Knowledge, Attitudes, and Beliefs about HIV/AIDS among males and females aged 15 to 49 in Cameroon, Africa.

by

Emmanuel Ngwakongnwi

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Dr. Darlene Steven

Lakehead University

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ABSTRACT

Levels of knowledge about AIDS are widely believed to be high in Cameroon, a country with low prevalence rates compared to other countries in Sub-Saharan Africa. However, not much effort has been made to evaluate these levels because HIV/AIDS prevention campaigns emphasize condom use, abstinence, and fidelity, not the attitudes and behaviors of the Cameroon population. The purpose of this study was to explore AIDS knowledge and attitudes among the sexually active population, review current literature on best practices regarding AIDS prevention and treatment, and propose recommendations for action. Data from the (2004) demographic and health survey (DHS) in Cameroon were collected from 10 provinces and 2 cities. The sample consisted of 10, 656 females and 5,280 males for the DHS questionnaire, and 12,065 males and females for HIV testing.

As with previous studies in Sub-Saharan Africa, the findings of this study showed an overall high level of awareness about AIDS, but it also revealed important deficiencies among the age groups, with knowledge levels higher for males than females and decreasing with age for both genders. Results also showed that females are more likely than males to contract HIV, and the likelihood of contracting the virus was far greater in urban areas and/or areas around the oil pipeline rather than rural areas. People with a higher level of education were more likely to engage in risky sexual behaviours. Low levels of knowledge and use of the voluntary HIV testing and counseling centre were reported. More education, screening, and counseling are required to mitigate the effect of the HIV/AIDS epidemic on the population.

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CHAPTER 1: INTRODUCTION

Since the first cases of acquired immunodeficiency syndrome (AIDS) were reported in 1981, infection with human immunodeficiency virus (HIV) has grown to pandemic proportions, resulting in an estimated 65 million infections and 25 million deaths. During 2005 alone, an estimated 2.8 million persons died from AIDS, 4.1 million were newly infected with HIV, and 38.6 million were living with HIV (Centers for Disease Control and Prevention [CDC], 2006). HIV continues to disproportionately affect certain geographic regions (e.g., Sub-Saharan Africa and the Caribbean) and subpopulations (e.g., females in Sub-Saharan Africa, males who have intercourse with males, injection drug users, and sex-trade workers).

For several years now, significant programmatic efforts have been put in place in many Sub-Saharan African countries to combat the high burden of HIV/AIDS in the continent. In 2005, the United Nations AIDS Agency (UNAIDS) reported that access to antiretroviral (ART) treatment has increased since 2003 and that it is no longer just in the wealthy countries of North America and Western Europe that persons in need of treatment have a reasonable chance of receiving it. Treatment coverage in countries such as Argentina, Brazil, Chile, and Cuba exceeds 80%. Despite progress in some places, however, the situation is different in the poorest countries of Latin America and the Caribbean; Eastern Europe; most of Asia; and virtually all of Sub-Saharan Africa, where only 1 in 10 Africans and 1 in 7 Asians in need of ART treatment were receiving it in mid-2005.

Okonofua (2002) suggested an increase in research to better understand the face of the AIDS epidemic and to identify the best approaches and practices for reducing the

rate of spread of the virus in the continent. He concluded that the true burden of the epidemic in Africa is still not known. Besides the difficulties associated with monitoring HIV prevalence and trends in Africa (which mostly rely on sentinel surveillance) other related information such as AIDS case surveillance (based on national reporting of AIDS, death registration, and sexually transmitted infections (STIs)), or tuberculosis (TB) surveillance data are also severely restrictive because many of these events go unreported in many African countries. Surveys on HIV/AIDS need not only focus on knowledge about the disease but should also be used to determine the pattern of sexual behaviour in different African countries.

Surveys of knowledge and attitudes are a common strategy for collecting information about the covariates of risk taking among populations at high risk of HIV/AIDS. An example of such a survey is the Demographic and Health Survey (DHS). The (2004) DHS-III in Cameroon is the third to be carried out in that country, and like the previous surveys of 1991 and 1998, it covered the entire population (ORC Macro, 2006a). The DHS-III provides information on fertility levels and preferences; sexual knowledge and sexual activity; use of family planning methods; breastfeeding practices; nutritional status of females and children; infant and child mortality; adult mortality, including maternal mortality; and knowledge, attitudes, and behaviour regarding HIV/AIDS and other STIs. The DHS-III is very important and differs from the others in the sense that for the first time, blood samples were taken for anemia and HIV testing (ORC Macro).

Statement of the Problem

According to Ndumbe (2002), the first AIDS case was recorded in Cameroon in 1986. By December 1994, the total number of full-blown AIDS cases had reached 20,419. The vast majority of infected cases (75%) are found in people between the ages of 19 and 39. In 2003, UNAIDS placed Cameroon in the 13th position among Countries with the most AIDS deaths in the world; 49,000 people were estimated to die from AIDS, as compared to 41,000 in 2001 for the age group from birth to 49 years.

Preliminary results of the 2004 DHS released by the Ministry of Plan and Regional Development in Cameroon (2005) revealed that among females, infection levels reached 10% or higher in some regions. Nationally, 1 in 10 young females ages 25 to 29 was living with HIV. Also, the Northwest Province (NWP), which enjoys one of the highest literacy rates in the country, had the highest seroprevalence rate of 8.7%, whereas the Muslim-dominated Far North Province with the lowest literacy rate had a prevalence rate of 2%. The disparity in seroprevalence in the Northwest was remarkable, with females scoring 11.9% versus 5.2% for males. This leads one to ask questions such as: What is the effect of an AIDS stricken population to a country?

The problem with the spread of the AIDS epidemic in Cameroon is that it is increasingly becoming a national crisis that impacts most sectors negatively and exacerbates poverty (Ndumbe, 2002). In fact Cameroon already has more than its fair share of ill health to cope with. Niebuhr, Gruber-Tapsoba, Degrando, and Gesing (2004) found that health indicators are worse than they were 10 years earlier; and that the additional burden caused by the HIV epidemic is worsening and promoting the spread of poverty, reversing human development, exacerbating gender inequalities, eroding the

government's capacity to provide essential services, and reducing labour productivity, thus the rationale for this study. The purpose of this study is to provide an understanding of general knowledge about HIV/AIDS among age groups and between genders.

Objectives of the Study

The difficulty in combating the AIDS epidemic justifies the need to broaden the scope of knowledge on prevention and treatment strategies by continuously reviewing case studies and programs that have been tested successfully in some parts of the world and adapting them for other population groups that need interventions. However, the broad nature of the AIDS epidemic is such that not all issues of concern can be addressed in a single study. The objectives of this study are:

1. To examine literature about HIV/AIDS in other countries.
2. To analyze data from the DHS-III, conducted in Cameroon in 2004, in order to assess the level of knowledge, attitudes and beliefs about HIV/AIDS by age group and gender. Topics of interest include prevention, transmission, misconceptions, use of prevention and counseling Centers, care for AIDS patients, and stigma associated with the epidemic.
3. To develop recommendations for prevention programs.

Summary

This chapter gave a general overview of AIDS in Sub-Saharan Africa, particularly in Cameroon. Data on the current prevalence of HIV in Cameroon was reported. Sources of data for the study were identified, and the scope of the study was introduced. The next chapter presents some theories and models used in HIV research. An extensive review of literature on HIV/AIDS also is conducted in chapter 2.

CHAPTER 2: LITERATURE REVIEW

Introduction

The AIDS epidemic has generated a large amount of literature over the past two decades. An online search of PubMed Medline revealed 10,675 articles on HIV/AIDS in general. "HIV/AIDS and Africa" had 2,060 articles, whereas "HIV/AIDS and Sub-Saharan Africa" listed 1,622 articles. Combining the latter with "Cameroon" gave only 33 titles, with 20 (60.6%) of them authored by foreign researchers and the remaining 13 (34.4%) articles either entirely written by national researchers or coauthored with foreign researchers. Most of the articles are on clinical aspects. This revelation supported the assertion by Tamukong (2004) that very limited statistics on HIV/AIDS in Cameroon are available. Thus, the articles reviewed for this study were drawn from online journals, periodicals, conference presentations, publications of national and international organizations, and so on.

Conceptual Framework

This study uses a conceptual framework for the study of the distribution and determinants of HIV infection, based on the proximate determinants framework. The proximate determinants framework has been applied extensively in the study of fertility and child survival in developing countries by combining demographic and epidemiological approaches. Key to the framework is the identification of a set of variables (Figure 1), called "proximate determinants," that can be influenced by changes in contextual variables or by interventions that have a direct effect on biological mechanisms to influence health outcomes (Boerma & Sharon, 2005).

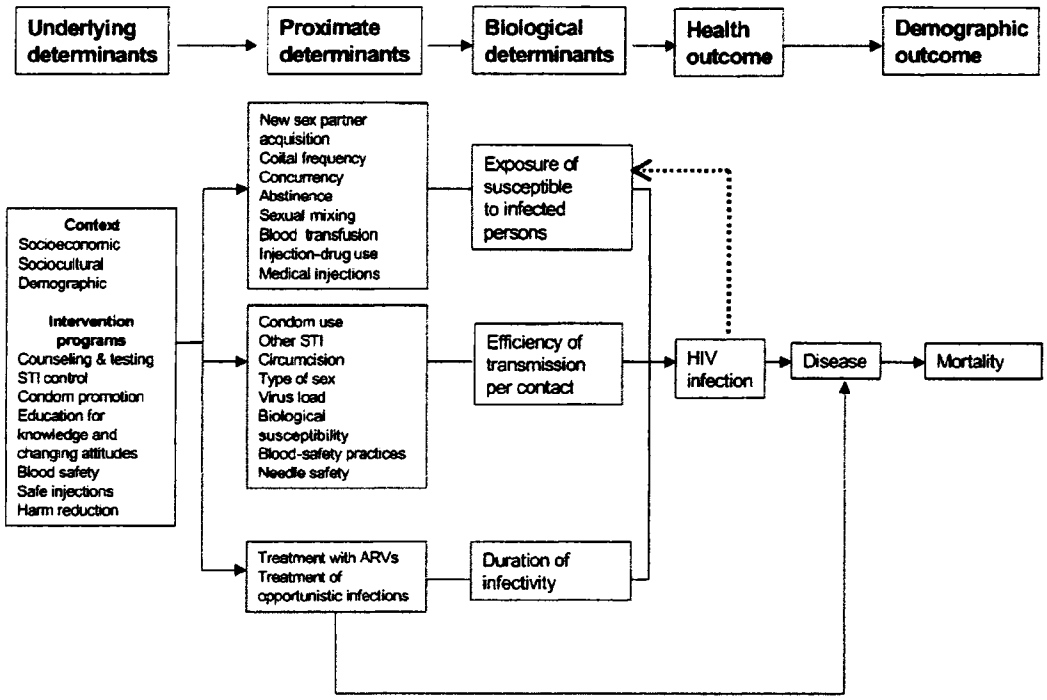

Figure 1. Proximate – determinants conceptual framework for factors affecting the risk of sexual transmission of HIV

Source: Davis and Blake (1956, n.p.)

Davis and Blake (1956) developed an analytical framework for the comparative study of the sociology of fertility. The key to the framework was a set of "intermediate variables through which any social factors influencing the level of fertility must operate" [Davis & Blake, p.211]. The intermediate variables were identified as: factors affecting exposure to intercourse, factors affecting exposure to conception, and factors affecting gestation and successful delivery. They argued that each of these biological factors can be influenced by a set of behavioural intermediate variables that are directly linked to the biological factors. This framework was further developed by Bongaarts (1978, 1983), who replaced the term 'intermediate variables" with "proximate determinants." He

further developed a simple statistical model in which any variation in the level of fertility, between populations or over time, can be decomposed into variations in the proximate determinants of marriage (exposure to sexual intercourse), postpartum infecundity (associated with lactation and abstinence), induced abortion, and contraceptive use. This model hypothesizes a level of fertility in the absence of deliberate fertility-control measures, called "natural fertility" or "total fecundity."

Further development of the framework includes the work of Stover (1998), who proposed to replace the term "total fecundity" with "potential fertility," after introducing an index of natural fertility into the model. Based on the proximate determinants framework for fertility, Mosley and Chen (1984) developed the Mosley-Chen framework for research on child survival. The basic feature of this framework is the specification of a set of proximate determinants through which socioeconomic determinants must operate in order to influence the risk of morbidity and mortality in children. Van Norren et al. (1986, 1989) further specified the proximate determinants and more clearly distinguished the biological factors from the mixed behavioral-biological proximate determinants; with the argument that just as stated by Davis and Blake (1956), the proximate determinants have to be both biological and behavioural and, therefore, act as a hinge between the social and biological systems.

In HIV/AIDS studies, the distribution and determinants of HIV infection in populations have included a wide range of factors that may affect the risk of transmission (Boerma & Sharon, 2005). Examples of studies where the proximate-determinants framework have been used included a comparative study to explain differences in the distribution of HIV/AIDS in four urban cities of Africa (Carael & Holmes, 2001), and

studies to explain the conflicting outcomes of intervention trials in Uganda and Tanzania (Grosskurth, et al., 2000). Both studies included sociobehavioral, epidemiological, and biomedical factors, while highlighting the importance of the role of underlying socioeconomic and cultural determinants as well as contextual variables in the distribution of HIV.

The levels of the proximate determinants framework shown on Figure 1 for the determinants of HIV infection links the social and environmental system on the left with the biological system on the right. The sociocultural and economic determinants and program characteristics influence the proximate determinants, which, by definition, have both behavioural and biological components. The proximate determinants have direct links to the biological determinants, which affect the rate of new infection, determine the prevalence of infection, and lead to disease and premature death. The schema does not attempt to show either the complex interactions that may occur between the underlying, proximate, and biological determinants or feedback mechanisms. HIV infection is included in the schema because of its importance in estimating the probability of exposure of susceptible persons to infected persons. This constitutes the major difference between the HIV conceptual framework and the fertility framework.

The model identifies biological mechanisms determining the efficiency of transmission of HIV to include: the infectious virulence of the pathogen, the amount and concentration of pathogens in body fluids (e.g. semen, genital fluids, and blood), and biological susceptibility of the person exposed to infection. Physical barriers or practices that limit the effective "dose" of exposure to HIV (e.g., condoms limiting exposure to infected genital fluids, gloves limiting exposure to infected blood, and bleach limiting

exposure to infected needles) are included as proximate determinants of the efficiency of transmission, rather than as factors affecting exposure. Thus this framework best represents an explanatory sequence at the population level, with the underlying social, economic, and environmental factors leading to exposure, transmission, infection, disease and death. The model suggests that the underlying social, economic, and environmental determinants must operate through proximate determinants in order to affect the biological outcome. Thus a careful examination and/or statistical evaluation of these pathways should improve estimates of the associations between determinants and transmission of HIV infection.

As well, the biological determinants of transmission of HIV are factors that affect the reproductive number of an infection, defined as the average number of secondary cases that arise from any new case of infection (Anderson, 1992). Models of transmission suggest that this reproductive number is determined by the product of 3 biological mechanisms: the rate of contact between susceptible and infected persons, the efficiency of transmission during exposure between susceptible and infected partners, and the duration of infectivity (Royce et al., 1997). Reducing any of the three biological factors will reduce the incidence of HIV infection, and reducing any of the factors to 0 will stop transmission of HIV completely.

The primary focus of the framework is on the most common mode of transmission of HIV (i.e., sexual transmission). Boerma & Weir, (p. 6) have identified some potential barriers associated with this model:

- In most cases, indicators measuring sexual behavior are self-reported and subject to multiple reporting biases. Where individual interviews are used, they provide

only limited information on factors affecting the efficiency of transmission, particularly if interviews of sex partners are not linked and if the HIV status of respondents is unknown.

- Data for self-reported condom use are relatively easy to obtain by means of surveys on sexual behavior, but the effect of condom use on transmission efficiency is difficult to gauge without information on whether condoms are used during acts in which sexual contact is between infected and susceptible persons.
- Information on the prevalence of disease, obtained by use of biomarkers, is essential for measuring the true importance of coinfections. However, it is important to note that the incidence of STIs is affected by the same proximate determinants that affect the incidence of HIV infection; therefore, the prevalence of STIs may feed back into the proximate determinants. Treatment of STIs can affect this cycle and thus affect the incidence of HIV infection, as was found in Tanzania (Grosskurth, et al, 2000).

Quantifying the effects of the proximate determinants on population health and its demographic outcome (mortality) may be crucial to furthering our understanding of the determinants of transmission of HIV and to design more-effective preventive programs.

Definition

The presence of HIV infection does not mean that a person has AIDS. AIDS occurs when the HIV infection has severely damaged the immune system, a process that may take years. The CDC use a public health reporting definition for AIDS that has changed several times since 1984 as more has become known about the infection. The most recent definition includes "a positive HIV blood test along with a major opportunistic condition

or a CD4 count less than 200/mm^3" (CDC, 1999, n.p.). "A normal CD4 count is 800 to 1,200 cells per cubic millimeter of blood" (CDC, n.p.).

Researchers at the American Cancer Society (2006) have documented the fact that opportunistic conditions include various cancers, infections, and syndromes that are often linked to AIDS. This definition has been used for finding and reporting AIDS in the United States. According to the CDC, this definition is less helpful these days because most patients are treated before these problems can happen. In Cameroon, a study to evaluate the clinical and epidemiologic trends in HIV/AIDS patients found that the predominant clinical manifestations include persistent fever and diarrhea, excessive weight loss, chronic cough, and profound asthenia (Mbanya et al., 2002). A related study identified oropharyngeal candidiasis and pulmonary Tuberculosis as other clinical manifestations of HIV/AIDS (Skalsky & Ndumbe, 1993). A study to investigate the prevalence of malaria among HIV/AIDS patients in Nigeria (Eni et al, 2005) found that 70% of the HIV-1 positive patients had concurrent malaria parasitaemia, as compared with malaria parasitaemia in normal adults (22.5%) and children (57.55%), respectively. However this study did not identify malaria as one of the opportunistic conditions.

Different strains of HIV have been identified. For example, part of the reason that HIV/AIDS may be spreading less rapidly in some West African countries (e.g., Senegal and Guinea-Bissau) is that a different strain of the virus predominates there (HIV-2), as opposed to HIV-1, which is the major strain in other parts of Africa such as Cameroon (Skalsky & Ndumbe, 1993). Unlike HIV-1, HIV-2 does not appear to spread as easily, is less likely to convert to full-blown AIDS, and tends to attack an older segment of the population (Moseley, 2004).

The ways in which HIV can be transmitted have been clearly identified. Fact sheets from the CDC (2003) have stipulated that HIV is spread by sexual contact with an infected person; by the sharing of needles and/or syringes (primarily for drug injection) with someone who is infected; or less commonly, and now very rarely in countries where blood is screened for HIV antibodies, through transfusions of infected blood or blood-clotting factors. Babies born to HIV-infected females may become infected before or during birth or through breast-feeding after birth.

Health Canada (2006) identified a myriad of ways by which HIV can be transmitted: unprotected sexual intercourse (vaginal, anal, oral); shared needles or equipment for injecting drugs; unsterilized needles for tattooing, skin piercing, or acupuncture; pregnancy, delivery and breast feeding (from an HIV-infected mother to her infant); and occupational exposure in health care settings. HIV cannot be transmitted by casual, everyday contact; shaking hands, hugging, or kissing; coughs or sneezes; giving blood; mosquitoes, other insects, or animals; swimming pools or toilet seats; or by sharing eating utensils and water fountains.

History of HIV

The CDC (1999) provided a brief overview of the history of HIV. According to the CDC, the earliest known case of HIV-1 in a human was from a blood sample collected in 1959 from a man in Kinshasa, Democratic Republic of Congo. How he became infected remains unknown. Genetic analysis of this blood sample suggested that HIV-1 may have stemmed from a single virus in the late 1940s or early 1950s. The virus has existed in the United States since at least the mid- to late-1970s. From 1979 to 1981, rare types of pneumonia, cancer, and other illnesses were being reported by doctors in Los Angeles

and New York among a number of male patients who had had intercourse with other males. These were conditions not usually found in people with healthy immune systems. In 1982, public health officials began to use the term *acquired immunodeficiency syndrome*, or AIDS, to describe the occurrences of opportunistic infections, namely, Kaposi's sarcoma (a kind of cancer) and *Pneumocystis carinii*, pneumonia in previously healthy people. Formal tracking (surveillance) of AIDS cases began that year in the United States.

In 1983, scientists discovered the virus that causes AIDS. The virus was at first named HTLV-III/LAV (human T-cell lymphotropic virus-type III/lymphadenopathy-associated virus) by an international scientific committee. This name was later changed to HIV (human immunodeficiency virus). The CDC (1999) acknowledged that for many years, scientists theorized as to the origins of HIV and how it appeared in the human population, most believing that HIV originated in other primates. Then in 1999, an international team of researchers reported that they had discovered the origins of HIV-1, the predominant strain of HIV in the developed world. A subspecies of chimpanzees native to west equatorial Africa had been identified as the original source of the virus. The researchers believe that HIV-1 was introduced into the human population when hunters became exposed to infected blood.

This theory gained support from a leading investigator, Pierone (2006), suggested a definition for HIV-1 from a molecular epidemiologic perspective as the predominant form of virus worldwide that accounts for the AIDS pandemic. According to him the virus was originally derived from a very similar retrovirus in chimpanzees and made the leap into the human population in Africa in the 1920s. Meanwhile, HIV-2 is not common,

and this epidemic is centered in Western Africa. The virus is closely related to a retrovirus found in the Sooty Mangaby (African Green Monkey). HIV-2 is rare in the United States and tends to have a more benign natural history, with slower damage to the immune system. It is also resistant to several of the medications that are used to treat HIV-1.

Incidence and Prevalence of HIV/AIDS

Worldwide Prevalence

AIDS has killed more than 25 million people since it was first recognized in 1981, making it one of the most destructive epidemics in recorded history. Despite recent, improved access to ART treatment and care in many regions of the world, the AIDS epidemic claimed 3.1 million (2.6-3.6 million) lives in 2005; more than half a million (570,000) were children (UNAIDS, 2005). A recent UNAIDS report (2005) revealed that the total number of people living with HIV is at its highest level: an estimated 40.3 million (36.7-45.3 million) people are now living with HIV worldwide; meanwhile close to 5 million people were newly infected with the virus in 2005 (see Figure 2).

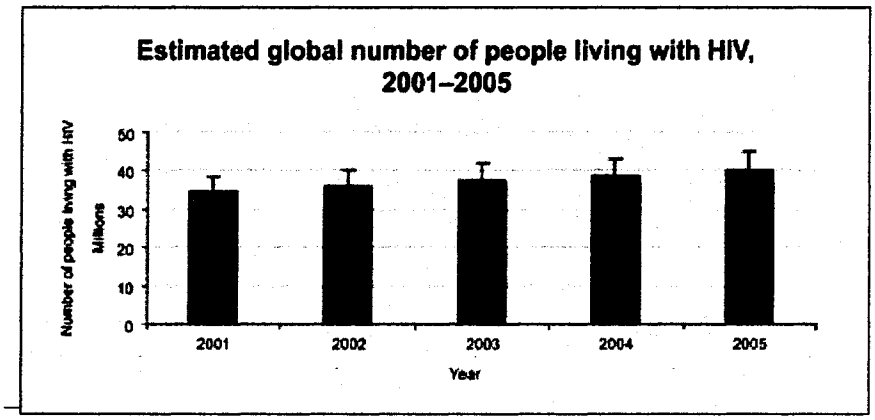

Figure 2. Estimated global number of people living with HIV, 2001-2005.
Source: UNAIDS, 2005, p. 2

According to UNAIDS (2005), the number of people living with HIV has increased in all regions of the world in the past 2 years, except for North America. In the Caribbean, the second-most affected region in the world, HIV prevalence overall showed no change in 2005, as compared with 2003. Sub-Saharan Africa remains the continent where the disease is the most severe and is home to 25.8 million (95% Confidence Interval = 23.8-28.9 million) people living with HIV, almost one million more than in 2003 (see Appendix A). UNAIDS reported that two thirds of all people living with HIV are in Sub-Saharan Africa, as are 77% of all females with HIV (see Appendix B). An estimated 2.4 million (2.1-2.7 million) people died of HIV-related illnesses in this region in 2005, and a further 3.2 million (2.8-3.9 million) became infected with HIV.

In Eastern Europe and Central Asia, the epidemic is growing. UNAIDS (2005) reports a 25% increase (to 1.6 million) in the number of people living with HIV in Eastern Europe since 2003, and the number of AIDS deaths almost doubled to 62,000 in the same period. In East Asia, the number of people living with HIV in 2005 increased by 20% to 870,000, as compared with 2 years earlier. Females are the most affected by the HIV epidemic. In 2005, 17.5 million (16.2-19.3) females were living with HIV, one million more than in 2003. Thirteen and a half million (12.5-15.1) of those females live in Sub-Saharan Africa. The widening impact on females is apparent also in South and South East Asia, where almost 2 million females now have HIV, and in Eastern Europe and Central Asia. Indications are that some of the treatment gaps will narrow further in the immediate years ahead, but not at the pace required to contain the epidemic effectively.

Prevalence in Africa

According to the U.S. Census Bureau's (2006) world population clock, the world population by mid-2006 was over 6.5 billion people. According to UNAIDS (2005), Sub-Saharan Africa, which has just over 10% of the world's population, is home to more than 60% of all people living with HIV. UNAIDS estimated that in 2005, 2.4 million (2.1-2.7 million) adults and children died of AIDS. Among young people ages 15 to 24, an estimated 4.6% (4.2%-5.5%) of females and 1.7% (1.3%-2.2%) of males were living with HIV in 2005. However, UNAIDS reported that declines in adult national prevalence appear to be underway in three Sub-Saharan African countries: Kenya, Uganda, and Zimbabwe. With the exception of Zimbabwe, countries of southern Africa show little evidence of declining epidemics. In West and Central Africa, including Cameroon, where the estimated national HIV prevalence is considerably lower than south and east of the region, there are also no signs of changing infection levels, except for urban parts of Burkina Faso, where prevalence appears to be declining.

Earlier studies have found large variations in HIV prevalence between Eastern/Southern Africa and West/Central Africa, and there is evidence that these differences are largely due to differences in the rate of spread (Buve et al., 2001). This research group conducted a multicentre study to identify behavioural and biological factors that could explain why HIV has spread much more rapidly in the populations of Kisumu (Kenya) and Ndola (Zambia) than in Cotonou (Benin) and Yaoundé (Cameroon). The HIV prevalence rates in the general pollution confirmed this preliminary assessment of the level of HIV infection in the general population of the four cities, which was based on estimates of HIV prevalence from sentinel surveillance among pregnant females. The

high HIV prevalences (> 20%) among females ages 15 to 19 years in Kisumu and Ndola were alarming, compared to lower prevalences in Yaounde and Cotonu. This study found that, on average, women in the high HIV prevalence cities (Kisumu and Ndola) had their sexual debut earlier than in the other cities (Yaounde and Cotonu). Men and women in Kisumu and Ndola got married earlier than men and women in Cotonu and Yaounde. In contrast, high rates of partner exchange, contacts with sex workers, concurrent partnerships and large age differences between partners were no more common in the two high HIV prevalence cities than in the two low HIV prevalence cities. This study group however found that the prevalence of HIV infection was substantially higher in females than in males in Yaoundé, Kisumu, and Ndola. A similar study by Ferry et al. (2001) to compare key parameters of sexual behaviour concluded that, in these same four African populations, differences in reported sexual behaviour could not explain the differences in rate of spread of HIV. In all four cities, high-risk sexual behaviour patterns were identified.

