Socio-Demographic Characteristics and HIV Testing in Omdurman National Voluntary Counseling and Testing (VCT) in Sudan

By

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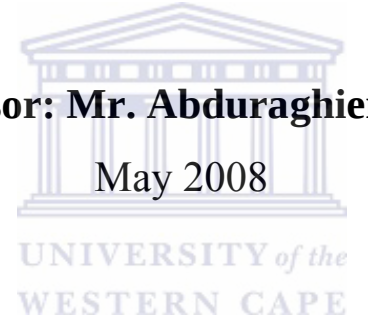

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KEYWORDS

HIV

AIDS

HIV Test Results

VCT

Demographic Characteristics

Sudan

Omdurman

Prevalence

Religion

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CDC	Centre for Disease Control and Prevention
CIA	Central Intelligence Agency
ELISA	Enzyme-Linked ImmunoSorbent Assay
HIV	Human Immunodeficiency Virus
SNAP	Sudan National AIDS Program
SNCP	Sudan National AIDS control Program
SPSS	Statistics Package for Social Science
STIs	Sexually Transmitted Infections
TB	Tuberculosis
UN	United Nations
UNAIDS	United Nations AIDS Program
VCT	Voluntary Counseling And Testing
WHO	World Health Organization

DECLARATION

I hereby declare that "**Socio-Demographic Characteristics and HIV Testing in Omdurman National Voluntary Counseling and Testing (VCT) in Sudan**" is my own work, that it has not been submitted in whole, or in part, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Signature: .....

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ABSTRACT

The identification of the association between socio-demographic characteristics and HIV was found to be a useful tool in determining the important risk factors in Sudan. In this study, the relationship(s) between HIV test results and the demographic characteristics such as gender, age, residence area, employment, education, marital status and religion in Omdurman, Sudan were investigated.

The data were collected from patients visiting Omdurman National Voluntary Counseling and Testing (VCT) Centre from April 2005 to April 2006. The study sample was represented by 320 patients. Tables were used in the data analysis to present the distribution of the participants by the result of HIV test and demographic factors; odds ratios were also obtained from these tables. The Chi-square test was used to test the association between each socio-demographic factor and the result of HIV test; the P-value obtained from this test was measured at a significance level of 0.05. Finally, the joint effect of all demographic factors on HIV test results was tested using logistic regression.

A significant association between socio-demographic characteristics and HIV test results was observed. It showed a higher incidence rate in females, middle-aged, married, employed and Christian individuals. HIV was also found to be higher in urban areas than in rural areas. The lower incident rate was observed among educated individuals.

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CHAPTER ONE

1 INTRODUCTION

1.1 Background

Acquired Immune Deficiency Syndrome (AIDS) is one of the deadly epidemics caused by Human Immunodeficiency Virus (HIV) and is one of the most important health problems currently faced by many developing countries. The disease has become the fourth largest killer in the world (after heart disease, stroke and respiratory diseases), and has become the single largest cause of death in Africa (World Health Organization (WHO), 2000).

According to Elkarim et al. (2002), the first case of HIV/AIDS in Sudan was reported in 1986 followed by two cases in 1987. By 1997, 250 new cases were reported, and the number increased to 511 in 1998. In 2000, the number of reported cases increased to 652. The United Nations (UN) joint programme on HIV/AIDS (UNAIDS, 2006) has estimated that 23,000 AIDS-related deaths occurred in 2001 in Sudan. According to the Central Intelligence Agency (CIA), in 2003 a total of 450,000 people were livings with HIV/AIDS. This number has reduced to 400,000 between 2004 and 2007 (CIA, 2007).

The prevalence of HIV/AIDS has reached epidemic proportions worldwide particularly in developing countries. According to the United Nations Programme on HIV/AIDS and WHO (2005a), the HIV/AIDS prevalence in some of the countries in the Middle East, North Africa and East African is very high, reaching up to 380.000 . For example, HIV/AIDS is a serious public health problem in Sudan where 16 out of 1,000 Sudanese are living with HIV/AIDS (UNAIDS, 2006). This makes Sudan one of the countries with the highest rate of HIV infection in North Africa and the Middle East.

Because of the serious socio-economic consequences related to HIV/AIDS, early HIV testing is very important in order to know one's status as this may have treatment implications. For example, an HIV test can help in reducing the risk and possibility of the infection transmission in a community. Nevertheless, there are challenges related to early testing in Sudan. In order to overcome problems of early diagnosis of HIV, international

health organisations have devolved vocational and testing centres to assist countries reporting test results that are reliable and accurate (Spielberg, Collins and Coates, 2000). Currently there are 48 Voluntary Counseling and Testing centres (VCT) in Khartoum state (the capital of Sudan) and 20 in other states. These VCTs are all under the Sudan National AIDS Program (SNAP).

According to Elkarim et al. (2002), there is limited information about HIV/AIDS prevalence in Sudan. The literature that has been reviewed highlights the association between socio-demographic characteristics and HIV infection and attempts to clarify the gaps that exist in Sudan between the demographic characteristics and HIV infection.

1.2 HIV/AIDS in Sudan

Sudan is a country located in north-east Africa and its capital city is Khartoum. It is the largest country in Africa. Many countries share borders with Sudan in many directions, namely in the north (Egypt), the East (Eritrea, Ethiopia), the south (Kenya, Uganda, Zaire), the west (Central African Republic, Chad) and the north-west (Libya). The Red sea lies in the north-east of the country. The languages used in the country are Arabic, local dialects, and African languages in the south. The population of Sudan in 2008 is 40 million. The total area is 2,505,800 sq. km and the population distribution is mostly rural, with 70% living in the rural areas, 25% urban and 5% nomadic (Wikipedia, 2008).

Sudan is one of the developing African countries that are facing the challenge of HIV/AIDS as a public health problem. The recent years of civil war and the limited epidemiological data make it difficult to generalize the status of HIV/AIDS in Sudan. In the last 20 years, HIV was unknown in the Sudanese society because HIV was a new disease to the world at that time. Furthermore, there were limited diagnostic equipment available in the health field whose the main concerns in Sudan were the familiar diseases such as malaria, yellow fever and poliomyelitis.

The first case of HIV/AIDS in Sudan was reported in 1986, followed by two cases reported in 1987, with a further 250 new cases reported in 1997, which increased to 511 in 1998 (Elkarim et al., 2002). In 2000, the number of reported cases increased to 652.

From 1986 to 2001, a total of 4,004 the cases were reported. Elkarim et al. (2002) and WHO (2005b), has estimated that 23,000 persons died of AIDS during the year 2001. This figures indicate that there is limited information about HIV/AIDS infection in Sudan and the data used were mostly extracted from UNAIDS and from the Sudan National AIDS control Program (SNCP). According to a United Nations report, Sudan has the highest rate of HIV infection in North Africa and the Middle East, as 16 of every 1,000 Sudanese where found to live with HIV/AIDS (United Nations, 2006).

Sudan is also home to refugees from neighbouring countries. Statistics show that the HIV/AIDS infection rate among refugees is 4% (WHO, 2005b). A 21-year civil war in Sudan left many women widowed with children and very little income rendering prostitution as a means of survival. With the mounting challenges of HIV/AIDS, the biggest problem is the stigma associated with HIV/AIDS. The culture, religion, and tradition, tend to make HIV patients feel isolated from society. In addition, condom use is still not acceptable and this increases the risk of infection for members of the public as they normally choose to have unprotected sex. The method(s) used to reduce HIV infection through discouraging pre- and extramarital sexual intercourse must support the various cultural or religious settings in Sudan (WHO, 2004).

