on the odds of having good knowledge of HIV/AIDS. In Model 1, whereby high education is the reference category, the odds of having good knowledge of HIV/AIDS increase with the increase in the level of education albeit at a lower rate. However in Model 2, when "no education" is the reference category, the odds increase greatly. The odds of having good knowledge of HIV/AIDS are 0.164 times higher for those with no education compared to those with higher education (Model 1) whereas the odds of having good knowledge of HIV/AIDS are 6.079 times higher for those with higher education as opposed to those with no education at all (Model 2), controlling for the effects of economic status, media exposure and race. This relationship that is observed between educational attainment and having good knowledge of HIV/AIDS is linear, that is, an increase in education is associated with an improvement in the knowledge of the means of avoiding HIV infection.

Looking at the variables measuring media exposure, it can be said with 99% accuracy that reading a newspaper or magazine improves the odds of having good knowledge of HIV/AIDS by a factor of 1.398. Since the ability to read is dependent on education, it can be said that those with no or low education are less likely to have good knowledge of HIV/AIDS than their educated counterparts. Having shown earlier that the poor constitutes the majority of those with no education and with low literacy levels, these findings therefore imply that the poor are less likely to have good knowledge of HIV/AIDS prevention methods than the non-poor.

## Model Logistic Regression Equations

**Regression model equation[14]:**

$ln(\text{Odds}) = \forall + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \ldots + B_k X_k$

Where $\forall$ = model constant; $\beta$ is the parameter estimate for the independent variables and $X_k$ represent each independent variable.

**Model 1 equation:**

*ln*(Odds of having good knowledge of HIV/AIDS) = .836+ (-.379)very poor + (-.386)Poor+ (-1.805) No education + (-1.221) Primary Education + (-.673) Incomplete secondary + .355 (Reads) + .222(Has TV) + (-.786) Coloured.

**Model 2 equation:**

*ln*(Odds of having good knowledge of HIV/AIDS) = 1.348 + .379(Non poor) + .583 (Primary) + 1.131 (Incomplete secondary) + 1.805(Higher) + .335(Reads) + .222(Has TV) + (-.786) Coloured.

**Example**: What are the odds that a very poor woman with primary education and no TV, who reads newspapers or magazines, will have good knowledge of HIV/AIDS? How do these compare to the odds for a non-poor woman with similar characteristics?

**Results**:

For poor woman (Model 1): *ln*(odds of having good knowledge) = .836 +(-.379)(1) + (-1.221)(1) + .355(1) +.222(0) = -.429

Odds = $e^{(-.429)}$ =0.65.

For non-poor woman (Model 2): *ln*(odds of having good knowledge) = 1.348 +.379 (1) + .583(1) +.335(1) +.222(0) = 2.65.

Odds = $e^{(2.65)}$ =14.08.

[14] The constants used in the model equations are normal coefficients instead of odds.

Following this example it appears that even with similar levels of education and somewhat similar characteristics (lack of TV and reading of newspapers or magazines), the poor and the non poor have different likelihoods of having better knowledge of HIV/AIDS. This clearly demonstrates the association between poverty and knowledge of HIV/AIDS.

## Part II: Exploring the Influence of Economic Status on Sexual Behaviour

It was hypothesised earlier that low economic status increases the risk of HIV infection since the poor are more likely to have unsafe sexual behaviours due partly to lack of knowledge as a result of poverty as well as harsh circumstances that force them to resort to unsafe sexual practices for survival. This section aims to establish if poverty can indeed be held accountable. Table 16 represents the regression model testing the relationship between economic status and condom use using the variable "condom use during last sexual intercourse" as the dependent variable.

Table 16: Regression Model of Condom Use Last Sex by Selected Socio-Economic Indicators

| Variable | Model 1 | Model 2 |
|---|---|---|
| Constant | .002*** | *** |
| *Poverty status* | * | N.S |
| Poor | N.S | |
| Non-poor | 0.7* | |
| *Educational attainment* | *** | *** |
| Primary | 3.18* | 2.90* |
| Incomplete secondary | 5.23** | 4.28** |
| Higher | 7.85** | 6.30*** |
| | | |
| Knows condom | 6.06* | 5.79* |
| Knows someone with/has died of AIDS | 1.45** | 1.36* |
| Use condom to avoid HIV/AIDS | 1.96* | 1.99* |
| | | |
| *Marital status* | | *** |
| Never married | | 3.66*** |
| Living together | | N.S |
| Widowed | | 2.67* |
| Divorced | | 3.20*** |
| Living alone | | 2.95*** |
| **Model chi-square** | (91.859)*** | (192.116)*** |

Note: * significant at 5% level; ** significant at 1% level; ***; significant at 0.1% level

Looking firstly at the model chi-squares for both Model 1 and Model 2, it is clear that both models are significant at 0.1% level therefore implying that the sets of predictors (independent variables) in each model contribute to the prediction of the log odds of the outcome variable. In Model 1 overall poverty has a significant effect on condom use. However when looking at different components of poverty, it is only being non-poor that has a significant effect on condom use. Those who are non-poor are 0.7 times more likely to have used a condom during their last sexual encounter as compared to those who are very poor, controlling for educational attainment, knowledge of condoms and knowledge of someone who has or had died of HIV/AIDS.

As anticipated educational attainment is linearly related to condom use whereby the odds of having used a condom during the last sexual encounter increase with an increase in the level of education attained, controlling for poverty; knowledge of condoms and knowledge of a person who died of or has HIV/AIDS. The highest effect is produced by having a higher education which serves to increase the odds by a factor of 7.85 when controlling for poverty, knowledge of condoms and of someone who had died of AIDS, and by a factor of 6.30 when marital status is included in the model. The reduction of the odds with the inclusion of marital status indicate the importance of social factors in sexual behavioural practices This shows that social factors take precedence over economic factors in influencing sexual behaviour such that even when an individual is not poor, they might practise unsafe sexual behaviours as a result of the social norms within which they exist. An example could be that of married people not using condoms because the use thereof is associated with infidelity.

Logistic regression equations for odds of condom use are as follows:

**Model 1 equation:**

*ln*(Odds: condom use last sex)= -.5.999 + (-.357)Non-poor + 1.158 (Primary education) + 1.655 (Incomplete secondary) + 2.061 (Higher education) + 1.801 (knows condom) + .675 (AIDS: condom use) + .372 (knows someone with/has died of AIDS)

**Model 2 equation:**

*ln*(Odds: condom use last sex) = -6.599 +1.064 (primary education) + 1.455 (incomplete secondary) + 1.841(Higher education) + 1.756 (knows condom) + .693 (AIDS: condom use) + 1.297 (never married) + .981(widowed) + 1.163 (Divorced) + 1.801 (Living alone).

Example: What are the odds of using a condom for a non-poor woman with primary education, who does not know a condom and does not know that condoms can be used to prevent HIV infection? Note: This woman knows someone who has died of HIV/AIDS.

Results: Following Model 1, the odds of not using a condom are:

*ln*(Odds: condom use) = -6.599 +1.158 (1) + 1.655(0) + 2.061 (0) +1.801 (0) + .675(0) + .372(1)

= -5.069

The odds are therefore $e^{(-5.069)}$ =0.0063. These odds are very low indicating that even if one is poor and knows someone with HIV/AIDS, the chances of them protecting themselves against HIV infection by using a condom are low if they have low levels of education and lack knowledge of the means of protecting against HIV infection.

Now let's examine the odds of condom use for a non-poor woman with higher education, who knows condoms and also knows that condoms can be used to avoid HIV infection using the same model.

Results: *ln*(Odds condom use) = -6.599 + 1.158 (0) + 1.655 (0) + 2.061(1) + 1.801(1) + .675(1) + .372(1). = -1.69. Odds = $e^{(-1.69)}$ = 0.18

Improving both the level of education and knowledge of the means of protecting against HIV infection increases the odds 28 times thus highlighting the mediating effect of education and knowledge on the adoption of safer sexual behaviour.

To examine this link more clearly and to also demonstrate the importance of social factors in determining sexual behaviour, I now look at the effect of socio-economic factors on the reasons for non-use of condoms. The two reasons that will be looked at are "non-use due to low perceived risk of HIV infection" as well as "non-use as a result of partner's dislike of condoms". The results of the regression models exploring these relationships are provided in Table 17 which is listed below. For each reason of non-use of condoms, two models are presented: Model 1 and Model 2. In Model 1, the last category for the variables "poverty status", "Educational attainment", "race" and "extent of household hunger" is the reference category whereas in Model 2 the first category is the reference category. The decision to swap categories was taken to allow for better exploration of the relationship that exists between socio-economic factors and sexual behavioural practices.

The model chi-squares for all models are significant at 0.1% level thus reflecting overall model significance. Focusing firstly on Model 1 of the regression model with "Low risk of HIV infection" as the reason for non-use during the last sexual encounter, it can be seen that overall poverty significantly contributes to the prediction of the outcome variable (didn't use: low risk) however being very poor and poor do not have a significant effect as compared to the non-poor. This changes when the category "very poor" is used as the reference category whereby being poor has a significant effect on non-use of condoms due to low perceived risk. The respective odds are .502. Based on the results of Table 14, knowledge does not appear to have a positive effect on the adoption of safer sexual behaviours. This is illustrated by the high odds of non-use of condoms due to low risk of HIV infection among those with incomplete secondary education; those who know condoms, those who know someone who has or had died of AIDS as well as those who know that one can protect themselves from HIV infection by practising safer sex (see Model 2). Respondents who had incomplete secondary education were .467 times more likely to not have used a condom due to low perceived risk of HIV infection as compared to those with no education.