In several Southern African countries, more than three quarters of all young people living with HIV are females (World Health Organization [WHO], 2004), whereas in Sub-Saharan Africa overall, young females between 15 and 24 are at least three times more likely to be HIV-positive than young males (UNAIDS, 2004). In 2005, UNAIDS reported that progress in expanding treatment and care provision in Sub-Saharan Africa in the past year has been uneven. Furthermore, the UN reported that at least one third of people in need of ART therapy are receiving it in countries such as Botswana and Uganda, whereas in Cameroon, Ivory Coast, Kenya, Malawi, and Zambia, between 10% and 20% of people requiring ART drugs were receiving them in mid-2005. At least 85%

of South Africans who needed ART drugs were not yet receiving them by mid-2005; the same applied to 90% or more of those in need in countries such as Ethiopia, Ghana, Lesotho, Mozambique, Nigeria, the United Republic of Tanzania, and Zimbabwe (UNAIDS, 2005).

Prevalence in Cameroon

In Cameroon, the prevalence of HIV/AIDS increased from 1% in 1985 to 11% in 2001 (Rwenge, 2004; see Appendix C). The DHS-III confirmed the national HIV prevalence at 5.5% in 2004 (MINSANTE, 2004). The survey results showed that among females, infection levels reached 10% or higher in three regions (Adamaoua, Northeast, and Southeast), as well as in the capital of Yaoundé. Nationally, 1 in 10 young females ages 25 to 29 was found to be living with HIV. The new estimates confirmed a higher infection rate of 6.7% for females, whereas men were lower at 4.1%. Of the 10 provinces of Cameroon, the most seropositive were Northwest (8.7%), East (8.6%), and Southwest (8.0%); meanwhile, the least seropositive prevalence came from the Muslim-dominated Far North (2%) and West (4%), respectively.

It is becoming increasingly clear that very little attention has been paid to iatrogenic transmission of HIV. By the late 1980s a consensus had emerged that more than 90% of adult HIV infections in sub-Saharan Africa were attributable to heterosexual contact, and only about 2% to contaminated sharps. According to Gisselquist, Rothenberg, Poterat, & Drucker, (2002), this consensus was forged in the absence of empirical studies controlling for confounding between sexual and medical exposures, and despite the fact that unsafe injections are common in developing countries. Nevertheless, this current study does not address iatrogenic transmission of HIV but it is worth noting that this

could actually explain some of the rates of HIV reported in higher income people or in women both of whom tend to go for medical care more often than poorer people and men.

Three main modes of transmission of HIV have been reported in Cameroon: blood, sexual, and prenatal (Kaptue, 2000). A screening program to prevent mother-to-child transmission of HIV-1 conducted at antenatal clinics in 6 of Cameroon's 10 provinces revealed that of the 63,094 females who agreed to be tested, 8.7% were HIV-1 positive (Welty et al., 2005). In a related study to screen 252 consenting first-time donors for blood transfusion in Yaoundé, 7.9% of participants tested positive for HIV and the HIV positive donors had a significantly increased risk of being positive for antibodies to syphilis (Mbanya, Takam, & Ndumbe, 2003). Independent risk factors for HIV-1 infection included young age at first sexual intercourse, multiple sex partners, and positive syphilis serology for each. A study to describe the characteristics associated with HIV infection in a cohort of sex-trade workers in Cameroon revealed that seropositive participants (18%) were more likely to be over age 25, have four or more children, live in Yaoundé or Douala for 5 years or less, solicit clients in their homes or on the street, have low educational levels, earn a weekly income of less than $24 U.S., and have no other occupation outside of sex-trade work (Ryan, Roddy, Zenkeng, Weir, & Tamoufe, 1998).

Wide ranges of HIV prevalence among rural villages of Cameroon have been documented. In 2000, a study to evaluate HIV-1 antibody seroprevalence and risk factors for HIV seropositivity in rural areas of Cameroon found that HIV prevalence was 5.8% overall (6.3% among females and 5.2 % among males); meanwhile, HIV seroprevalence among persons ages 15 to 70 did not differ significantly by province. Age- and gender-standardized prevalence across provinces indicated a near significant difference, with the highest prevalence in the Southwest, followed by south, center, and east (see Appendix

D). Also, the study revealed that single females are significantly more likely to be HIV seropositive than married females, whereas females with a history of sexual relations while traveling and males who reported ever having an STI are at significantly increased risk of HIV-seropositivity (Nyambi, et al, 2000).

Behaviours and Attitudes related to HIV/AIDS

Sexual Culture and Knowledge of the Epidemic

In much of Sub-Saharan Africa, knowledge about HIV transmission routes is still low (UNAIDS, 2005). Generally, females are less well informed than are males; this is also true of rural areas, as compared with those living in cities and towns. In 2005, the United Nations AIDS program (UNAIDS) reported that in 24 Sub-Saharan countries (including Cameroon, Ivory Coast, Kenya, Nigeria, Senegal, and Uganda), two thirds or more of young females ages 15 to 24 lack comprehensive knowledge of HIV transmission. Data from 35 of the 48 countries in Sub-Saharan Africa have shown that on average, young males are 20% more likely to have correct knowledge of HIV than are young females.

According to UNICEF (2004), levels of education of the population make a huge difference on knowledge levels about the HIV epidemic. Onifade (1999), while investigating the reproductive health needs of adolescents in Africa, found a considerable level of awareness on HIV/AIDS, as compared with STIs, among youths. However, knowledge on the transmission of HIV/AIDS was identified as rudimentary in some cases. For example, a significant number of adolescents believe that HIV/AIDS can be contracted through "kissing and mosquito bites" (n.p.). This view with respect to

mosquitoes stems from the belief that since they can transmit malaria through infected blood, the same would be true of HIV (Onifade, 1999).

Misconceptions about HIV/AIDS have been well documented. Orubuloye, Cadwell, & Ntozi (1999) have documented the fact that males in most African societies prefer younger female sex partners. This is due to the belief that younger females are less likely to be HIV positive. Furthermore, a myth persists among some males that having intercourse with a virgin can cure AIDS. Several such worrisome misconceptions about HIV/AIDS have spread among populations in many countries. At the same time, many young people hold the common perception that clean, well-dressed, and good-looking people are not and cannot be infected with HIV (Kuate-Defo, 2004).

Awareness of HIV/AIDS has been disseminated through the media, workshops, and peer education and printed materials. A study of knowledge of HIV/AIDS among adolescents in Nigeria revealed mass media as a source of information does not allow in-depth knowledge of the disease (Oyo-Ita et al., 2005). From the study, a majority (89.5%) did not know the features of AIDS, and only a few (48.4%) knew that avoidance of sex, keeping one sexual partner (2.6%), use of condoms (17.4%) and screening blood before transfusion (5.3%) could prevent HIV transmission. Mass media were the main sources of information on HIV/AIDS to these adolescents. Some of them believed that HIV/AIDS cannot be prevented, that it is common among the uneducated, and that the disease is not common among youth (Oyo-Ita, n.p.).

Multiple sexual relationships is an important factor in studying the spread of HIV/AIDS. Carael, Ali, & Cleland (2001) conducted a study to assess the link between partnership status and the probability of having one or more casual or nonregular sexual

relationships in Zambia. They found that nonregular sexual relationships are much more common among individuals in relatively primary partnerships than among married individuals, and also among those with multiple primary partners than among those in monogamous unions. Adeboyejo & Onyeonoru (2005) investigated sexual activity among adolescents in high density environments. In this study of South Western Nigeria they found that 3 out of every 4 adolescents reported having had intercourse with more than one partner in the last 6 months of the study, also identifying commercial sex-trade workers as sexual partners. In a similar study to screen for HIV in a mixed Muslim-Christian town (Ngaoundere) in Cameroon by Holtedahl, Bonono, & Salpou (2005) males reported having an average of 4.9 sex partners in the last 5 years, as compared with 2.5 for females.

The level of knowledge of healthcare workers caring for AIDS patients has been investigated. In Cameroon, Mbanya et al (2001) evaluated health service factors that influence nurses' knowledge, attitudes and practices with respect to HIV/AIDS. They found that the nurses scored higher in the knowledge section (70.1%) than the attitude and practice section. The major health service factors thought to influence knowledge, attitudes, and practices include the lack of adequate information, the lack of commitment to alter attitudes and practices, the lack of in-service promotions, and the ongoing fear of becoming infected with the virus through caring for patients with AIDS.

There have been attempts to determine if individuals' levels of knowledge about HIV/AIDS are determined by levels of education. De Walque (2006) examined demographic health survey data from five countries: Burkina Faso (2003), Cameroon (2004), Ghana (2003), Kenya (2003), and Tanzania (2003-2004). These five African

countries have different HIV/AIDS epidemics, but the five data sets have similar variables that allow for comparison across countries. De Walque (2006) found that education was not positively associated with HIV status; but predicts protective behaviours like condom use, use of counseling and testing, discussion among spouses and knowledge, but it also predicts a higher level of infidelity and a lower level of abstinence.

Condom Use and Risk Perception

Because there is yet no vaccine for AIDS, all effective strategies are based on prevention: abstinence, fidelity, and condom use. Thus, STIs/AIDS prevention programs in Cameroon aim, among other things, to sensitize youth about the raison d'etre of sexual abstinence before marriage and the use of condoms (Rwenge, 2001). According to Kuate-Defo (2004), young girls run more risk in contracting STIs/AIDS than young boys. This is because due to economic constraints (and their dependence on men for support) they generally do not negotiate and do not insist on the use of condoms. Also, gender-related power structures make it difficult, if not impossible, for females to insist on the use of condoms. In addition, Aase & Agyei-Mensah (2005) identified negative cultural practices and sanctions against females who refuse to have intercourse with their husbands.

A study on gender and sexuality of youths carried out in Cameroon at Bafoussam (Bamileke area) and Mbalamayo (Bëti area) revealed that the ideology of masculinity and feminity prevail in the populations studied; however, in the Bamileke group, where gender system is unfavourable to females, young people adhere less to these ideologies than their parents (Rwenge, 2004). The level of knowledge of the modes of transmission of STIs/AIDS and the degree of acceptability of condoms in the Bemileke group group was reported as higher among boys than girls. The young Bëti are more inclined to take

risks in sexual activities than the Bamileke. It was also found that boys are more inclined than girls to be unfaithful to their regular partners; in addition, boys are more inclined than girls to use condoms. A similar study among youths ages 15 to 24 in urban Cameroon found that first intercourse often occurs at an early age (15 years or less) and that despite the epidemic, a substantial fraction of youth, particularly males, continue to have high rates of partner change, consistently use condoms with casual partners, even though consistent use of condoms in regular relationships is low (Meekers, Klein, & Foyet, 2003).

Bankole, Singh, Hussain, and Wulf (2004) had similar findings from a study of males ages 15 to 54 from 22 Sub-Saharan countries using DHS data between 1994 and 2001. An evaluation of a program aimed at increasing the availability and use of condoms for HIV prevention in Cameroon revealed that at the onset, condoms were only available in pharmacies and were primarily purchased for family planning purposes, females still prefer condoms as a means of contraception compared to traditional methods (Niebuhr et al., 2004).

Aase & Agyei-Mensah (2005) have investigated two African countries, Uganda and Senegal, which have been acclaimed as success stories in the fight against the HIV epidemic in Africa. In the case of Senegal, combinations of factors were found to have contributed to the success. They included Islamic and cultural practices that promote circumcision and fidelity in polygamous relations, as well as effective political leadership. The Ugandan case is not linked to religion per se, but rather to effective political will and the resulting behavioural changes. Although the emphasis is on

abstinence and monogamy, it has promoted condom use and has been nonjudgmental in its work with high-risk groups, including prostitutes and gay males.

In 1999, Calves conducted a study to investigate specific constraints to condom use among male and female adolescents in Edéa, Cameroon; and how they differ by gender. Edea is a small town about 90 km from the coastal town of Kribi, also the main link (stop over) between the economic capital (Douala) and the political capital (Yaoundé), serving tourists and transporters. In this qualitative study, six focus group discussions were conducted among female and male youth attending school and those who were out of school. The following subgroups were interviewed separately: female students aged 15 to 17, male students ages 15 to 17, female students ages 18 to 22, male students ages 18 to 22, out-of-school males ages 18 to 22, and out-of-school females ages 18 to 22. Considering the small number of female and male adolescents less than 18 years of age who are not in school in Edéa, these two groups were not interviewed in the study.

Local informants recruited student participants from the six different schools (collèges and lycées) in Edéa. The purpose of using more than one informant to recruit the participants was to ensure that the participants would not all know each other or would come from the same "group of friends." Out-of-school males and females were recruited directly from various venues in the town: the market, carwash, hair salons, small shops, and the like. Female students also helped to recruit nonstudent females. The focus groups were moderately sized groups ranging from 6 to 8 participants. All participants were asked to complete a short form with background information, including age, ethnic group, occupation, and class attended. This study covered a wide range of topics and youth perceptions about HIV including: AIDS risk assessment, gender

differences in condom use, access to condoms, motivations for using condoms, condom negotiation, condom use among male and female adolescents, sex for money and condom use negotiation, and other barriers to condom use.

For AIDS risk assessment, Calves (1999) found that AIDS awareness was high among the youth in Edéa who participated in his study. With the exception of the nonstudent female adolescents who mentioned kissing and greetings, the adolescents were able to accurately cite all the transmission modes. The female participants were more likely than the males to mention mother-to-child transmission. However, despite this apparent awareness about the disease, the participants stressed that many adolescents in Edéa, especially uneducated ones, still deny the very existence of HIV/AIDS. In fact, UNICEF (2002, n.p.) had found that in some parts of Africa some individuals view AIDS as "America's idea to discourage sex" and "a way to help keep the African population down".

Following are statements from Calves' study to collaborate this perception:

> People are fooling us, I can't believe in this disease [AIDS] (Nonstudent male, 18).
>
> I only believe what I see, I never saw a victim (Nonstudent male, 21).
>
> I don't know if AIDS exists in Cameroon. I don't believe in all this (Nonstudent female, 19).
>
> If a girl dies, people say it is AIDS. If a girl loses weight, people say it's AIDS. We never know. It can be dysentery or anything. It is when there is a dead body that people talk about AIDS. I don't know. I never saw someone with AIDS (Nonstudent female, 21). (Calves, p. 8)

Calves (1999) identified the lack of proof as a recurrent argument provided by the nonstudent participants to justify their disbelief. Whereas the students believed in the epidemic, some students tended to underestimate its magnitude: "Malaria kills more people than AIDS in Cameroon. Why should I protect myself against AIDS and do nothing about malaria? You can die of anything, hepatitis ...or even a cold!" (Female student, 16, as cited in Calves, p. 8). For convenience, a summary of other relevant findings investigated in this study is presented in table 1 below.

Table 1. Constraints to condom use among adolescents in Edea, Cameroon

Variable investigated	**Summary findings**
Gender differences in condom use	Strong stigma is attached to female adolescents obtaining or carrying condoms. Girls who use or carry condoms are referred to as: passe-partout (literally, "goes everywhere"); occasion pressée (literally, "quickie "); or simply as prostitutes. Male condom users also perceived as passe-partout, promiscuous, unfaithful boys Carrying or buying condoms is deemed acceptable or normal attitude for a males.
Access to condoms	Condoms were accessible to both male and female adolescents. Small shops, street vendors, market vendors, and pharmacies were the most often cited condom sources.
Motivations for using condoms	No condom use with stable partners. Mostly used with casual partners (girls met in bars, prostitutes, first time partners), partners who cannot be trusted.
Condom negotiation	Young females use prevention of unwanted pregnancies to negotiate for condom use while young males use the argument of preventing STIs to negotiate.
Condom use among male and female adolescents	Young female adolescents have difficulty discussing condom use. Females use condoms mostly to prevent pregnancy, while men use them mostly to prevent STIs.
Sex for money and condom use negotiation	Condoms mostly used during sex for money. A participant stated: these girls "often have a little bag in their bra with condoms in it" (p. 17).
Other barriers to condom use.	Some adolescents perceived sex with condom as unnatural, artificial, and too indirect; condoms reduce pleasure and sensation; condoms too thick no sensation, condoms or condom lubricant could transmit diseases, can't afford higher quality condoms from pharmacies.

Overall, this study by Calves (1999) concluded that condom use with regular sexual partners is perceived as necessary only to prevent an unwanted pregnancy. Asking a new partner to use a condom is considered suspicious and is interpreted as a sign of mistrust. This is an indication that information, education, and communication campaigns need to focus more on reducing the stigma associated with condom use.

Attitudes of Cameroonian students toward HIV/AIDS have been extensively investigated and documented. Njikam Savage (1993) conducted an exploratory study to investigate attitudes of Douala University Students about HIV/AIDS. He found that AIDS was being regarded as a fiction, resulting in incredible disbelief of its existence or grudging acceptance of its existence in European countries, but certainly not in Africa, much less Cameroon. A subsequent study (Njikam Savage, 1998) supported the continued skepticism and disbelief in the existence of AIDS in Cameroon and revealed that males as well as females were in favour of "full contact" (students' euphemism for unprotected sex). As well, they believed in a strategy of having multiple sex partners, since they could never be sure of the faithfulness of their campus girlfriends or boyfriends. This was to ensure that they have a partner at all times in case a boy/girl friend abandoned one.

A more recent study (Njikam Savage, 2005) investigated STIs, HIV/AIDS, and health promotion strategies among university students in Douala, Cameroon. This qualitative study used informal, semistructured discussions with two groups of 15 students each. These informal discussions involved both genders and formed the basis for the development of a focus group and an in-depth interview guide. Two focus group discussions each were subsequently conducted among 10 female and 10 male students. In addition, 40 in-depth interviews each were also carried out among students in the four faculties and the three professional institutions that make up the University of Douala. In total, there were 320 participants: 160 females and 160 males. The study participants were recruited on campus by peers of the same gender in between lectures, at the end of lectures, and during weekends. The focus group discussions, like the informal

discussions, dwelt on perceptions of condom use, students' sexual behaviour, and HIV/AIDS. The collected data were analyzed, and the results of both the focus group discussions and the in-depth interviews were merged and then regrouped by theme.

The students identified three categories of sexual partners/relationship: *"meilleure amie,"* or their principal partner; secondary partner; and occasional partner. The first category represented a partner with whom they perceived they have a regular or stable relationship which is expected to lead to engagement and subsequent marriage. The secondary relationship, which may well be of the same duration as the first category, was not perceived as having the same importance, especially in terms of emotional investment and future expectations. Secondary relationships were regarded as standbys. The last category comprised one-night stands or spontaneous partners of no future consequence (Njikam Savage, 2005).

The use of condoms varied among this category of partners. Among those in primary relationships, about half of the students (52.5%, or 168) said that they use condoms with their partners to avoid STIs and unwanted pregnancies. However, 23.43% (75) stated that they do not use condoms because they have total confidence in their partners. About a similar proportion (24.1%, or 77) reported irregular condom usage. For those who admitted having secondary and occasional relations, 40% of them indicating using condoms, whereas 4% and 12%, respectively, said that they cannot be bothered to do so. Third-year students revealed that they are more likely to use condoms than first years, 48% versus 12%, respectively. Female students appeared to practise mixed methods (i.e. condom use and abstinence) in their efforts to avoid pregnancy (Njikam Savage, 2005).

The types of methods used appear to be related to the type of relationship one is involved in. With regard to the different categories of relationships, those involved in primary relationships were found to be the most likely to practice abstinence with their partners, as compared with those in secondary or occasional relationships: 60% versus 24% and 20%, respectively. The use of abstinence tended to be most common among students between the ages of 25 and 29 (40%), as compared with older ones 30 years and above (8%) and those younger than 24 (16%; Njikam Savage, 2005).

Although condoms were perceived generally as an important means of preventing STIs, especially HIV/AIDS, the male students especially raised several negative issues concerning it. Firstly, it discouraged young people from knowing and mastering how their bodies function (physiology) because of the tendency to rely absolutely on condom usage. Secondly, they felt that the propaganda to use condoms is driven by a huge commercial, profit-making incentive, but not so much by a concern or strategy to fight against HIV/AIDS, as is often claimed. Thirdly, the widespread use of condoms encourages promiscuity and infidelity because the partners are lulled by the promise of being protected against unwanted pregnancy (which would otherwise expose them as being sexually active or cheats, thus giving them away) and HIV/AIDS. Consequently, about 50% (160) of the male and female students perceived condoms negatively, that is, as being a bad thing. A minority of the females (8.75%, or 28) felt disgusted and repulsed by condoms, which they did not perceive as being protective at all. This was because they believe that the condom cannot withstand prolonged sex (it could tear or burst); in any case, even with condom usage, one is still exposed to the risk of HIV/AIDS contamination in one way or the other. Nonetheless, 72.25% (116) of the girls said that

they use condoms to avoid being contaminated by HIV/AIDS; 27.75% practised abstinence. Nearly all of the students (females and males) believed that the best way of avoiding HIV/AIDS is through the practice of fidelity and abstinence between partners.

Poverty and Sexual Risk Behavior

There has been considerable effort to determine whether living conditions have any influence on sexual behaviours. White & Robinson (2000) inferred that poverty is a factor that determines people's lifestyles, may increase an individual's susceptibility to infection by HIV/AIDS and vulnerability to its physical, social, and economic impact. However, HIV/AIDS itself is not linked with poverty.

Rwenge (2001) conducted a study to investigate how poverty influences sexual risk behaviour among youths in Cameroon. He hypothesized that (a) poverty motivates young people to engage in risky sexual behaviour, and (b) young people enter into sexual relationships for sexual satisfaction as well as economic and marriage purposes. He used quantitative and qualitative data. For the first hypothesis, quantitative data from a 1995 survey on the sexual behavior of the young people of Bamenda was used. The young females were ages 12 to 20 years, and the young males were 12 to 25 years. This survey had collected data on the social and economic characteristics of young people and the sex education they received from their parents or guardians, their knowledge about AIDS, their sources of information about AIDS, the prevention measures they have adopted, and their sexual behaviour. Among the social and economic characteristics of the young people interviewed were the father's job; the presence of durable goods (television, radio, etc.) in the households; and the young people's means of satisfying their needs. These characteristics were used to evaluate the effects of living conditions on young people's

sexual behaviours. In addition, a social variable, namely, the persons with whom the young people lived at the time of the survey, was used because it is also, in the African context, an indicator of their living conditions.

Risky sexual behaviours were defined by Rwenge (2001) as behaviours that expose young people to a greater risk of contracting STIs/AIDS: having multiple concurrent sex partners, having had sex with a casual partner, and failing to use condoms during sexual intercourse. To test the second hypothesis, data from two focus group discussions among young males, two other ones among young females, and in-depth interviews with young females were used.

Generally, the results showed that among young people interviewed, 57% had one sexual partner, 27% had multiple sexual partners at the time of the survey, and 16 % said that they had no current sexual partner (Rwenge, 2001). The mean age at first sexual intercourse did not vary significantly with gender (15.6 for males vs. 15.8 for females). Forty-one per cent of the sexually experienced young people had had casual sexual intercourse during the previous 12 months. Only 25% of young people who were sexually active at the time of the survey were using condoms. This study also found that living in a poor household was positively associated with the probability of being sexually active (OR:1.4), of having more than one sexual partner, of having had casual sexual relations, and being more likely not to use condoms during sexual intercourse.

Qualitative data collected along with the survey further explained the results from the quantitative data. Rwenge (2001) found that most young girls interviewed had many sexual partners in order to increase their opportunities of finding a husband. Some young girls had many sexual partners for economic reasons, but those who prostituted

themselves also undertook prostitution because they had not found other alternatives. This means that some young girls from poor families have regular sexual relations with rich males to improve their socioeconomic status (SES) and increase their chance of getting a husband later on. They also have sexual relations with young boys among whom they will choose their husbands. Other poor young girls engage in sexual activity in order to have the necessary means of survival.

Most young girls reported that they do not insist on condoms use because they are afraid of losing their partners if they do so. Some young boys interviewed reported that they have many partners because the society is such that they want to avoid deception, or they think that their partners also have many partners. Some young boys, however, claimed that their friends do so for economic reasons. Young boys also declared that some of their mates have casual sexual relations either because they lack means of keeping their girlfriends for a long time or because the females they met enabled them to satisfy their sexual desires the ways they wanted. Therefore, the reasons for which poor young people engage in risky sexual activities differ according to gender; among young girls, the reasons are mostly economic (Rwenge, 2001, p. 103). This study is a good example of the role that proximate determinants (underlying factors) has on the transmission of HIV/AIDS.

Discrimination and Stigma Related to HIV/AIDS

Persons diagnosed with HIV/AIDS are likely to face discrimination from society as well as from caregivers. De Bruyn (2004) reported that females in Africa are facing discrimination and challenges in relation to HIV/AIDS, particularly regarding their sexual and reproductive health care. This includes a lack of information regarding HIV

and pregnancy as well as difficulties with contraceptive use. A study in Botswana (Letamo, 2004) found that misconceptions about HIV transmission often encourage stigmatization and discrimination of people living with HIV/AIDS. This results from fear, ignorance, and denials. The discrimination and stigma associated with HIV/AIDS make it difficult for infected persons to disclose their serostatus, thus placing their partners at risk.

A study to examine HIV serostatus disclosure and its relationship to risky sexual behaviours in sexually active, heterosexual, married, or cohabiting HIV patients in South Africa revealed that 78% had not disclosed their HIV serostatus to their partners and that 46% had no knowledge of their sexual partner's serostatus (Olley, Seedat, & Stein, 2004). Compared with those who disclosed their serostatus, those who did not were more likely to be male, to have not used a condom during their last sexual encounter, to have used alcohol heavily before intercourse, to have multiple sex partners, and to have engaged more frequently in intercourse in the 6 months preceding the study. More exploration showed that being in a married relationship, being male, having more than two multiple partners, and not using condoms during last intercourse were significantly associated with the nondisclosure of HIV serostatus (Olley et al.).

Another study of nurses and AIDS patients by Mbanya et al. (2001) in a hospital setting in Cameroon found that 15% (62 patients) indicated that they were attended to with signs of disgust and/or hatred. Stigma associated with use of contraceptives has also enhanced the spread of HIV. Upton (2002) found that a significant factor contributing to the spread of HIV in Northern Botswana is the perception that infertility is caused by the use of contraceptives. Male infertility in particular is understood as the result of female

contraceptive use and is highly stigmatized. In an area with such a high HIV rate, these perceptions directly contribute to the lack of efficient family planning and HIV prevention programs in the country.

HIV prevention and treatment

Until recently, little has been said about a cure for HIV/AIDS. Pharmaceutical companies are constantly working on developing drugs to tackle the epidemic. Even when such drugs are developed, they have to go through the initial stages of testing through trials before being approved for use. Such trials sometimes result in media controversies. Two planned trials of pre-exposure prophylaxis tenofovir in Cambodia and Cameroon to prevent HIV infection in high-risk populations were closed because of activist pressure on the host country governments (Mills et al., 2005). The primary reasons cited for the Cambodian trial closure were a lack of medical insurance for trial-related injuries, human rights considerations, study protocol concerns, general suspicions regarding trial location, and inadequate prevention counseling. Meanwhile, the primary reasons cited for the Cameroon trial closure were inadequate access to care for seroconverters, participants not sufficiently informed of risks, inadequate number of staff, exploitation of the participants, and an unethical study design.

In some situations, the fight against HIV/AIDS has been made difficult by policy makers. Hasnian (2004) documented the situation of South Africa, where policy makers consistently maintain that HIV infection is not responsible for AIDS, thus creating the biggest obstacle to the implementation of appropriate prevention and therapeutic programs, including ART therapy for HIV-positive persons. It is only recently that people within the government and the ruling party have defied previous policy and have agreed

that ART drugs be given to pregnant females with HIV (Hasnain, 2004, n.p.). In Uganda and Senegal, an estimated 33,000 and 2,300 HIV+ patients were on ART drugs by the end of 2004. ART drugs constituted the largest proportion of the average per patient costs, accounting for 68% in Uganda (US$541 per annum, 2004) and 81% (US$622 per annum, 2004) in Senegal, respectively (Kyomuhangi, 2005). Despite the use of ART, much advocacy has been on preventing the spread of the epidemic rather than treatment. Preventive work in African countries has focused on change of sexual behaviour in heterosexual relations. Turesson (2006) asserted that prevention information is based on three key messages: A-B-C, or "Abstention," "Be faithful," and "Use condoms." Abstention means that one should not engage in sexual relations before marriage; the other two are intended to highlight the fact that fidelity and condom use reduce the risk of infection with HIV. Abstinence and condom use were the most reported preventive measures for a majority of students in Northern Uganda (Grazia et al., 2005).