Studies about HIV in Sudan are very limited due to social, cultural and economical issues. Lack of awareness has been observed in the Sudanese community so far as HIV testing is concerned. This is due to cultural and traditional complications. Most of the people don't get tested for the disease without realising that the test is very important in order to know one's status. Knowledge of HIV status may lead to provision of treatment to the infected individual. It may also help in reducing the risk and possibility of the infection transmission in the community (Engelbrecht, 2007).

According to Engelbrecht (2007) survey on Health in Sudan there is a lack of information about issues related to HIV/AIDS. In South Sudan 40 years of war makes it difficult to estimate the HIV/AIDS prevalence. Also the data on sexual behaviour were very limited in Sudan apart from selected research work. In order to ensure that information about HIV/AIDS is communicated to the general public, the Minister of Health in Sudan Dr.

Thabita said: “The way forward in scaling-up of HIV/AIDS strategy in the region involves developing a comprehensive response to HIV/AIDS as well as addressing the need to expand coverage geographically, to reach more people”. This strategy should also focus on increasing coverage to different population types, improving the quality and ensuring that all systems are accountable (UN, 2006).

1.2.1 Testing HIV/AIDS in Sudan

In Sudan there are 48 VCT centres in Khartoum and 20 in other states and all these centres under the Sudan National AIDS Program. One of these VCT centres is located in Omdurman city. This centre is funded by the Global Fund for AIDS, Tuberculosis (TB) and Malaria (WHO, 2005b).

Omdurman is the largest city in Sudan lying on the western banks of the river Nile, opposite the capital, Khartoum. It has a population of over 1.2 million. Omdurman is the national centre of commerce shared with Khartoum and Khartoum North. It forms the cultural and industrial heart of Sudan (WHO, 2005b).

1.2.2 Socio-demographic characteristics and HIV/AIDS in Sudan

A study conducted in 2000 estimated that 6,000 children live on the streets full-time because of many factors such as poverty, war, or abuse, following friends and/or desiring drugs. The majority of girls find employment as sex workers. Boys engage in heterosexual or homosexual activities for pleasure (Kudrati et al., 2000). According to national estimates in 2003, the prevalence of HIV infection among vulnerable groups is 1% among antenatal care attendees, 10% among tea sellers, 2% among prisoners, 1% among truck drivers, 1.3% among street children, 4.3% among sex workers and 4% among refugees (Sudan, 2005). In terms of age groups, the prevalence of HIV/AIDS in Sudan compared with other Sub-Saharan African countries was low. It was found to range between 2.6 and 6.1 in 2003 among adults (15 to 49 years). Estimation from 2005 showed that 180,000 women are living with HIV/AIDS in Sudan (Engelbrecht, 2007).

1.3 The purpose of the study

The purpose of the study is to investigate the relationship between the socio-demographic characteristics and the HIV test results. The socio-demographic characteristics under study include gender, age, residence area, employment, education, marital status and religion. The data used for the investigation were collected from one of the VCT centres in Omdurman, Sudan. The data were collected from the patients who were visiting the centre from 10th April 2005 to 10th of April 2006.

1.4 Problem statement

The association between socio-demographic characteristics and HIV test results has been poorly investigated (Elkarim et al., 2002). Due to difficulties in performing basic HIV testing, the HIV status of the Sudanese community largely remains unknown. Therefore, identifying the association between socio-demographic characteristics and HIV would be useful in determining the important risk factors in the community.

1.5 Specific objectives of the study

The objectives of the study are:

1. To investigate the relationship between HIV testing and each of the following variables: Gender, Age, Residence area, Employment, Education, Religion, and Marital status.
2. To determine the combined effect of socio-demographic characteristics on HIV testing.

1.6 Hypotheses:

1. Females have higher HIV/AIDS prevalence than males.
2. HIV/AIDS prevalence among adults aged between 15 and 49 years is higher than the prevalence of the other age groups.
3. The urban areas have a higher HIV/AIDS prevalence than the rural area.
4. The risk of HIV/AIDS is higher among the unmarried compared to the married and widow/ divorced.
5. The HIV/AIDS prevalence is higher among higher educated people.
6. The employed have higher HIV/AIDS prevalence than unemployed.
7. Muslims have a lowered HIV/AIDS prevalence than Non-Muslims.

1.7 Significance of the study

The identification of any significant relationship between HIV/AIDS and the socio-demographic characteristics will have implications on HIV/AIDS prevention strategies thereby leading to the reduction the risk of new infections. The results of this study will form a basis for developing further studies. The study can also act as a foundation for educational programs focusing on the specific targeted groups. In addition, the identification of most susceptible groups will help in the development of new treatment policies and more focussed awareness campaigns against HIV/AIDS

1.8 Outline of the study

The study is organized as follows: Chapter one introduces the study and other aspects related to the relationship between HIV and AIDS in Sudan. In addition, Chapter one provides the purpose of the study, the problem statement, objectives, hypothesis, and significance of the study. Finally, the chapter concludes with a brief summary. Chapter two presents the literature review by highlighting essential issues that need to be focused on. These include prevalence of HIV/AIDS, signs and symptoms of HIV/AIDS, management of HIV/AIDS, socio-demographic characteristics and HIV/AIDS, overview of HIV/AIDS and testing in Sudan. Chapter three discuses the methodological issues of the study such as: sampling, methods of data collection and the procedure of the study. The chapter also provides limitations of the study. Chapter four will provide a presentation and a brief description of the main results stemming from this study whereas chapter five will discuss the results and conclude with recommendations based on findings from other countries. An attempt will be made to suggest possible solutions to the problems identified in this study.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Introduction

Since the discovery of HIV/AIDS in the early 1980s, HIV/AIDS related research has received increased support from health organisations, governmental foundations and individuals. The increasing interest is due to the absence of a cure for the disease, the increasing numbers of infected people and the almost 100% mortality associated with the disease. Since the beginning of the infection in the early 1980s to 2006, more than 40 million people worldwide were infected with HIV and 13 million have progressed to AIDS (Maplanka, 2007; UNAIDS, 2006)

2.2 An overview of HIV/AIDS

HIV was discovered in 1981 by French and American scientists (WHO, 2004). The virus affects and weakens the human immune system. Infection with HIV progresses to Acquired Immune Deficiency Syndrome (AIDS). The term "syndrome" refers to the resulting collection of symptoms associated with AIDS (WHO, 2004). The condition is "acquired" from a virus, which destroys the human body's "immune" system. Thereafter, the ability of the body to fight disease is significantly lowered or made deficient (Kallings, 2008).

A study done in 1999 by the Centre for Disease Control and Prevention (CDC) concluded that HIV/AIDS has different modes of transmission. The main modes of HIV transmission are unprotected sexual contact, used needles and blood transfusion. Unprotected sexual contact has the highest prevalence in the disease occurrence. Sexual contact can occur in different forms, which are between different genders or the same gender. According to UNAIDS, about half of the HIV infections occurred during heterosexual intercourse (WHO, 2005a).

HIV/AIDS has progressed to become one of the world's most serious health problems particularly in developing countries. According to WHO (2005a), the incidence of sexually transmitted infections (STIs) including HIV/AIDS is higher in the Middle East, North Africa and East African countries. Associated with the increased incidence of STIs in these countries is the increase in HIV/AIDS prevalence. In an attempt to address problems associated with HIV/AIDS in both developed and developing countries, most of the research has focused on the prevalence of HIV/AIDS and its consequences (Detels, 2004; Bai et al., 2007). Most of the research also focused on the relationship between HIV/AIDS and socio-economic conditions, mortality rate, and quality of life of infected individuals (Sorlie et al., 1995).

Due to the absence of cure for HIV/AIDS, research has taken a different angle from standard approaches of associations with other socio-demographic factors to pursuits of protective vaccines. However, reliable HIV vaccines might still require years to develop (WHO, 2004). As a result, identification of risk factors in marginalized populations such as Sudan becomes inevitable.