Table 17: Odds of reasons for non-use of condoms by selected socio-economic indicators

| Variable | Didn't use: low risk | | Didn't use: partner dislike | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | .002*** | .001*** | .028*** | .191*** |
| *Poverty status* | ** | ** | * | * |
| Very Poor | | | 1.443** | |
| Poor | | .502** | | |
| Non-poor | | | | .693** |
| *Educational attainment* | ** | ** | * | ** |
| None | | | 1.805** | |
| Primary | | | 1.632** | |
| Incomplete | .566** | .467** | 1.390** | |
| Secondary | | | | .554** |
| Higher | | | | |
| Knows condom | 12.620** | 12.620** | 2.674** | 2.674** |
| AIDS: Safe sex | 2.196** | 2.196** | n/a | n/a |
| AIDS: condom | n/a | n/a | 1.867** | 1.867** |
| Age | 1.030** | 1.030** | | |
| Knows someone with/has died of AIDS | 1.364* | 1.364* | | n/a |
| *Race* | *** | *** | n/a | n/a |
| Black | | | | |
| Coloured | .461* | .414** | | |
| White | 7.213*** | 6.476*** | | |
| Indian | | | | |
| *Extent of household hunger* | *** | *** | *** | *** |
| Often | .246** | | 2.088** | |
| Sometimes | .347*** | | 1.912*** | |
| Seldom | .373** | | | |
| Never | | 4.057** | | .479** |
| Husband provided money | n/a | n/a | 1.561** | 1.561** |
| **Model chi-square** | (389.351)*** | (389.351)*** | (106.832)*** | (106.832)*** |

Note: * significant at 10% level; ** significant at 5% level; ***significant at 0.1% level. n/a=not applicable

The odds are much higher among those who know condoms (12.467 times) as compared to those who do not, indicating that knowledge does not always translate into positive behavioural change. Even knowing someone with or who has died of AIDS does not appear to encourage positive sexual behaviour as can be seen in the results provided in Table 17 above. Instead those who know someone with or who had

died of AIDS are more likely (1.364 times) to not have used condoms due to low perceived risk of HIV infection. These results are consistent with the findings of the 1998 SADHS which reported high knowledge of HIV/AIDS and of the means of avoiding infection which was not matched by positive behaviour. An exploration of the effect of the extent of household hunger on condom use in Model 2 hints at the stigmatization of HIV/AIDS as a disease of the poor. This is illustrated by the significant effect of the variable "never go hungry" on non-use of condoms due to low perceived risk of HIV infection. Respondents who reported never experiencing hunger were 4 times more likely to have not used a condom due to low perceived risk of HIV infection as compared to those who often experience hunger. Aside from stigmatization, this could also highlight the increased risk of HIV infection among the poor. For example the reason for the insignificance of the variables "sometimes and seldom" against those who often experience hunger could be that respondents in all these categories did not report low risk as they know that their poor circumstances often force them into behaviours that carry a high risk of HIV infection. Such behaviours would be non-use of condoms in exchange for food.

The regression model for non-use of condoms due to partner's dislike also highlights the complex nature of the relationship between economic status and sexual behaviour. Starting with Model 1 it can be seen that the very poor are more likely (1.443 times) to not use a condom due to a partner disliking of condoms than the non-poor, when controlling for education, knowledge of condoms, knowing that condoms can be used to avoid HIV infection  extent of house hunger as well as husband's provision of money. Unlike with non-use due to low perceived risk, education has a positive effect on safer sexual behaviour. This is indicated by a decline in the odds of non-use due to partner's dislike of condoms with an increase in the level of education reached. This regression model also highlights the link between poverty and sexual behavioural practices better as can be seen by the significance of the variables "extent of household hunger and husband provided money" in the prediction of non-use as a result of partner's dislike of condoms. Women who are financially dependent on their men (that

is those whose partners provided them with money for other things except for rent, food, or bills) were 1.56 times more likely to not use condoms because their partners did not like them as compared to those women who did not receive any money from their partners.

The regression results of reasons for non-use of condoms during last sex highlight the complexity of the poverty and HIV/AIDS relation. Looking firstly at the odds ratio of having not used a condom due to low perceived risk of HIV infection, it can be seen that a low socio-economic status is associated with increased risk of HIV infection whereby the poor are 0.63 times more likely to have not used a condom as compared to the very poor. However being non-poor has no significant effect on the odds of not having used a condom during the last sexual encounter due to low perceived risk of HIV/AIDS. Furthermore an increase in the occurrence of hunger increases the risk of HIV infection as those who often and sometimes experience hunger are more likely to not use condoms if their partner disapproves as opposed to those who never experiences hunger. Although it cannot be said with certainty that these women often rely on survival sex, the relationships demonstrated by the regression results characterises such behaviour and as such it cannot be ruled out.

The regression equations for the two regression models are as follows:

For Non-Use of Condoms Due to Low Perceived Risk of HIV Infection

**Model 1 equation:**

*ln*(Odds of non-use: low risk) = -6.428 + (-.569) Incomplete secondary + (-1.401) often hungry +(-1.060)sometimes hungry + (-.986) seldom hungry ) + 2.535 (knows condom) + .030 (Age) + .786 (AIDS: safe sex) + .310 (knows someone with/has died of AIDS) + (-.774)Coloured +1.976 White.

**Model 2 regression equation:**

*ln*(Odds of non-use: low risk) = -6.428 + (-.688) Poor + (.762)incomplete secondary + 1.401 (never hungry) + 2.535 (knows condom) +.030 Age + .786 (AIDS: safe sex) +.310(knows someone with/has died of AIDS) +(-.882)Coloured + 1.868 White

Example 1: What are the odds of not using a condom due to low perceived risk of HIV infection for a 20 year old female with incomplete secondary education residing in a household that often experiences hunger, who does not know condoms and does not know that practising safe sex protects against HIV infection?

**Results**: Model 1

*ln*(odds: non-use-low risk) = -6.428 + (-.569)(1) + (-1.401)(1) +2.535(0) +.030(20) + .786(0) = -7.798. Odds =e (-7.798) =0.00041.

**Example 2**: What are the odds for a female of the same age (20 years) with the same level of education from a similar household but with knowledge of condoms and knowledge that AIDS can be avoided by practising safe sex?

**Results**: *ln*(odds of non-use of condoms: low risk) = -6.428 + (-.569)(1) + (-1.401)(1) + 2.535(1) + .030(20) + .786(1). = -4.477. Odds = e (-4.477) = 0.0114.

A comparison of the results of example 1 and example 2 yields very interesting findings whereby a 20 year old female from a household with frequent occurrences of hunger, who has incomplete secondary education but does not know condoms nor that practising safe sex prevents HIV infection is less likely to not use condoms due to low perceived risk of HIV infection than another female of the same age but with knowledge of the means of protecting against HIV infection. Could these observations be a result of having not controlled for poverty or race? When controlling for poverty (the poor) and race (white) and changing the occurrence of hunger to never, the odds become

*ln*(Odds of non-use: low risk) = -6.428 + (-.688)(1) + (.762)(1) + 1.401 (1) + 2.535 (1) +.030 (20) + .786 (1) + 1.868 (1). Odds = 0.03

When controlling for being White and poor but never experiencing hunger, the odds of not using condoms as a result of low perceived risk of HIV infection. This is however not surprising considering the widespread view of HIV/AIDS as a problem for the poor Blacks in South Africa.

<u>For non-use as a result of partner's dislike of condoms</u>

**Model 1 logistic regression equation**

*ln*(Odds of non-use: partner dislike) = -3.563 + .367(Very poor) + .591(No education) + .490 (Primary) + .329(Incomplete secondary) + .736 (Often hungry) + .648 (Sometimes hungry) + .984 (knows condom) + .624 (AIDS: condom use) + .445 (Husband provided money)

**Model 2 logistic regression model**

*ln*(Odds of non-use: partner dislike) = -1.869 + (-.367)non-poor + (-.591) Higher education + (-.736) Never hungry + .984 (Knows condom) + .624 (AIDS: condom use) + .445 (husband provided money) + .006 (Age)

Let us now look at a final example that illustrates the complex relationship between economic status and sexual behaviour.

**Example**: What are the odds that a very poor woman with no education, who comes from a household that often experiences hunger will not use a condom because their partner dislikes it even when that woman knows condoms and that they can be used to prevent HIV/AIDS? Note that the woman receives some money from her partner.

**Results**: *ln*(Odds of non-use: partner dislike) = -3.563 + .367(1) + .591(1) + .736 (1) + .984 (1) + .624 (1) + .445 (1). Odds = $e^{(0.184)}$ =1.2020

What are the odds for someone with similar characteristics but who doesn't receive any money from their partner?

*ln*(Odds of non-use: partner dislike) = -3.563 + .367(1) + .591(1) + .736 (1) + .984 (1) + .624 (1) + .445 (0).

Odds = $e^{(-0.261)}$ =0.770

Following this explain, it can be seen that low economic status encourages unsafe sexual behaviours as women with knowledge of condoms and their role in preventing HIV infection who are financially dependent on their men are more likely to not use condoms to please their partners than those who receives no money from their partners.

## SECTION 3: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

### Brief discussion of the Findings

In this section I review the findings of data analysis and relate them to the hypothesis stated earlier, in Chapter 2. These findings are discussed according to their appropriate sections.

#### Economic Status and HIV knowledge

In Chapter 2 it was hypothesised that low economic status increases the risk of HIV infection through its associated factors of low education that reduce the likelihood of having the knowledge necessary to adopt safer sexual behaviours. The results of data analysis provide support for this argument. As was hypothesised, the non-poor are more likely to have good knowledge of the means of avoiding HIV infection as opposed to the poor. The same applied to level of education whereby an increase in the level of education was associated with an increase in the likelihood of knowing the means of avoiding AIDS. These results are supported by a multitude of literature both in Africa and elsewhere (see Chapter 5). The results also indicated that even with

similar levels of education, the poor were less likely to have good knowledge of the effective means of avoiding HIV infection. The results do not, however provide reasons for this and as such further research is required to establish the factors at play.

### Economic Status and Sexual Behavioural Practices

This section aimed to provide evidence to the hypothesis stated earlier which stated that the poor were less likely to adopt safer sexual behaviours due to low levels of education and financial dependence on their partners, which reduce their sexual negotiating power. This claim was supported by the results of the data analysis which showed that the non-poor were more likely to use condoms than the very poor. As with knowledge of the effective means of avoiding HIV infection, the chances of having used a condom during last sexual intercourse improved with an increase in the level of education attained.