A review of studies on contraceptive use for family planning in Nigeria suggested that its integration with HIV prevention and care programs could be beneficial in combating the epidemic. However, the main handicap with this notion is that a growing body of evidence has shown that of all known contraceptives, only the male latex condom, and perhaps the female condom, can protect against HIV/STIs as well as unplanned pregnancy (Okonofua, 2004). In addition to supporting the use of contraceptive methods, Fonchingong and Abong (2004) highlighted the need to incorporate counseling in developing strategies to prevent the spread of HIV, suggesting that patients who use health centres for psychological and spiritual support may receive

HIV testing against a backdrop of cultural standards that allow unsafe intercourse and bar open discussions on sexual behaviour and sexuality.

Examples of Pharmaceutical treatment programs

Douala ART Initiative (DARVIR)

To facilitate access to ART therapy (ART) in line with the WHO's (2004) "3 by 5" initiative (treatment of 3 million people living with HIV/AIDS in developing countries by the end of 2005), and considering the fact that in Africa, most HIV/AIDS data come from UNAIDS, research institutions, or international NGOs, the goal of DARVIR was to collect data from a routine care setting that will help in the design of ART treatment in a large cohort of patients treated in 19 public and private clinics in Cameroon (Laurent et al., 2005). In this program, a total of 941 patients out of 1,200 who attended the baseline visit and at least one follow-up visit were included for the study and enrolled from October 2000 to October 2003. The research team found that although the main goal of the DARVIR initiative was to rationalize treatment with the aid of a therapeutic committee, standardized medical files, and standardized care, clinical follow-up visits, biological follow-up visits, and the drug supply were irregular and that many patients interrupted treatment. They identified cost as the main obstacle to continuing ART and to biological and clinical follow-up, even though the patients included in the DARVIR initiative were not the poorest Cameroonians.

Other constraints included patient management hindered by organizational constraints; an increase in physician workload; and a lack of social workers, thus hindering patient follow-up. The fact that ART drugs were dispensed only by the major hospital's pharmacy and only on Mondays, Wednesdays, and Fridays posed major

problems of anonymity, timing, and social mixing. Finally, fluctuations at the pharmacy necessitated temporary changes in treatment. As a result of these constraints, disappointingly few patients continued receiving treatment. In conclusion, Laurent et al. (2002) highlighted some of the limitations of such a program in Africa, including cost of care, limited numbers of health care professionals and social workers involved in the management of ART, centralized drug dispensing, and interrupted drug supply.

Community Mobilization and Oil Pipeline Projects

Prevention programs for HIV/AIDS require mobilizing the community. One such campaign targeted social gatherings in rural and urban communities in Cameroon. Between 1997 and 1998, a local NGO worked with community associations, "Njangis," in one urban and one rural location to promote knowledge and positive practices concerning family planning, STIs, and treatment of common childhood diseases. The project involved selecting and training two prominent and influential members of each community as "relais," or middlemen, who then trained mobilizers from participating "Njangis" to provide relevant information and help to mobilize their fellow members in favour of the positive attitudes and practices promoted by the project. After evaluating the project, the results suggested that the intervention had significant influence in the rural location area, with noticeable positive effects on knowledge and practices of family planning, knowledge, and attitudes about HIV/AIDS and STIs, and use of health services (Babalola et al., 2001). This approach can be very useful in planning prevention programs in the rural areas with a similar organizational structure.

In another related campaign, Kigotho (1997) reported that the World Bank-funded oil pipeline project in Chad and Cameroon is the first large-scale construction project in

Sub-Saharan Africa to incorporate an HIV/AIDS prevention component. The project entails the development of oil fields in southern Chad and the construction of 1,100 kilometres of pipeline to port facilities on Cameroon's Atlantic coast. The project would employ 3,000 construction workers from the two countries from 1998 to 2001, including about 600 truck drivers. In some areas around the pipeline route, 50% of the prostitutes (who are frequently visited by truck drivers) are infected. The HIV/AIDS intervention aims to prevent HIV and STIs among project workers through the social marketing of condoms, treatment of STIs in prostitutes along the route, and health education to modify high-risk behaviours. Interestingly, part of the data analyzed in the current study was collected along this pipeline route.

The HAART Project

The ethical issues related to the nonaccessibility to efficient but expensive triple combination ART therapy for treating HIV in poor countries, as compared with rich countries, and paid access by rich people in poor countries, led to the medical demand for a highly active ART therapy (HAART). HAART was introduced in the region of Adamawa in Cameroon from 2001 as part of the National HIV/AIDS program subsidized by the WHO and other international organizations (Holtedahl et al, 2005). Since 2001, a medically led technical group has organized a week of voluntary, free-of-charge HIV testing around the International AIDS Day (December 1). Systematic precounselling was given by trained health personnel, and the test results were given in a postcounselling session one week later. This project was focused on investigating who came for testing, their knowledge about HIV, how many came back for results, and determining those that tested positive for HIV.

The findings of this intervention revealed some interesting data. Seropositivity tended to increase with female gender, increasing age and number of sex partners, and low level of schooling. Seropositive persons reported a mean number of 4.9 sex partners, and seronegative persons 3.7. For each gender separately, this difference was significant for females, but not for males. One of five persons tested never came back to know their result, but seropositivity in this group was not higher. There was no difference in age groups when it came to knowing the results, but seropositive persons more often had kept to themselves that they had been tested. In a rare situation, a seronegative man was the only one who admitted to having had intercourse with other males; meanwhile, a woman reported her fears of being seropositive because she knew that her husband had had intercourse with males and she had tested positive.

The researchers also found that the cost of treatment and the ability to pay for testing is a problem for this population. Many persons tested would not have come during the year when they have to pay a subsidized fee. Dramatically lowered drug prices have helped a high number of people, but regular payment is still beyond the means of most individuals.

Finally, they concluded that campaigns offering free-of-charge testing are useful in promoting knowledge about the AIDS epidemic. It is also an opportunity for people to know their HIV status. This study consistently confirmed the important role of specific HIV knowledge as well as education in general in preventing new cases of HIV. Results indicate that all programs for HIV-testing and necessary follow-up should be publicly paid (Holtedahl et al, 2005).

The "Among Youth" Peer Education Project

Between July 2000 and February 2002, the Institute of Behavioural Research and studies (IRESCO), in collaboration with the population Council Frontiers in Reproductive Health Program, conducted an operations research project to increase contraceptive prevalence and reduce the rate of STIs/HIV among adolescents in Cameroon. The intervention consisted of a series of media campaigns and peer education strategies. The project involved adolescents ages 15 to 19 in the neighborhoods of Mokolo, Yaoundé (intervention site), and New Bell, Douala (control site). During the campaign, a total of 49 peer educators were trained in effective reproductive health communication and teaching techniques. These young males and females were then charged with the responsibility of educating their peers through informal educational talks, one-on-one sessions, conferences and round table discussions, and cultural and athletic activities. Each educator organized at least one educational discussion per week in a variety of popular public locations: cultural centres, schools, sports, or cultural events. The messages were presented in formal and nonformal settings. IRESCO (2002) also worked with youth in the target area to produce a magazine on adolescent reproductive health, producing six editions of "Among Youth" magazines in English and French in 2001 and several comic books and brochures on reproductive health issues that affect adolescents. To measure the effects of the project, IRESCO completed baseline and endline surveys in May 2000 and February 2002.

The following lessons could be drawn from this project. Adolescents in both the control and intervention sites had high levels of knowledge regarding HIV/AIDS prevention methods, but their behaviours did not always reflect this knowledge. Condom

use remained insufficient. Fidelity and abstinence were known prevention methods, but condom use with commercial and occasional partners remained inconsistent in over half of adolescents in the intervention area. However, the proportion of respondents in the intervention site who used condoms during their last sexual encounter with a commercial partner went up significantly after the intervention (IRESCO, 2002).

Summary

This section highlighted the scarcity of scientific literature on HIV/AIDS for Cameroon. The proximate determinants conceptual framework whose primary focus is on transmission of HIV is discussed. A brief history on the origin of HIV is presented; at the same time highlighted some of the opportunistic conditions associated with AIDS. Literature on knowledge levels, attitudes, and prevalence of HIV was reviewed and presented, with specific quotes from the participants in qualitative studies conducted in Cameroon. Emphasis was made on the fact that knowledge about transmission routes remain low in sub-Saharan Africa, with females being more less knowledgeable and three times more likely to contract HIV than males. Risky sexual behaviour such as non condom use during sexual intercourse, sex with multiple partners, and poverty were highlighted in the literature. Discrimination against persons living with HIV by society and care givers was also presented in addition to misconceptions surrounding AIDS. Finally, some pharmaceutical treatment programs and HIV prevention initiatives were presented to the reader.

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CHAPTER 3: METHODOLOGY

Introduction

Demographic and Health Surveys (DHSs) are nationally representative household surveys with large sample sizes, usually between 5,000 and 30,000 households. The DHS program has collected, analyzed, and disseminated accurate and representative data on population, health, HIV, and nutrition through more than 200 surveys in over 75 countries. Typically, DHSs are conducted every 5 years to allow comparisons over time. Interim surveys focus on the collection of information on key performance monitoring indicators, but they may not include data for all impact evaluation measures, such as mortality rates.

This study was based on data from the DHS-III, which was conducted in Cameroon from February to August 2004 by the National Institute of Statistics in collaboration with the National Committee for the Fight against AIDS; known by their French acronyms as INS and CNLS. The DHS-III was initiated by the federal government of Cameroon and is part of the MEASURE DHS program. MEASURE DHS is a 5-year project to assist institutions in collecting and analyzing data needed to plan, monitor, and evaluate population, health, and nutrition programs. MEASURE DHS is funded by the U.S. Agency for International Development (USAID). The project is implemented by ORC Macro in Calverton, Maryland, in partnership with the Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs; the Program for Appropriate Technology in Health; the Jorge Scientific Corporation; and Casals & Associates, Inc.

The main objectives of the MEASURE DHS program are to (a) provide improved information through appropriate data collection, analysis, and evaluation; (b) improve coordination and partnerships in data collection at the international and country levels; (c) increase host country institutionalization of data collection capacity; (d) improve data collection and analysis tools and methodologies; and (e) improve the dissemination and utilization of data (ORC Macro, 2005).

DHS Process

The first step involves preparatory activities, including designing the sample and developing the survey questionnaires to meet the specific needs of the host country. The standard DHS consists of a household questionnaire and a females' questionnaire. Two versions of the core females' questionnaires are available: the A core is for use in countries with high contraceptive prevalence, and the B core is for use in countries with low contraceptive prevalence. Modules are added to many DHS household questionnaires on topics that are not included in the core questionnaire but which reflect the needs of individual countries. In the case of Cameroon, the HIV/AIDS module (section 9 of the household questionnaire) was added and administered to males and females from eligible households. The survey instruments were then translated into local languages, pretested, and finalized (months 1-6).

The second stage involves training field staff and conducting fieldwork (months 7-11). The households that have been scientifically selected for inclusion in the DHS sample are visited and enumerated using a household questionnaire, which includes a cover sheet to identify the household and a form on which all members of the household and visitors are listed. This form is used to record some information about each

household member, such as name, gender, age, education, and survival of parents for children under age 18. The household questionnaire also collects information on housing characteristics such as type of water source, sanitation facilities, quality of flooring, and ownership of durable goods. After all of the eligible females in a household have been identified, they are interviewed using the females' questionnaire. A country-specific module (i.e., the males' survey) allows eligible males in a subsample of 50% of all households to be identified and interviewed. Individuals from eligible households are voluntarily enlisted for HIV testing.

Prior to an interview, DHS consent forms (see Appendix F) are administered to the eligible participants. The consent form clearly identifies the interviewer, the name of organization, the time required to complete the survey, the confidentiality of responses, and a respondent's right not to answer any questions or discontinue the interview if necessary.

DHS Sample

For the (2004) Cameroon DHS, (see Appendix G), the sample consisted of 12 clusters (small geographically defined areas, 10 provinces and 2 cities) throughout the country. The households in each of these clusters were listed or enumerated prior to the survey. A sample of households was then scientifically selected to be included in the DHS survey from the list in each of the clusters. Each of the households was visited, and information was obtained about the household using the household questionnaire. The DHS covered the national territory with the total sample drawn from 10,462 households. This constituted 10,462 females (n_1, de facto) between the ages of 15 and 49 and 5,280 males (n_2, de facto) ages 15 to 59. In total, 12,065 respondents consented to voluntary

HIV testing. Despite the vast nature of topics covered by the (2004) DHS in Cameroon, the current study was based only on data from the HIV/AIDS module (AIDS behavior, AIDS knowledge, HIV testing).

DHS Data Sets and Data Acquisition

To collect data that are comparable across countries, standard model questionnaires have been developed, along with a written description of why certain questions or sections have been included. These model questionnaires, which have been regularly reviewed and updated throughout the life of the DHS program, form the basis for the questionnaires which are applied in each country.

The third stage involves data processing, including editing, coding, and entering and verifying the data, as well as checking them for consistency. This stage usually begins after the beginning of fieldwork (months 8-16). The final stage involves analyzing the data, preparing the final report, and disseminating the survey results in the country. This stage usually begins following the completion of fieldwork (months 14-20). DHS releases survey data to researchers after the main survey report is published, generally within 12 months after the end of fieldwork. Requests for access to the data sets must be submitted and approved before access is granted.

In February of 2006, after learning of the internationally recognized DHS program and the recent DHS survey in Cameroon (data availability date: September 2005), the researcher requested data from the national executing agency in Cameroon. After sending a fax message and making several follow-up phone calls with no feedback, the researcher became entangled in the normal bureaucracy that is characteristic of most government offices in Cameroon, his country of origin. An alternative was to contact

ORC Macro, the internal executing partner based in Maryland. As a requirement, the researcher had to submit a project proposal that stated very clearly the start and end dates and then had to agree to share a final copy of the study with ORC Macro that will be transmitted to the country where the DHS survey was conducted. This is a standard requirement. On February 15, 2006, the researcher made a formal request to ORC Marco through the HIV/AIDS coordinator. On February 16, the researcher received an approval letter (see Appendix H) giving him access to Cameroon data, with the option of either downloading the datasets or purchasing a digital copy available on CD-ROM. For convenience, the available data were downloaded. Since then, the researcher has gone through a process of familiarization with the data set by studying the different formats, the questionnaires used, the coding system, and the analytical considerations outlined by ORC Macro to determine variables of interest and adopt the appropriate analytical methods.

Validity, Reliability, and Weighting

To achieve comparable information across countries, it is necessary that the questionnaires and the survey procedures followed in each country are similar. Therefore, the DHS program has developed a set of basic documentation to go with the model questionnaires.

The interviewer's manual. This manual is designed to explain to interviewers how to conduct an interview. It includes information about implementation of the survey, training activities, and fieldwork procedures. It discusses in detail interview techniques and procedures for completing the questionnaires.

Supervisor's and editor's manual. This manual is designed to explain to field supervisors and field editors how to do their jobs. The instructions for both positions have been combined into one manual because supervisors and field editors are expected to share many activities such as editing questionnaires and tracking interviewers' performance.

Guidelines for the main survey report. The Guidelines for the Main Survey Report, also known as the Tabulation Plan, provides model tables that set forth the major findings of a survey in a manner that will be useful to policy makers and program managers. The data are presented in terms of national level statistics and for population subgroups such as those defined by age, education, marital status, economic status, urban/rural residence, and region of the country.

Technical assistance, MEASURE DHS staff provide technical assistance at critical stages of survey implementation to ensure that the survey procedures are consistent with the technical standards set by the DHS and to ensure that the survey activities are progressing at a reasonable pace. Assistance is provided mainly during visits to the country, although staff also spend considerable time when not on travel preparing for visits and back-stopping the survey.

Since 1996, ORC Macro has conducted more than 130 DHSs in more than 50 countries in the regions of Sub-Saharan Africa, North Africa, West Asia, Europe, South and Southeast Asia, Latin America, and the Caribbean (see Appendix I). Thus, the questionnaires and methods used in the process have been sufficiently revised and tested in several countries, ensuring the validity and reliability of the survey.

With the DHS being a nationally representative survey, the sample was selected with unequal probability to expand the number of cases available for certain areas or subgroups for which statistics are needed. While the data can be weighted to estimate population rates, the present study uses the unweighted (actual data) in order to conduct statistical tests of significance.

Survey questions to be analyzed
The variables selected for the study fell into four specific categories:

Variables on knowledge and beliefs about HIV/AIDS
Knowing how HIV is transmitted and the risk behaviors that can reduce the risk of becoming infected with the virus is key for people to protect themselves from the virus. Condom use, limitation of sexual activity to a single uninfected partner who has no other partners, and total sexual abstinence are the primary protective behaviors of interest to HIV/AIDS prevention programs, serving as indicators to behaviour change. The questions below measure whether people know these three behaviours to reduce transmission of HIV. The first question measures the level of awareness of AIDS Response options for each question is shown in brackets.

Table 2. Knowledge about HIV and prevention methods

Variable label	Question	Response options
V751	Now I will like to talk about something else. Have you ever heard of an illness called AIDS?.	1= Yes 2= No
V753	Are you aware of any ways to avoid AIDS?	1=Yes 2=No 8=Don't know
V754B	Can people reduce their chance of getting the AIDS virus by not having sexual intercourse at all?	1=Yes 2=No 8=Don't know
V754C	Can people reduce the chance of getting the AIDS virus by using a condom every time they have sex?	1=Yes 2=No 8=Don't know
V754D	Can people reduce their chance of getting the AIDS virus by having just one uninfected sex partner who has no other sex partners?	1=Yes 2=No 8=Don't know

The following questions measure whether people believe common misconceptions about how HIV is transmitted.

Table 3: knowledge of common misconceptions about transmission of HIV

Variable label	Questions	Response options
V754JP	Can people get the AIDS virus from mosquito bites?	1= Yes 2= No 8=Don't know
V754WP	Can people get the AIDS virus by sharing food with a person who has AIDS?	1=Yes 2=No 8=Don't know
V756	Is it possible for a healthy person to have the AIDS virus?	1=Yes 2=No 8=Don't know
V823	Do you think that AIDS can be transmitted by witchcraft or supernatural means?	1=Yes 2=No 8=Don't know

The survey investigated whether people were aware that HIV can be transmitted from mother to child and also if they knew the modes of transmission. The following questions addressed this need.

Table 4. Knowledge of transmission of HIV from mother – to - child

Variable label	Questions	Response options
V774	Can the virus that causes AIDS be transmitted from a mother to her baby?	1= Yes 2= No 3=Don't know
V774A	Can the virus that causes AIDS be transmitted from mother to her baby during pregnancy?	1=Yes 2=No 8=Don't know
V774B	Can the virus that causes AIDS be transmitted from mother to her baby during delivery?	1=Yes 2=No 8=Don't know
V774C	Can the virus that causes AIDS be transmitted from mother to her baby by breastfeeding?	1=Yes 2=No 8=Don't know

Variables on attitudes and sexual behaviour.

Series of questions were ask to assess risky sexual attitudes that may render people vulnerable to contracting the AIDS. Condom use during sexual intercourse has been established to reduce chances of getting an infection. Participants were asked to indicate the number of sex partners, other than their wife/husband, with whom they had sex in the last 12 months; as well as the partners including their wife/husband with whom they had sex. Both questions were recoded from number to "Yes" or "No" (see table below). Thus the first question addressed the issue of extramarital relations while the second addressed whether or not they were sexually active.

Table 5. Multiple sex partners and condom use during intercourse

Variable label	Questions	Response options
V761	In the past 12 months, did you use condoms during your last intercourse?	1= Yes 2= No 3=Don't know
V766A	How many sex partners other than your wife (husband) did you have sex with in the last twelve months?	
V766B	How many other sex partners including your wife did you have sex with in the last 12 months?	

Questions were asked to ascertain respondents own personal opinions and attitudes towards people with HIV/AIDS. The questions highlight four imaginary situations aimed at capturing how the respondents would react to the situation.

Table 6. Stigma related to HIV/AIDS

Variable label	Questions	Response options
V777	If a member of the family got infected with the AIDS virus, would you want it to remain a secret or not?	1= Yes 2= No 3=Don't know
V778	If a member of the family became sick with the AIDS, would you be willing to care for her or him in your own household?	1=Yes 2=No 8=Don't know
V779	In your opinion, if a teacher has the AIDS virus but is not sick, should that person be allowed to continue teaching in the school?	1=Yes 2=No 8=Don't know
V823	Would you buy vegetables from a shopkeeper or vendor if you knew that this person had the AIDS virus?	1=Yes 2=No 8=Don't know
V781	I don't want to know the results, but have you ever been tested to see if you have the AIDS virus?	1=Yes 2=No 8=Don't know

Variables on HIV testing and use of counseling centre (CPDV).

One of the measures undertaken by the Government of Cameroon to control AIDS was to create voluntary HIV testing and Counseling Centres where services are available to the population at little or no cost. The following questions investigated the level of knowledge and use of these centres by study participants in the last 12 months.

Table 7. Use of the Voluntary HIV testing and counseling cener

Variable label	Questions	Response options
S816N	Have you ever heard of the voluntary HIV testing and counseling center?	1= Yes 2= No 3=Don't know
S816O	Have you ever been to the voluntary HIV testing and counseling center?	1=Yes 2=No 8=Don't know
S816Q	Have you ever been tested for HIV at the voluntary HIV testing and counseling Center?	1=Yes 2=No 8=Don't know

Variables associated with HIV testing and prevalence.

Gender, level of education, milieu of residence, socioeconomic status may have an influence on the way HIV is transmitted. Some of these factors are underlying factors identified by the proximate determinants framework to explain transmission of HIV. The residence milieu (environment) may affect peoples' life styles. In the Cameroon context, habitations along the pipeline project serve as stop over for truck drivers, a category of workers that has been determined to by very vulnerable to HIV/AIDS. The following variables where used to predict the prevalence of HIV.

Table 8. Gender, milieu of residence, education, wealth index, and prevalence of HIV

Variable label	Questions	Response options
Hiv62	Sex of household member	1=male 2=female
hivtype	Milieu of residence	1=urban 2=rural
hiveduc	Level of education attending	0= No education 1= Primary education 2= Secondary education 3=Higher education
fresult	Final result of testing	0=negative 1=positive
hivpet	Cluster in petrol line (living along pipeline or not)	1=yes 2=no [check this]

Analytical Methods

The statistical software package used for analyzing the data was SPSS 13.0 for Windows. Univariate descriptive statistics (frequencies and descriptives) was used for each variable and to check for data quality. This technique was helpful in examining the variability of the data, describing the sample, and checking statistical assumptions before performing more complex analyses. Because most of the variables were dichotomous, cross-tabs (chi-square) were mostly used to test for relationships between variables. Logistic regression was used to used to estimate the probability of being seropositive with regards to gender, living in an urban/rural area, educational level, and living on a cluster near an oil pipeline. This would serve as a baseline for further detailed investigations. The maintain uniformity with age groups for both males and females, the male data set was filtered to include data for the 15 – 49 year age group (4817) compared to females (10,656). Data for HIV testing (12065) was drawn from the male and female respondents and was analyzed separate. All variables where checked for missing values . During the analysis, missing data was simply ignored because of the large sample size. In

some cases, data was recoded into new categories. Appendix J shows a univariate analysis of study variables highlighting frequency for the different responses categories. In addition crosstabs of gender and HIV testing plus related variables is presented in Appendix K.

CHAPTER 4: RESULTS

Survey Demographics

Three datasets were analyzed separately for this study. The results will focus mostly on the male and female datasets that form the basis of this study. A univariate description of the study variables is provided for convenience in Appendis J.

The distribution of age by gender is presented in figure 3, with age grouped into 5-year categories. The greatest proportion of selected study participants fall within the 15- to 19-year age group for both males (23.1%) and females (25.2%) The number of respondents decreases with age for both genders.

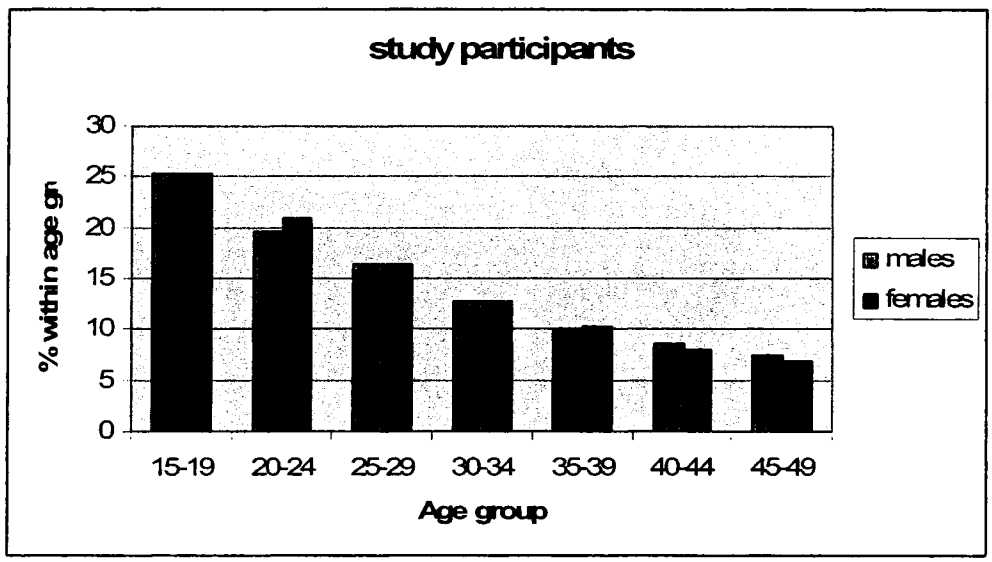


Figure 3. Selected study participants by age group

The distribution of study participants by educational level is illustrated on figure 4.

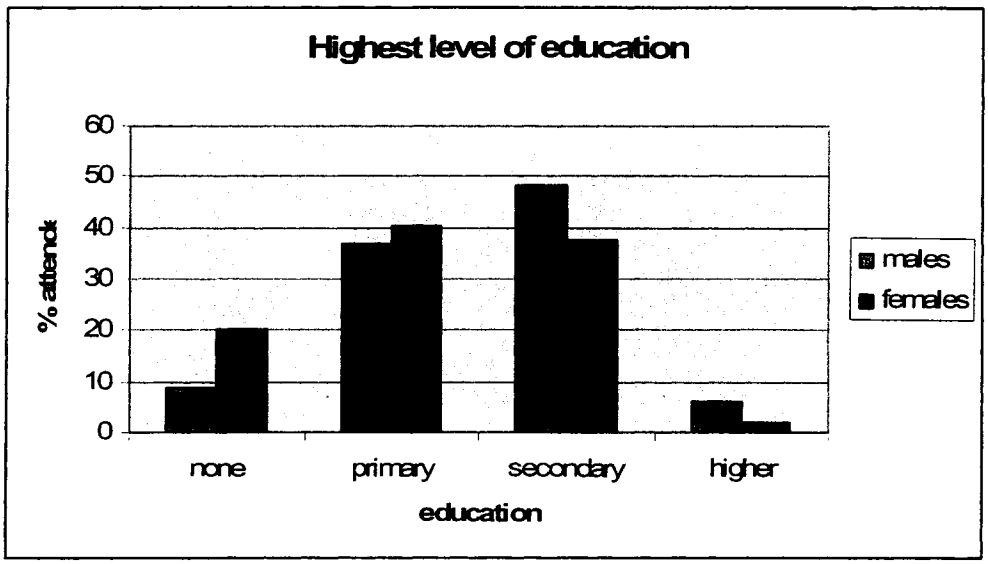


Figure 4. Selected study participants by educational level

The distribution of educational level for females shows that a good proportion of the female respondents have a primary level education, followed by secondary education and very few attained a higher (college/university) level of education. Approximately half of the males (47%) have a secondary education, followed by primary and then higher education. The proportion of males who have attained a higher education is greater than for females. There is a wide gap between males and females who reported having no education, approximately 600 males (8.9%) and 2,100 females (20.1%). The sample size for HIV testing was almost normally distributed as 6038 (50.1%) males consented to testing for HIV compared to 6027 (49.9%) females. Of this number 745 (12.3%) males were not tested, 212 (3.5%) tested positive and 5078 (84.2%) negative. For females 638 (10.6%) did not test, 372 (6.2%) tested positive and 5016 (83.2%) tested negative. Details of HIV testing and related variables is presented in Appendix k.