2.2.1 Prevalence of HIV/AIDS

The prevalence of HIV/AIDS is high all over the world. Since the discovery of HIV/AIDS in the 1981, more than 25 million people have died from the disease and of these, 2.5 million died in 2007 (WHO, 2007). Recent estimates in 2007 showed that worldwide, 33.2 million people were living with HIV and of these 30.8 million were adults and 2.25 million were children less than 15 years. Women accounted for half of adults living with HIV/AIDS worldwide. However, Sub-Saharan Africa has the highest prevalence of HIV. For example, 76% of the number of death in 2007 occurred in Sub-Saharan Africa (WHO, 2007; WHO, 2003b).

According to WHO (2005a), the HIV/AIDS prevalence in Middle East, North Africa and East Africa countries was high in some countries. The order of those countries in 2001 was as follows: Djibouti, Algeria, Islamic republic of Iran, Libya, Sudan, Kuwait, Oman, and Qatar. The main mode of HIV transmission in Algeria, Libya, Morocco, and Somalia was found to be unprotected sexual contact. On the other hand, injected drugs abuse increased HIV transmission in Iran and Libya. In addition, about half of the HIV

infections occurred during heterosexual intercourse according to research conducted in the capital of Saudi Arabia (Jenkins and Robalino, 2003; WHO, 2005a). According to data collected by WHO and UNAIDS in 2001, about 32.9 million people were living with HIV/AIDS, and 4 million were newly infected. Of these, 83,000 people were infected with HIV/AIDS in the Middle East, North and East African countries (WHO, 2007). Figure 2.1 displays the global trend of the number of people living with HIV/AIDS between 1990 and 2007 as estimated by the UNAIDS (WHO, 2007). Figure 2.1 shows an increased incidence of infected people approximately from 7.5 million in the 1990 to 22 million in 1997, then again increasing to 33.2 million 2007.

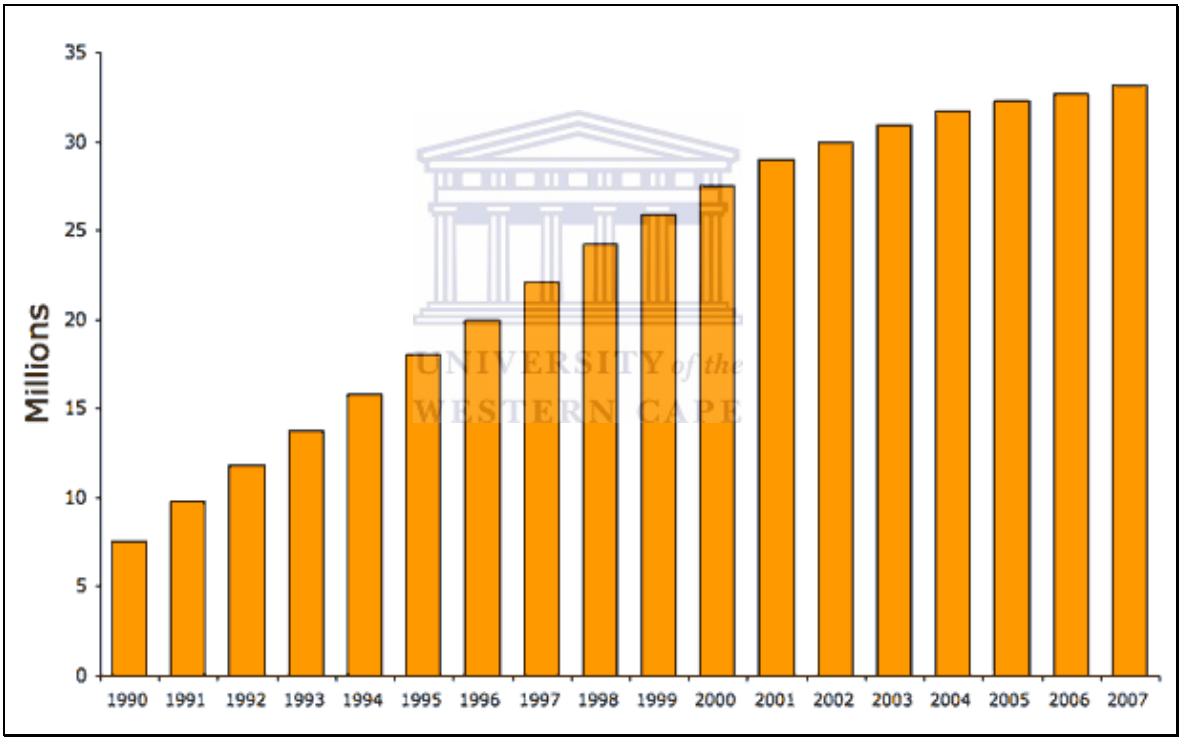

Figure 2.1: The global trend of the number of people living with HIV/AIDS from 1990 to 2007

Most of the HIV estimates may be inaccurate due to improper sampling where the sample does not represent the society. For example, most of the private clinics are excluded in many countries surveillance systems (WHO, 2003a) there by making the estimates biased. From a statistical point of view, some adjustments are required when making estimates in order to reduce the bias. This can be achieved through using the median

instead of the mean in representing the prevalence of HIV in any study (Schwartländer et al., 1999).

2.2.2 Signs and symptoms of HIV/AIDS

According to Morgan, et al. (2002), the general symptoms of HIV infection are fever, sweat, chills, weakness, weight loss, diarrhea, coughing, and shortness of breath, headache, forgetfulness, nausea, abdominal cramps, vomiting, extreme fatigue, and coma. In addition, there are other symptoms such as a thick, whitish coating of the tongue or mouth that is caused by a yeast infection. There is also an easier chance of bruising (Mayo, 2008). In the early stages of infection, the HIV infected patient usually looks healthy and may live for a long time, up to 15 years before the AIDS stage manifests itself (WHO, 2004; Ledwaba, 2003). The symptoms of HIV infection appear later after the virus destroys the immune system and AIDS develops. As result, an infected person becomes very weak and cannot fight other diseases. Therefore, any disease can develop progressively in the body in the absence of a strong immune system. For example, Tuberculosis (TB) is one of the opportunistic infections that lead to death among HIV/AIDS patients in many African countries (Dudeni, 2007).

2.2.3 Management of HIV/AIDS

This section discusses the different ways for the treatment of HIV/AIDS and also focuses on the scope of and reasons for Voluntary Counseling and HIV Testing in Sudan.

2.2.3.1 Treatment of HIV/AIDS

As discussed earlier, there is no cure for AIDS because the virus keeps changing. Therefore, treatment for HIV/AIDS is largely in the form of antiretroviral drugs which reduce the rate of progression to AIDS but cannot eliminate the virus permanently thereby making HIV/AIDS the most deadly epidemic. Five groups of antiretroviral drugs exist and each of them attacks the HIV pathogen in a different way, eventually reducing the amount of virus in the body. However, after treatment the virus is hidden in certain cells and appears to be removed from the body. That gives the patient a false belief of cure. Once the patient has started the antiretroviral medication he/she needs to take it for

all his/her life (Ledwaba, 2003; WHO, 2004). According to WHO (2006c), antiretroviral therapies have been identified as key in reducing the symptoms of AIDS and can extend the life spans of HIV-infected individuals.

2.2.3.2 Voluntary counseling and testing centre (VCT)

HIV testing has been available since 1985 whose benefits include reduction of risky sexual behaviours to prevent HIV infection and early access to clinical care. Issues related to HIV testing behaviour has been the subject of a number of research protocols. Some of these issues include HIV-related stigma and discrimination, lack of treatment and medical care among HIV infected people and little or no perceived risk of HIV infection have been identified as the main barriers to HIV testing (Kakoko et al., 2006).