The relationship between economic status and sexual behavioural practices is perhaps better reflected by the association between economic status and non-use of condoms as a result of partner's dislike of condoms. Respondents who received money from their partners as well as those who came from households where hunger was a common phenomenon were more likely to not use condoms because their partner's dislike them than those who did not, that is, controlling for level of education and economic status, among other factors.

More interesting were the findings of the regression of non-use of condoms due to low perceived risk of HIV infection which indicate that knowledge does not always guarantee the adoption of safer sexual behaviours. This is indicated by the high odds of not using a condom due to low perceived risk of HIV infection among women who knew condoms (12.62) and among those who knew that practising safe sex helps to avoid HIV infection (2.96). Even more interesting about these results is their demonstration of the intricacy of the poverty and HIV/AIDS relation whereby it is not only low economic status that increases susceptibility to HIV infection but also high socio-economic status. While being poor increases susceptibility much more than being

non-poor, the stigmatization of poverty as a disease of poverty, which provides the poor with a false sense of protection from HIV infection, may hinder their adoption of safer sexual behaviours. The increased odds of non-use of condoms due to low perceived risk of HIV infection among the poor as compared to the very poor as well as among those who never experience hunger as opposed to those who come from households where hunger is frequent and even among the White population (which has few poor people) as opposed to Blacks bear evidence for this.

## Conclusion

It is undisputable that HIV/AIDS and poverty are associated. What needs to be understood is the nature of the relationship. Poverty does not cause HIV/AIDS and HIV/AIDS does not cause poverty. Instead poverty increases susceptibility to HIV infection and HIV/AIDS deepens poverty. Establishing and explaining this complex relationship formed the main objective of this study. To accomplish this objective two hypotheses were set: hypothesis 1, the hypothesis of increased susceptibility to HIV, which states that the poor are more susceptible to HIV infection than the non-poor due firstly to low education levels which reduce the chances of knowing the effective means of avoiding HIV infection and secondly through lack of or low sexual negotiation power as a result of financial dependence on their partners. Hypothesis 2, which is the hypothesis of reduced mitigation power, states that the poor are less likely to mitigate the various impacts of HIV/AIDS due a variety of poverty related factors. Firstly lack of proper nutrition and unsanitary living conditions can lead to a compromised immune system, thus increasing the susceptibility of the poor to opportunistic infections. To fight off infection, HIV infected individuals require treatment and care. However for the poor, their low income levels often imply that they do not afford the cost of treatment and care. Sometimes poor families divert money from other household expenditure to afford the cost of treatment and care. This can upset household income. Continued ailment may result in loss of employment which consequently results in loss of household wealth thus deepening

household poverty. Lastly, the coping strategies adopted by the poor to fight off the impacts of HIV/AIDS such using up of savings or selling asset may increase household poverty even further.

This study has been unable to reject the two hypotheses. Firstly evidence for hypothesis 2 has been provided in Chapter 4 whereby it was shown through a review of current literature on how the vicious poverty-HIV/AIDS cycle works. From the studies reviewed as well as the case studies provided it became evident how intricately poverty and disease are linked, from stage 1(not yet infected) to the final stage (coping with the impacts of disease). During the first stage, it has been shown how insufficient knowledge increases susceptibility to infection. There is common consensus among various scholars that prevention from any disease requires prior knowledge of the risk on infection and of the ways of avoiding HIV infection. However due to their low education and literacy levels as well as low access to media, poor people often lack enough knowledge to enable them to protect themselves from HIV infection. This then causes them to unconsciously put themselves at a higher risk of HIV infection through continued practise of unsafe sexual behaviours. Furthermore a lack of knowledge becomes a problem for those who are infected but do not yet show signs of infection. Access to infection encourages good health seeking behaviour; therefore lacking knowledge might result in poor health seeking behaviour, thus resulting in infections that go undetected until very late. This then reduces survival time. Survival time is also affected by a lack of resources (treatment and care (both medication and facilities)), which is often a characteristic of poor communities. More disheartening in the poverty and HIV/AIDS cycle is the lengths that people will go to fight off the impacts of the pandemic such as deliberately acquiring the deadly disease or refusing treatment in order to be eligible for the disability grant so as to live a "happier" life.

In Chapter 6, empirical evidence supporting hypothesis 1 was provided. From the findings of this section it can be said that poverty and its associated factors, that is, low education and decreased decision making power, can indeed increase the risk of HIV infection. Low socio-economic status robs the poor of the knowledge necessary for the

prevention of infection with HIV/AIDS and also increases susceptibility to infection by making the poor more likely to practice unsafe sexual behaviour. However the stereotypes associated with high economic status such as the view of AIDS as a disease of the poor increase susceptibility to infection among the non-poor as they discourage the adoption of safer sexual behaviours. While the results contained in this study do not provide direct evidence of the role of such stereotypes, the increase in the odds of non-use of condoms due to low perceived risk among the educated and those who never experience household hunger hint at this relationship.

The evidence contained in this study has proven how inseparable poverty and disease, in this case HIV/AIDS, are. Therefore any efforts to successfully reduce HIV infection rates should take poverty into consideration just as poverty reduction programmes aiming at success should take HIV/AIDS into consideration.

## Recommendations

The continued growth of the South African AIDS epidemic is evidence of a loophole in the current strategies to prevent new infections and also of poor behavioural changes. Poverty and its related factors such as low education and financial dependence on partners are the main culprits responsible for the escalating prevalence rates. Poor people often sacrifice the future to ensure a better today. A perfect example is that mentioned earlier whereby people deliberately acquire HIV infection in the hope that they would receive an "AIDS grant" arguing that they would rather live shorter lives with some money than endure years of poverty. Therefore HIV prevention programmes that aim to successfully tackle the HIV problem in South Africa need to take this into serious consideration. However non-use of condoms among the non-poor due to low perceived risk of HIV infection implies that HIV prevention programmes are not really succeeding in removing the stigma associated with HIV/AIDS. Much needed to be done in order to avoid a catastrophe in the future.

Below are my recommendations on how further catastrophic infection rates can be avoided:

1. Revise the ABC strategy

While the promotion of abstinence might have resulted in success in the fight against HIV in Uganda, I believe that it has not had much success in South Africa. The continued growth of the country's HIV/AIDS epidemic and the declining age of sexual debut bear evidence. Even Uganda, which is regarded as a success story, recognizes the shortfalls of preaching abstinence to the extent that extreme measures are being taken to "force" people into abstinence. Abstinence is now advocated for in the church whereby the priest works on the youth's relationship with God to encourage them to abstain. The youth were made to "surrender their boyfriends and girlfriends" to the Lord. The message was that being in the presence of a significant other is bound to result in sexual arousal and should therefore be avoided. Even holding hands with a partner was believed (by the priest) to lead to sexual arousal and hence the need to "surrender the boyfriend or girlfriend" to the Lord. The priest then held a crucifix in front of the congregation and made them vow to God that they will surrender their boyfriends and abstain from sex (Special Assignment, 16 November 2004, SABC 3). The logical question to ask is "for how long will the youth "surrender their boyfriends or girlfriends"?

Several studies have demonstrated a decline in the age of sexual debut in South Africa. Moreover, this study and many others have shown that for the majority of the poor, abstinence is not much an option as prostitution is a choice. Therefore in order for the ABC of HIV prevention to work in South Africa, it needs to be adapted to South Africa's situation. I therefore suggest that instead of Abstain, Be Faithful and Condomize, the message should be Adopt a safer sexual behaviour, Be Faithful and Condomize. This new ABC will ensure that having sexual intercourse does not become a death sentence for those whom abstinence is not an option. There is a consensus among scholars that condom use and the adoption of safer sexual behaviours are the second safest option of avoiding HIV infection after abstinence. This new ABC clearly

advocates for that. Furthermore I believe that this new ABC deals with the contradiction that exists between Lovelife messages and the current ABC strategy. Lovelife advocates for open talk between parents and their children about sex while the ABC advocates for abstinence. My argument is that advocating for abstinence makes it hard if not impossible for parents and their children to talk about sex. Obviously parents would rather preach abstinence than talk about sex. Therefore my question is how are the youth supposed to discuss sex with their parents when there is a programme that encourages abstinence? While this revised ABC strategy might be met with widespread criticism, I firmly believe in its ability to make a change. Years ago it was hard to imagine parents discussing sex with their children but Lovelife has made it possible. In encouraging open sex talk, Lovelife has made parents aware that their children have sexual intercourse. Therefore the revised ABC strategy supports the Lovelife strategy by encouraging parents to not only discuss sex but to inform their children of safer sexual practices. Moreover this ABC strategy deals with other factors that increase susceptibility such as having multiple partners, which will be addressed under A, Adopt safer sexual behaviour.

2. Improve access to education

The South African government should increase their efforts at empowering women. This can be done by firstly making education freely available to all women, especially the poor and the very poor who have long been at a disadvantage. Improving access to education will not only help in the fight against HIV/AIDS but also in the fight against poverty. In terms of fighting AIDS, the results have shown that increased educational attainment is associated with better knowledge of the means of avoiding HIV infection as such susceptibility will be reduced to some extent. Furthermore education will help ensure that women do not misconstrue the messages conveyed by HIV prevention programmes. In terms of poverty alleviation, greater access to education will improve the chances to employment and can also help women formulate entrepreneur ideas that might greatly improve their poor circumstances.