Knowledge and Beliefs about HIV/AIDS

The level of knowledge that individuals have about a disease may influence their attitudes and behavior towards it. During the (2004) DHS-III, the respondents were asked if they had ever heard of HIV/AIDS. The pattern of response for both male and female age groups is illustrated on figure 5.

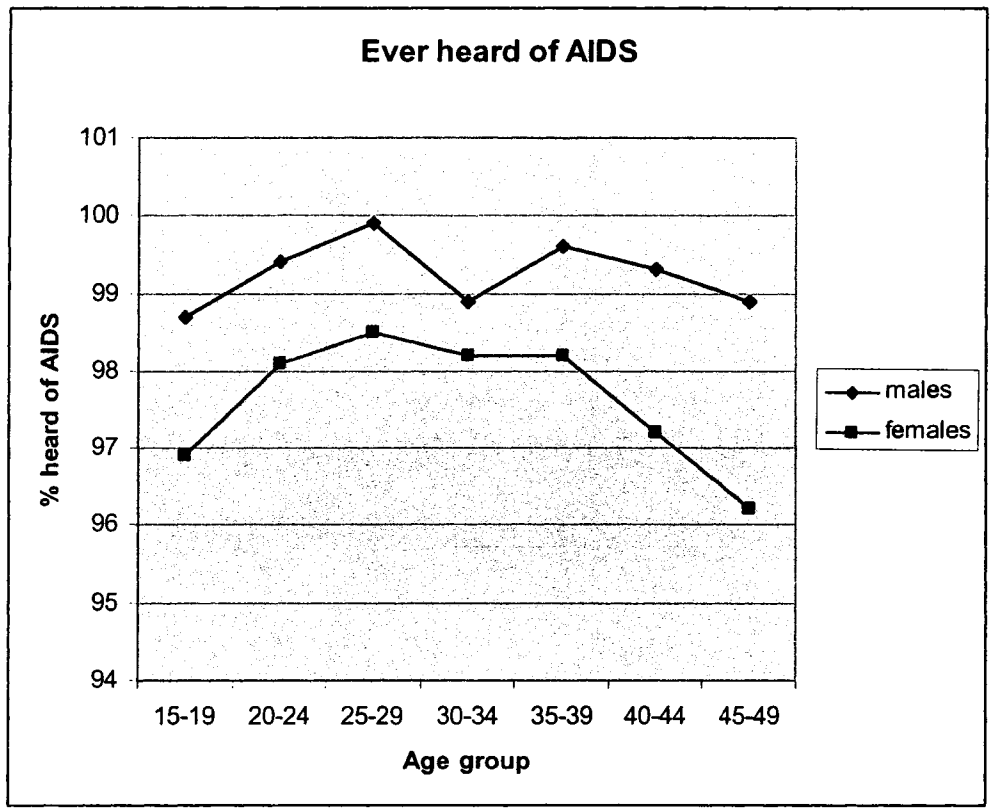


Figure 5. Awareness of AIDS by study participants

Figure 5 shows that the vast majority of males (99%) and females (98%) have heard of HIV/AIDS. For females, the Chi-square ([6] =24.765, $p < .001$) showed a significant difference in knowledge of HIV/AIDS among the age groups; with fewer older females having heard of HIV/AIDS. For males, the Chi-square test of independence

sample was nonsignificant (Chi square [6] = 11.004, p = .088), indicating no significant difference among the age groups in knowledge of HIV/AIDS for males. A test of males and females showed significant gender differences (Chi square [1] = 41.241, p < .001) regarding having heard of AIDS, with males demonstrating higher knowledge of HIV/AIDS.

Prevention and Transmission of HIV

Study participants who acknowledge having heard of AIDS were asked the question if they knew ways to avoid HIV/AIDS. Figure 6 illustrates the responses from study participants.

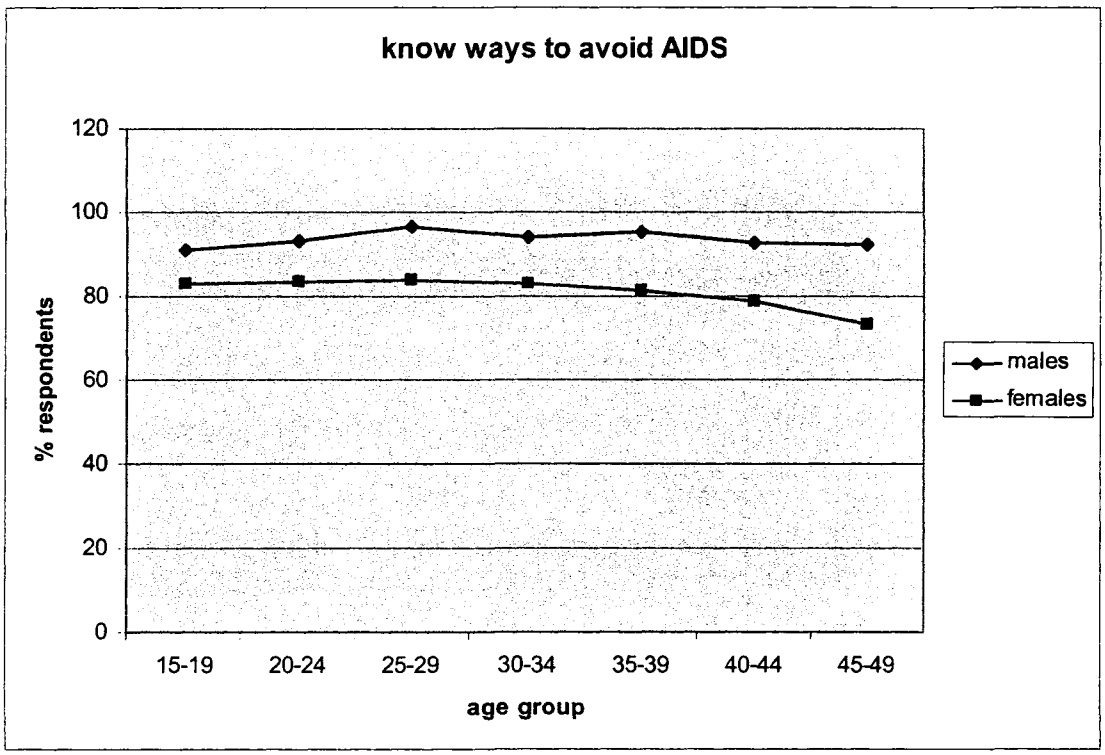


Figure 6. Knowledge of ways to avoid AIDS

A Chi square ([6] = 28.182, $p < .001$) shows that there are significant differences between male age groups in terms of knowledge of ways to avoid AIDS, with lower percentages among the younger and older groups. For the females, a Chi square ([6] = 50.500, $p < .001$) is also significant, indicating there are differences among age groups in terms of knowledge of ways to avoid AIDS. The older females reported the lowest knowledge. Analysis also showed gender differences in knowledge of ways to avoid AIDS between males and females, Chi square ([1] = 357.347, $p = .001$). On average, 93.5 % of males acknowledge knowing ways to avoid AIDS compared to 81.9 % for females.

Knowledge of ways to prevent the transmission of HIV/AIDS is a first step toward combating the AIDS epidemic. The respondents were asked what could be done to prevent the transmission of the virus, and were asked whether each of the following were ways to avoid AIDS: abstinence, condom use, and fidelity.

Figure 7 shows the percentage of males and females who identified abstinence as a way of avoiding AIDS.

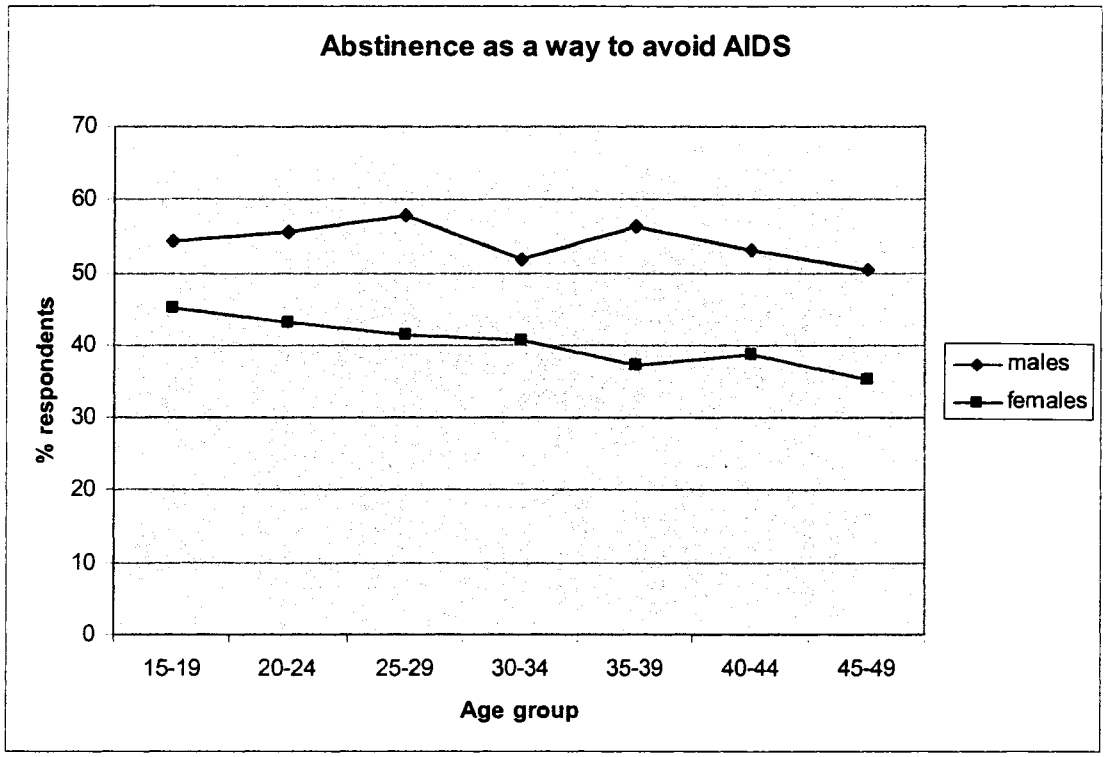


Figure 7. Abstinence as a way to avoid AIDS

A Chi square test of males ([6] = 8.894, p = .180) showed non significant differences between age groups in terms of knowledge of abstinence as a way to avoid AIDS. For females, the Chi square ([6] = 41.261, $p < .001$) was significant, indicating significant differences between female age groups for abstinence as a way to avoid AIDS, again with lower scores among the older women. A Chi square test ([1] = 229.417, $p <$ .001) showed significant gender differences for abstinence as a way to avoid AIDS; with males (54.7%) reporting higher levels of knowledge than females (41.6%) on average. Figure 8 demonstrates the pattern of responses for participants who identified condom use as a way to avoid AIDS.

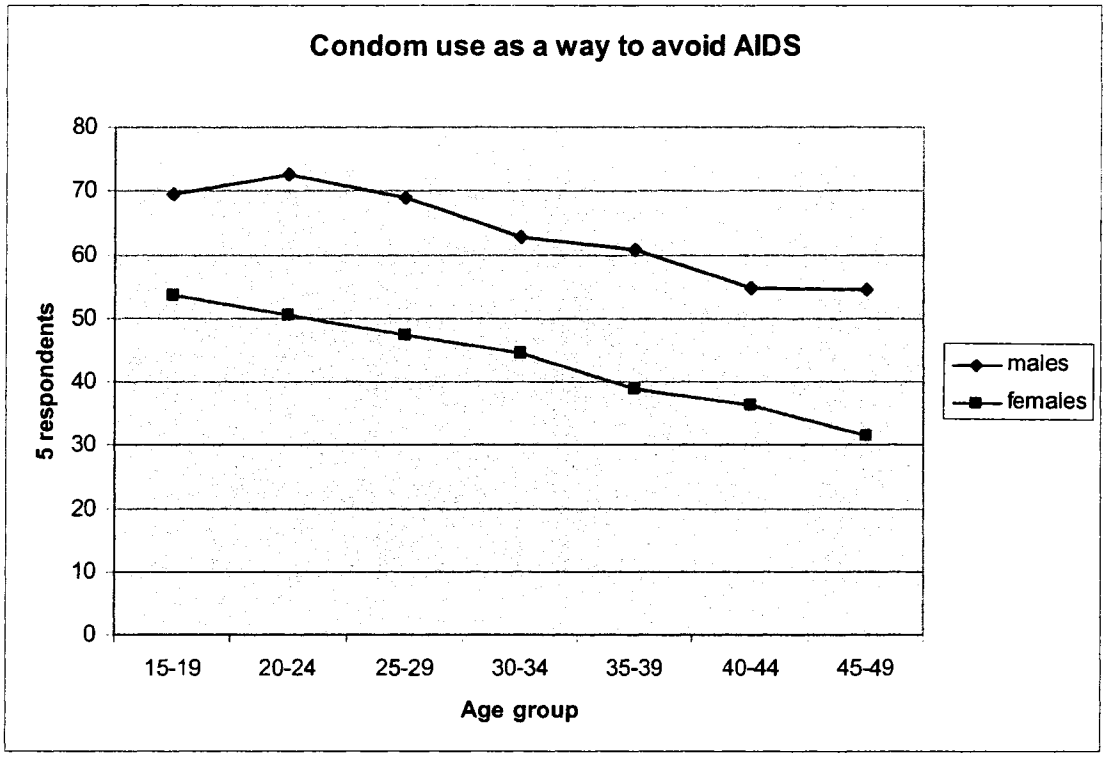


Figure 8. Condom use for avoiding AIDS

A Chi square test of males ([6] = 79.497, $p < .001$) showed significant differences between male age groups for condom use in avoiding AIDS. This was same for female age groups with a significant measure of Chi square ([6] = 198.258, $p < .001$). In both cases correct responses decreased with age. A test of males and females (Chi square [1] = 502.915, $p < .001$) revealed significant gender differences, males (65.9%) reporting more condom use than females (46.4%) on average.

Figure 9 presents a pattern of responses for male and female age groups regarding having only one uninfected partner as a way to avoid AIDS.

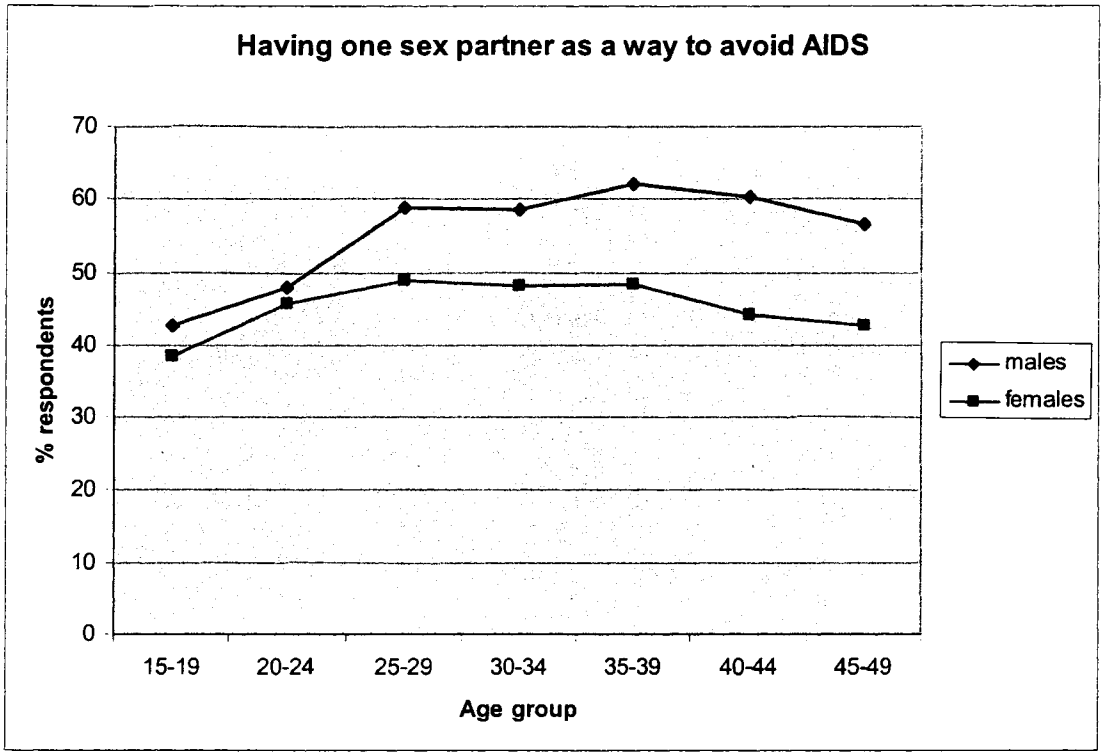


Figure 9. Fidelity as a way to avoid AIDS

Chi squares for both males ([6] = 107.296, p < .001), and females ([6] = 70.598, p < .001), revealed significant differences among age groups for having only one uninfected sex partner as a way to avoid AIDS. In both genders, the youngest age group gave the fewest correct responses. A Chi square test showed significant gender differences for use of one sex partner as a way to avoid AIDS (Chi square [1] = 91.072, p < .001). Males (52.9%) reported higher knowledge of fidelity compared to females (44.6%) on average.

Misconceptions about HIV

Certain misconceptions about a disease may derail an entire population if they fail to understand what is right or wrong about that particular disease. To further evaluate

knowledge about HIV transmission, male and female respondents were asked during the DHS-III if a healthy person can have HIV, whether HIV can be transmitted by a mosquito bite, whether HIV can be transmitted by witchcraft or supernatural means, and whether HIV can be transmitted by sharing food with an infected person.

Figure 10 is a graphical representation of both male and female participants who are aware that HIV cannot be transmitted by mosquito bites.

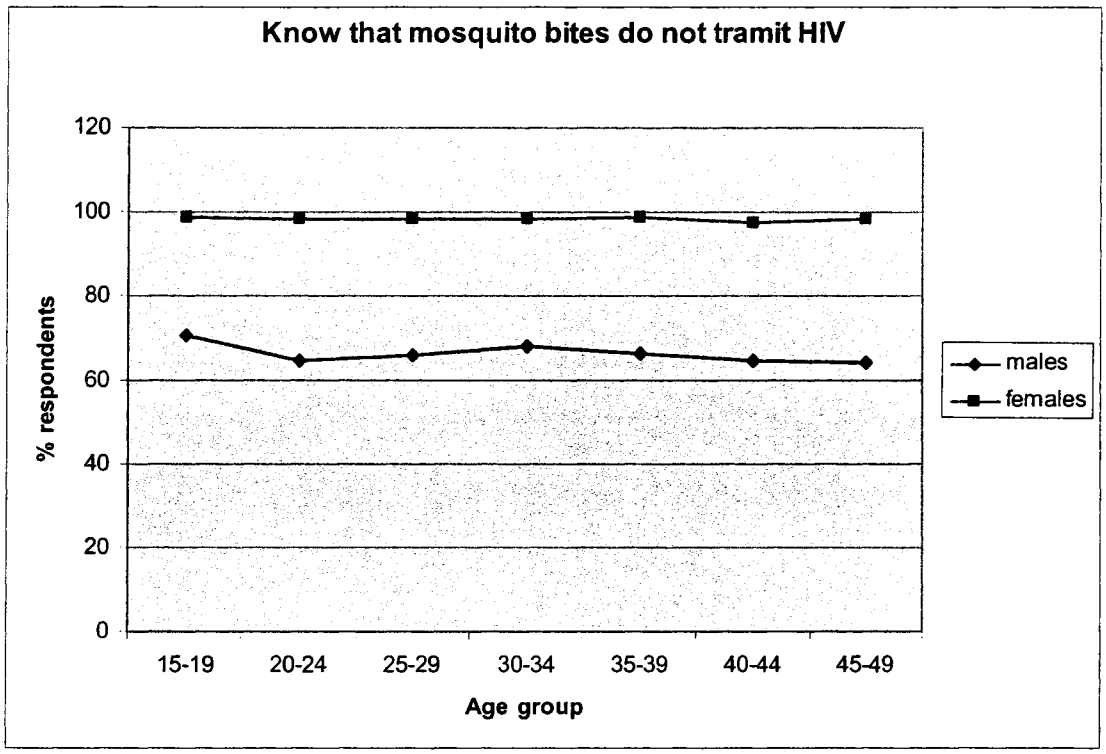


Figure 10. Knowledge of whether HIV can be transmitted by mosquito bite

Chi squares for males ([6] = 12.650, p = .049), and females ([6] = 6.104, p = .412) showed barely significant and non significant differences between age groups for knowing that HIV cannot be transmitted by mosquito bites. A significant difference is observed between genders ([1] = 3222.4.491, p < .001), with females (98.3%) being more aware that HIV cannot be transmitted by mosquito bite than males (67.0%).

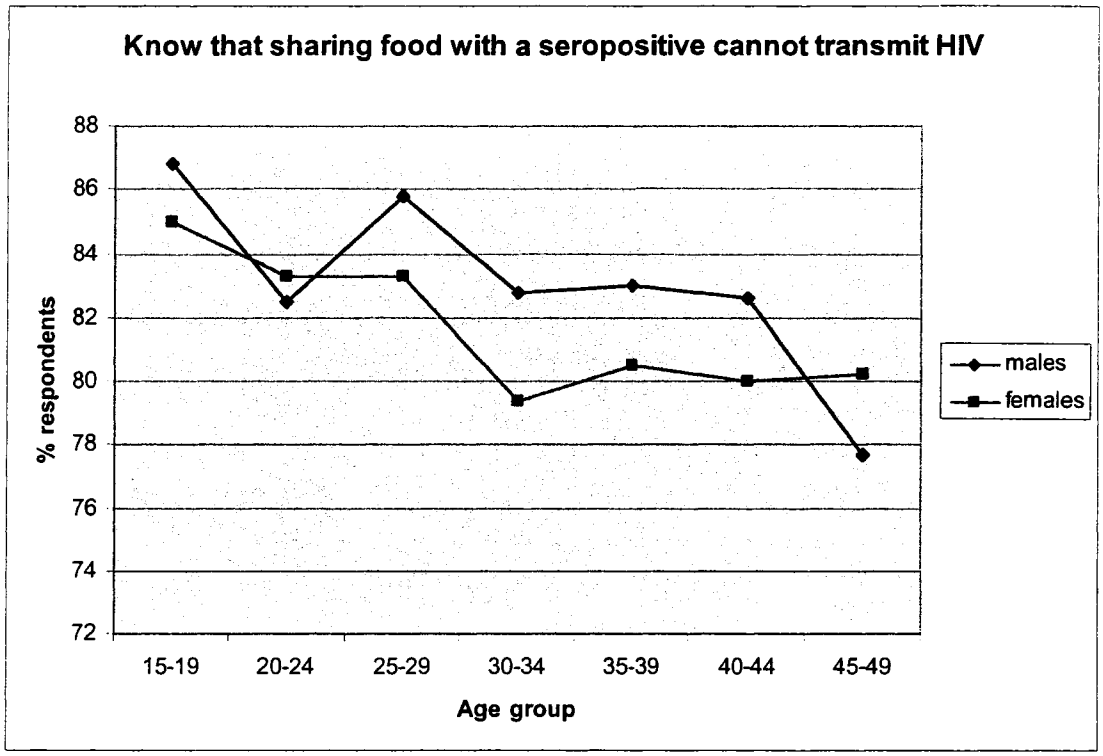


Figure 11. Knowledge of whether HIV can be transmitted by sharing food with a seropositive

Figure 11 shows knowledge levels of study participants whether HIV can be transmitted by sharing food with a seropositive. Chi squares for males ([6] = 22.469, p = .001), and females ([6] =32.788, p < .001) showed significant differences between age groups for knowing that HIV cannot be transmitted by sharing food with a person who has AIDS. In both genders, knowledge decreases with age. In addition, a significant difference is observed between genders ([1] = 4.2, p = .038). On average, more males (83.9%) reported knowing that HIV cannot be transmitted by sharing food with a seropositive compared to females (82.5%).

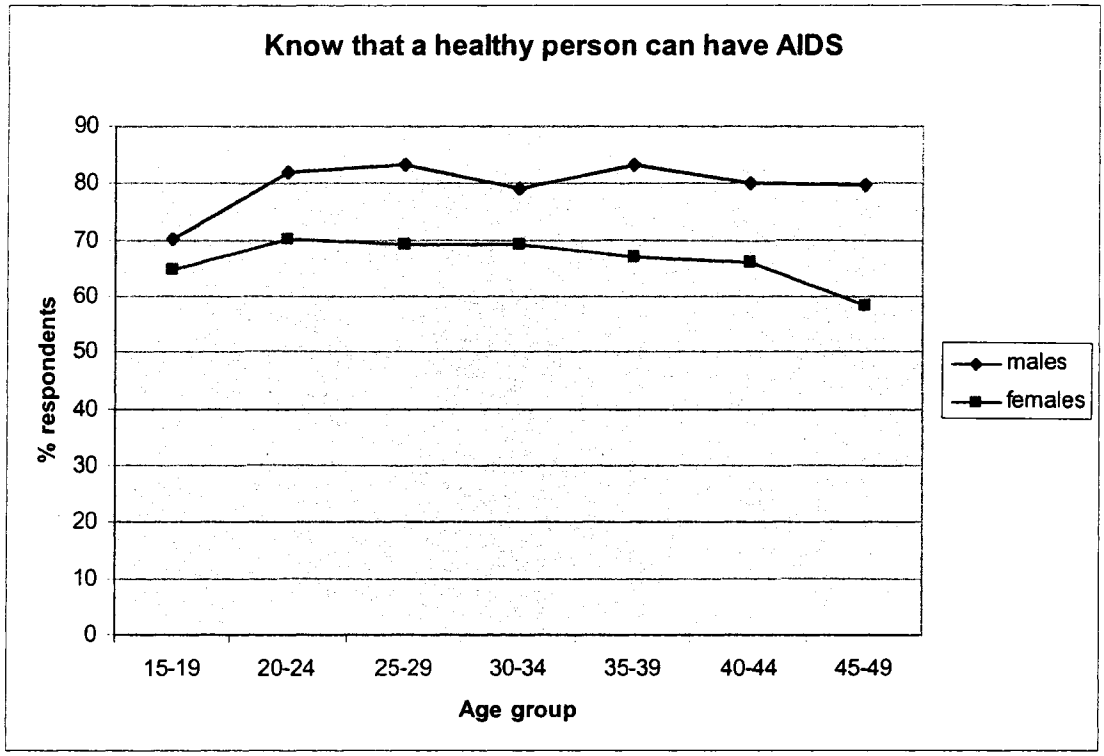


Figure 12. Knowledge of whether a healthy person can have AIDS

Another knowledge variable investigated in the study is whether a healthy (asymptomatic) person can have AIDS. Participant opinions are illustrated on figure 12. Chi squares for males ([6] = 76.862, $p < .001$), and females ([6] =49.341, $p < .001$) showed significant differences between age groups for knowing that a healthy person can have AIDS. For males, the youngest were least knowledgeable; for females knowledge decreased more in the older groups. Comparing genders, Chi square ([1] = 211,937, $p < .001$) reveals significant gender differences for males and females. Overall, males (78.7%) reported higher knowledge of the fact that a healthy person can have AIDS compared to females (67.2%).