After testing for HIV and receipt of possible counseling, the decision for an individual to seek health care could be affected by many factors such as personal factors (e.g., age, sex, marital status, education level), enabling factors (e.g., affordability of costs related services, location of residence, and accessibility of services), and illness level (e.g., self-rated health status or perceived susceptibility) (Sahay et al., 2007).

Although Sudan is one of the countries at risk of experiencing increased HIV prevalence, there is lack of investigation and diagnosis methods. In order to provide a better health services towards HIV/AIDS in Sudan, the Centres for Disease Control and Prevention (CDC) introduced the Voluntary Counseling and Testing Centre (VCT) (Baggaley and Oberzaucher, 2002). The objectives of the VCT centres is to assist countries by equipping them with individuals who have the knowledge and skills necessary to establish policies and to perform testing in a manner that will ensure accurate reporting of reliable results (Summers and Spielberg, 2000). In addition, the main purpose is to provide preventive health services such as screening for HIV in asymptomatic population and diagnostic HIV testing (Sahay et al., 2007).

The role of VCT centres as a convenient and cost effective tool for monitoring the HIV epidemic is well known in Sudan through the successful outcomes achieved during the last decade. The key to overall success and cost effectiveness of the VCT program is in its high coverage and good quality counseling (Sahay et al., 2007).

2.3 Socio-demographic characteristics and HIV

Socio-demographic characteristics such as age, gender, education, and location are crucial in understanding the dynamics of HIV/AIDS. Therefore, better knowledge can be achieved through studies gathering HIV-related data containing socio-demographic information. For example, the age group at highest risk of contracting HIV/AIDS is 15 to 49 years. The focus of this study is to focus on the same age groups and assess whether awareness levels are high and the associated issues pertaining to HIV/AIDS.

Ledwaba (2003) has also indicated that the HIV infection risk depends on different socio-demographic factors such as sexual behaviour transformation, cultural, traditional, and socio-economic factors. The WHO also points out that early cases of HIV in many countries were concentrated in homosexual males and intravenous drug users. As the epidemic spread, a progressive shift towards heterosexual transmission was developed. As a result the rate of females' infections increased (WHO, 2000). Hence an examination on factors associated with HIV infection is crucial in a country with limited HIV-related research such as Sudan.

2.3.1 Gender and HIV/AIDS

Worldwide, HIV/AIDS studies and investigations show that the prevalence of HIV/AIDS is more among females than males (WHO, 2008). According to WHO (2000), the death incidence due to HIV/AIDS infection are more in women than men. The WHO in 2007 estimated that worldwide there were more women than men living with HIV/AIDS and in sub-Saharan Africa, women constitute 61% of people living with HIV/AIDS. Of the 5.8 million HIV infections that occurred in 1999 in Africa, nearly half were among women who currently account for 42% of people living with HIV/AIDS (Aniekwu, 2002).

For example, the male to female ratio for HIV infection in South Africa changed dramatically from 29: l in 1985 to 2: l in 2000 (Bailey et al., 2001). According to results from the Zambia Demographic and Health Survey, the spread of HIV/AIDS among adults aged between 15 to 49 years was 17% for females and 12% for males (Leclerc and Garenne, 2007).

In 2000, there were 2.2 million women in East and South East Asia (out of the 5.3 million people worldwide) living with HIV/AIDS (WHO, 2000). Some of the reasons explaining the gender differences in infection are attributed to the biological nature and the greater quantity of fluids transferred from men to women leads to a higher percentage of the virus transferred to females. In addition, the risk of HIV infection during unprotected vaginal intercourse is two to four times higher for women than men (Peterson et al., 1993; Glynn et al., 2001).

On the other hand, factors such as cultural, social and economic pressures make women more likely to contract HIV infection than men. For example, women are often less able to negotiate for safer sex due to their lower status, economic dependence and fear of violence (WHO, 2000). High levels of education (formal schooling) and quality of life are likely to reduce the risk towards HIV/AIDS. In other words, poor and low educated societies are more flexible in accepting wrong beliefs that may compromise the ability to protect oneself from HIV/AIDS. For example, among other African societies, there is a strong belief in magic and other issues that may contribute to the increased risk of contracting HIV/AIDS. For example, young women and men in some societies who are in search of partners incorrectly believe that a man infected with HIV/AIDS will get rid of the disease by having sex with a virgin. This may contribute to higher infection rates among young women compared to young men (Glynn et al., 2001). In other societies, it is acceptable for men to have more sexual partners and is also encouraged to have sex with young women and girls.

Studies have demonstrated gender differences in the age patterns of HIV infection. The average age of infected women in Africa is typically several years lower than that for men. For example, the 1998 HIV data from UNAIDS/WHO for Namibia showed that most of the women who tested positive for HIV were in their twenties, while most of the men were in their mid-to-late thirties (WHO, 2000).

2.3.2 Age and HIV/AIDS

Studies conducted in other parts of the world such as the United States show that most of the HIV positive people are aged between 35 and 44 years (Wikipedia, 2008). In other studies (Hubely and John, 2002), it has been found that individuals aged 20-29 years have

the highest HIV prevalence. According to Central Statistic Agency of Ethiopia, the HIV/AIDS prevalence among adults aged 15 to 49 years was 2.1% whereas it was 2.8% in Eritrea and 3.3% in Chad. Central Africa Republic registered 11% (WHO, 2006a). According to an HIV study conducted by the WHO in 2006b, it was found that the prevalence of HIV/AIDS in 2004 among adults age group 15 to 49 was 6% in Sub-Saharan Africa and 0.2% in the Middle East and North Africa. Further, most of the deaths associated with AIDS occur among people aged between 15 to 49 years.

2.3.3 Marital status and HIV/AIDS

Marital status is one of the key factors associated with HIV infection. For example, a study conducted in South Africa in 2002 found that HIV prevalence among married people was 10.5% compared with 15.7% among unmarried people (Shisana et al., 2004). In the study by Shisana et al. (2004), participants were divided into three groups: single, married, and widow/divorced. The HIV prevalence among the widow/divorced was the highest as of 50% of them were HIV positive followed by those who were married at 34.9%. HIV prevalence among members of the single group was 14.4% HIV positive.

The study results on the role of marital status in South Africa are similar with those found in previous studies that have also identified the association between factors such as sexual behaviour transformation, cultural, traditional, and socio-economic factors on HIV infection (Maplanka, 2007; Ledwaba, 2003).

The findings outlined earlier on the relationship between marital status and HIV infection are different from the study by Ariyaratne (2001) who found that the percentage of HIV infected people was higher among single participants at 80.3% followed by 11% among married people with the divorced/widowed accounting for only 8.7%.

2.3.4 Education and HIV/AIDS

The role of education on HIV infection has been pronounced in many studies. It has been found that over the years the incidence of HIV/AIDS has increased among educated people (Hargreaves and Glynn, 2002). According to Walque et al. (2005), HIV prevalence in many African countries has been among higher educated people. According to Glynn et al. (2004), a total of 27 studies investigated the relationship between the

prevalence of HIV infection and education in developing countries. In their study, they conclude that there is a higher association between high educational level and prevalence of HIV infection in Africa. A study conducted in South-West Uganda based on a cohort between 1989 and 2000, investigated the association between HIV prevalence for each schooling level (Walque et al., 2005). It was found that there was a significant association between high level of education and low HIV infection in Africa.