3. The need for capacity building and life skills training

Education alone is not the answer. As Nattrass (2004:148) argues, to the extent that women's sexual behaviour is a product of economic circumstances, interventions at the level of individual behaviour and sexual culture are unlikely to be very successful. Thus poverty alleviation needs to be made a major component of any intervention aiming at successfully combating HIV/AIDS. Capacity building and life skills training are therefore necessary to reduce financial dependence and to provide families with the economic capacity to meet the challenges posed by HIV/AIDS. This could be done by incorporating life skills and economic programmes into existing HIV prevention programmes (Department of Social Development, 2002). Alternatively stand-alone projects could be established by the government and other major stakeholders to avoid stigmatization. These projects should not be solely aimed at HIV infected and affected factors but at the general public while still giving precedence to the very poor

4. Improve efforts at de-stigmatizing HIV/AIDS

That some of the non-poor do not use condoms due to low perceived risk of HIV infection implies that prevention efforts are yet to succeed at reducing HIV related stigma. Perhaps this owes to the fact that most messages have been aimed at the "high-risk" population groups, such as homosexuals, prostitutes and the poor. Prevention efforts need to work at reducing HIV related stigma among the poor and non-poor alike for failure to do as such might result in the breeding of a silent epidemic among the non-poor, whose impacts will not only be isolated among this population group but will affect all south Africans alike. This could be done by broadcasting more documentaries on HIV/AIDS and ensuring a balance between the population groups covered.

5. Incorporate couple counselling on sexual cultures into voluntary counselling and testing (VCT) programmes

Making couple counselling on sexual cultures an integral part of VCT can help combat HIV/AIDS in that it has the ability to encourage couples to critical assess their sexual

cultures, consequently increasing the likelihood of the occurrence of behavioural change (Nattrass, 2004). Furthermore by encouraging discussion of the sexual cultures that individuals are part of, couple counselling can equip women with the power to negotiate safer sex options with their partners.

6. Improve access to treatment

The provision of treatment has great benefits at the individual, household, community and national level. Because access to treatment helps prolong the life of the AIDS-sick individual, it reduces the risk of losing household wealth due to loss of employment as a result of incompetence due to AIDS related sickness. Furthermore access to treatment reduces the cost of care and treatment of opportunistic infections and as thus families need not divert money from other important household expenditures such as school fees to settling the cost of hospitalisation and treatment. Access to treatment can also result is increased company productivity as well as a reduction in costs associated with absenteeism, illness and death (Soul City Institute for Health and Development Communication and the Khomanani Campaign of the Department of Health, 2004).

7. Find Equilibrium between Poverty Alleviation and Addressing AIDS

HIV prevention programmes should come up with efficient and effective ways of allocating resources between poverty alleviation and combating HIV/AIDS. It was shown earlier how providing Highly Active Antiretroviral Treatment (HAART) could threaten access to the disability grant and also how poverty can lead people to deliberately acquire HIV/AIDS in order to access the grant. Therefore aiming at poverty alleviation without addressing HIV/AIDS or vice versa will only lead to no-win situation. There are two possible solutions to this problem: firstly the government could provide a small grant for those receiving HAART because while being on HAART improves the physical ability to work, it does not guarantee employment (as it is, South Africa's unemployment rates are high). The advantage of the grant is that it can reach even those people who are too ill to work. Secondly the government could

establish some low wage public works programmes, targeted at the poor. However the main disadvantage with public works programmes is that a major percentage of their resources (40-50%) are spent on administrative work rather than on wages for the poor.

8. React then Research

While government denialism in South Africa has been an important factor in the escalating AIDS epidemic so has their slow response. This slow response has in most instances been attributed to government's need for evidence prior to taking action. For example the refusal to provide ARVs until research could "prove" that they do not carry harmful side-effects. Or President Mbeki's questioning of the HIV/AIDS link. My argument is that perhaps the need for some "statististically significant" or "scientifically significant" evidence of the existence of the relationship between HIV/AIDS and a proposed intervention (ARVs) or factor (for example poverty) is as much to blame for the current scale of the epidemic as government denialism. HIV/AIDS is a life and death issue and all it takes is an observation of one's surrounding to see the destruction and devastation it leaves in its trail. Therefore I recommend that action precede research. (Or Action Based Research) This is not to say that the infected should be used as guinea pigs. Prevention or cure strategies that are often proposed, for instance the provision of ARVs, have been tried and tested elsewhere; therefore administering them prior to conducting research is not much a risk as delaying their provision while waiting for evidence.

9. The key challenge is to find effective and sustainable methods of changing unsafe sexual behaviours. This requires an intense exploration of the economic, social, cultural and political factors that influence such behaviours. Direction can be sought from existing studies as well as from public opinions on what could be done.

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## Appendix 1: List and characteristics of Studies Included.

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| **Study** | **Auvert 01** |
| Methods | Follow-up planned for 24 months. Two years of recruitment making the study four years in total. Cross-sectional study of the general population conducted in a township northwest of Carletoneville, Gauteng Province, South Africa. The study was conducted in August 1999. Index houses randomly selected from a map obtained from the local municipal office. Each index house was used as a starting point to systematically select households which were invited to participate. The method was designed to collect data on 800 men and 800 women and sampling schema designed to be self-weighting, but no details given. Informed consent obtained from participants and approval gained from local Ethics Committee. |
| Participants | All men and women aged 14-24 years who slept in the included household the night before the study team visited. 89% of occupants of selected households were located and 11.3% of eligible participants declined to participate (no numbers reported). 723 men agreed to participate. Final analysis included 559 men (77.3%) - 163 men were excluded due to reporting not to be sexually active and data was unavailable for 1 participant. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 established by Latex aggregation test. No confirmatory test of HIV status described. Assessors blinded to circumcision status. |
| Notes | This cross-sectional study is reasonably representative of the general male population, although specific details are not provided about the method of systematic sampling. Only those males self-reporting to be sexually active were analysed, introducing potential attrition bias. Performance bias may be present as circumcision status was assessed by self-report only and data of circumcision status was only reported for 77% of all men. Data is not presented according to circumcision status. Multivariate analysis did not include circumcision as a risk factor, so no adjustment for confounders was made. |
| Allocation concealment | D |
| **Study** | **Auvert 01Sa** |
| Methods | Cross-sectional study of the general population conducted in Cotonou, Benin as part of a four-city study. The study was conducted in 1997 - 1998. Cities were selected according to the following criteria: data available on pregnant women; a local research team interested in collaborating; presence of a national AIDS control programme to endorse the research; and a stable political situation. Cotonou was chosen to represent a city with a low and stable prevalence of HIV. Households were selected according to two-stage sampling: clusters were selected from lists of census enumeration areas obtained from the census office. All men and women aged 15-49 years who slept in the house the night before the visit by the study team were eligible for inclusion. If eligible participants were not at home, the study team made 2 repeat visits. Informed consent was obtained from all participants and ethics approval was obtained from the Institute of |

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| | Tropical Medicine, Antwerp, the London School of Hygiene and Tropical Medicine and The Population Council. |
| Participants | All men aged 15 - 49 years who slept in the house the night before the visit by the study team. 1080 men were eligible for inclusion and 928 agreed to interviews and bloods (86%). Final analysis included 742 men (80%) - exclusions due to men reporting not being sexually active and incomplete data. |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 established by ELISA and discrepant results were confirmed with a Western Blot. Assessors blinded to circumcision status |
| Notes | This cross-sectional study has good external validity as attempts were made to make the sample as representative as possible and participation rate was high. There is no indication of performance or detection bias. Attrition bias may be present as men self-reporting to not be sexually active were excluded after enrolment. The possibility exists that the proportions excluded were different between the circumcised and uncircumcised groups. Confounding may be present as risk factors are not reported according to circumcision status and no adjusted analysis was conducted due to the insufficient power (no uncircumcised men were HIV positive). |
| Allocation concealment | D |
| **Study** | **Auvert 01Sb** |
| Methods | Cross-sectional study of general population conducted in Kisumu, Kenya. Methods as for Auvert01Sa. Kisumu was selected to represent a city with a high prevalence of HIV. |
| Participants | As for Auvert01Sa. 1014 men were eligible and 626 agreed to interviews and bloods and were enrolled (62%). Final analysis included 502 men (80%) - exclusions due to men reporting not being sexually active and incomplete data. |
| Interventions | As for Auvert01Sa |
| Outcomes | As for Auvert01Sa |
| Notes | External validity is compromised as although attempts were made to make the sample as representative, participation rate was low. There is no indication of performance or detection bias. Attrition bias may be present as men self-reporting to not be sexually active were excluded after enrolment. The possibility exists that the proportions excluded were different between the circumcised and uncircumcised groups. An adjusted analysis was conducted to control for potential confounders. |
| Allocation concealment | D |
| **Study** | **Auvert 01Sc** |
| Methods | Cross-sectional study of general population conducted in Yaounde, Cameroon. Methods as for Auvert01Sa. Yaounde was selected to represent a city with a low and stable prevalence of HIV. |
| Participants | As for Auvert01Sa. 1282 men were eligible and 896 agreed to interviews and bloods and were enrolled (70%). Final analysis included 782 men (87.2%)- exclusions due to men reporting not being sexually active and incomplete data. |
| Interventions | As for Auvert01Sa |

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| Outcomes | As for Auvert01Sa |
| Notes | External validity is compromised as although attempts were made to make the sample as representative, participation rate was low. There is no indication of performance or detection bias. Attrition bias may be present as men self-reporting to not be sexually active were excluded after enrolment. The possibility exists that the proportions excluded were different between the circumcised and uncircumcised groups. An adjusted analysis was not conducted due to the insufficient power (only 1 uncircumcised man was HIV positive) so confounding may be present. |
| Allocation concealment | D |
| **Study** | **Auvert 01Sd** |
| Methods | Cross-sectional study of general population conducted in Ndola, Zambia. Methods as for Auvert01Sa. Ndola was selected to represent a city with a high prevalence of HIV. |
| Participants | As for Auvert01Sa. 955 men were eligible and 625 agreed to interviews and bloods and were enrolled (65%). Final analysis included 494 men (79%) - exclusions due to men reporting not being sexually active and incomplete data. |
| Interventions | As for Auvert01Sa |
| Outcomes | As for Auvert01Sa |
| Notes | External validity is compromised as although attempts were made to make the sample as representative, participation rate was low. There is no indication of performance or detection bias. Attrition bias may be present as men self-reporting to not be sexually active were excluded after enrolment. The possibility exists that the proportions excluded were different between the circumcised and uncircumcised groups. An adjusted analysis was not conducted due to the insufficient power so confounding may be present. |
| Allocation concealment | D |
| **Study** | **Barongo 92** |
| Methods | Cross-sectional study of the general population conducted in Mwanza region, Tanzania. The study was conducted between August 1990 and February 1991. Local communities were approached through the regional authorities, government leaders and party leaders in six districts. Districts comprise villages which are in turn aggregates of 10 households. Districts were subdivided into rural, urban and roadside strata. Twenty villages were then randomly selected from each stratum and within each of these, 10 households were randomly selected and individuals surveyed within these. Verbal informed consent was obtained from participants and the Tanzanian Ministry of Health and National Institute for Medical Research gave permission for the study. |
| Participants | All individuals aged 15 - 54 years living in the selected households. 5145 men and women were eligible and 4173 were enrolled (81% participation rate and rates were not associated with sex or age group). 1998 men were enrolled and analysed. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status |
| Outcomes | HIV-1 established by ELISA test and positive tests confirmed by Western Blot. Assessors blinded to circumcision status. |