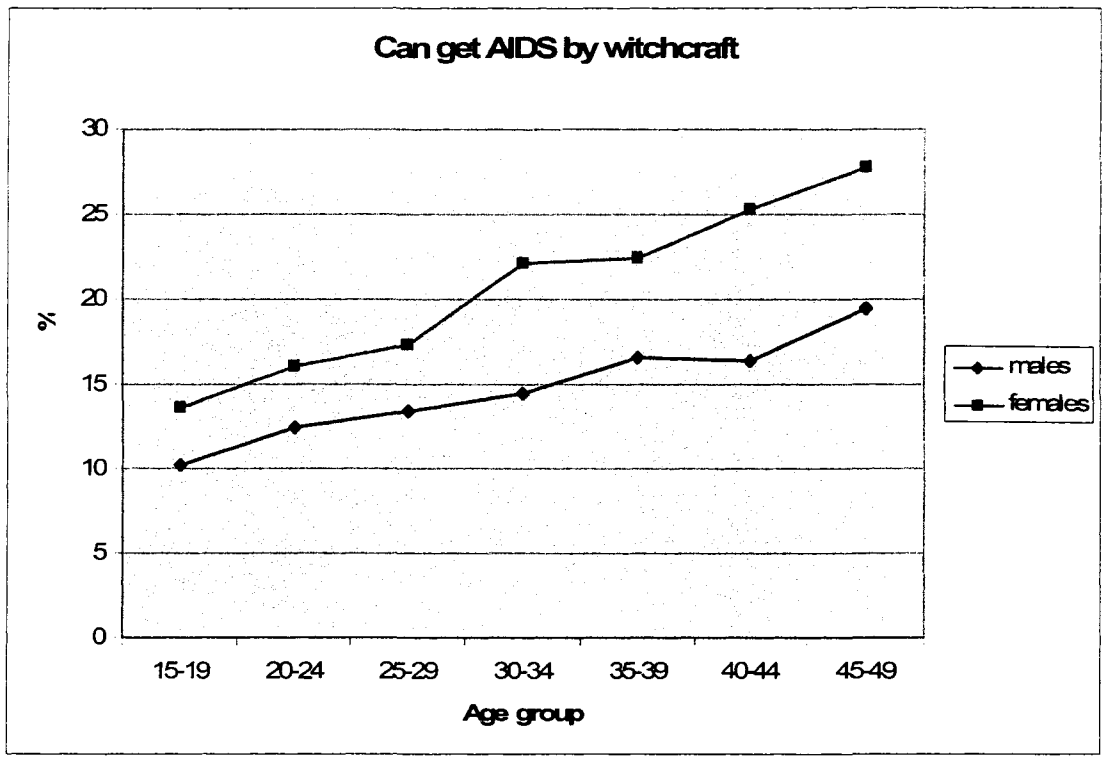


Figure 13. Knowledge of whether AIDS results from witchcraft or supernatural means

Another misconception about the transmission of HIV is the fact that some individuals attribute the disease to result from witchcraft or supernatural means. This study investigated the belief that HIV can be transmitted by this method. The responses are illustrated in figure 13. Chi squares for males ([6] = 30.792, $p < .001$), and females ([6] =143.993, $p < .001$) showed significant differences between age groups for the belief that AIDS results from witchcraft or supernatural means. In both cases this belief increased linearly with age. Comparing genders, Chi square ([1] = 60.135, $p < .001$) reveals significant gender differences for males and females. On average, 13.6 % of males believed that AIDS can be contracted by witchcraft or supernatural means compared to 18.6 % of females.

Transmission from Mother to Child

Transmission of HIV from mother to child is the primary method by which children acquire AIDS. During the DHS-III, both genders were asked if they know that the HIV virus, which causes AIDS, can be transmitted from mother to child and during which process the transmission will occur. The variables investigated here were knowledge of mother to child transmission during pregnancy, during delivery, and during breastfeeding.

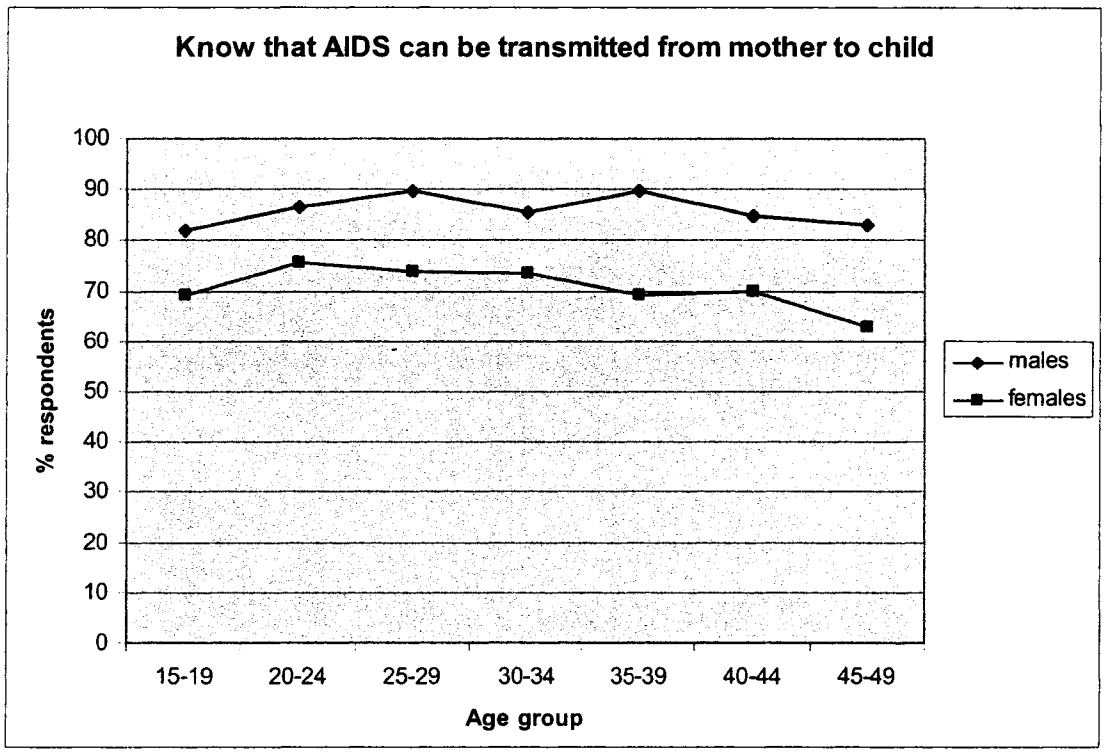


Figure 14. Knowledge of whether HIV can be transmitted from mother to child

Figure 14 is an illustration of respondents who know that HIV can be transmitted from mother to child, consequently able to identify transmissions methods. Chi squares

computed for male and female age groups with regards to their knowledge of whether HIV can be transmitted from mother to child revealed significant differences between age groups for both males ([6] = 33.571, $p < .001$) and females ([6] = 63.603, $p < .001$). For both genders knowledge was lowest in the youngest and oldest groups. Chi square test ([1] = 370.130, $p < .001$) of males and females revealed significant gender differences in knowledge of mother to child transmission, males (85.7%) reporting higher knowledge levels than females (71.3%) on average.

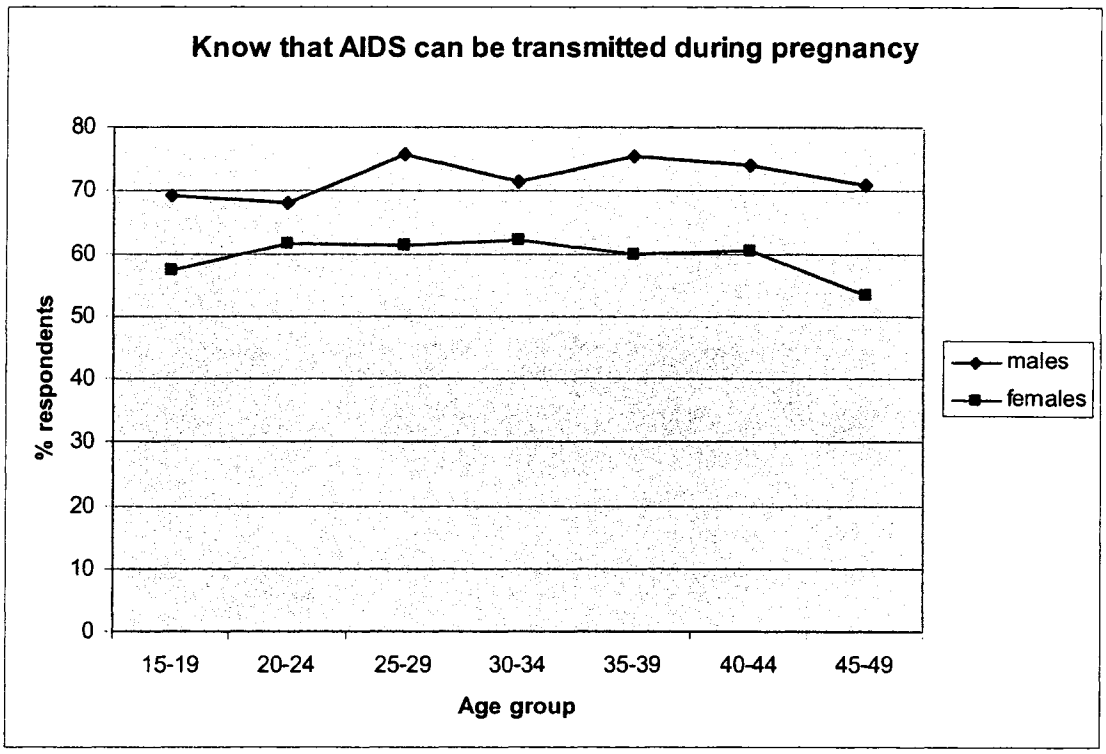


Figure 15. Knowledge of transmission of HIV during pregnancy

Knowledge of transmission methods were investigated separately. Figure 15 illustrates responses from participants who identified pregnancy as a possible means of transmission. Chi squares for male and female age groups with regards to their level of knowledge that HIV can be transmitted from mother to child during pregnancy, revealed

significant differences between age group for both males (Chi square [6] = 20.379, p = .002) and females (Chi square [6] = 63.603, p < .001). Chi square test ([1] = 199.004, p < .001) between males and females revealed significant gender differences in knowledge of mother to child transmission of HIV during pregnancy; males (71.5%) reporting higher knowledge levels than females (59.7%) on average.

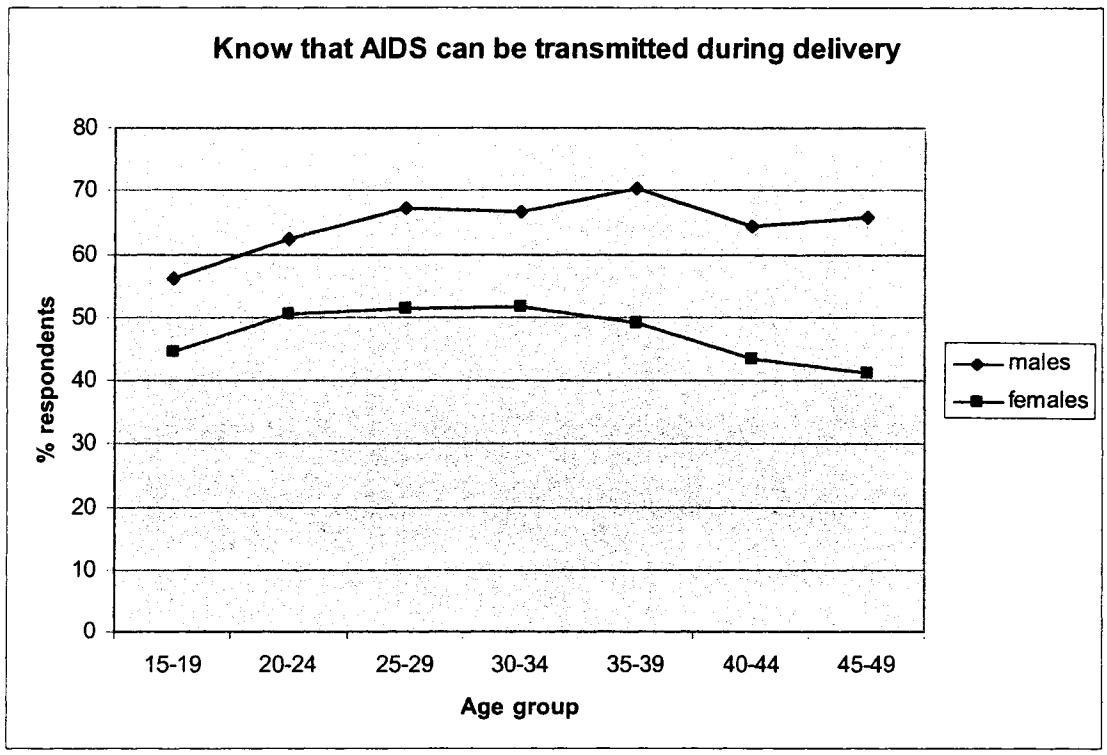


Figure 16. Knowledge of transmission of HIV during delivery

Knowledge of mother to child transmission during delivery is represented on figure 16. Chi squares with regards to their level of knowledge that HIV can be transmitted from mother to child during delivery, revealed significant differences between age groups for both males (Chi square [6] = 47.814, p < .001) and females (Chi square [6] = 54.271, p < .001). For males the youngest gave lower scores, while for

females, the oldest two groups were poorest. Comparing genders, Chi square ([1] = 315.850, $p < .001$) revealed significant gender differences in knowledge of mother to child transmission of HIV during delivery. Males (63.4%) reported higher levels of knowledge of transmission during delivery than females (48.0%).

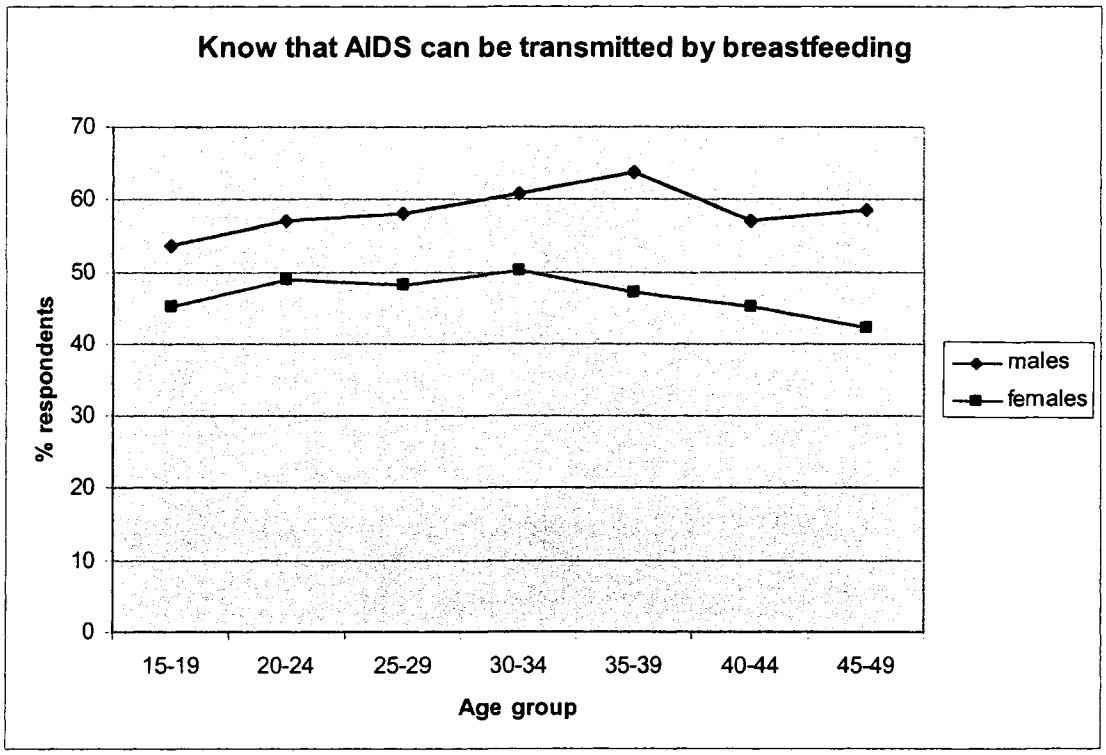


Figure 17. Knowledge transmission of HIV by breastfeeding

Lastly, study participants were questioned on their knowledge of mother to child transmission of HIV by breastfeeding. This is illustrated in figure 17. Chi squares for study participants with regards to their level of knowledge that HIV can be transmitted from mother to child by breastfeeding show significant differences among age groups for both males (Chi square [6] = 18.284, p = .006) and females (Chi square [6] = 20.800, p = .002). For males, knowledge increases until 35-39, while for females it drops after 30-34. Chi square ([1] = 145.527, $p < .001$) for gender revealed significant gender differences in

knowledge of mother to child transmission of HIV by breastfeeding. On average, males (57.5%) reported higher levels of knowledge of transmission by breastfeeding compared to females (47.1%).

Risky sexual behaviours

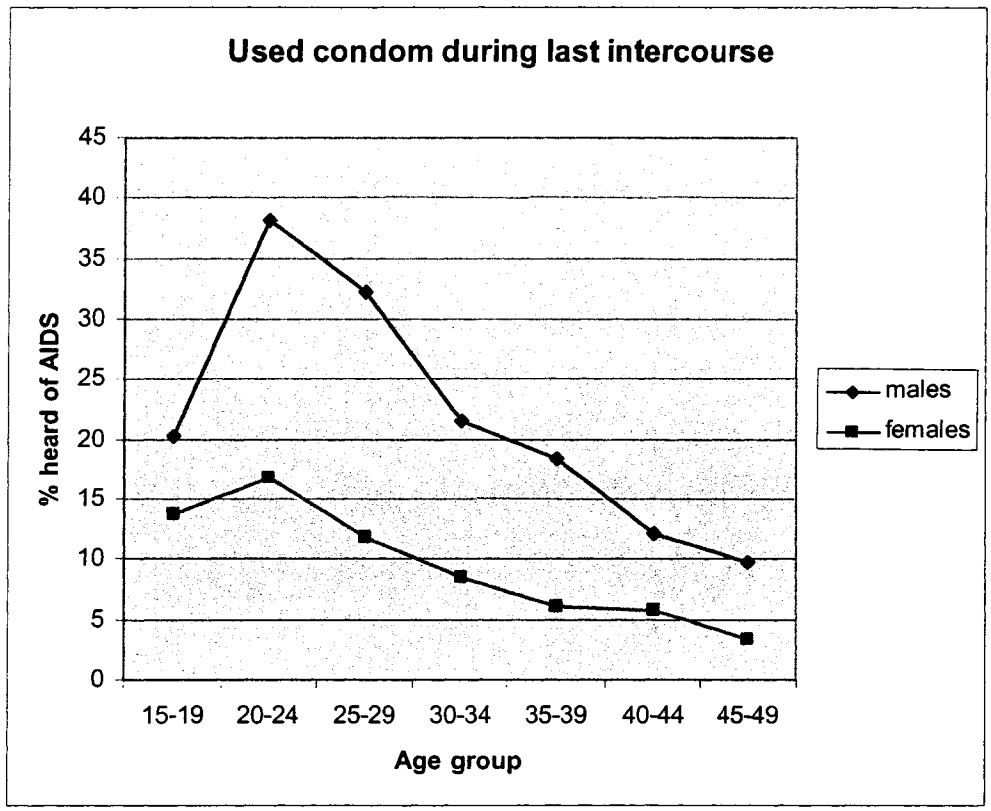


Figure 18. Condom use during last sexual encounter

Risky sexual behaviour exposes individuals to the AIDS virus. Study participants were asked whether they used condoms during their last sexual encounter. Figure 18 shows a pattern of responses obtained from study participants. Chi squares for males ([6] = 223.519, $p < .001$) and females ([6[= 198.547, $p < .001$) showed significant differences among age groups with respect to use of condoms during the last intercourse. Condom

use is highest in the 20-24 age group for both genders, and is used least by the older groups. There are also significant gender differences (Chi square[1] = 145.527, $p < .001$) between males and females with regards to their use of condoms during their last intercourse: 24.2% of males on average reported condom use during their last intercourse compared to 11.3 % of females. Because very few of the participants responded to having used condoms during their last intercourse, one may wonder if the activity involved faithful partners or was an act of indulging in high-risk sex.

To further investigate high risk sexual behaviour among study participants, they were asked the number of sexual partners other than wife or husband with whom they had sexual intercourse in the 12 months prior to the survey. This question was recoded as "yes" "no" to measure whether they had extramarital relations (relations with more than one partner). Figure 19 illustrates responses from study participants whether they had sexual intercourse with more than one partner.

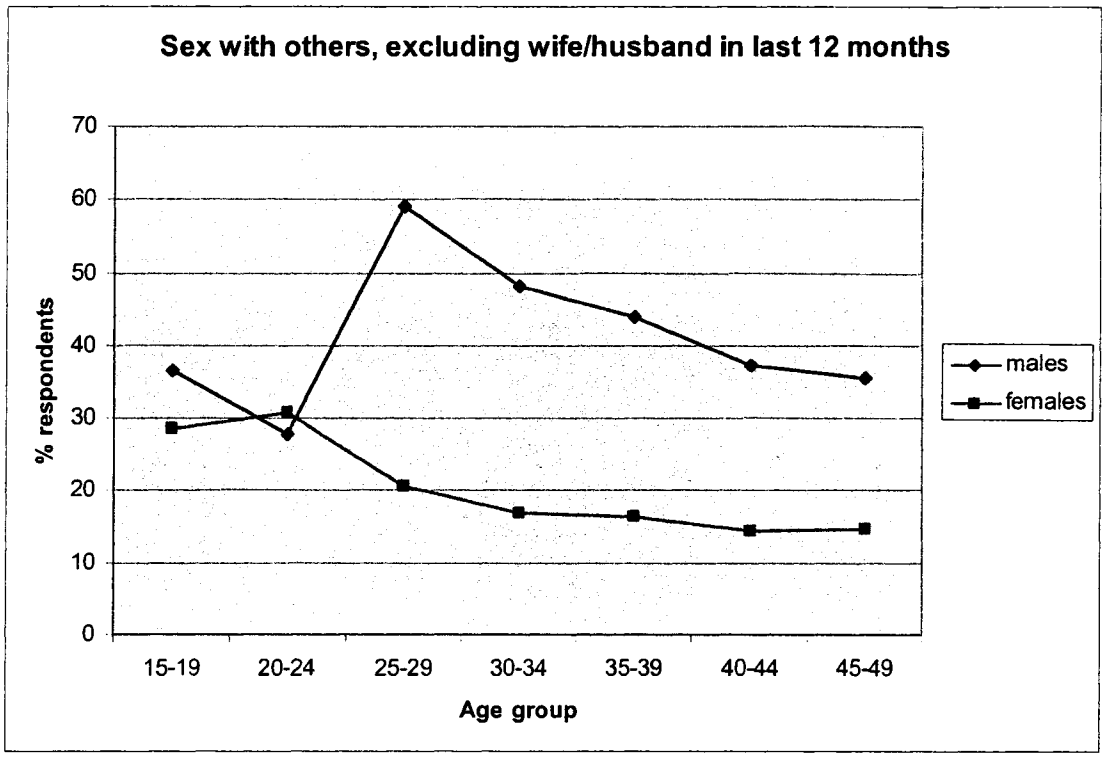


Figure 19. Sex with more than one partner in the last 12 months

Statistical analysis of responses from both genders showed significant differences between age groups for both males (Chi square [6] = 312.797, $p < .001$) and females (Chi square [6] = 249.368, $p < .001$). The males show a large increase in the 25-29 age group, which decreases with age, while the females show a decreasing percentage after the 20-24 age group. Overall, 48.7% of males reported having one or more sexual partners other than their wife. On the other hand, 22.9 % of females reported having one or more sexual partners other than their husbands in the last 12 months. This gender difference in responses is illustrated by a significant Chi square test ([1] = 1039.016, $p < .001$).

To further assess sexual activity, they were asked to indicate the number of sex partners with home they had sexual intercourse in addition to their wife (husband) in the

past 12 months. This variable was recoded to "yes" or "no" to indicate whether they were sexually active (having intercourse). The findings are presented on figure 20.

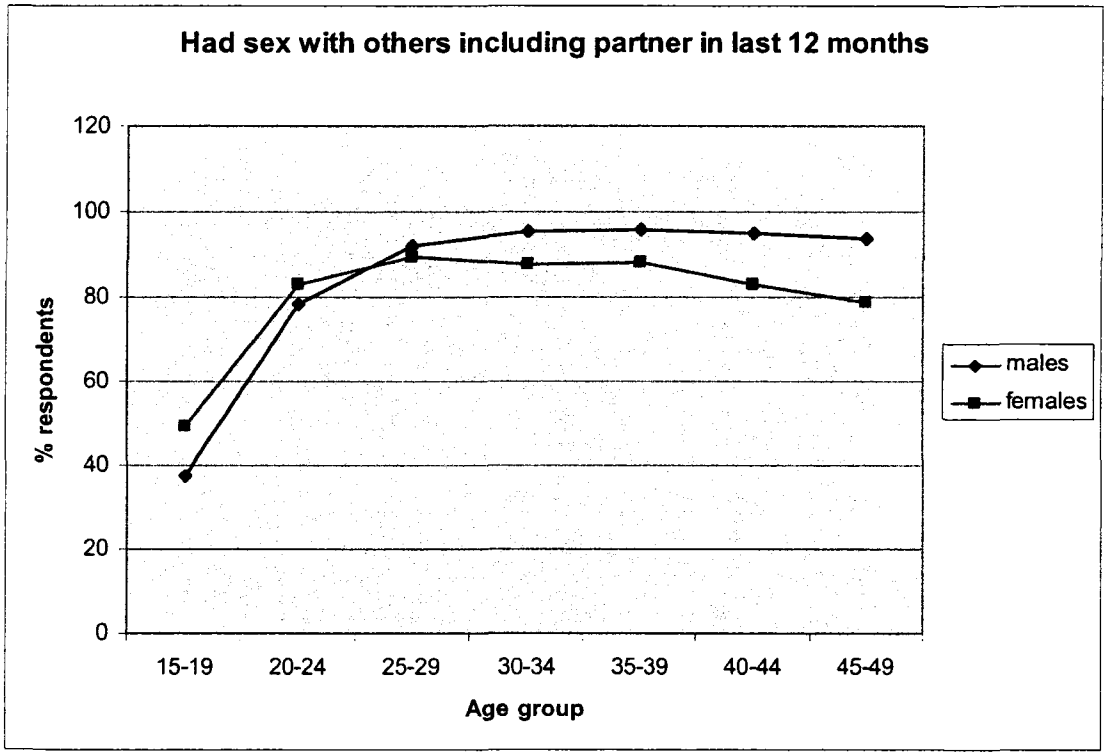


Figure 20. No of sex partners including wife (husband) in the last 12 months

Measures of Chi square for both males ([6] = 1511.472, $p < .001$) and females revealed significant differences in responses for number of sex partners including wife (husband) in the last 12 months. Sexual activity increased with age for both genders, reaching a plateau for males, but dropping off a bit for the older females. Chi square showed non significant gender differences (chi square [1] = .246, $p = .620$), with both males (76.7%) and females (76.3%) reporting equal levels of sexual activity.