Different results in a series of cross sectional studies have shown that there is a lower risk of HIV infection among educated people. In Uganda and Zambia, results showed negative relationships between HIV infection and high education levels especially among younger age groups (Kilian et al., 1999). Between 1987 and 2003, studies conducted in 36 different settings in 11 countries representing data on over 200,000 individuals showed a lower risk of contracting HIV/AIDS among the most educated people (News Medical Net, 2008). In another comparative study in four African cities (Glynn et al., 2004) have reported that there is an association between more educated, less risky sexual behaviour and less HIV infection for women in some areas and men in others.

2.3.5 Religion and HIV/AIDS

Because of the common constraints religions place on sexuality, the context of sexually transmitted diseases (STDs), religiosity and religious affiliation is negatively related to STDs (Seidman et al., 1992). Therefore, religions that have a limitation on sexuality may have impacts on health and disease transmission. Studies on 38 Sub-Saharan Africa countries show that Muslims have lower HIV infection rates than non Muslims (Gray, 2004; Okaalet, 2007). Exclusion against sex outside married may help in reducing HIV infection. Islam also prohibits consumption of alcohol which can be a catalyst for higher rates of sexual transmitted diseases.

It has been reported that an association exists between lack of circumcision and risk of HIV infection. It has been shown that circumcision may help account for lower HIV prevalence among Muslims (Bailey et al., 2001; Weiss et al., 2000). For all these reasons it expected that being a Muslim should be associated with low chances of being infected with HIV/AIDS. A survey containing data on HIV prevalence and religious affiliation

showed that six of seven studies indicated a negative relationship between HIV prevalence and being Muslim (Gray, 2004).

2.3.6 Employment and HIV/AIDS

HIV/AIDS is normally spread by the people who have resources and money as they pursue their leisure time with multiple sexual partners. In a study conducted by Vitry-Henry et al. (1999), the HIV prevalence among the employed persons was higher but there was no significant association between HIV and unemployment. In a study by Rabkin et al. (2004), 40% of HIV/AIDS positive participants were unemployed and 60% were employed. The prevalence among those employed full time was relatively higher in the same study. This may be due to time and resources issues. In other words, people who are employed full time may have better income and more time especially after work days to participate in risky behaviours towards HIV/AIDS. Unlike part-time workers who most of the time are working on off days to increase their little income especially if they are committed to other responsibilities like paying student tuition or supporting mothers.

Some studies show that HIV/AIDS patients increase their working hours after knowing their status. That may be due to the many socioeconomic issues such as psychological status, financial issues, and social issues. For example, the financial costs of the medication may increase the budget load of the worker who is HIV positive. Finally, the difference between employed and unemployed in HIV prevalence in most of the studies were not high.

2.3.7 Residence area and HIV/AIDS

HIV/AIDS prevalence is different in rural and urban areas. According to Sambisa and Stores (2006) Zimbabwe urban areas have a higher HIV prevalence than rural areas. That can be associated with high migration of people between rural and urban areas. These high prevalence rates occur in urban areas despite the fact that urban areas have greater awareness of HIV/AIDS. This prevalence of HIV/AIDS makes Zimbabwe as one of the most affected country by this epidemic (Feeney, 2001). The HIV/AIDS prevalence rate is 18% in urban areas while it is 12-13% in rural areas of Malawi (Kalipeni et al., 2004).

Study of HIV prevalence in a number of countries, they found that Kenya had a prevalence of 17-18% in urban area compared with 12-13% in rural area; whereas Ethiopia had an HIV prevalence of 5.5% and 0.7% in urban and rural areas respectively (Kalipeni et al., 2004).

CHAPTER THREE

3 METHODOLOGY

3.1 Research design

The research design is qualitative survey using secondary data in cross sectional study. This type of study is collected by scrutinize and study many subject in the same time or with out regard to differences in the time. This design is used to define population that was collected in Omdurman city in Sudan, which contain most of the VCT in Sudan. The data does not contain any information that may lead to identification of respondents.

3.2 Study population and research setting

The data were used in this study was secondary data that were collected from primary sources to create anew research, this type of data has an advantage it will save the time and grant large database than the one you collected on your own (Wikipedia, 2009).

The Secondary data were collected from Omdurman Voluntary Counseling and Testing Centre. All the patients who visited the centre between the 10th of April 2005 and the 10th of April 2006 were included in the study. The sample size was 320 patients. Attendance to the centre was voluntary and those who were tested for HIV were counseled. Most of the patients were referred from different hospitals, particularly from Omdurman General Hospital.

3.3 Data collection

The data used in the study was obtained from Omdurman VCT centre records. The centre provides a file for each patient which contains patient's background information. The result of the laboratory test together with socio-demographic characteristics of each patient was then recorded. These include socio-demographic characteristics such as gender (*male, female)*, age, marital status (*single, married, widowed, divorced*),

employment *(employed, unemployed)*, education (*illiterate*, *primary*, *secondary*, *university and above*) and residence (*urban, rural).* Information on HIV test indicated whether the patient tested negative or positive. Permission to use the data was obtained from the Sudan National AIDS Program (SNAP) and the Omdurman (VCT) Centre. Serial numbers were used to identify patients rather than their names.

3.4 HIV test procedures

According to Jurgens (2006) the Serologic tests are the most important studies in the evaluation for HIV disease. Recent guidelines in the United States encourage routine HIV screening in all adults in acute health care settings such as emergency departments and as part of routine physical examinations.

- An enzyme-linked immunoabsorbent assay (ELISA; high sensitivity) should be used for screening. Most ELISAs can be used to detect human immunodeficiency virus (HIV)–1 types M, N, and O and HIV-2.
- A positive ELISA result should be followed with confirmatory testing in the form of one or more Western blot assays or similar specific assay. Specific diagnostic criteria vary by test. Results are typically reported as positive, negative, or indeterminate.

Staging of HIV disease is based partially on clinical presentation, but other laboratory tests can help in deciding whether to initiate or modify treatment.

- The CD4 T-cell count is a reliable indicator of the current risk of acquiring opportunistic infections. CD4 counts vary, and serial counts are generally a better measure of any significant changes. The reference range for CD4 counts is 500-2000 cells/μL. After sero conversion, CD4 counts tend to decrease (around

700/μL on average) and continue to decline over time. For surveillance purposes, a CD4 count under 200/μL is considered AIDS-defining in the United States owing to the increased risk of opportunistic infections at this level.

- Viral load in peripheral blood is used as a surrogate marker of viral replication rate. This is a surrogate because most of the viral replication occurs in the lymph nodes rather than in the peripheral blood. The test is a quantitative amplification of the viral RNA using nucleic acid sequence-based amplification (NASBA), reverse-transcription PCR (RT-PCR), or similar technologies. Quantitative viral-load assays should not be used as a diagnostic tool because several false-positive misdiagnoses have been reported in the literature. The rate of progression to AIDS and death is related to the viral load, although, on an individual level, it is poorly predictive of the absolute rate of CD4 T-cell loss. Patients with viral loads greater than 30,000/μL are 18.5 times more likely to die of AIDS than those with undetectable viral loads.

Several government hospitals own ELISA machines and use them for screening of blood for transfusion. However, supplies of reagents are often irregular and the trend is to turn to the Rapid tests, even for Hepatitis B and C screening (Jurgens, 2006)

3.5 Data analysis

The data will be analysed, using the statistics package for social science (SPSS) software. The SPSS software can do most of the standard analyses (Karen et al., 2005).