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| Notes | This is a cross-sectional study of the general population living in an area of high background HIV prevalence. The random sampling should ensure a representative sample. Performance bias may be present as circumcision status was ascertained by self-report. There is no indication of detection bias. Attrition bias is unclear as data is not reported separately for men. The study adjusts for a number of risk factors to reduce confounding. Religion was not included as a potential confounder. |
| Allocation concealment | D |
| **Study** | **Barongo 94** |
| Methods | Cross-sectional study of an occupational group (urban factory workers) conducted in Mwanza, north-west Tanzania. The study was conducted between October 1991 and March 1992. Factory workers were enrolled into the study after a questionnaire to assess their willingness to participate (90% positive response rate). No reporting of formal ethics approval obtained. |
| Participants | Male urban factory workers. 1728 male and female factory workers were eligible (13% were female). Of the total eligible men (1503), 926 participated (63%). |
| Interventions | Circumcision assessed by self-report, although genital examination was conducted in those complaining of genital ulcer discharge or abdominal pain. Unclear whether assessors were blinded to HIV status |
| Outcomes | HIV-1 established by ELISA and positive tests were confirmed with a Western Blot. Assessors blinded to circumcision status |
| Notes | This study is specific to an occupational group. Only 63% of workers agreed to participate, limiting external validity. Performance bias may be present as circumcision status was ascertained by self-report, unless genital symptoms were present. There is no indication of detection or attrition bias. The study adjusts for a number of risk factors to reduce confounding, but it is unclear whether those risk factors that are not adjusted for are balanced between study groups. |
| Allocation concealment | D |
| **Study** | **Barongo 95** |
| Methods | Cross-sectional study of the general population conducted on the south-eastern shores of Lake Victoria, Magu district, Tanzania. Unclear about date of study. Thirteen villages along the lake shore were classified into four settlement types. One village representing one type of each settlement was selected for inclusion. Samples from each village were based on listings of balozi (10 household heads). In the two larger villages 14 balozi were randomly selected from the listing and in the two smaller villages, all the balozi were included. Each balozi listed all people aged 15-49 in his area and each individual was invited to participate. No details given regarding exclusions or refusals. Approval to conduct study obtained from village leaders, but no report of institutional ethics committee approval. |
| Participants | All people aged 15 - 49 years living in the specified areas listed by balozi. No details given about exclusions or refusals. 524 men analysed. |
| Interventions | Circumcision assessed by self-report. It is unclear whether assessors were blinded to HIV status. |
| Outcomes | HIV status established by an ELISA test and positive tests confirmed by another ELISA and indeterminate tests confirmed by Western Blot test. Assessors blinded to circumcision status. |

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| Notes | This is a cross-sectional study of the general population living in an area of high background HIV prevalence. Sample was selected in a representative way, but participation rate is unclear. Performance bias may be present as circumcision status was ascertained by self-report. There is no indication of detection or attrition bias. The study adjusts for a number of risk factors to reduce confounding, but the report is inconsistent in its reporting of adjusted results. The linked paper Urassa97 provides an adjusted Odds Ratio for a number of potential confounders including religion. |
| Allocation concealment | D |
| **Study** | **Bwayo 94** |
| Methods | Cross-sectional study of a high-risk occupational group conducted at Athi River Weigh Bridge, 25 km from Nairobi, Kenya. The study was conducted between June 1989 and February 1992. Truck drivers, their assistants and mechanics were asked to participate at a twice weekly research clinic located at the Weigh Bridge Police station. Informed consent was obtained from participants, but no report of institutional ethics approval. |
| Participants | Male long-distance truck drivers, assistants and mechanics. No details provided about the number of eligible men and participation rate. 970 men were enrolled and 950 analysed - exclusions due to missing data. |
| Interventions | Circumcision assessed by self-report. It is unclear whether assessors were blinded to HIV status. |
| Outcomes | HIV status established by an ELISA test and confirmed by a Western Blot test. (As the study was conducted in East Africa, we assume that HIV-1 was measured - the report does not specify the type of HIV). Assessors blinded to circumcision status. |
| Notes | The study is specific to an occupational group. Ninety-seven percent of enrolled participants included in the final analysis, but no details given about the number of men who agreed to participate, so external validity may be compromised. Performance bias may be present as circumcision status was determined by self-report. Detection bias is low. Confounding may be present as some risk factors such as religion, were unequally distributed in the study factor groups and were not adjusted for in the analysis. |
| Allocation concealment | D |
| **Study** | **Cameron 89** |
| Methods | Cohort study conducted of a high-risk population group in Nairobi, Kenya. The study was conducted between March 1986 and December 1987. All men presenting to the City Commission Special Treatment (STD Clinic) who reported sexual exposure to a specific group of sex workers in the previous month and who were HIV negative, were eligible to participate. Informed consent was obtained from participants, but no report of institutional ethics approval. |
| Participants | All men presenting to the clinic who were HIV negative. No details given regarding how many men were eligible for enrolment. Of 422 men enrolled in the baseline cross-sectional study, 370 men were HIV negative and eligible for inclusion into the cohort study. 370 men were enrolled and 293 followed-up and included in the final analysis (79.2%). |
| Interventions | Circumcision assessed by direct observation. Unclear whether assessors blinded to HIV status. |

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| Outcomes | HIV-1 status established by an ELISA test and confirmed by a Western Blot test. Assessors blinded to circumcision status. |
| Notes | This study is specific to a STD clinic. Although no details are given regarding the number of men initially asked to participate, the sample is representative of the HIV negative men identified in the baseline sample. Participation rate was high. Selection bias may be present as there is no report of the number of men who agreed to participate. There is no indication of performance or detection bias. Attrition bias is likely as the follow-up period for the cohort was a mean of 14 weeks with SD of 16 weeks; there was a unequal follow-up between the circumcised (62%) and uncircumcised group (27%). Confounding may be present as no information is provided for whether risk factors are balanced between study factor groups. |
| Allocation concealment | D |
| **Study** | **Carael 88** |
| Methods | Case-control study of high risk group conducted in Kigali, Rwanda. The study was conducted between February and June 1986. Mothers presenting with children to the Paediatric Outpatient Department clinic or to the Oral Rehydration Unit at the Centre Hospitalier de Kigali with symptoms of the mother or child suggestive of HIV were enrolled. Husbands of the women were then recruited and blood taken from both partners. If either partner was HIV positive the couple was enrolled as a case for the study. If both partners were negative, the couple was enrolled as a control. Informed consent was obtained from participants, but no institutional ethics approval is reported. |
| Participants | Cases: all HIV positive males in a partnership with a woman also HIV positive. Controls: all HIV negative males in a partnership with a woman also HIV negative. 336 couples were assessed for eligibility. In 128 couples, the male partner was HIV positive, and of these in 124 couples, both partners were HIV positive. Only those couples where both partners were HIV positive were analysed. The remaining 150 HIV negative couples were enrolled and analysed as controls. Case: control = 1:1 |
| Interventions | Circumcision assessed by self-report. Assessors were blinded to HIV status. |
| Outcomes | Unclear whether HIV-1 or HIV-2 measured, but assume HIV-1 as conducted in East Africa. HIV status established by an ELISA test and all results confirmed by a second ELISA. Assessors blinded to circumcision status. |
| Notes | This case-control study has a poorly defined study base and has limited external validity. Performance bias may be present as circumcision was self-reported. There is no indication of detection bias or attrition bias. There is a possibility that selection bias and confounding are operating as the cases and controls were drawn from a hospital base. An adjusted (discriminant) analysis was conducted in order to control for potential confounders, but circumcision was not included as a variable as it was not found to be significant in univariate analysis. |
| Allocation concealment | D |
| **Study** | **Diallo 92** |
| Methods | Cross-sectional study of a high-risk group conducted in Abidjan, Cote d'Ivoire. The study was conducted between 15 January and 4 August 1990. All new consecutive male patients presenting to one of two public STD clinics or the Outpatient Department at the University of Abidjan Department of Dermatology were eligible. No details provided regarding informed consent or institutional |