Stigma Associated with HIV/AIDS

Discrimination toward people infected with HIV can affect their psychological well-being and social interaction in the society. The DHS-III evaluated how people behave toward those infected with HIV/AIDS through a series of questions: if it is necessary to keep HIV infection a secret, if they will care for a parent or relative infected with HIV/AIDS, if a teacher infected with HIV should continue teaching, and if they would buy vegetables from a person infected with HIV/AIDS.

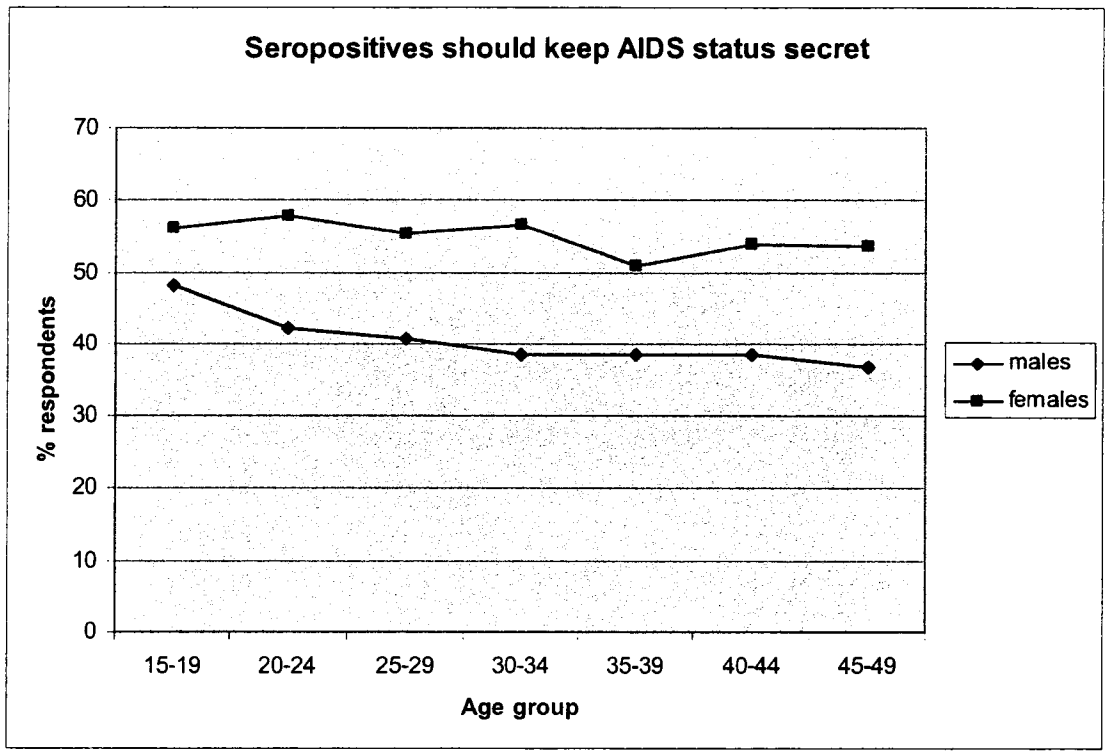


Figure 21. Disclosure of HIV status

Figure 21 presents responses from participants about the opinion that persons infected by HIV should keep their HIV status a secret. Opinions on keeping HIV status a secret differ significantly among age groups for both males (Chi square [6] = 31.046, p <

.001) and females ([6] = 16.687, p = .011). In both genders, wanting to keep it a secret decreases with age. Females (55.5%) reported a higher agreement on keeping the HIV status of a seropositive secret compared to males (41.9%), Chi square ([1] = 245.806, p < .001).

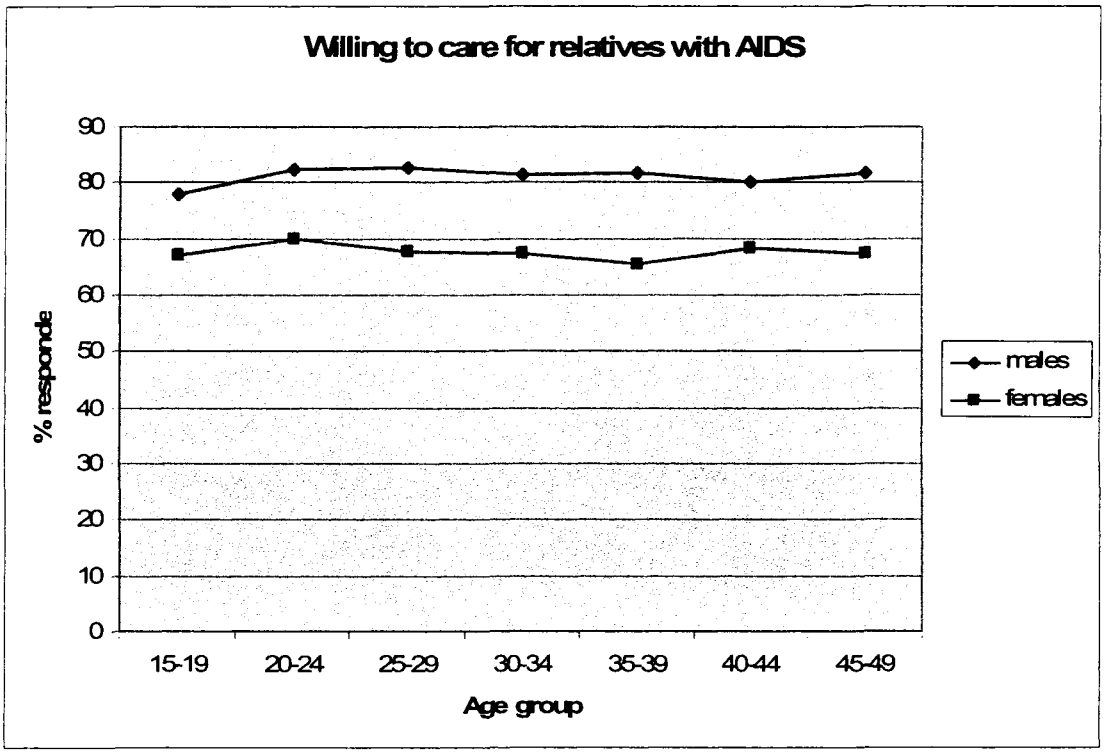


Figure 22. Willing to care for parent or relative with HIV

To further understand stigma, study participants were ask if they would care for a parent or relative infected with HIV. The responses are shown on figure 22. Interestingly, no significant differences exist among age groups with respect to caring for a parent or relative with HIV. This is illustrated by the Chi squares for males ([6] = 11.239, p = .081)

and females ([6] = 7.409, p = .285). Conversely, Chi square tests revealed significant gender differences (Chi square [1] = 279.135, p < .001) , with males (80.8%) indicating more that they are willing to care for a parent or relative with HIV compared to females (67.7%).

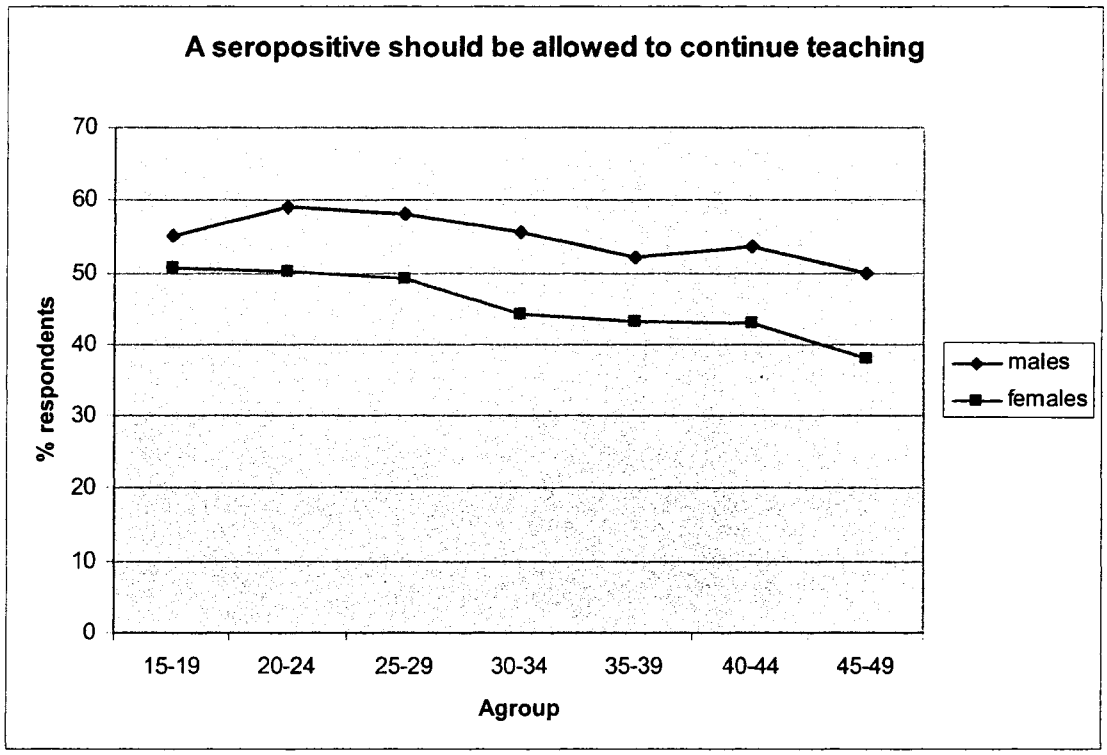


Figure 23. Opinions on whether a teacher infected with HIV should continue teaching

Figure 23 presents responses from study participants about the opinion that a teacher infected with HIV should be allowed to continue teaching. Results from male participants indicate significant differences in opinion among age groups (Chi square [6] = 14.802, p = .022) with regards to whether a teacher with HIV should be allowed to continue teaching. Similarly, significant differences were found among female age groups (Chi square [6] = 67.186, p < .001). In both cases opinions generally became less

positive with increasing age. Gender differences were observed (Chi square [1] = 91.980, p< .001) on this opinion, males (55.6%) being in favour compared to 47.3 % of females.

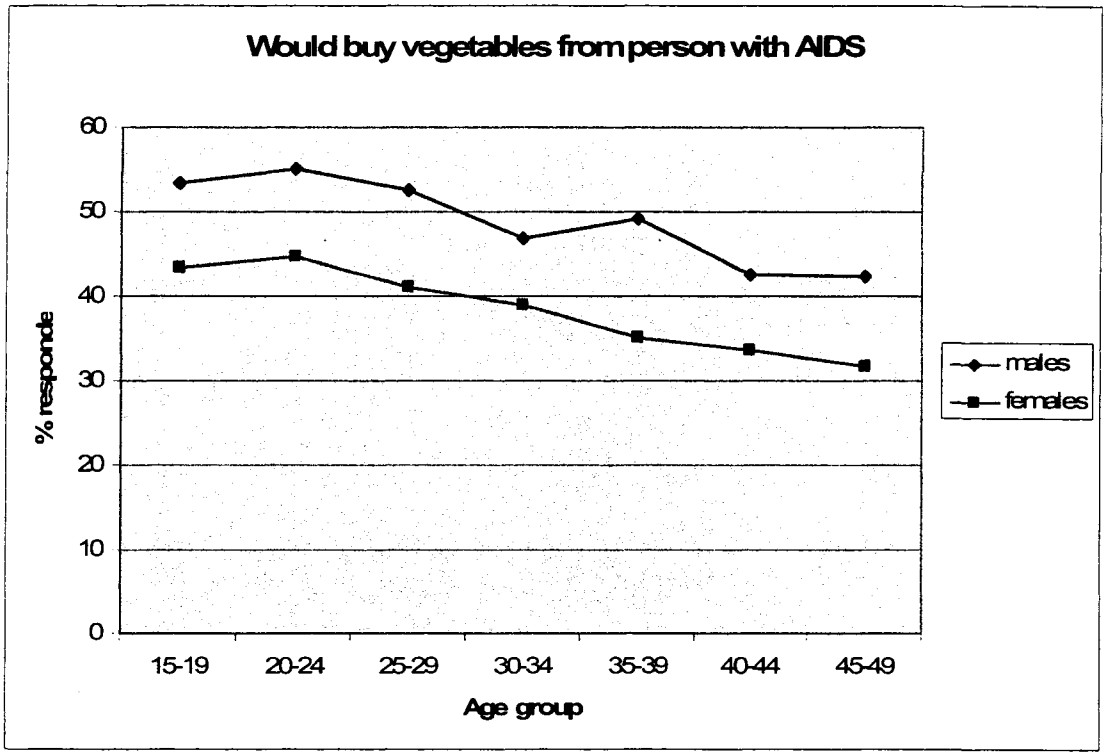


Figure 24. Would buy vegetables from a person infected with HIV

Finally, study participants were asked if they would buy vegetables from a vendor with AIDS. This was another strong measure of stigma and attitudes towards seropositives. The findings are presented on figure 24. Significant differences in opinion were observed among age groups for males (Chi square [6] = 37.180, p < .001) and females ([6]= 80.130, p < .001) regarding whether they will buy vegetables from a vendor with AIDS. In both genders, opinions became more negative with increasing age. A test of gender differences in opinion revealed significant differences between males

and female responses (Chi square [1] = 143.060, p < .001). Overall, males (50.6%) were more in favour compared to females (40.3%).

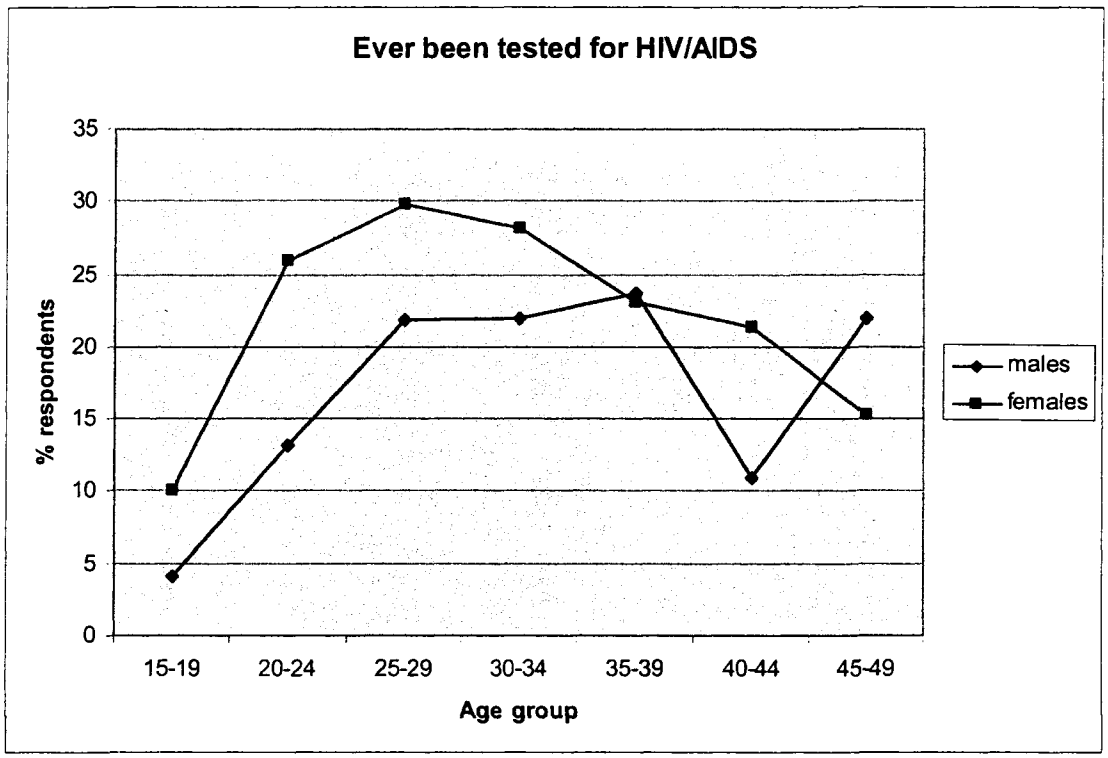


Figure 25. Ever been tested for HIV

The stigma associated with HIV/AIDS together with misconceptions about the disease deters some persons from testing for HIV. Study participants were asked if they have ever been tested for HIV. Figure 25 summarizes the responses in graphical form. Significant differences in response were found among age groups for both males (Chi square [6] = 208.141, p < .001) and females ([6] = 351.034, p < .001). The likelihood of testing increased until ages 25-29 for both males and females. After that point, females deacreased, while the testing rates for males remained high, except for an anomaly in the 40-44 age group. Also gender differences were observed as revealed by the Chi square

([1] = 68.955, $p < .001$): only 15.7% of males and 21.5% of females reported to have tested for HIV.

Knowledge and Use of the Voluntary HIV Testing and Counseling Center (CPDV)

Knowing the HIV/AIDS status of a population age group may help in designing prevention programs for that population. Part of the action plan of the Cameroon government to fight HIV/AIDS was to create voluntary HIV screening and prevention centers (CPDV). During the DHS-III, the respondents were asked a country-specific question with four levels of dependent variables (ever heard of CPDV, ever been to CPDV, tested for HIV at CPDV) to investigate the participants' knowledge of and use of the centre for voluntary HIV prevention and screening.

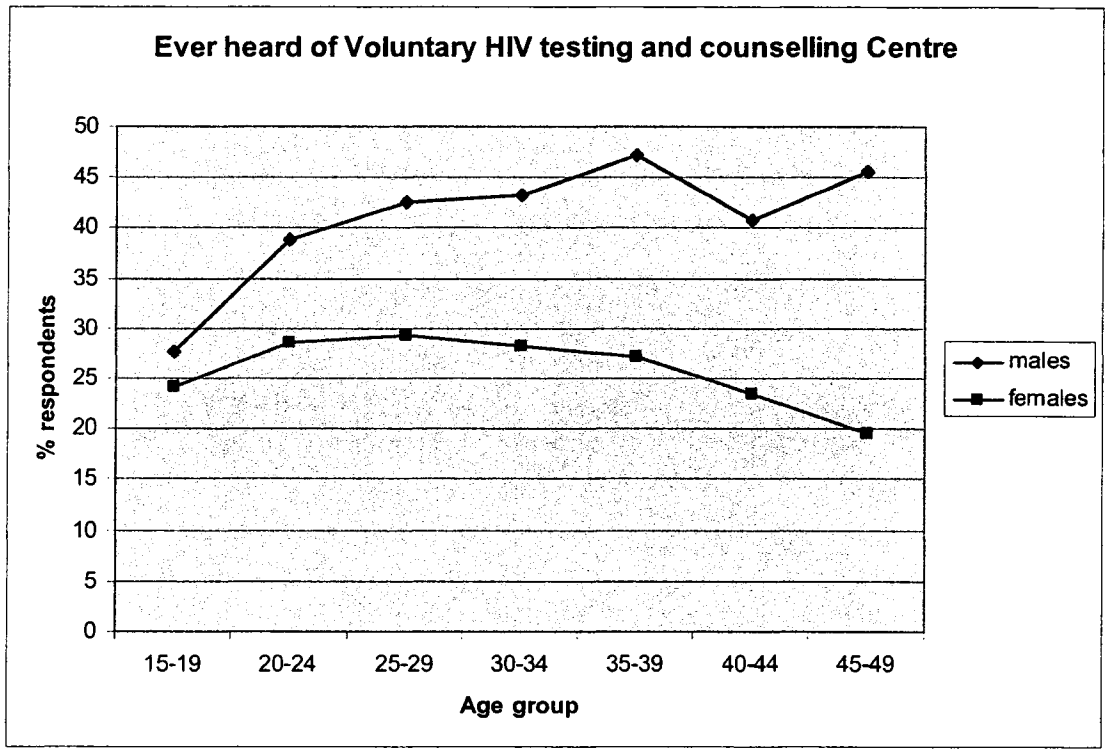


Figure 26. Knowledge of the Voluntary HIV testing and counseling center

Figure 26 illustrates graphically, responses of participants about having knowledge of the CPDV. There are significant differences among age groups in terms of their knowledge of the CPDV for both males (Chi square [6] = 93.815, $p < .001$) and females ([6] = 41.607, $p < .001$). Knowledge increased with age for males, but decreased for the older women. Significant gender differences in response were also observed (Chi square [1] = 238.288, $p < .001$). An average of 38.7% of males reported having knowledge of the existence of the CPDV compared to 26.3% of females. However, these knowledge levels are both rather low.

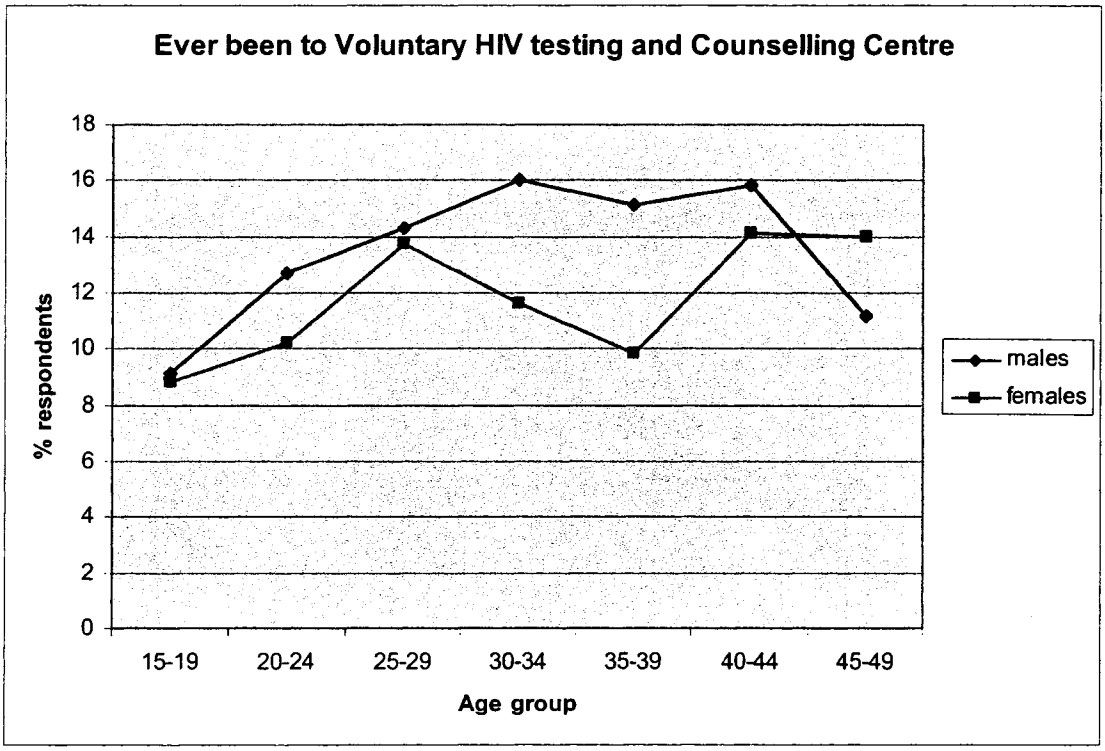


Figure 27. Ever been to the Voluntary HIV testing and counseling center

A very small proportion of participants reported having been to the CPDV as illustrated on figure 27. However, this question did not sort the reasons for going to the CPDV. There were no significant differences among male and female age groups with regards to whether they had been to the CPDV, Chi squares ([6] = 9.351, p = .155) for males and ([6] = 10.891, p = .092) for females. Nevertheless, significant gender differences in response were observed (Chi square [1] = 4.906, p = .027). A total of 13.3% of males on average reported having been to the CPDV compared to 11.1% of females.

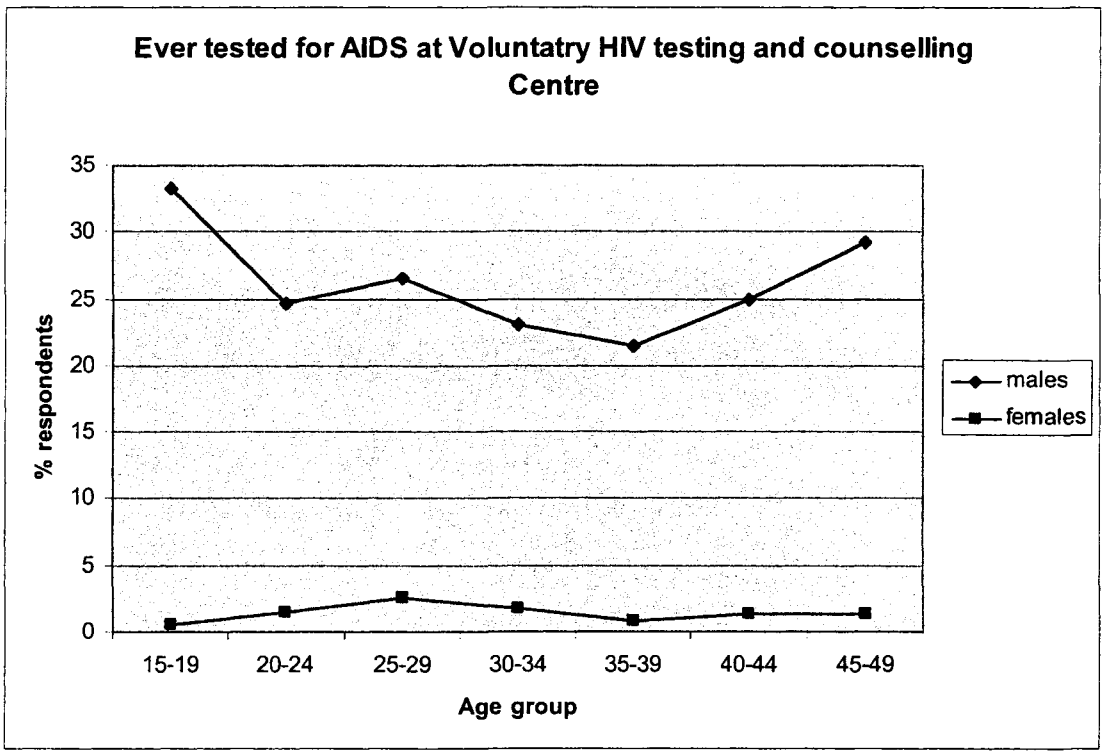


Figure 28. HIV testing at the CPDV

Finally, the use of the CPDV was evaluated by asking participants if they have tested for HIV at the CPDV. Figure 28 shows the responses of study participants. Chi

squares showed no significant differences in response among male age groups (Chi square [6] = 2.061, p = .914), conversely significant differences exist among female age groups ([6] = 33.189, p < .001), although the rates are very low for every age group. Figure 28 shows a remarkable gender difference in response regarding testing for HIV at the CPDV. This is confirmed by computed Chi square ([1] = 1070.213, p < .001) where males (25.3%) reported more testing for HIV at the CPDV compared to only 1.4% of females.

Predicting HIV/AIDS

A remarkable aspect of the (2004) DHS-III in Cameroon was that testing for HIV was included on a voluntary basis as a country-specific measure. For those who consented to the test, 88.5% (10,678) were available for testing. From the results, the researcher examined the odds of testing positive (independent variable) for HIV based on the following dependent variables: living in a cluster near the Chad-Cameroon pipeline (pipeline cluster), education, gender, and medium of residence (urban/rural).

Table 9. Logistic Regression of Selected Model Variables on HIV

Variable	Chi-square	*df*	Sig.	EXP(B)	95% C.I for EXP(B)
Pipeline cluster		1	.003	1.330	1.100-1.608
Education		1	.001	1.614	1.213-2.148
Gender		1	.000	1.856	1.559-2.209
Residence milieu		1	.001	.724	.598 - .877
Omnibus tests	99.710	4	.000		
Hosmer and Lemeshow test	1.423	6	.964		
Cox & Snell r square	.009				
Nagelkerke r square	.027				

*Significance at $p < .05$ Total: 10,678 (88.5%)

Table 8 shows the results for all four predictors. The omnibus test was significant,(Chi-square [4] = 99.710, $p < .001$). All variables made significant contributions to predicting HIV. The Cox & Snell and Nagelkerke coefficients indicated

that 0.9% to 2.7% of the variance for the HIV test was accounted for by this set of variables.