SPSS will be use to summarised the data descriptively by means of one- and two-way frequency tables. The distribution of the participants by the result of HIV test and socio-demographic factors will be presented. After summarising the data, two methods will be used for further analysis: Chi-square test of association and logistic regression. Chi-square tests will be used to test the association between each socio-demographic factor and HIV test. The P-value obtained from this test will be measured at a significance level of 5%. For example, the P-value obtained from Chi-square when testing the association between HIV test result (negative, positive) and marital status (single, married, widowed, divorced) will be measured against 0.05. If the P-value is less than 0.05, then the null hypothesis will be rejected, so the association between the HIV test result and the marital status will be significant at the 0.05 significance level. If the P-value is greater than 0.05 then there is not enough evidence to reject the null hypothesis or the association between the HIV test result and the marital status will be non-significant at the 0.05 significance level.

Logistic regression will be used to determine the relationship between predictor variables and a dichotomously coded dependent variable. Logistic regression methods are analogous to multiple linear regression methods when the dependent measure is dichotomous (e.g., 0 and 1). In this study the dependent variable will be the HIV test results (1 for positive and 0 for negative) and the independent variables such as gender, age, residence area, employment, education and marital status. The use of logistic regression will be useful to understand the relationship between the independent variables jointly and the dependent variable.

The logistic model takes the form:

$$Logit(p_i) = Ln\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 \chi_{1,i} + ... + \beta_k \chi_{k,i}$$

where:

$i = 1,2,.....n,$

$Pi = E(Y / X_i) = \Pr(Y = 1).$

$\alpha, \beta_1, ..., \beta_k$ are the parameters

$P_i / (1 - p_i)$: The odds ratio

$x_{1i}, ..., x_{ki}$: The measures of the predictors (gender, age, marital status, education, residence and HIV test) for the participant number i .

3.6 Study limitation

There is limitation for the study the reason is that the sample size is too small to represent the entire region. In addition, the study focused only on one HIV test centre and therefore the results we will get from next chapter cannot be generalized to the whole population of Sudan. This result will determine the effect of socio-demographic characteristics on HIV testing only in Omdurman Voluntary Counseling and Testing in Sudan.

CHAPTER FOUR

4 RESULTS

This chapter presents the findings of the study. The participants in this study were volunteers who went to Omdurman VCT Centre in Sudan from the 10th of April 2005 to the 10th of April 2006. The groupings of the participants were based on their respective demographic characteristics. The frequency distributions together with the percentage in the cross-tabulation, Chi-Squire test, and logistic regression were use to show the association between the demographic variables and HIV test result.

4.1 Socio-demographic characteristics

4.1.1 Gender and age

In the study there were 197 females and 123 male representing (61.6%) and (38.4%) of the sample respectively. Majority of the participants were in the age group 15 to 49. There were 48 individuals (15%) aged less than 15 years, 261 (81.6%) individuals aged 15 to 49 years while 11 individuals (3.4%) were aged 49 years and above. The median age was 28 indicating that half of the participants were less than 28 years of age and the other half was older than 28 years.

4.1.2 Marital status and religion

Table 4.1 shows that (53%) of the 320 respondents were single followed by about (40%) of the respondents who were married and about (6%) of them were widowed and divorced. About (83%) of the sample is Muslim and (17%) Non-Muslim.

Table 4.1: Distribution of participants by marital status and religion

Characteristics		Frequency	Percent (%)
Marital Status	Single	171	53.4
	Married	129	40.3
	Widowed	13	4.1
	Divorced	7	2.2
Religion	Muslim	267	83.4
	Non-Muslim	53	16.6
Total		320	100.00

4.1.3 Educational level, employment and area of residence

Table 4.2 shows the distribution the study population by education level, employment and residence. The results show that (22%) were illiterate, (24%) had primary education and (28%) had secondary education. Individuals with university education accounted for (26%). In the employment category, the percentage of employed and unemployed was approximately equal at (52%) and (48%) respectively. About two-thirds of the study population lived in urban areas whereas the rest lived in rural areas. On HIV status, a quarter of the sample tested positive whereas three out of every four participants tested negative.

Table 4.2: Distribution of participants by education, employment and residence

Characteristics		Frequency	Percent
Education level	Illiterate	71	22.2
	Primary	76	23.8
	Secondary	90	28.1
	University	83	25.9
Employment	Employed	165	51.6
	Unemployed	155	48.4
Residence	Urban	210	65.6
	Rural	110	34.4
HIV status	Positive	80	25.0
	Negative	240	75.0

4.2 Socio-demographic characteristics by HIV status

The distribution of the participants by gender, age group and HIV status and associated Chi-square is presented in Table 4.3. The P-value obtained from these tests will be measured against significance level of 0.05. Results show that there were 38 females (19.3%) were positive compared with 42 males (34.1%) who were positive which is approximately twice the proportion of females who are positive. The P-value for gender is 0.003 which is less than 0.05 then there is no enough evidence to reject the null hypothesis. In other word there is association between the HIV test result and gender. For the age group 15 to 49 years there were 65 positive individuals which is the lowest percentage (24.9%). Individuals with a positive status and aged less than 15 years were 12 (25%) and only three individuals aged 49 years and older were positive (27.3%). The P-value obtained from Chi-square test was 0.984 for the age group. The P-value is greater than 0.05 then we accept the null hypothesis that there is no association between the HIV test result and the age group.

Table 4.3: Gender, age group and HIV status among participants in Omdurman (240 negative and 80 positive)

Characteristics		HIV Test			Chi-square value	P-value
		Negative	Positive	Total		
Gender	Male	81 (65.9%)	42 (34.1%)	123 (100%)	8.914	0.003
	Female	159 (80.7%)	38 (19.3%)	197 (100%)		
Age group	Less than 15	36 (75.0%)	12 (25.0%)	48 (100%)	0.032	0.984
	15 to 49	196 (75.1%)	65 (24.9%)	261 (100%)		
	More than 49	8 (72.7%)	3 (27.3%)	11 (100%)		

Table 4.4 shows 25 HIV positive people were single (14.6%) compared with 45 HIV positive who were married (34.9%). This percentage is almost three times that of the single people. Only 10 participants who were widowed and divorced (50%) were positive. The P-value obtained from the Chi-square test for each of the social variable was 0.000 which is less than 0.05, the critical value implying that the null hypothesis should be rejected.

Table 4.4: Distribution of HIV test results by marital status

Marital Status	**HIV Test**			**Chi-square value**	**P-value**
	Negative	**Positive**	**Total**		
Single	146 (85.4%)	25 (14.6%)	171 (100%)	23.214	0.000
Married	84 (65.1%)	45 (34.9%)	129 (100%)		
Divorced/ widowed	10 (50.0%)	10 (50.0%)	20 (100%)		

Table 4.5 shows that 54 Muslims were HIV positive representing (20%) of the Muslim sample. There were 26 Non-Muslims who were HIV positive representing (49.1%) of the Non-Muslim which is more than two times the population of Muslims who are HIV positive. The P-value is 0.000 which is less than 0.05. As such, the null hypothesise is rejected. Therefore, the results show that there is a significant association between religion and HIV test result.

Table 4.5: Distribution of HIV test results by religion

Religion	HIV Test			Chi-square value	P-value
	Negative	Positive	Total		
Muslim	213 (79.8%)	54 (20.2%)	267 (100%)	19.606	0.000
Non-Muslim	27 (50.9%)	26 (49.1%)	53 (100%)		

Table 4.6 shows that there were 30 (42.3%) illiterate HIV positive individuals. For those with university education, only 7 people were HIV positive (8.4%). The P-value obtained from Chi-square test was 0.000 and the null hypothesis is rejected. That is, there is a highly significant association between education and HIV test results.