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| | ethics approval. |
| Participants | All men presenting consecutively at the described clinics. There is no reporting of how many were eligible and how many agreed to participate. 1169 men were enrolled and analysed. |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 established by an ELISA test. Positive results were confirmed by a Western Blot test and specimens positive on Western Blot were further tested by synthetic peptide-based tests. Assessors blinded to circumcision status. |
| Notes | Participants were drawn from a STD clinic. External validity may be compromised as no details are given about participation rates. There is no indication of performance or detection bias. Attrition bias is low as all enrolled participants were included in the final analysis. The study adjusts for a number of risk factors to reduce confounding, but an important confounder, religion, was not reported on. [authors provided available missing data.] |
| Allocation concealment | D |
| **Study** | **Gilks 92** |
| Methods | Cross-sectional study of a high-risk group conducted in Nairobi, Kenya. The study was conducted between November 1988 and May 1989. All patients (men and women) presenting with an acute illness to casualty at Kenyatta Hospital and referred to one of eight possible medical teams over a 6 month period were recruited. Informed consent was obtained from participants, but there is no report of institutional ethics approval. |
| Participants | Men with an acute illness admitted to the medical wards of Kenyatta Hospital. 605 men and women were eligible and 600 were enrolled. Of these, 358 were men. Final analysis included 207 men (151 men were excluded because circumcision status was only collected after first 3 months). |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 established by two ELISA tests and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | Participants were sampled from a hospital setting. Participation rates were high and the sample is reasonably representative of this high risk group. Performance bias is limited because circumcision status was determined by direct observation. There is no indication of detection or attrition bias. Risk factors were not presented according to study factor groups and no adjusted analysis was conducted. Confounding may be present. [not able to contact authors.] |
| Allocation concealment | D |
| **Study** | **Gray 00** |
| Methods | Cohort study of the general population conducted as part of RCT of STD control in Rakai district, south-western Uganda. The study commenced in November 1994 and continued until October 1998. Clusters of 4 - 7 villages were grouped into 3 blocks and then randomised within clusters to receive STD treatment of controls. All consenting permanent residents of study communities aged 15 - 59 years who were HIV negative at round one or two of the RCT were eligible for inclusion into the open cohort study. Individuals were followed-up by home visits every 10 months and the study duration was 20 months in the trial, but cohort surveillance was continued beyond 20 months. Informed consent was obtained |

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| | form participants and ethics approval was bobtained from the AIDS Research Subcommittee of the Uganda National Council for Science and Technology, the Columbia University Institutional Review Board, the Johns Hopkins University Committee on Human Research and the National Institutes of Health Office for Protection from Research Risk. |
| Participants | All consenting permanent residents of study communities aged 15 - 59 years who were HIV negative at round one or two of the RCT were eligible for inclusion into the open cohort study. Unclear how many men were assessed for eligibility, but 89.9% of both men and women assessed for eligibility agreed to participate. 5516 men were included in the final analysis. |
| Interventions | Circumcision assessed by self report. Assessors were blinded to HIV status. |
| Outcomes | HIV-1 established by an ELISA test and positive and all discordant tests were confirmed with Western Blot (10% were based on urine assay). Assessors were blinded to circumcision status. |
| Notes | This cohort study of the general population has good external validity. Performance bias may be present as circumcision was ascertained by self-report. Detection bias may be present in 10% of the results as HIV status was determined by urine assay and no details are provided as to the sensitivity and specificity of these tests compared with the blood tests. Attrition bias may be present as no details are provided for the length and adequacy of follow-up between circumcised and uncircumcised groups. An adjusted analysis attempted to control for confounders. |
| Allocation concealment | D |
| **Study** | **Greenblatt 88** |
| Methods | Cross-sectional study of a high-risk group conducted in Nairobi, Kenya. The study was conducted between May and July 1985. All men presenting consecutively with genital ulcers to the Nairobi City Council Special Treatment Clinic were eligible or enrolment. Informed consent was obtained from all participants, but there is no report of institutional ethical approval. |
| Participants | Men (born in Kenya) presenting to the described clinic with genital ulcers. No details are provided about how many men were eligible and participation rates. 115 men were enrolled and analysed. |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 established by two ELISA tests and a Western Blot test. No details given regarding confirmation of tests. Assessors blinded to circumcision status. |
| Notes | Participants were drawn from a STD clinic. The article does not report on the number of eligible men so it is unclear whether all consecutive presentations were included and external validity may be compromised. There is no indication of performance, detection or attrition bias. A range of risk factors were measured, but not reported according to circumcision status. Although an adjusted analysis was conducted, it did not assess the association between circumcision and HIV status. [authors contacted but unable to provide missing data] |
| Allocation concealment | D |
| **Study** | **Grosskurth 95** |
| Methods | Cross-sectional study of the general population conducted in Mwanza region, Tanzania. The study was conducted between November 1991 and December |

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| | 1992. Twelve communities were selected from 3 geographical strata within the region: roadside; rural; and island. In each strata, 20 clusters of three to four "balozi" (comprising 10 household heads) were selected. A random sample of seven to nine clusters was selected in each community and household heads within the sample were asked to list all adults aged 15-54 years resident in the cluster. All eligible adults were asked to attend a central site. Repeated home visits were made to encourage attendance and transport provided to reduce selection bias. This is a baseline survey of the cohort of a randomized trial of the impact of improved STD treatment on HIV incidence. Verbal informed consent was obtained from all participants, but there is no report of institutional ethics approval. |
| Participants | All adults resident in sampled clusters aged 15-54 years old. 12534 men and women were enrolled (80% of eligible individuals). Of these 5857 were men and 5849 were included in the final analysis (99%). |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status as clinical genital examination was done only on those men with a current STD and/or positive RPR test. |
| Outcomes | HIV-1 established by an ELISA test. Confirmation was done by a Western Blot "where necessary", but it is unclear for which tests. Assessors blinded to circumcision status. |
| Notes | External validity is good as attempts were made to reduce selection bias and achieve a representative sample with 80% of selected individuals participating. Performance bias may be present as circumcision status was mainly determined by self-report and by clinical examination only in those men with a current STD or positive RPR (introducing possible differential misclassification). Both detection and attrition bias are unlikely. Risk factors were not reported according to circumcision status. However, an adjusted analysis was conducted in an attempt to control for all measured risk factors. |
| Allocation concealment | D |
| **Study** | **Kelly 99** |
| Methods | Cross-sectional study of men from the general population living in the Rakai District, rural south-western Uganda. This study was the baseline survey of an open cohort study which was part of a larger randomised controlled trial for STD control for AIDS prevention [Wawer99]. The study was conducted between November 1994 and March 1996. All consenting adults living in the 56 communities selected for the RCT were eligible for enrolment into the cross-sectional study. Informed consent was obtained from participants and ethics approval was obtained from the AIDS Research Subcommittee of the Uganda National Council for Science and Technology, the Columbia University Institutional Review Board, the Johns Hopkins University Committee on Human Research and the National Institutes of Health Office for Protection from Research Risk. |
| Participants | All consenting men, 15 -59 years living in the community who were at home at the time of the study. 6994 men were enrolled and 6821 men on whom blood samples were available (97.6%) were included in the final analysis. |
| Interventions | Circumcision assessed by self-report. It is unclear whether assessors were blinded to HIV status |
| Outcomes | HIV-1 established by two ELISA tests and discordant samples confirmed by a Western Blot. Assessors blinded to circumcision status. |

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| Notes | Representativeness is good as sampling included all men in the general population, but it is not reported how many men refused to participate. Performance bias may be present as self-report was used to determine circumcision status. Both detection and attrition bias are unlikely. Risk factors were adjusted for and distribution of risk factors within study factor groups was reported in an attempt to reduce confounding. Religion and travel to other regions were unequally distributed within circumcised and uncircumcised groups and was not adjusted for, introducing important potential confounders. |
| Allocation concealment | D |
| **Study** | **Kisesa 96** |
| Methods | Cross-sectional study of the general population living in Kisesa ward, Magu district, Tanzania. The study was conducted between August 1994 and July 1995. A central study site was set up in each of the seven villages in Kisesa ward and demographic listings were used to identify eligible adults. All adults born between 1950 and 1980 and living in the villages were invited to participate. No details provided regarding informed consent or institutional ethics approval. |
| Participants | All adults living in the villages and born between 1950 and 1980. 7585 men and women were eligible and 5734 were enrolled (76%). 2678 men were enrolled and 2670 analysed - no details provided re exclusions. |
| Interventions | Circumcision assessed by self-report. It is unclear whether assessors were blinded to HIV status |
| Outcomes | HIV status (unclear whether HIV-1 and HIV-2) established by an ELISA test and positive tests confirmed by a second ELISA. All indeterminate tests subject to a Western Blot. Unclear whether assessors blinded to circumcision status as tests done on site. Some participants had only needle-prick tests and not full samples. |
| Notes | External validity is moderate as the sample was representative although the participation rate was less than 80% (76%). Performance bias may be present as circumcision status was by self-report. Detection bias is limited, although it is unclear whether all bloods were full samples or needle-prick only. There is no indication of attrition bias. Risk factors are not presented according to circumcision status. An adjusted analysis was conducted in the linked paper Urassa97 to reduce the effect of confounding. Religion was included in the model. |
| Allocation concealment | D |
| **Study** | **Lankoande 98** |
| Methods | Cross-sectional study of a high-risk occupational group in Bobo Dioulosso, south-western Burkina Faso. The study was conducted in November 1994. Truck drivers of a cotton-producing company were consecutively sampled during their annual medical check-up in November 1994. Verbal informed consent was obtained from participants, but no report of institutional ethics approval. |
| Participants | All truck drivers working for the company - sex and age were not stipulated in the report. 236 men were enrolled with no refusals. |
| Interventions | Circumcision assessed by direct observation. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 status established by ELISA test and positive and negative tests were confirmed by a second ELISA and a Western Blot. Assessors blinded to |