The odds ratios indicated that individuals who live on clusters near the pipeline are 1.3 times more likely to test positive for HIV than others ($p = .003$). Educated persons are 1.6 times more likely to test positive for HIV than less educated people ($p = .001$). Meanwhile, females are almost two times (1.9) more likely to test positive for HIV than males ($p < .001$). As to the milieu of residence, urban residents are 1.4 times more likely to test positive for HIV than rural residents ($p = .001$).

Summary

The sample's knowledge of HIV/AIDS was high, but differences existed among age groups and between the genders, with females generally less informed than males about HIV/AIDS. There were gender differences in condom use and risk perceptions. Risky sexual activity was a factor propagating the AIDS epidemic, with men very much more involved in risky behaviour than women. Educational level and SES were found to influence people's sexual behaviour and likelihood of contracting HIV. HIV can be predicted using gender, education, and milieu. The next chapter discusses the findings and makes recommendations for future action.

CHAPTER 5: DISCUSSION

Knowledge of HIV differs with gender. Males reported higher levels of knowledge of HIV than females in all age groups. However, knowledge levels for both males and females follows a similar pattern, with females (45-49 year) being the least aware. On average, males (93.5%) reported more knowledge on ways to avoid AIDS compared to females (81.9%). This difference in knowledge about avoiding AIDS varies among age groups for both genders and does not follow a similar pattern. For females, the knowledge of ways to avoid AIDS decreased with age, while for males it was lower for both the 15-19 (91.1%) and 45-49 (92.2%) year age groups.

Abstinence was identified as one of the ways to avoid AIDS. On average, more men reported abstinence as a way to avoid AIDS compared to women. The pattern of responses for both male and female age groups differs, with the 45-49 year olds registering the fewest correct responses. It is worth noting that for this particular variable, the response frequency for all female age groups was below fifty percent, but above fifty percent for all male age groups.

Another way to avoid AIDS is condom use. On average, males identified condom use as a way to avoid AIDS more than females. For both genders. knowledge of condom use as a way to avoid AIDS decreases with age, the 15-19 year old reporting the most and the 45-49 year group reporting the least knowledge levels. Having one uninfected sex partner is one of the ways identified for combating AIDS. Overall, males were more in favour of having one uninfected partner as a way to prevent AIDS than women. An irregular pattern of responses over age groups was observed for this particular variable as illustrated in figure 9. However, it is worth noting that in both genders, the 15 -19 year

age group were least likely to report having only one uninfected partner as a way to reduce their chance of contracting AIDS. The reported low levels of knowledge of females about HIV/AIDS compared to males relates to previous studies by UNAIDS (2005) in which females reported low knowledge levels of HIV transmission routes.

The fact that malaria is transmitted by a mosquito bite led some people to believe that it would be the same with HIV. On average, females were more aware than males that HIV cannot be transmitted by mosquito bite. The difference in awareness was uniform across female age groups, while for males, the 15-19 year olds were the most aware that HIV cannot be transmitted bite mosquito bite. In a related study in Nigeria, Onifade (1999) found similar rudimentary knowledge about HIV transmission routes, identifying kissing and mosquito bites as a transmission route reported by study participants.

Another misconception about the transmission of HIV is the belief that sharing food with a seropositive may transmit the virus. For this variable, males were more knowledgeable than females that the HIV virus cannot be transmitted by sharing food. The frequency of responses for this misconception varies among age groups of both genders, with the 15 – 19 year age group being the most knowledgeable about this misconception, and knowledge decreasing with age. Another misconception about transmission of HIV is the belief that a healthy person cannot have AIDS. For males, the 15-19 year olds were least knowledgeable, while for females, knowledge decreased more in the older group. However, it is worth noting the gap in frequency of responses between males and females. Kuate –Defo (2004) had reported the same gender difference in this misconception in an earlier study of adolescents in Cameroon.

On the misconception that AIDS can be transmitted by witchcraft or supernatural means, females were more of this opinion than males. The pattern of response for both genders shows that the misconception of transmission of HIV by witchcraft increases with age. However, for both male and female age groups, only a slim proportion of individuals have this belief (13.6% and 18.6%, respectively).

Mother to child transmission of HIV was investigated at four levels; knowledge of transmission from mother to child, and subsequently transmission during pregnancy, delivery and breast feeding. In all four situations, males reported higher knowledge levels compared to females. Differences in knowledge levels among age groups for both males and females were observed for knowledge of mother to child transmission, transmission during pregnancy, delivery and breastfeeding. There was no uniformity in the pattern of responses over age. For all four measures, knowledge was low in the 15-19 year olds, and older females showed a larger decrease in knowledge than older males.

Some of the variables used to assess risky sexual behaviour between genders included condom use and sex with multiple sex partners. For condom use during intercourse in the last 12 months prior to the study, males, overall, reported more condom use than females. This difference in response between genders is also observed among age groups for each category. The pattern of responses were similar for both male and female age groups, the 20 – 24 year category reporting the most condom use during and the 45 – 49 year reporting the least. This study did not investigate access to female condoms. However, this finding of lower condom use among females compared to males had been documented earlier (Njikam Savage, 2005; Rwenge, 2004; Calves, 1999).

To explore risky sexual behaviour through the use of multiple sex partners, study participants indicated whether they had sex with other than their wife/husband. Males and females were similar for the 15-19 and 20-24 age groups, but after that the number of males having multiple sexual partners increased, while the rates decreased for females.. This decrease in number of sex partners with age may be explained by the fact that the decision to marry a partner is delayed over time, during which there is a tendency to have other partners. Also, males may be over reporting number of sex partners other than their wives while females may be under reporting, due to stigma. Being in a polygamous relationship could be another factor to explain this difference in frequency of response. Nevertheless, discrepancies in use of multiple sex partners have been well documented with males reporting having more sexual partners than females (Calves, 1999; Holtedahl et al. 2005; Njikam Savage, 2005).

Being sexually active (having intercourse) was measured by responding to the number of sex partners with whom study participants had sex with including their wife (husband). Contrary to the previous question the pattern of response for this variable was the same for both males and females. The 15-19 year olds were the least sexually active, and males increased with age to near the maximum (about 95%), while females increased, then decreased in the oldest groups to about 80% active.

The stigma associated with HIV/AIDS affect the way people will react to situations involving seropositives. Gender differences were observed with regards to keeping the HIV status a secret. Overall, females were more of the opinion that that HIV status should be kept a secret compared to the males. However, there was variation in this opinion among age groups for both males and females but with no uniform pattern

observed. Except for the 15-19 year male age group, the frequency of response for keeping HIV status a secret decreased with age. Also gender differences were observed for willingness to care for family members with AIDS. Males reported more willingness to provide care for relatives infected with AIDS compared to females. Interestingly the response did not differ among age groups for either gender.

Gender differences were also observed for the opinion on whether a teacher with HIV should continue teaching. Males were more for this opinion compared to females. However, the levels of opinion differed among age groups and followed a similar pattern, with the 45 – 49 year age group having the least responses for this opinion. Lastly, gender differences were also observed for the opinion on whether study participants would buy vegetables from a vendor with AIDS. Overall, males were more affirmative to this statement compared to females. The difference in opinion was also reflected among age groups. The frequency of response to this opinion decreases with age. In general the younger age group seem to be more tolerant to persons infected with HIV than the older age groups. Such unfounded fears of casual contact among the older respondents have important implications because this group of people may suffer from overly cautious behaviour when they come into contact with people infected with AIDS. Tolerance levels for people with AIDS were generally low, indicating more information needs to be disseminated.

The AIDS stigma may affect the decision to test for HIV. In this study females reported more testing for HIV than males as illustrated on figure 25. However, responses on testing for HIV differ considerably among age groups with the 15-24 year old category reporting the least testing. Knowledge of the voluntary HIV testing and

counseling centre differs between genders. Despite the generally low levels of knowledge of the centre, males reported more than females that they were aware of the existence of the centre. The frequency of responses varies among age groups and follows and irregular pattern. For the males, the 15-19 year age group were the least informed about the existence of this center, meanwhile the 45-49 year old female age group reported the least responses to this variable. It is also worth noting the frequency of responses for all male and female age groups was below 50 percent. Even lower frequency of responses were observed from participants for visits to the CPDV. This low frequencies relate to the low levels of knowledge about its existence. Despite differences in gender for visits to the CPDV, there were no differences among age groups for males as well as female respondents. As far as testing for HIV at the CPDV is concern, far more males reported to have tested for HIV than females at the CPDV. No difference in response among male age groups was observed. Nevertheless, despite the considerably low levels of testing for HIV at the CPDV by females, differences exist among age groups, with the 15 – 19 year olds reporting the least testing and the 25-29 year olds reporting the most. However, the extremely low frequency of response for females is worrisome and needs to be targeted to narrow the gap. In contrast, for males, the 15-19 to year old reported the most testing for HIV at the CPDV followed by the 45 -49 year old. This difference between males and female age groups may be explained by the fact that the younger male age group might have responded well to HIV prevention campaigns through schools, meanwhile, for the 45-49 year male age, this may be a result of higher level of education and socioeconomic status.

This study made mention of the proximate determinants conceptual framework as a model to explain transmission of HIV. The significant independent variables investigated here: residence cluster, education, gender, and residence milieu constitute some of the underlying factors affecting transmission of HIV. Individuals who live along the Chad -Cameroon pipeline project (petrol cluster) are more likely to contract the AIDS virus than others living away from the petrol cluster. This likelihood may be explained by the fact the these clusters are made up of workers, some of whom have left their families behind and moved to the area, who may become vulnerable to sex workers looking for lucrative areas for business.

Surprisingly, individuals with higher levels of education are more likely to contract the AIDS virus compared to persons with limited eduction. This finding relates to a similar finding by De Walque (2006) where higher levels of education predicted higher levels of infidelity and lower levels of abstinence. Females are also more likely to contract the HIV virus than males. This difference may be explained by the fact that females generally are less knowledgeable than males about HIV transmission methods, and have less capacity to negotiate for condom use during sexual intercourse. Similar findings had been reported earlier studies (UNAIDS, 2004; Buve et al., 2001; Nyambi et al 2000).

Finally, the likelihood of contracting HIV is more for persons living in an urban environment compared to living in a rural area. Despite the contributions made by these variables in predicting HIV, it is worth noting that the percentage contribution by each variable is quite low. Thus these variables are not the sole determinants of HIV and it is

always necessary to understand these risk factors in the context of a comprehensive model, such as the Proximate-Determinants Conceptual Framework (see page 9).

Conclusion

The results indicated that levels of familiarity and knowledge about AIDS among Cameroonians is high but varies across population strata. Females are less informed than males about prevention methods and mother-to-child transmission. They also have more misconceptions about AIDS than males. Young adults reported higher levels of knowledge of the misconceptions about AIDS than did the older respondents.

The younger males and females reported highest levels of condom use during sexual intercourse. At the time of the survey, condoms for females were just being introduced, which may have accounted for the lower levels of condom use for females.

Both genders reported very low levels of testing for HIV/AIDS, with the males more likely to test for the virus than the females. Not even a quarter of the females knew about the CPDV, as compared with over a quarter of the males. In general, very low levels of knowledge and use of the CPDV were reported, with the males having a significant edge over females.

In Cameroon, the prevalence of HIV/AIDS increased from 1% in 1985 to 11% in 2001. Prevalence estimates for 2004 stood at 5.5%. In general, Cameroonians have somewhat high levels of knowledge about HIV/AIDS, but the catalyst for the AIDS epidemic is the population's attitude and high-risk sexual behavior.

The vulnerability to HIV occurs in clusters near the pipeline and/or in urban centres than in rural areas and increases with level of education.

Limitations of the Study

One of the primary goals of the MEASURE DHS program is to produce high-quality data and make them available for analysis in a coherent and consistent form. National surveys in developing countries are prone to incomplete or partial reporting of responses. Additionally, complex questionnaires inevitably allow for inconsistent responses to be recorded for different questions. This result is a data file containing incomplete or inconsistent data, complicating the analysis considerably for the analyst. To avoid these problems, the DHS program has adopted a policy of editing and imputation that results in a data file that accurately reflects the population studied and may be readily used for analysis.

Another problem encountered with survey data is that of missing values. A missing value is defined as a variable that should have a response, but because of interview errors, the question was not asked. The general rule for the survey data processing is that under no circumstances should an answer be made up. Instead, a missing value is assigned in the data file. Other special responses and codes are "inconsistent," "don't know," and "blanks." "Missing," "inconsistent," "don't know," and "blanks" codes are excluded when calculating statistics such as means or medians; otherwise, they are treated as real values.

Finally response bias and social acceptability bias could influence results obtained in this study. This is may come as a result of the fact that the interviewee provides a response that is obvious or expected, in addition a participant may provide responses because they

do no want to be associated to a certain social class. This might have been relected in sensitive questions such as condom use, number of sex partners. However the large sample size in this study minimizes such bias.

Recommendations

As already determined, females' knowledge about AIDS remains lower than that of males. Therefore, information, education, and communication programs targeting females should receive high priority at this stage of the epidemic. Such programs should include information about the existence and availability of female condoms and possible education on how they are used. However, females' knowledge about HIV has risen since the (1998) DHS.

Sensitization is needed on prevention methods, misconceptions, and mother-to-child transmission of HIV. Only about half of the females knew that HIV cannot be transmitted by mosquito bites, witchcraft, and supernatural means. Sensitization programs should very much target the older population, which reported relatively low knowledge about AIDS, because theses individuals are expected to transmit this information to their children and relatives. Furthermore, older persons in Cameroon society occupy positions of respect and often serve as opinion leaders within the community. They are more likely to cite friends and acquaintances as important sources of information, suggesting that they are less likely to be reached by official AIDS educational campaigns than are young adults. This is particularly true for older individuals with the lowest levels of education. Older people are much more likely than

young adults not to use condoms during intercourse and to overstate the risks of contracting HIV through casual contact.

If government-controlled voluntary counseling and HIV screening centres are to play a greater role in the fight against HIV, more sensitization has to be done on their existence, locations, and advantages. Results of HIV screening during the DHS III revealed that 88.5% of those who consented to voluntarily test for HIV actually took the test. This is an indication that more males and females are willing to screen for HIV if they are informed and motivated in culturally sensitive and appropriate ways. High-risk sex prevention campaigns are needed to specifically target the higher social class (high socioeconomic and more educated) of the population whose attitudes and behavior are likely to be dangerous and propagate the transmission of HIV/AIDS.

Finally, programs to fight the AIDS epidemic should start with a needs assessment of the target population. The needs of adolescents vary according to age, gender, class, religion and culture; urban or rural residence; in school or out of school; married or unmarried; sexually active, or not. Likewise, programs designed to meet diverse needs are clearly shaped by social and economic factors; no program model could possibly suit all contexts.

It is important to note the issues involved in the theory of behaviour change, which is based on the social learning theory, the social influencing theory, and the theory of reasoned action. The social learning theory posits that people learn behaviours by observing and imitating others as well as through obtaining a formal education.

The social influence theory suggests that behaviours are shaped by group and individual norms and attitudes. Thus, it is helpful for people to identify social pressures

and then develop individual and group values that support healthy and appropriate behaviours.

REFERENCES

Aase, P. & Agyei-Mensah, S. (2005). HIV/AIDS in sub-Saharan Africa. *Norwegian Journal of Geography, 59*(1), 1-5.

About, Inc. (2006). *Map of Cameroon.* Retrieved June 18, 2006, from http://geography.about.com/library/cia/blccameroon.htm

Adeboyejo, T. A., & Onyeonoru, I. P. (2005). Aspects of home environment and adolescent sexual behaviour in Southwestern Nigeria. *African Population Studies, 20*(1), 38-52.

American Cancer Society. (2006). *Detailed guide: HIV/AIDS.* Retrieved April 14, 2006, from http://www. Cancer.org/docroot/CRI/content.

Anderson, R.(1992). Some aspects of sexual behaviour and the potential demographic impact of AIDS in developing countries. Soc Sci Med, 34:271-280.

Babalola, S., Sakolsky, N., Vondrasek, C., Mounlom, D., Brown, J., Tchupo, J. P., et al. (2001). The impact of a community mobilization project on health-related knowledge and practice in Cameroon [Electronic version]. *Journal of Community Health. 26*(6), 459-477.

Bankole, A., Singh, S., Hussain, R., & Wulf, D. (2004). The sexual, marital and fathering behavior of men in Sub-Saharan Africa. *African Population Studies, 19*(2), 21-40.

Boerma, J.; Weir, S. (2005). Integrating demorgraphic and epidemiological approaches to research on HIV/AIDS: The proximate – determinants framework. The Journal of Infectious Diseases. 191(1), S61-S67.

Bongaarts, J.; Potter, E. (1983). Fertility, biology and behaviour. New York: Academic press.

Bongaarts, J (1978). A framework for analyzing the proximate determinants of fertility. Population Development Review. 4:105-132.

Buve, A., Carael, M., Hayes, R. J., Auvert, B., Ferry, B., Robinson, N. J., et al. (2001). Multicenter study on factors determining differences in rate of spread of HIV in Sub-Saharan Africa: Methods and prevalence of HIV infection [Electronic version]. *AIDS, 15*(4), S5-S14.

Calves, A. (1999). *Condom use and risk perceptions among male and female adolescents in Cameroon: Qualitative evidence from Edea.* Washington DC: Population Services International.

Carael, M., Ali, M., & Cleland, J. (2001). Nuptiality and risk behaviour in Lusaka and Kampala. *African Journal of Reproductive Health, 5*(1), 83-89. Abstract retrieved July 17, 2006, from Bioline database.

Carael, M.; Holmes, K.. (2001). Dynamics of HIV epidemics in sub-Saharan Africa: introduction. AIDS: 15 (4), S1-S4.

Centers for Disease Control and Prevention. (1999, July 21). *HIV and its transmission.* Retrieved August 21, 2006, from http://www.cdc.gov/hiv/resources/qa/qa3.htm

Centers for Disease Control and Prevention. (2003). *Division for HIV/AIDS prevention.* Retrieved April 14, 2006, from http://www.cdc.gov/hiv/pubs/facts/transmission.htm

Centers for Disease Control and Prevention. (2006). Abstract. *Global AIDS Pandemic, 55*(MM31), 841. Retrieved August 18, 2006, from CDC database.

Culley, L. (2000). Working with diversity: Beyond the factfile. In L. Finlay & A.

Bullman (Eds.), *Changing practice in health and social care* (pp. 145). London: Sage.

Davis, K.; Blake, J. (1956). Social structure and fertility: an analytical framework. Economic Development and Culture Change. 4:211-235.

Dawn, D. (1996). *Cultural practices determine care model. International Conference on AIDS.* Retrieved August 2, 2006, from http://gateway.nlm.nih.gov/robot_pages/MeetingsAbstracts/102219951.html

De Bruyn, M. (2004). Living with HIV: Challenges in reproductive health care in South Africa. *African Journal of Reproduction Health, 8*(1), 92-98.

De Walque, D. (2006). *Who gets AIDS and how? The determinants of HIV infection and sexual behaviors in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania.* Retrieved May 10, 2006, from http://econ.worldbank.org

Eni, R. N., Ogbechie, P. O. A., & Ibrahim, A. (2005). Prevalence of malaria among HIV/AIDS patients at Amadu Bello University hospital. *Annals of African Medicine, 4*(1), 43.

Ferry, B.; Carael, M.; Buve, A.; Auvert, B.; Laourou, M.; Kanhonou, L.; de Loenzien, M.; Akam, E.; Chege, J.; Kaona, F. (2001). Comparison of Key parameters of sexual behaviour in four African urban populations with different levels of HIV infection. AIDS: 15 (4), S41-S50.

Fonchingong, C. C., & Abong, J. T. (2004). Barriers to counseling support for HIV/AIDS patients in south-western Cameroon. *African Journal of AIDS Research, 3*(2), 157-165.

Grazia, M., Fabiani, M., Okway, R, Conesta, N., Opira, C., Declich, S., et al. (2005). Topical issue: HIV and AIDS - Impact of voluntary counseling and testing and health education on HIV prevention among secondary school students in Northern Uganda [Electronic version]. *Health Policy and Development Journal, 3*(1), 1-11.

Grosskurth, H.; Gray, R.; Hayes, R.; Mabey, D.; Wawer, M. (2000). Control of sexually transmitted diseases for HIV-1 prevention: Understanding the implications of the Mwanza and Rakai trials. Lancet, 355, 1981-1987.

Hasnain, M. (2004). Antenatal HIV screening and treatment in South Africa: Social norms and policy options. *African Journal of Reproductive Health, 8*(2), 77-85. Retrieved July 17, 2006, from Bioline database.

Health Canada. (2006). *HIV/AIDS.* Retrieved August 21, 2006, from http://www.hc-sc.gc.ca/dc-ma/aids-sida/index_e.html

Holtedahl, K., Bonono, L., & Salpou, D. (2005). The value of population campaigns offering free-of-charge HIV-testing: Observational study in a town in Cameroon. *Norsk Epidemiologi, 15*(2), 159-164.

Institute of Behavioural Research and Studies. (2002). *Peer education as a strategy to increase contraceptive prevalence and reduce the rate of STIs/HIV among adolescents in Cameroon.* Yaoundé: Author.

Kaptue, L. (2000). Universities in the fight against AIDS in Cameroon: What HIV prevention policy for Cameroon today? Yaoundé: Yaoundé University Press.

Kigotho, A. W. (1997). World Bank oil-pipeline project designed to prevent HIV transmission. *Lancet, 350*(9091), 1608. Retrieved September 12, 2006, from http://www.aegis.org/news/ads/1997/AD972198.html

Kuate-Defo, B. (2004). Young people's relationships with sugar daddies and sugar mummies: What do we know and what do we need to know? *African Journal of Reproductive Health, 8*(2), 13-37.

Kyomuhangi, L. S. B. (2005). Financial implications of scaling up antiretroviral programs in Uganda and Senegal [Electronic version]. *Health Policy and Development Journal, 3*(1), 12-20.

Laurent, C., Meilo, H., Guiard-Schmid, J., Mapoure, Y., Noel, J., M'bangue, M., Joko, A., et al. (2005). Antiretroviral therapy in public and private routine health care clinics in Cameroon: Lessons from the Douala Antiretroviral Initiative [Electronic version]. *Clinical Infectious Diseases, 41,* 108-111.

Letamo, G. (2004). HIV/AIDS related stigma and discrimination among adolescents in Botswana. *African Population Studies, 19*(2), 191-204.

Mbanya, D. N., Takam, D., & Ndumbe, P. M. (2003). Serological findings amongst first-time blood donors in Yaoundé, Cameroon: Is safe donation a reality or a myth? [Electronic version]. *Transfusion Medicine, 13*(5), 267.

Mbanya, D. N., Zebaze, R., Kengne, A., Minkoulou, E., Awah, P., Beure., et al. (2001). Knowledge, attitudes and practices of nursing staff in a rural hospital of Cameroon: How much does the health care provider know about the human immunodeficiency virus/acquired immune deficiency syndrome? [Electronic version]. *International Nursing Review, 48*(4), 241-249.

Mbanya, D. N., Zebaze, R., Minkoulou, E. M., Binam, F., Koulla, S., & Obonou, A. (2002). Clinical and epidemiological trends in HIV/AIDS patients in a hospital

setting of Yaoundé, Cameroon: A 6-year perspective. *International Journal of Infectious Diseases, 6*(2), 134-138.

Mbunwe, C. (2005, June 16). *Fighting HIV/AIDS: Time for behavioural change in the Northwest.* Retrieved March 17, 2006, from http://www.postnewsline.com/2005/06/strongfighting_.html

Meekers, D., Klein, M., & Foyet, L. (2003). Patterns of HIV risk behavior and condom use among youth in Yaoundé and Douala, Cameroon [Electronic version]. *Netherlands: Springer.* 7(4), 413-420.

Mills, E., Rachlis, B., Wu, P., Wong, E., Wilson, K., & Singh, S. (2005). Media reporting of tenofovir trials in Cambodia and Cameroon [Electronic version]. *BMC International Health and Human Rights, 5,* 6.

MINSANTE. (2004). *HIV/AIDS surveillance report, technical unit.* Yaoundé: Ministry of Public Health.

Moseley, G. W. (2004). *Taking sides: Clashing views on controversial African issues.* St. Paul: McGraw-Hill

Mosley, H.; Chen, C.(1984). An analytical framework for the study of child survival in developing countries. Population Development Review. 10, 25-45.

Mulholland, J. (1995) Nursing, humanism and transcultural theory: The bracketing-out of reality [Electronic version]. *Journal of Advanced Nursing, 22,* 442-449.

Ndumbe, P. (2002). *Universities in the fight against AIDS in Cameroon: Epidemiological and general considerations.* Yaoundé: Yaoundé University press.

Nformi, W. B. (2005). *HIV/AIDS highest amongst educated, rich Cameroonians.* Retrieved March 17, 2006, from http://www.postnewsline.com/2005/08/index.html

Niebuhr, B., Gruber-Tapsoba, T., Degrando, D., & Gesing, K. (2004). *Role of social marketing in HIV/AIDS prevention in Cameroon.* Yaoundé: Association Camerounaise pour le Marketing Social (ACMS).

Njikam Savage, O. M. (1993). *Family and AIDS.* Paper Presented at a Round Table Conference on AIDS, University of Douala, Cameroon.

Njikam Savage, O. M. (1998). Adolescents' beliefs and perceptions towards sexuality in urban Cameroon. In B. Kuate-Defo (Ed.), *Sexuality and reproductive health during adolescence in Africa with special reference to Cameroon* (pp. 77-90). Ottawa: University of Ottawa.

Njikam Savage, O. M. (2005). Risky sexual behavior, sexually transmitted infections, HIV/AIDS and health promotion among students in the University of Douala. [Electronic version]. *African Population Studies Journal, 20*(1), 53-67.

Nyambi, P., Zekeng, L., Kenfack, H., Tongo, M., Nanfack, A., Nkombe, I., et al (2000). HIV inefection in Rural Villages of Cameroon. *Journal of Acquired Immune Deficiency Syndromes*, 31(5), 506-513.

Okonofua, F. (2002). Need to intensify research on HIV/AIDS in Africa. *African Journal of Reproductive Health, 6*(3), 7-8. Retrieved July 17, 2006, from Bioline database.

Okonofua, F. (2004). Rethinking contraception in Africa in the era of HIV/AIDS. *African Journal of Reproductive Health, 8*(2), 7-9. Retrieved July 17, 2006, from Bioline database.

Okuonzi, S. A., & Epstein, H. (2005). Pragmatic safe sex, not abstinence or faithfulness, was key in Uganda's HIV decline. *Health Policy and Development Journal, 3*(1), ii-iii. Retrieved July 18, 2006, from Bioline database.

Olley, B. O., Seedat, S., & Stein, D. J. (2004). Self-disclosure of HIV serostatus in recently diagnosed patients with HIV in South Africa [Electronic version]. *African Journal of Reproductive Health, 8*(2), 71-76.

Onifade, I. (1999). *Unmet reproductive health needs of adolescents: Implications for HIV/AIDS prevention in Africa.* Abuja- Nigeria: Youth Empowerment Foundation.

ORC Macro. (2005). *Demographic and health survey interviewer's manual.* Calverton, MD: MEASURE DHS.

ORC Macro. (2006a). *Cameroon 2004 executive summary.* Retrieved August 19, 2006, from http://www.measuredhs.com/pubs/pdf/SR107/SR107.pdf

ORC Macro. (2006b). *Demographic and health surveys.* Retrieved August 26, 2006, from http://www.measuredhs.com

Orubuloye, I. O., Cadwell, C. J., & Ntozi, P. M. J. (Eds.). (1999). *The continuing HIV/AIDS epidemic in Africa: Responses and coping strategies.* Canberra: Health Transition Centre.