Table 4.6: Distribution of HIV test results by education

Education	HIV Test			Chi-Square Value	P-value
	Negative	Positive	Total		
Illiterate	41 (57.7%)	30 (42.3%)	71 (100%)	24.428	0.000
Primary	59 (77.6%)	17 (22.4%)	76 (100%)		
Secondary	64 (71.1%)	26 (28.9%)	90 (100%)		
University	76 (91.6%)	7 (8.4%)	83 (100%)		

Table 4.7: Distribution of HIV test results by employment

Employment	HIV Test			Chi-square value	P-value
	Negative	Positive	Total		
Employed	119 (72.1%)	46 (27.9%)	165 (100%)	1.506	0.220
Unemployed	121 (78.1%)	34 (21.9%)	155 (100%)		

In Table 4.7 above there were 46 employed people who were HIV positive in the study (27.9%) compared with 34 unemployed people (21.9%) who were HIV positive participant. The P-value obtained from Chi-square test was 0.220 for the employment. The P-value is greater than 0.05, thus we accept the null hypothesis that there is no association between the HIV test result and the employment.

Table 4.8: Distribution of HIV test results by residence

Residence	HIV Test			Chi-square value	P-value
	Negative	Positive	Total		
Urban	164 (78.1%)	46 (21.9 %)	210 (100%)	3.122	0.077
Rural	76 (69.1%)	34 (30.9%)	110 (100%)		

The results presented in Table 4.8 shows that the P-value is grater than 0.05 thus we accept the null hypothesis so there is no significant relationship between HIV status and residence.

Table 4.9: Distribution of HIV test results by gender and marital status

Characteristics		HIV Test			Chi-square value	P-value
Gender	**Marital Status**	**Negative**	**Positive**	**Total**		
Male	Single	36 (78.3%)	10 (21.7%)	46 (100%)	0.032	0.029
	Married	39 (61.9%)	24 (38.1%)	63 (100%)		
	Widowed/Divorced	6 (42.9%)	8 (57.1%)	14 (100%)		
Female	Single	110 (88.0%)	15 (12.0%)	125 (100%)	0.003	0.003
	Married	45 (68.2%)	21 (31.8%)	66 (100%)		
	Widowed/Divorced	4 (66.7%)	2 (33.3%)	6 (100%)		

In Table 4.9 we studied the association between marital status and HIV test result for males and females separately. Results shows that only 8 males (57.1%) were widowed/divorced and positive followed by 10 males (21.7%) who were single and positive. Twenty four males (38.1%) who were married were found to be positive. A P-value of 0.029 was obtained from Chi-square test, thus we will reject the null hypothesis. So there is significant association between marital status and HIV test results for males.

Among females, two of them (33.3%) were widowed/divorced and positive followed by 15 (12%) who were single and positive and another 21 (31.8%) who were married and HIV positive. Two cells have expected count less than 5, therefore the P-value opted from Fisher's exact test is 0.003 and less than 0.05 implying that the null hypotheses is rejected. That is, there is highly significant association between marital status and HIV test results for females.

Table 4.10: Distribution of HIV test results by gender and education level

Characteristics		HIV Test			P-value
Gender	**Education level**	**Negative**	**Positive**	**Total**	
Male	Illiterate	20 (52.6%)	18 (47.4%)	46 (100%)	0.001
	Primary	32 (86.5%)	5 (13.5%)	37 (100%)	
	Secondary	15 (48.4%)	16 (51.6%)	31 (100%)	
	University+	14 (82.4%)	3 (17.6%)	17 (100%)	
Female	Illiterate	21 (63.6%)	12 (36.4%)	33 (100%)	0.001
	Primary	27 (69.2%)	12 (30.8%)	39 (100%)	
	Secondary	49 (83.1%)	10 (16.9%)	59 (100%)	
	University +	62 (93.9%)	4 (6.1%)	66 (100%)	

In Table 4.10 we studied the association between education and HIV status by gender. For males, 18 were illiterate and positive representing (47.4%) of the sample of illiterate males followed by 16 men (51.6%) with secondary education who were positive. Five men (13.5%) had primary education and positive with the rest 3 men (17.6%) being positive in the university and above category. Among females, were 12 (36.4%) who were illiterate and positive and another 12 had primary education and were and positive (30.8%). Ten (16.9%) women with secondary education were positive and finally four (6.1%) university students were positive. Associated P-values from Chi-square test were 0.001 for both males and female. Since the P-value is less than 0.05 then null hypothesis is rejected. That is, there is highly significant association between education level and

HIV test results for males and females. Even if we use a significance level of 0.01, the results are still significant.

Table 4.11: Distribution of HIV test results by gender and religion

Characteristics		**HIV Test**			**P-**
Gender	**Religion**	**Negative**	**Positive**	**Total**	**Value**
Male	Muslim	67 (69.8%)	29 (30.2%)	96 (100%)	0.082
	Non-Muslim	14 (51.9%)	13 (48.1%)	27 (100%)	
Female	Muslim	146 (85.4%)	25 (14.6%)	171 (100%)	0.000
	Non-Muslim	13 (50%)	13 (50%)	26 (100%)	

Table 4.11 shows the association between religion and HIV test results for males and female. For males, 29 (30.2%) were Muslim and positive and 13 (48.1%) were Non-Muslim and positive. Therefore the Muslim males were more likely to be infected than the Non-Muslim males. For females, 25 (14.6%) were Muslim and positive and 13 (50%) were Non-Muslims and positive. P-values obtained from Chi-square test was 0.000 for females indicating that there are significant differences in HIV status among females based on their religion.

Table 4.122: Socio-demographic characteristics and HIV status

Characteristics		Row totals	HIV Status		Chi-square value	P-value
			Negative	Positive		
Gender	Male	123 (38.4%)	81 (33.8%)	42 (52.5%)	8.914	0.003
	Female	197 (61.6%)	159 (66.3%)	38 (47.5%)		
Age Group	Less than 15 years	48 (15%)	36 (15%)	12 (15%)	0.032	0.984
	15 to 49 years	261 (81.6%)	196 (81.7%)	65 (81.3%)		
	More than 49 years	11 (3.4%)	8 (3.3%)	3 (3.8%)		
Marital Status	Single	129 (40.3%)	146 (60.8%)	25 (31.3%)	23.214	0.000
	Married	171 (53.4%)	84 (35.5%)	45 (56.3%)		
	Widow and divorced	20 (6.3%)	10 (4.2%)	10 (12.5)		
Religion	Muslim	267 (83.4%)	213 (88.8%)	54 (67.5%)	19.606	0.000
	Non-Muslim	53 (16.6%)	27 (11.3%)	26 (32.5%)		
Education level	Illiterate	71 (22.2%)	41 (17.1%)	30 (37.5%)	24.428	0.000
	Primary	76 (23.8%)	59 (24.6%)	17 (21.3%)		
	Secondary	90 (28.1%)	64 (26.7%)	26 (32.5)		
	University+	83 (25.9%)	76 (31.7%)	7 (8.8%)		
Employment	Employee	165 (51.6%)	119 (49.6%)	46 (57.5%)	1.506	0.220
	Unemployed	155 (48.4%)	121 (50.4%)	34 (42.5%)		
Residence	Urban	210 (65.6%)	164 (68.3%)	46 (57.5%)	3.122	0.077
	Rural	110 (34.4)	76 (31.7%)	34 (42.5%)		

Table 4.12 presents the association between different variables with HIV status and the results show that gender, marital status, religion and education level are significantly related with HIV status.

4.3 Logistic regression results

Logistic regression is used to determine the relationship between the predictors (gender, age, residence, employment, education level, religion and marital status) and the response variable (HIV test result). The response variable takes value 1 for positive HIV test result and 0 for negative HIV test result**.** The use of logistic regression is useful to understand the relation between the predictors jointly and the response variable. The results of the logistic regression analysis are presented in term of the odds ratio in Table 4.13. The odds ratio of each category in the each variable in the model compared with the reference category in the same variable is calculated and the P-value is attached.