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| | circumcision status. |
| Notes | This cross-sectional study is specific to truck drivers in Burkina Faso. Sampling was done consecutively and there is no indication that it was not representative. A high participation rate (100%) was achieved. There is no indication of performance, detection or attrition bias. An adjusted analysis was conducted but circumcision was not included as a variable. Confounding may be present. |
| Allocation concealment | D |
| **Study** | **Lavrey 99** |
| Methods | Prospective cohort of a high risk occupational group in Mombasa, Kenya. The study was conducted between March 1993 and June 1997. Mobile clinics were held on a weekly basis at five different trucking companies for their employees. Male employees underwent pre-test counselling and testing for HIV-1 antibodies. Men who tested HIV1 sero-negative were enrolled and were asked to return for follow-up every three months. Informed consent was obtained from participants and ethics approval received from the University of Nairobi and the University of Washington. |
| Participants | All men who tested HIV-1 sero-negative at initial consultation and who returned for one follow-up visit were included in the study. Bloods were taken on 1500 men. Of these, 1233 men were HIV negative and therefore eligible. Of these, 999 returned for first follow-up visit and 992 men were enrolled (80.4%) - 7 refused to participate. Final analysis included 746 men (75%) - exclusions were due to 236 not returning for second follow-up; 6 men were partially circumcised; 1 had unknown circumcision status and 3 had no HIV tests after enrolment. |
| Interventions | Circumcision assessed by direct observation. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by ELISA test and positive tests were confirmed by a second ELISA and a Western Blot. Assessors blinded to circumcision status. |
| Notes | This study is specific to a high risk group. It is unclear what proportion of employees was screened. However, sampling was systematic and the participation rate was high, suggesting good external validity. There is no indication of performance or detection bias. Loss-to-follow-up was 25% and attrition bias may be present. There was no differential length of follow-up between circumcised and uncircumcised groups. Analysis used survival techniques to adjust for confounders. |
| Allocation concealment | D |
| **Study** | **MacDonald 01** |
| Methods | This is a case-control study of a high-risk group conducted in Nairobi, Kenya. The study was conducted between January 1993 and October 1997. This nested case-control study forms part of a prospective cohort study of men presenting to the Nairobi City Commission Special Treatment Clinic assessing vitamin A status and HIV infection. Cases and controls were identified retrospectively from the cohort, but exposure information was collected prospectively. For each case identified, 2 or 3 consecutive men who attended the clinic for follow-up and who did not sero-convert were selected as controls. No report of informed consent or institutional ethics approval. |
| Participants | Cases were all men presenting with a genital ulcer discharge (GUD), aged 18 years or over, sexually active and sero-positive for HIV-1. Controls were all men |

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| | presenting with a GUD, aged 18 years or over, sexually active and who did not sero-convert to HIV1 over time. 38 cases and 94 controls were included (case-control ratio was 1: 2.5). |
| Interventions | Circumcision assessed by direct observation. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by ELISA test and positive tests confirmed by a second ELISA. Assessors blinded to circumcision status. |
| Notes | This case-control study has a poorly defined study base (specific to a STI clinic) and external validity is therefore compromised. There is no indication of detection, performance and attrition bias. The study reports the distribution of a number of risk factors according to HIV status and an adjusted analysis was conducted in an attempt to reduce confounding. |
| Allocation concealment | D |
| **Study** | **Mbugua 95** |
| Methods | Cross-sectional study of high risk occupational group (truck drivers and their assistants) conducted at the Mariakani Weigh Bridge, 40 km from Mombasa in Kenya. Study was conducted between September 1991 and April 1992. Investigators contacted truck drivers and their assistants carrying sensitive goods awaiting police escort while they camped at the Mariakani Weigh bridge. Informed consent obtained and study received ethics approval from the Kenyan National AIDS Control Progamme and Kenyan Medical Research Institute. |
| Participants | All truck drivers and their assistants who were delayed awaiting police escort at the weigh bridge site. 1382 men were eligible, 283 were enrolled (rest refused), and 276 analysed - exclusions due to missing data. |
| Interventions | Circumcision assessed by self-report. It is unclear whether assessors were blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 status established by ELISA test and positive tests were confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | External validity is compromised as 80% of truck drivers approached refused to participate. Performance bias may be present as circumcision was determined by self-report. Detection bias may be present as bloods were kept at room temperature and different types of testing kits were used to determine HIV status. Attrition bias is low. An adjusted analysis attempted to control for measured confounders. [authors contacted, but unable to provide data due to time lapse since study] |
| Allocation concealment | D |
| **Study** | **Mehendale 96** |
| Methods | Cohort study of high risk group attending STI clinics conducted in Pune, India. The study was conducted between May 1993 and October 1995. All new patients (male and female) attending the STI clinics of a state hospital and a municipal dispensary were screened for HIV between May 1993 and October 1995. All those sero-negative who returned to collect their blood results were eligible for enrolment. Informed consent obtained from participants and received ethics approval from the Indian Council of Medical Research, the Johns Hopkins University and the National AIDS Research Institute. |
| Participants | All those male and female patients who were HIV sero-negative and who |

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| | returned to collect their blood results were eligible for enrolment. 4193 men and women were HIV negative and eligible for the cohort study. 2260 (54%) agreed to participate and final analysis of men included 991 men. |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by ELISA test and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | The study is specific to men attending STI clinics. Participation rate was low (54%), limiting external validity. There is no indication of performance or detection bias. Attrition bias may be present as loss-to-follow-up is large and no details are provided regarding this. An adjusted analysis was conducted in an attempt to control for confounding. However, an important confounder, religion, was not adjusted for and was not balanced between circumcised and uncircumcised groups. The relevance of certain risk factors in an Indian context may be different to that in an African setting. |
| Allocation concealment | D |
| **Study** | **Mehendale 96a** |
| Methods | Cross-sectional study of a high risk group attending STI clinics conducted in Pune, India. This is the baseline sample from which the cohort study described in Mehend96 was taken. The study was conducted between May 1993 and October 1995. All new patients (male and female) attending the STI clinics of a state hospital and a municipal dispensary were screened for HIV between May 1993 and October 1995. Informed consent obtained from participants and received ethics approval from the Indian Council of Medical Research, the Johns Hopkins University and the National AIDS Research Institute. |
| Participants | All male and female patients attending the two STI clinics in Pune, India. 5321 patients were screened of whom 4543 were male. Circumcision data was available for 4539 men (no details for the missing data). |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by ELISA test and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | The study is specific to men attending STI clinics. Participation rate is unclear as no details are given regarding how many men refused to be screened. There is no indication of performance or detection bias. An adjusted analysis was conducted in an attempt to control for confounding. However, an important confounder, religion, was not adjusted for and was not balanced between circumcised and uncircumcised groups. The relevance of certain risk factors in an Indian context may be different to that in an African setting. |
| Allocation concealment | D |
| **Study** | **Nasio 96** |
| Methods | Cross-sectional study of a high risk group of men (STI clinic attendees) conducted in Nairobi, Kenya. All men consecutively presenting to the Nairobi Special Treatment Clinic with genital ulcer discharge [GUD] and every 10th man presenting with urethritis were eligible for enrolment. The study took place between January and September 1993. A case-control study was also conducted simultaneously comparing patients with GUD (cases) with those with urethritis (controls). Informed consent to participate was obtained, but there is no report of |

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| | institutional ethics approval. |
| Participants | All men consecutively presenting to the Nairobi Special Treatment Clinic with genital ulcer discharge and every 10th man presenting with urethritis were eligible for enrolment. No patient refused participation. A total of 883 patients were enrolled and final analysis included 881 (no details given re the 2 missing patients). |
| Interventions | Circumcision assessed by direct observation. Assessors blinded to HIV status |
| Outcomes | HIV-1 status was determined by serology. No details provided about testing procedure. |
| Notes | This study is specific to a high risk group. However, it may not be representative as the sampling procedure only included every tenth patient with urethritis as compared with every consecutive patient with GUD. Participation rate was good as no patient refused to participate. There is no indication of performance bias, and it is not possible to comment on detection bias as no details are provided. Potential confounding variables were measured but only those results adjusted for ulcer status are reported. The authors do present weighted crude and unadjusted results to adjust for sampling only every 10th urethritis patient. [Authors contacted for information re the case-control study - willing but unable to provide data.] |
| Allocation concealment | D |
| **Study** | **Pepin 92** |
| Methods | Cross-sectional study of high risk group of men (STI attendees) conducted in Fajaro, The Gambia. Study conducted between August 1988 and June 1990. All men presenting with genital symptoms to the Outpatient Screening Nurse at the Medical Research Council in Fajaro were eligible. Informed consent obtained from participants and institutional ethics approval received from the joint Gambia government - MRC Ethical Committee. |
| Participants | All men presenting to Outpatient Screening Nurse and who were confirmed to have a sexually transmitted disease were included. Men with genital symptoms due to conditions other than STIs and HIV-1 and those with indeterminate Western Blots were excluded. 624 men were eligible and 435 were enrolled (69.7%). 303 were analysed - 132 were excluded as circumcision status was by self-report only. |
| Interventions | Circumcision assessed by direct observation. During the initial stages of the study circumcision status was determined by self-report and these results were excluded. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-2 status established by ELISA test and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | Participants were selected from an STD clinic. External validity may be compromised as participation rate was low and those with indeterminate Western Blot tests and HIV-1 were excluded. Internal validity good with minimal performance bias. However, attrition bias is great as circumcision status is only reported for those who were directly observed and this was only begun a few months into the study. No adjusted analysis was conducted and risk factors are not reported according to circumcision status. [unable to get reply from authors] |
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| **Study** | **Pison 93** |
| Methods | Case-control study of the general population conducted in Zinguichor region, south-west of Senegal. Cases and controls were recruited from participants of a larger serological survey conducted in October 1990. For each sero-positive person, three controls were selected randomly among the sero-negatives of the same sex and age in the whole area. Informed consent obtained from participants but no report of institutional ethics approval. |
| Participants | Cases were all men who were HIV-1 or HIV-2 sero-positive and aged 20 years or older. Controls were men selected randomly from the HIV negative base of same age across the whole study area. Of the 3230 persons included in the serological survey, there were 14 male cases and 37 male controls (case:control = 1:3). |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 status established by ELISA test and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | This is a retrospective case control study with a well-defined study base drawn from the general population. It is matched on age and sex. Performance bias may be present as circumcision status was self-reported. It is unclear whether blood samples (whole-blood drops were collected) were sent to a laboratory so detection bias may be present. Although adjustment for confounders was conducted, it is unclear whether the effects of circumcision were adjusted for men only in the final analysis. |
| Allocation concealment | D |
| **Study** | **Sassan 96** |
| Methods | Case-control study nested within a cohort study of a high-risk group conducted in Abidjan, Cote d'Ivoire. The study was conducted between July 1989 and February 1992. Cases were identified as HIV positive individuals from a cohort of patients with sputum smear-confirmed pulmonary Tuberculosis (TB) presenting at Abidjan ambulatory TB treatment centres. Controls were chosen from the same cohort and "partially matched on age", but no details are given. For each HIV-2 infected patient, one HIV-1 infected patient and two HIV negative patients were enrolled. Both men and women were invited to participate, but 85% were men so the case-control study was analysed using the men only. There is no reporting of informed consent or ethics approval being obtained. |
| Participants | Cases were men with sputum-positive pulmonary TB who were HIV-1 positive or HIV-2 positive or dually infected. Controls were men with sputum-positive pulmonary TB who were HIV negative. 490 cases were included in the analysis and 239 controls. Case:control ratio = 1:0.5. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status |
| Outcomes | No report of specific details about how HIV-1 and HIV-2 status were established. The article states that testing was: "according to a standardized serological algorithm." Assessors blinded to HIV status. |
| Notes | This case-control study is reported as partially matched but is unmatched. The control population is poorly defined coming from a clinic setting. As patients were tuberculosis positive, the possibility of Berkson's bias exists compromising external validity. The case:control ratio = 1:0.5 which reduces the power of the study. Performance and detection bias may be present. Differences in potential |