Oyo-Ita, A. E., kpeme, B. M., Etokidem, J. B., Offor, J. B., Okokon, E. O., et al. (2005). Knowledge of HIV/AIDS among secondary school adolescents in Calabar-Nigeria. *Annals of African Medicine, 4*(1), 2-6. Retrieved July 17, 2006, from Bioline database.

Pierone, G. (2006). *HIV-1 and HIV-2 difference. AIDS research and treatment center of the Treasure Coast.* Retrieved September 12, 2006, from http://www.thebody.org/Forums/AIDS/Meds/Archive/Misc/Q171744.html

Populations Council. (2006). *Behavioural and social theories commonly used in HIV research.* Retrieved August 20, 2006, from http://www.popcouncil.org/horizons/AIDSquest/cmnbehvrtheo/index.html

Royce, A.; Sena, A.; Cates, W Jr.; Cohen, S. (1997). Sexual transmission of HIV. North England Journal of Medicine. 336:1072-1078.

Rwenge, M. J. (2001). Poverty and sexual risk behaviour among young people in Bamenda, Cameroon. *African Population Studies Journal, 18*(2), 91-104.

Rwenge, M. J. (2004). Gender and sexuality of youths in Bafoussam and Mbalmayo, Cameroon. *African Journal of Reproductive Health, 8*(2), 145-163.

Ryan, K. A., Roddy, E., Zenkeng, L., Weir, S. S., & Tamoufe, U. T. (1998). Characteristics associated with prevalent HIV infection among a cohort of sex workers in Cameroon [Electronic version]. *Sexually Transmitted Infections, 74*(2), 131-135.

Skalsky, J., & Ndumbe, P. M. (1993). Characteristics of HIV/AIDS patients attending a rural hospital in Cameroon. Manyemen HIV/AIDS Team [Electronic version]. *Anales de la société belge de médecine tropicale, 73*(3), 209-216.

Stover, J.(1998). Revising the proximate determinants of fertility framework: What have we learned in the past 20 years? Student Family Planning. 29: 255-267.

Tamukong, J. (2004). *The impact of HIV/AIDS on teachers and other education*

personnel in west and central Africa: A synthesis of the literature from 2000 to 2004. Yaoundé: Educational Research Network for West and Central Africa.

Tangwa, G. B. (2002). The HIV/AIDS pandemic, African traditional values and the search for a vaccine in Africa [Electronic version]. *Journal of Medical Philosophy, 27*(2), 217-230.

Turesson, G. (2006). *Prevention of HIV. A field study of Tanzania nurses' culturally adapted prevention work against HIV.* Retrieved August 9, 2006, from http://hdl.handle.net/2043/1884

UNICEF. (2002). *Flesh to flesh...Dust to dust: HIV/AIDS in Sierra Leone.* Retrieved August 9, 2006, from http://www.unicef.org.uk/press/pdf/sierra_leone.pdf

UNICEF. (2004). *Epidemiological fact sheets: HIV/AIDS and sexually transmitted infections - Cameroon.* Retrieved March 17, 2006, from http://www.who.int/hiv/pub

United Nations AIDS Agency. (2003). *Estimates, AIDS deaths UN common database.* Retrieved March 17, 2006, from http://unstats.un.org/unsd/cdb/Cameroon

United Nations AIDS Agency. (2004). *Report on global AIDS epidemic.* Geneva: Author.

United Nations AIDS Agency. (2005). *Global summary of the AIDS epidemic: December update.* Geneva: Author.

UNAIDS (2006). XVITH International AIDS Conference, Toronto. Retrieved August 15, 06 from http://www.unaids.org.

Upton, R. L. (2002). Perceptions of and attitudes towards male infertility in northern Botswana: Some implications for family planning and AIDS prevention policies. *African Journal of Reproductive Health, 6*(3), 103-111.

U.S. Census Bureau. (2006). *Population clocks.* Retrieved August 20, 2006, from http://www.census.gov/main/www/popclock.html

Van Norren, B.; Boerma, T.; Sempebwa, N. (1989). Simplifying the evaluation of primary health care programmes. Soc Sci Med. 28:1091-1097.

Van Norren, B.; Van Vianen, H.(1986). The malnutrition-infections syndrome and its demographic outcome in developing countries. The Hague: Programming Committee for Demorgraphic Research. [Publication 4].

Welty, T. K., Bulterys, M., Welty, E., Tih, P., Ndikintum, G., Nhuoh, G., et al. (2005). Integrating prevention of mother-to-child HIV transmission into routine antenatal care: The key to program expansion in Cameroon [Electronic version]. *Journal of Acquired Immune Deficiency Syndrome, 40*(4), 486-493.

White, J., & Robinson, E. (2000). HIV/AIDS and rural livelihoods in sub-Saharan Africa. Policy services No.6, UK: Natural Resources Institute.

World Health Organization. (2004). *Technical reports. Regional Office for Africa, reproductive health/medical research units.* Retrieved May 10, 2006, from http://www.who.int/Africa

APPENDIX A: HIV and AIDS Estimates and Data, 2005 and 2003

1. Estimated number of people living with HIV

Country	Adults (15+) 2005 Estimate	Adults (15+) 2005 [low estimate–high estimate]	Adult (15–49) rate (%) 2005 Estimate	Adult (15–49) rate (%) 2005 [low estimate–high estimate]	Adult (15–49) rate (%) 2003 Estimate	Adult (15–49) rate (%) 2003 [low estimate–high estimate]	Women (15+) 2005 Estimate	Women (15+) 2005 [low estimate–high estimate]
Global	[illegible]	[illegible]	1.1	[illegible]	1.0	[illegible]	[illegible]	[illegible]
Sub-Saharan Africa	**21 600 000**	**[19 200 000 – 24 100 000]**	**6.1**	**[5.4 – 6.8]**	**6.2**	**[5.5 – 7.0]**	**13 200 000**	**[11 400 000 – 15 100 000]**
Angola	270 000	[170 000 – 380 000]	3.7	[2.3 – 5.3]	3.7	[2.3 – 5.3]	170 000	[90 000 – 260 000]
Benin	81 000	[53 000 – 110 000]	1.8	[1.2 – 2.5]	2.0	[1.3 – 2.9]	45 000	[24 000 – 68 000]
Botswana	250 000	[240 000 – 320 000]	24.1	[23.0 – 32.0]	24.0	[23.0 – 31.6]	140 000	[130 000 – 190 000]
Burkina Faso	130 000	[100 000 – 160 000]	2.0	[1.5 – 2.5]	2.1	[1.6 – 2.6]	80 000	[49 000 – 110 000]
Burundi	120 000	[110 000 – 140 000]	3.3	[2.7 – 3.8]	3.3	[2.8 – 3.7]	79 000	[68 000 – 91 000]
Cameroon	450 000	[410 000 – 490 000]	5.4	[4.9 – 5.9]	5.5	[5.0 – 6.0]	290 000	[260 000 – 310 000]
Central African Republic	220 000	[95 000 – 340 000]	10.7	[4.5 – 17.2]	10.8	[4.6 – 17.2]	130 000	[53 000 – 220 000]
Chad	150 000	[74 000 – 250 000]	3.5	[1.7 – 6.0]	3.4	[1.7 – 5.9]	90 000	[40 000 – 160 000]
Comoros	500	[< 1000]	0.1	[< 0.2]	0.1	[< 0.2]	100	[< 1000]
Congo	99 000	[63 000 – 140 000]	5.3	[3.3 – 7.5]	5.4	[3.4 – 7.7]	61 000	[33 000 – 89 000]
Côte d'Ivoire	640 000	[400 000 – 870 000]	7.1	[4.3 – 9.7]	7.0	[4.3 – 9.7]	400 000	[220 000 – 600 000]
Democratic Republic of the Congo	830 000	[470 000 – 1 300 000]	3.2	[1.8 – 4.9]	3.2	[1.8 – 4.9]	520 000	[250 000 – 850 000]
Djibouti	13 000	[3600 – 29 000]	3.1	[0.8 – 6.9]	3.1	[0.8 – 6.8]	8400	[2200 – 19 000]
Equatorial Guinea	7600	[6300 – 9000]	3.2	[2.6 – 3.8]	3.2	[2.6 – 3.8]	4700	[3900 – 5600]
Eritrea	49 000	[28 000 – 78 000]	2.4	[1.3 – 3.9]	2.4	[1.3 – 3.8]	31 000	[15 000 – 53 000]
Ethiopia (1)	...	[360 000 – 1 100 000]	...	[0.9 – 3.5]	...	[1.0 – 3.5]	...	[190 000 – 730 000]
Gabon	52 000	[34 000 – 74 000]	7.9	[5.1 – 11.5]	7.7	[5.0 – 11.0]	33 000	[18 000 – 52 000]
Gambia	16 000	[8400 – 26 000]	2.4	[1.2 – 4.1]	2.2	[1.2 – 3.6]	11 000	[5100 – 20 000]
Ghana	280 000	[240 000 – 330 000]	2.3	[1.9 – 2.6]	2.3	[1.9 – 2.7]	180 000	[150 000 – 210 000]
Guinea	74 000	[58 000 – 91 000]	1.5	[1.2 – 1.8]	1.6	[1.2 – 1.9]	53 000	[42 000 – 61 000]
Guinea-Bissau	27 000	[15 000 – 42 000]	3.8	[2.1 – 6.0]	3.8	[2.1 – 6.1]	17 000	[8100 – 29 000]
Kenya	1 200 000	[1 000 000 – 1 400 000]	6.1	[5.2 – 7.0]	6.8	[5.8 – 7.7]	740 000	[640 000 – 840 000]
Lesotho	250 000	[240 000 – 260 000]	23.2	[21.9 – 24.7]	23.7	[22.3 – 25.1]	150 000	[140 000 – 160 000]
Liberia	...	...	...	[2.0 – 5.0]	...	...	...	...
Madagascar	39 000	[14 000 – 82 000]	0.5	[0.2 – 1.2]	0.5	[0.2 – 1.0]	13 000	[4000 – 33 000]
Malawi	810 000	[420 000 – 1 200 000]	14.1	[6.9 – 21.4]	14.2	[7.0 – 21.5]	500 000	[220 000 – 800 000]
Mali	110 000	[82 000 – 130 000]	1.7	[1.3 – 2.1]	1.8	[1.3 – 2.2]	66 000	[51 000 – 81 000]
Mauritania	9800	[6400 – 15 000]	0.7	[0.4 – 2.8]	0.7	[0.4 – 1.0]	6300	[3300 – 13 000]
Mauritius	1600	[760 – 5100]	0.6	[0.3 – 1.8]	0.2	[0.1 – 0.7]	< 1000	[310 – 2400]
Mozambique	1 600 000	[1 200 000 – 1 900 000]	16.1	[12.5 – 20.0]	16.0	[12.5 – 19.7]	960 000	[590 000 – 1 300 000]
Namibia	200 000	[92 000 – 310 000]	19.6	[8.6 – 31.7]	19.5	[8.7 – 30.6]	130 000	[54 000 – 220 000]
Niger	67 000	[33 000 – 100 000]	1.1	[0.5 – 1.9]	1.1	[0.5 – 1.7]	42 000	[17 000 – 75 000]
Nigeria	2 400 000	[1 400 000 – 3 500 000]	3.9	[2.3 – 5.6]	3.7	[2.2 – 5.5]	1 600 000	[810 000 – 2 400 000]
Rwanda	190 000	[170 000 – 200 000]	3.1	[2.9 – 3.2]	3.8	[3.5 – 3.9]	91 000	[86 000 – 95 000]
Senegal	53 000	[26 000 – 85 000]	0.9	[0.4 – 1.5]	0.9	[0.5 – 1.5]	33 000	[14 000 – 58 000]
Sierra Leone	40 000	[24 000 – 61 000]	1.6	[0.9 – 2.4]	1.6	[0.9 – 2.4]	26 000	[15 000 – 39 000]
Somalia	38 000	[20 000 – 69 000]	0.9	[0.5 – 1.6]	0.9	[0.5 – 1.6]	23 000	[11 000 – 45 000]
South Africa	5 100 000	[4 600 000 – 5 600 000]	18.8	[16.8 – 20.7]	18.6	[16.6 – 20.5]	3 100 000	[2 800 000 – 3 400 000]
Swaziland	190 000	[130 000 – 250 000]	33.4	[21.2 – 45.3]	32.4	[20.7 – 44.1]	120 000	[70 000 – 180 000]
Togo	95 000	[55 000 – 140 000]	3.2	[1.9 – 4.7]	3.2	[1.9 – 4.7]	61 000	[31 000 – 95 000]
Uganda	850 000	[740 000 – 960 000]	6.7	[5.7 – 7.6]	6.8	[5.8 – 7.8]	520 000	[450 000 – 590 000]
United Republic of Tanzania	1 300 000	[1 100 000 – 1 400 000]	6.5	[5.8 – 7.2]	6.6	[5.9 – 7.3]	710 000	[640 000 – 780 000]
Zambia	960 000	[900 000 – 1 000 000]	17.0	[15.9 – 18.1]	16.9	[15.9 – 18.0]	570 000	[540 000 – 610 000]
Zimbabwe	1 600 000	[1 100 000 – 2 100 000]	20.1	[13.3 – 27.6]	22.1	[14.6 – 30.4]	890 000	[520 000 – 1 300 000]

Source: UNAIDS (2005), p. 3.

APPENDIX B: Regional HIV/AIDS Features for Females, 2003 and 2005

		Number of women (15 – 49) living with HIV	Percentage of adults (15 – 49) living with HIV who are women (%)
Sub-Saharan Africa	2005	13.5 million [12.5–15.1 million]	57
	2003	13.1 million [12.1–14.6] million	57
North Africa and Middle east	2005	220 000 [83 000–660 000]	47
	2003	230 000 [78 000–700 000]	50
South and south East Asia	2005	1.9 million [1.1–2.8 million]	26
	2003	1.6 million [950 000–2.4 million]	25
East Asia	2005	160 000 [82 000–260 000]	18
	2003	120 000 [59 000–190 000]	17
Oceania	2005	39 000 [20 000–62 000]	55
	2003	27 000 [14 000–43 000]	44
Latin America	2005	580 000 [420 000–770 000]	32
	2003	510 000 [370 000–680 000]	32
Caribbean	2005	140 000 [88 000–250 000]	50
	2003	140 000 [87 000–250 000]	50
Eastern Europe and Central Asia	2005	440 000 [300 000–620 000]	28
	2003	310 000 [210 000–430 000]	26
Western and Central Europe	2005	190 000 [140 000–240 000]	27
	2003	180 000 [150 000–220 000]	27
North America	2005	300 000 [150 000–440 000]	25
	2003	270 000 [130 000–400 000]	25
TOTAL	2005	17.5 million [16.2–19.3 million]	46
	2003	16.5 million [15.2–18.2 million]	47

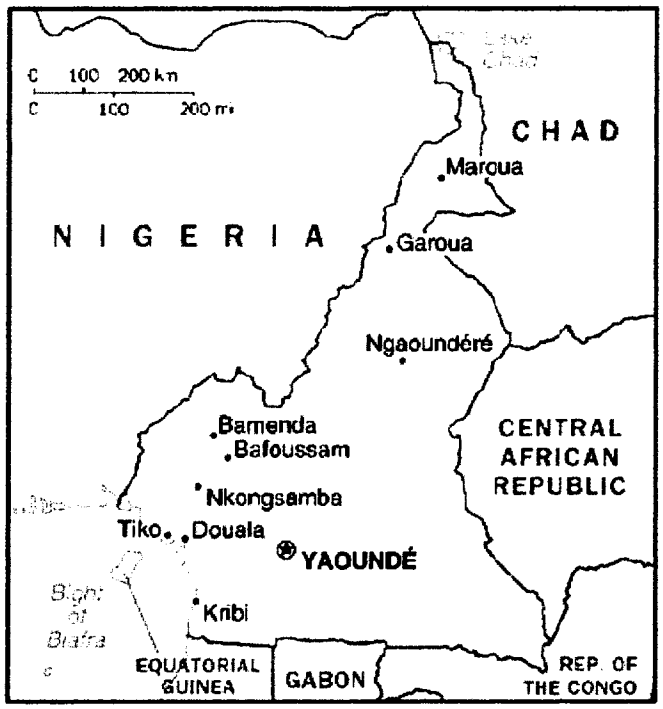
Source: UNAIDS (2005), p. 4.

APPENDIX C: Selected Indicators for Cameroon, 1991, 1998, and 2004

Indicator	1991	1998	2004
Percentage of women with no education	40.2	28.1	22.4
Percentage of women with access to newspaper, television and radio		6.1	8.7
Total fertility rate (children per women)	5.8	4.8	5.0
Percentage of teenagers who have begun childbearing	35.0	31.2	28.4
Percentage of married women currently using any method of family planning	16.1	19.3	26.0
Percentage of married women currently using any modern method of family planning	4.3	7.1	12.5
Median age at first marriage for women age 25-49 (years)	16.5	17.4	17.6
Median age at first sex for women age 25-49 (years)	16.0	15.8	16.4
Percentage of married women who want no more children	13.6	19.6	21.3
Percentage of married women with an unmet need for family planning	21.7	19.7	20.2
Mean ideal number of children	6.8	6.0	5.7
Infant mortality rate (per 1,000 live births)	64.3	77.0	74.1
Under-five mortality rate (per 1,000 live births)	125.3	150.7	143.6
Percentage of live births receiving antenatal care from a trained health professional	78.6		83.4
Percentage of live births delivered at a health facility	62.2		59.0
Percentage of live births receiving assistance at delivery from a trained health professional	63.5		61.8
Percentage of children fully immunized	40.0	35.8	48.2
Percentage of children with acute respiratory infection or fever taken to a health facility	43.6		40.6
Percentage of children with diarrhea who received either ORS or RHS	32.7		24.2
Median breastfeeding duration (months)	1.6	1.5	3.4
Percentage of children underweight (-2 SD)	15.1		18.5
Percentage of children stunted (-2 SD)	26.0		31.7
Percentage of children wasted (-2 SD)	2.9		5.1

Source: ORC Macro (2006b).

APPENDIX D: Map of Cameroon Showing Major Cities and Neighbouring Countries



Source: About, Inc. (2006).

APPENDIX F: DHS Consent Form

Introduction and consent

Hello. My name is _____and I am working with (NAME OF ORGANIZATION). We are conducting a national survey about various health issues. We would very much appreciate your participation in this survey. The survey usually takes between 10 and 15 minutes to complete.

As part of the survey we would first like to ask some questions about your household. All of the answers you give will be confidential. Participation in the survey is completely voluntary. If we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?
May I begin the interview now?

Signature of interviewer: _____ Date _____

RESPONDENT AGREES TO BE INTERVIEWED.....1 RESPONDENT DOES NOT AGREE TO BE INTERVIEWED....2 → END

Source: ORC Macro (2006a).

APPENDIX G: Cameroon: DHS-III (2004)

Year: 2004 **Implementing Organization:** Institut National de la Statistique

Collection Date:	**Start Date:** 02/01/2004	**End Date:** 07/01/2004
Status:	Completed	
Data Availability Date:	09/2005	
Report Availability Date:	06/2005	
Respondents:	**Female** *(All Women)* Age: 15 to 49 Sample Size: 10656	**Male** *(All Men)* Age: 15 to 59 Sample Size: 5280
Households Sample:	10462	

Features & Modules:

AIDS Behavior
AIDS Knowledge –Questions assess knowledge/sources of knowledge/ways to avoid AIDS
AIDS Testing
Anemia –Questions or testing assessing prevelence/severity of iron-def. anemia among women or children
Anthropometry
Birth registration
Domestic Violence
Female Genital Cutting
GPS/Georeferenced –Global Positioning System or Georeferenced Data
Iodine
Malaria
Maternal Mortality
Men's Survey
Micronutrients
Vitamin A

Data Files:	**Survey Data**	**GPS Data**	**HIV Testing**
	DHS Data Available	*GPS Data Available*	*HIV Data Available*

Source: ORC Macro (2006a).

APPENDIX H: DHS Data Release Approval

From ▸ Bernard Barrere <bernard.l.barrere@orcmacro.com>
Sent Thursday, February 16, 2006 8:44 am
To engwakon@lakeheadu.ca
Cc
Bcc
Subject Request Cameroon data

Dear Ngwakongnwi,

I received your fax requesting access to the 2004 Cameroon-DHS data. Please connect to the internet www.measuredhs.com and follow the instruction under "Register to access datasets". The Cameroon data set will be made available to you after you have registered.

Bernard Barrère
HIV/AIDS Coordinator
MEASURE DHS
ORC Macro
11785 Beltsville Drive
Calverton MD 20705
Tel. 301-572-0957
Fax 301-572-0999
Email: Bernard.L.Barrere@orcmacro.com

APPENDIX I: Examples of Completed DHSs

Country/Year	Fieldwork Start/End Date	Type	Status	Implementing Organization	Female			Male			Households Sample	Facilities/ Communities Sample
					Resp.	**Age**	**Sample**	**Resp.**	**Age**	**Sample**		
DHS-I												
Sub-Saharan Africa												
Botswana 1988	08/1988 - 12/1988	DHS	Completed	Ministry of Health	All Women	15 - 49	4,368	NA	NA	NA	4,473	NA
Burundi 1987	04/1987 - 07/1987	DHS	Completed	Dép. de la Pop., Min. de l'Intérieur	All Women	15 - 49	3,970	Husbands	NA	542	3,868	99
Ghana 1988	02/1988 - 05/1988	DHS	Completed	Ghana Statistical Service	All Women	15 - 49	4,488	Husbands	NA	943	4,406	NA
Kenya 1989	12/1988 - 05/1989	DHS	Completed	Nat. Council for Pop. and Dev.	All Women	15 - 49	7,150	Husbands	NA	1,133	8,173	NA
Liberia 1986	02/1986 - 07/1986	DHS	Completed	Min. of Planning & Economic Affairs	All Women	15 - 49	5,239	NA	NA	NA	5,023	NA
Mali 1987	03/1987 - 08/1987	DHS	Completed	Instit de Sahel: USED/CERPOD	All Women	15 - 49	3,200	All Men	20 - 55	970	3,048	NA
Ondo State 1986	09/1986 - 01/1987	DHS	Completed	Min. of Health	All Women	15 - 49	4,213	NA	NA	NA	3,437	NA
Cameroon 2004	02/2004 - 07/2004	DHS	Completed	Institut National de la Statistique	All Women	15 - 49	10,656	All Men	15 - 59	5,280	10,462	NA
Chad 2004	08/2004 - 12/2005	DHS	Completed	Inst. de la Statistique, des études éco. démogra.	All Women	15 - 49	6,085	All Men	15 - 59	1,887	5,369	196

Source: ORC Macro (2006a)

APPENDIX J : Univariate Analysis of study variables by response category

Variable description		Value Label	Males(n=4817)		Females (n=10656)	
				p		p
Ever heard of AIDS	1	Yes	394	.148	1922	.000
Ways to avoid AIDS	0	No	4		43	
	1	Yes	390		1832	
	8	DK	-		47	
AIDS: abstain from sex	0	No	131	.027	839	-
	1	Abstain from sex	263		1036	
	8	DK	-		47	
AIDS: use condoms during sex	0	No	92	.442	585	.313
	1	Condoms during sex	302		1290	
	8	DK	-		47	
AIDS: only one sex partner	0	No	121	.079	784	.142
	1	Only one sex partner	273		1091	
	8	DK	-		47	
Get AIDS from mosquito bites	0	No	281	.037	1233	.000
	1	Get AIDS from mosquito bites	91		513	
	8	Don't know	22		176	
Get AIDS by sharing food with person who has AIDS	0	No	355	.366	1655	.753
	1	Get AIDS by sharing food with person who has AIDS	25		191	
	8	Don't know	14		76	
Can a healthy person have AIDS	0	No	21	.849	140	.102
	1	Yes	371		1740	
	8	DK	2		42	
Last intercourse used condom	0	No	232	.010	1402	.057
	1	Yes	162		520	
No. other than husband had sex in last 12 months	0		148	.278	1082	.004
	1		130		670	
	2		60		147	
	3		20		15	
	4		12		7	
	6		9		1	
No. had sex including				.000		.000

husband in last 12 months	1		226		1681	
	2		102		215	
	3		23		18	
	4		16		6	
	5		10		1	
	6		4		1	.000
AIDS transmitted from mother to child	1	Yes	394	.000	1922	
AIDS transmit. during pregnancy	0	No	67	-	297	.000
	1	Yes	313	.420	1549	.016
	8	DK	14		76	
AIDS transmit. during delivery	0	No	61	.569	299	.378
	1	Yes	307		1437	
	8	DK	26		186	
AIDS transmit. by breastfeeding	0	No	105	.609	414	.791
	1	Yes	252		1285	
	8	DK	37		223	
Allowed to keep AIDS infection secret	0	No	213	.404	697	.874
	1	Yes	171		1161	
	8	DK	10		64	
Willing to care for relative with AIDS	0	No	33	.656	228	.011
	1	Yes	355		1616	
	8	DK	6		78	
Person with AIDS allowed to continue teaching	0	No	90	.205	490	.001
	1	Yes	294		1332	
	8	DK	10		100	
Ever been tested for AIDS	0	No	-	-	1130	.694
	1	Yes	394		792	
Can get AIDS by witchcraft or supernatural means	0	No	307	.000	1319	.000
	1	Yes	54		326	
	8	Don't know	33		277	
Would buy vegetables from vendor with AIDS	0	No	125	.415	733	.514
	1	Yes	267		1153	
	8	Don't know	2		36	-
Heard of Centre de Prevention et D,pistage Volontaire (CPDV)	1	Yes	294	-	1922	
Ever been to a CPDV	0	No	277	.203	1703	.106
	1	Yes	117		219	
Ever been tested for AIDS at a CPDV	0	No	293	.627	1811	.596
	1	Yes	101		111	

APPENDIX K : Crosstabs of gender and HIV testing/related variables

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Sex of household member * Sample result	11995	99.4%	70	.6%	12065	100.0%
Sex of household member * Urban/rural	12065	100.0%	0	.0%	12065	100.0%
Sex of household member * Level of education attending	12058	99.9%	7	.1%	12065	100.0%
Sex of household member * Cluster in petrol line	12065	100.0%	0	.0%	12065	100.0%
Sex of household member * Final result of testing	12065	100.0%	0	.0%	12065	100.0%

Sex of household member * Sample result

Crosstab

Count

		Sample result					
		Sample taken	Refused	Not present	Technical problem	Other	Total
Sex of household member	Male	5293	334	347	1	26	6001
	Female	5389	322	248	2	33	5994
Total		10682	656	595	3	59	11995

(Chi square [4] = 18.714, p=.001)

Sex of household member * Urban/rural

Crosstab

Count

		Urban/rural		
		Urban	Rural	Total
Sex of household member	Male	3138	2900	6038
	Female	3033	2994	6027
Total		6171	5894	12065

(Chi square [1] = 3.276, p=.070)

Sex of household member * Level of education attending

Crosstab

Count

		Level of education attending						
		No education	Pre-school	Primary	Secondary	Higher	NSP	Total
Sex of household member	Male	613	0	2264	2806	349	1	6033
	Female	1153	1	2447	2290	133	1	6025
Total		1766	1	4711	5096	482	2	12058

(Chi square [5] = 322.267, p=.000)

Sex of household member * Cluster in petrol line

Crosstab

Count

		Cluster in petrol line		
		No	Yes	Total
Sex of household member	Male	3981	2057	6038
	Female	4099	1928	6027
Total		8080	3985	12065

(Chi square [1] = 5.889, p=.008)

Sex of household member * Final result of testing

Crosstab

Count

		Final result of testing				
		Not tested	HIV positive	HIV negative	HIV status undetermined	Total
Sex of household member	Male	745	212	5078	3	6038
	Female	638	372	5016	1	6027
Total		1383	584	10094	4	12065

(Chi square [3] = 53.48, p=.000)