Table 4.13: Logistic regression results of HIV status on socio-demographic status

Variable	**Reference Category**	**Compared Categories**	**Odds Ratios**	**P-Value**
Gender	Male	Female	0.827	0.604
Age (years)	Less than 15	15 to 49	1.052	0.910
		More than 49	0.685	0.656
Marital status	Single	Married	2.709	0.003
		Widowed/Divorced	6.489	0.001
Education level	Illiterate	Primary	0.403	0.024
		Secondary	0.546	0.125
		University+	0.185	0.001
Religion	Muslim	Non-Muslim	3.241	0.001
Employment	Employed	Unemployed	0.933	0.850
Residence	Urban	Rural	0.332	0.017

Table 4.13 shows that the gender and age have no significant effect on HIV status. For marital status the odds that widowed and divorced will be positive (6.489) which are six

times the odds that single test result will be positive. In other words the widowed and divorced were six times more likely to be HIV positive than single. The odds that married people will be positive are 2.709 times the odds that single test result will be positive. That means they were two times more likely to be HIV positive than single.

A significance result for education is observed for university educated people with odds ratio of 0.185 whereas for primary it is 0.403. In other words, primary and university educated people are less likely to be positive compared with the illiterate. Non-Muslims have three times (3.242) odds of being infected than Muslims whereas those living in the rural areas are less likely to be infected than those living in urban areas (odds ratio = 0.332).

CHAPTER FIVE

5 DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter discusses the important findings of the study and the relationship between demographic characteristics and HIV test. An attempt will also be made to link the findings to other previous studies in Sudan and elsewhere.

5.2 Demographic characteristics

Among the 320 participants who completed the forms at VCT centre, there were 197 females and 123 males. The participation rates are higher among the females than males and these findings are consistent with findings from a study in Sudan by Elkarim et al. (2002) who found that 31.9% percentages of males and 67.9% of females participated in a similar study. The same report stated that the participation rate among female refugees was high at 94.3% compared to 5.5% of males. This implies that females in Sudan are more able to participate in HIV tests than males.

5.3 Association between socio-demographic characteristics and HIV prevalence

In this study the 25% of the respondents tested positive while 75% of them had negative results. A study by Elkarim et al. (2002) consisting of 7,385 participants showed different results in that 1.6% tested positive compared with 98.4% who tested negative.

5.3.1 Gender

Findings from this study shows that the prevalence among males is almost double the prevalence among females. This finding is different from those reviewed earlier. As mentioned in the literature review, the exposure of women to HIV infection is quite higher due to different demographical influences and we would expect the prevalence

among females to be high. This can be attributed to the fact that men in there are more exposed to sex than female due to cultural issues. In addition, the marriage pressure in the society is much often on the males than females. With the high poverty in Sudan, the wedding expenses are one of the main problems.

Another factor that may influence lower infection rates among women is the fact that heterosexual transmission is the key factor influencing infection rates in women (WHO, 2000). In Sudan, heterosexual transmission prevalence is quite low in general and specifically for female. Also circumcision can be one of the factors likely to reduce HIV prevalence among females in Sudan. Comparing the level of participants in the study the females were more but the HIV prevalence among males is still higher in our study. These findings suggest that men in Sudan are more exposed to HIV prevalence due to factors that are more specific to men than to women.

5.3.2 Age

The highest prevalence on HIV was observed in age category more than 49 years at 27.3%. The age group (less than 15years old) were 25% positive whereas those aged between 15 and 49 years accounted for 24.9%. In a previous study worldwide by WHO (2005a), results showed that only 1.2 % of the people aged between 15 to 49 years were HIV positive. According to WHO, (2006b) it shows that it is 2.1% in Ethiopia, 2.8% in Eretria, 3.3% in Chad, and 11% in Central Africa Republic. According to Elkarim et al. (2002), their estimated indicate that 0.9% of individuals in the age group 15 to 49 years are positive. In human physical development, those aged 15 years and above are more likely to be exposed to risky behaviour that may increase their chances of being infected with HIV.

5.3.3 Marital status

The results show that being married is associated with high chances of being infected with HIV than those who are single, divorced or widowed. This finding is different from a study by Ariyaratne (2001) who found that the percentage and rate of infection is higher among the single participants (80.3%) followed by 11% of married people and 8.7% of those who were divorced/widowed.

5.3.4 Religion

Among participants who were tested positive, there were 20% among the Muslim participants while 49.1% were Non-Muslims. This is approximately two times the Muslim positive. This finding is similar as the one observed in the literature stating that Christians have high infection rates than Muslims. Religions restrict individuals on different aspects of sexuality (Seidman et al., 1992). Studies on 38 Sub Saharan Africa countries show that Muslim have a lower HIV infection than Non-Muslim. A survey containing data on HIV prevalence and religious affiliation showed that six of seven studies indicated a negative relationship between HIV prevalence and being Muslim (Gray, 2004). Exclusion against sex outside married will help reducing HIV infection.

5.3.5 Education

The results show that high infection rates were observed among the illiterate. A study conducted in South-West Uganda based on a cohort between 1989 and 2000 studied the association between HIV prevalence for each schooling level. It showed a significant association between high level of education and low HIV infection in Africa. Also, different results in Uganda showed negative relationships between HIV infection and high education levels especially among younger age group (Walque et al., 2005). Between 1987 and 2003, studies conducted in 36 situations in 11 countries representing data on over 200,000 individuals. The results were different from 1996 in which a lower risk of contracting HIV/AIDS among the most educated people appeared (News Medical Net, 2008). It shows a lower risk of contracting HIV/AIDS among the most educated people than illiterate due to low awareness about HIV infection and the mode of transmissions.

5.3.6 Employment

The prevalence of HIV by employment shows that the employed people have higher prevalence of HIV infection than unemployed as about 27.9 % of the employed were HIV positive and 21.9% were HIV positive. In other words, among the positive participants there were 57.5 % who were employed and 42.5 % who were unemployed.

This is somehow similar to the study conducted by Vitry-Henry et al. (1999) which found that 55% of positive HIV tests were observed among the employed whereas 45% were among unemployed. The finding is different from some other studies. For example, according to Rabkin et al. (2004) only 35% of participants who were HIV positive were employed and 65% were unemployed.

5.3.7 Residence

The prevalence of HIV/AIDS among the urban areas was higher than the rural areas. According to Kalipeni et al. (2004) Kenya the prevalence of HIV/AIDS was 17-18% in urban areas comparing to 12-3% in rural areas. According to Central Statistic Agency Ethiopia had an urban HIV prevalence of 5.5% and 0.7% fro rural areas. Urban areas have greater awareness of HIV/AIDS yet their prevalence is high in many countries. That due to the restricted culture in the rural areas compared to the urban areas where the access to risky behaviour is easier (Garrard et al., 2003).

5.3.8 Logistic regression

The regression analysis shows significant effect on marital status, education, religion and residence. When we compare the participant on these variables we found that they are likely to be HIV positive. On the other hand gender, employment and age have no significant effect on HIV status.

5.4 Conclusion

From the results we conclude that there were many participants who were females, mid-aged, married, employed and non Muslim individuals. HIV was also found to be higher in urban areas. The lower incident rate was observed among educated individuals. A significant association between demographic characteristics and HIV test results were observed from chi-square tests. It showed associations between gender, marital status, religion, education level and HIV test result. On the other hand it showed that there were no association between age, employment, residence and HIV test result.

The logistic regression analysis showed different results than chi-square in term of gender, secondary level of education, residence. This showed that there were no association between gender and HIV test results. And there were association between secondary level of education and residence and HIV test result. Further, logistic regression showed that there is association between marital status, religion, residence, primary school, university and HIV test result.

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