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| | confounding factors between groups were adjusted for in multivariate analysis, but overall the study is poorly reported, making quality assessment difficult. |
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| **Study** | **Seed 95** |
| Methods | Cross-sectional study of the general population conducted in Kigali, Rwanda. The study was conducted between March 1 and October 31, 1991. Male partners of women enrolled in a research study run by Project San Francisco were recruited by radio announcements and letters. Written informed consent was obtained from participants, but there is no report of institutional ethics approval. |
| Participants | Men whose sexual partners were already involved in Project San Francisco. 1166 men were eligible and 867 were enrolled. No details provided re exclusions. Men who had been previously circumcised because of complications from sexually transmitted infections were excluded (30 men) so final analysis included 837 men. |
| Interventions | Circumcision assessed by direct observation. Assessors were blinded to HIV status |
| Outcomes | Unclear whether HIV-1 or HIV-2, but assume HIV-1 as conducted in East Africa. HIV status established by ELISA test and positive tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | External validity is compromised as only men who were current sexual partners of women enrolled in the Project San Francisco were eligible limiting generalisability to the general population. Participation rate was high. There is no indication of performance or detection bias and attrition bias is unlikely to influence the analysis. The study adjusted for a number of risk factors, including religion, to reduce confounding |
| Allocation concealment | D |
| **Study** | **Serwadda 92** |
| Methods | Cross-sectional study of the general population conducted in Rakai District, Uganda. The study was conducted in 1989. Out of 780 local political units, 21 units were randomly selected. Each unit each comprises approximately 100 households. An index household was then randomly selected in each unit and this house and 39 contiguous houses were enrolled. An enumeration team visited each of these 840 households and made 2 repeat visits if necessary. All adults older than 13 years who were resident in the house for at least 3 months of the previous year were eligible. Informed consent was obtained from participants but there is no report of institutional ethics approval. |
| Participants | All adults older than 13 years who were resident in the house for at least 3 months of the previous year, whether present or not, were eligible. Children under 13 were excluded. 1927 men and women were eligible, 1292 agreed to participate, of which 594 were men. Final analysis included 574 men - exclusions due to missing data. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by ELISA test and all positive tests and 200 negative tests confirmed by a Western Blot. Assessors blinded to circumcision status. |
| Notes | The sampling was well-conducted and attempts were made to increase |

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| | participation. However, the participation rate was low (67%). Reporting is for both men and women so it is not clear whether non-participation was balanced between men and women. Performance bias may be present as circumcision was determined by self-report. There is no indication of detection bias. Adjusted analysis controlled for confounders but it is unclear whether other risk factors were balanced between circumcised and uncircumcised groups. [not able to contact authors] |
| Allocation concealment | D |
| **Study** | **Simonsen 88** |
| Methods | Cross-sectional study of a cohort study [Camero89] conducted in a high-risk population group in Nairobi, Kenya. The study was conducted between March and December 1986. All men presenting to the City Commission Special Treatment (STD Clinic) who had evidence of a STD and who reported that the infection section source was a sex worker from a particular area of the city, were eligible to participate. Informed consent was obtained from participants, but no report of institutional ethics approval reported. |
| Participants | No report of number of eligible men. 340 men enrolled and final analysis included 338 men (circumcision status not available for 2 men). |
| Interventions | Circumcision assessed by direct observation. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 status established by an ELISA test and confirmed by a Western Blot test. Assessors blinded to circumcision status. |
| Notes | This study is specific to men presenting to STD clinics. External validity may be compromised as there is no report of participation rates. There is no indication of performance or detection bias. A multivariate analysis was conducted to attempt to control for confounding, but results are only reported for circumcision and genital ulcer status together. Of note, it is called a case-control study in the text, but is in fact a cross-sectional study. |
| Allocation concealment | D |
| **Study** | **Telzak 93** |
| Methods | Cohort study of a high-risk group attending a STD clinic in New York, United States of America. The study was conducted between 1988 and 1991. All persons attending an inner-city STD clinic for diagnosis or treatment of an STD and who were HIV negative were asked to participate in the study. Those who agreed were followed-up when they returned to the clinic at 3 weeks and 3 months. Informed consent was obtained from participants and the study was approved by the institutional review boards of the NYC Department of Health and the Centers for Disease Control and Prevention. |
| Participants | All adults attending the STD clinic who were HIV negative were eligible. 28000 men and women were asked to consider participating. Of these, 2893 men and women agreed and were screened. 2543 men and women were HIV-negative and therefore eligible. Of these, 1669 were enrolled (65.6%) - exclusions due to refusal and not returning for results. 1325 men and women completed the study (79.3%). Of the 1325, 948 were men, but final analysis included 758 men - exclusions due to participants reporting injecting drug use and homosexual intercourse. |
| Interventions | Circumcision assessed by direct observation. Assessors were blinded to HIV |

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| | status |
| Outcomes | HIV-1 established by an ELISA test and positive and negative tests were confirmed with Western Blot. Assessors were blinded to circumcision status. |
| Notes | The sample was taken from a STD clinic, but it is unclear how representative the sample is. Participation rate was very poor, limiting external validity. There is no indication of detection or performance bias. However, attrition bias may be present as men reporting injecting drug use and/or homosexual intercourse were excluded after enrolment. The proportions excluded may be different in the circumcised and uncircumcised groups. Analysis of multiple risk factors was conducted to adjust for confounders, but distribution of risk factors within circumcised and uncircumcised groups is not reported. Other risk factors considered in the African context may not be important in an urban environment in the developed world and therefore would be inappropriate to include in this study. [not able to contact authors] |
| Allocation concealment | D |
| **Study** | **Tyndal 96** |
| Methods | Cross-sectional study of a high risk group from a clinic conducted in Nairobi, Kenya. Dates of study not reported. All men with purulent genital discharges presenting to a major referral clinic were invited to participate in the study. A 95% participation rate is reported, but no actual numbers reported. Verbal informed consent was obtained from all participants and the study was approved by the University of Nairobi Scientific and Ethical Review Committee. |
| Participants | All men with purulent genital discharges presenting to a major referral clinic were invited to participate in the study. 810 men were enrolled and analysed. |
| Interventions | Circumcision assessed by direct observation. Assessors were blinded to HIV status |
| Outcomes | HIV-1 established by an ELISA test and positive tests were confirmed with a second ELISA. Indeterminate results were resolved with a Western Blot. Assessors were blinded to circumcision status. |
| Notes | Men were selected from a clinic sample and participation was reported as high. External validity is good. There is no indication of performance or detection bias. Attrition bias is unclear as it is not reported how many who agreed to participate were included in the analysis. An adjusted analysis attempted to reduce confounding, but potentially important behavioural confounders such as religion, were not measured. |
| Allocation concealment | D |
| **Study** | **Van de Perre 87** |
| Methods | Cross-sectional study of male factory workers in Kigali, Rwanda. The study was conducted between January and February 1995. All the workers in the factory were enrolled into the study. Unclear whether informed consent or ethical approval obtained. |
| Participants | Male workers of a factory in Kigali. 302 workers were eligible, enrolled and analysed. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status. |

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| Outcomes | Unclear whether HIV-1 or HIV-2 detected. HIV status established by an ELISA test and all positive tests confirmed by a second ELISA and a Western Blot. Assessors blinded to circumcision status. |
| Notes | The study is specific to factory workers. Performance bias may be present as circumcision status was determined by self-report. No indication of detection or attrition bias. Although discriminant (multivariate) analysis was conducted to adjust for potential confounders, these results are not reported and risk factors are not reported according to study factor group so it is unclear whether these are balanced between groups. |
| Allocation concealment | D |
| **Study** | **Vaz 95** |
| Methods | Cross-sectional study of a prison population (high-risk) conducted in Maputo, Mocambique. The study was conducted between September 1990 and February 1991. A health post was established at 3 prisons and 1 jail and all prisoners (male and female) were eligible to participate. Informed consent was obtained from participants, and ethics approval was received from the National Institute of Health and the Ministry of Justice in Mocambique and the University of Washington. |
| Participants | All prison inmates incarcerated in 3 prisons and 1 jail. 2292 men and women were eligible and 1284 agreed to participate (56%). All 1284 were analysed. |
| Interventions | Circumcision assessed by self-report. Unclear whether assessors blinded to HIV status. |
| Outcomes | HIV-1 and HIV-2 established by an ELISA test and positive tests were confirmed with a second ELISA and a Western Blot. Assessors were blinded to circumcision status. |
| Notes | This cross-sectional study is specific to prisoners - a high-risk group. External validity is compromised as only 56% of male inmates agreed to participate. Performance bias may be present as circumcision status was self-reported. There is no indication of detection or attrition bias. As only 8 men were HIV positive, the study was not able to evaluate risk factors associated with HIV infection. Confounding may be present. |
| Allocation concealment | D |