

UNIVERSITY OF CAPE COAST

HOUSEHOLD ECONOMIC STATUS AND RISK OF HIV/AIDS
INFECTION AMONG YOUNG PEOPLE: EVIDENCE FROM GHANA

BY

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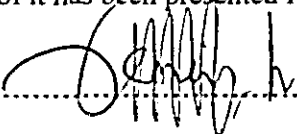
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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.


.....

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FRANCIS KWAW ANDOH

Supervisors' Declaration

We hereby declare that the preparation and the presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.


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ABSTRACT

Recent evidence suggests that the burden of new HIV infection in developing countries is concentrated among young people even with the increasing knowledge of how to protect oneself from infection. Many scholars have explained this under the economic thesis that the daily situations of economic and social disadvantage that characterize the lives of many young people push them to indulge in risky sexual behaviours that increase their risk of contracting HIV. This study empirically tests the veracity of this economic thesis among young people in Ghana.

Extracting data on young men and women aged 15-24 years from the 2003 Ghana Demographic and Health Survey data, a national household survey; the study explores the association between economic status and three risky sexual behaviours – age at sexual debut, multiple sexual partnership and inconsistent use of condom.

Interestingly, the long held poverty hypothesis is not confirmed in this study. However, variables such as knowledge of one's HIV/AIDS status, frequency of watching television, years of schooling and staying away from home for more than a month are found to be significantly associated with risky sexual behaviours among young people in Ghana.

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DEDICATION

NAA ADJELEY and VICTORY.

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LIST OF ACRONYMS

ABC	Abstinence be faithful and Condom use
ADRA	Adventist Development relief Agency
AIDS	Acquired Immune Deficiency Syndrome
ARV	Anti-Retroviral
CRS	Catholic Relief Services
DRI	District Response Initiative
GACP	Ghana AIDS Control programme
GAC	GHANA AIDS Commission
GDHS	Ghana Demographic and Health Survey
GOG	Government of Ghana
GSS	Ghana Statistical Service
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
HSS	HIV sentinel surveillance
LPM	Liner Probability Model
MTCT	Mother- To-Child Transmission
MTP	Medium Term Plan
NGOs	Non Governmental Organisation
OLS	Ordinary Least Squares
PLWHA	People Living With HIV/AIDS
PMB	Problem Behaviour Model
PRB	Population Reference Bureau
STI	Sexually Transmitted Infections

STP	Short Term Plan
UNAIDS	United Nations Programme on AIDS
VCT	Voluntary counseling and Testing
WHO	World Health Organisation

CHAPTER ONE

INTRODUCTION

This chapter is the introductory chapter. It presents the background of the study, the problem statement, study objectives, hypotheses, and significance of the study. The chapter also highlights the gaps in other comparable researches intended to be filled by this study.

Background of the study

Since the Human Immunodeficiency Virus (HIV) was first identified as the cause of Acquired Immune Deficiency Syndrome (AIDS) in 1981; the disease has been reported to have killed about 25 million people in both developing and industrial countries making it one of the most destructive epidemics in recorded history (Garrett, 1994; UNAIDS/WHO, 2005). The United Nations joint programme which is dedicated to combating the AIDS epidemic, UNAIDS, has reported that as at the middle of 2005 about 40.3 million people were living with the HIV/AIDS. About 5 million people were newly infected with the HIV in 2005 (UNAIDS/WHO, 2005).

Nearly one third of the estimated 40 million people living with HIV/AIDS worldwide is under age 25 (UNICEF-UNAIDS-WHO, 2002). Moreover, about half of the estimated 22 million people who have died of AIDS (UNAIDS, 2004), became infected when they were between 15–24 years old (UNAIDS, 2004).

Sub-Saharan Africa remains not only as the hardest hit region but also as the region where the virus is spreading at the fastest rate. It is estimated that about 77 percent of young people living with HIV/AIDS reside in sub-Saharan Africa (UNAIDS/WHO, 2005). Twenty percent of this region's population is between 15 and 24 years of age, compared with 13 percent of the population of high-income countries (UNICEF, UNAIDS, WHO, 2002).

Heterosexual transmission is identified as the main mode of transmission in sub-Saharan Africa with other modes such as mother to child transmission and transfusion of contaminated blood accounting for only a small proportion (Ghana AIDS Commission, 2004). Reports from the Ghana Demographic and Health Survey (GDHS), 2003 indicate that HIV prevalence among women and men who have never been in union and have never had sex is almost non-existent; suggesting that non-sexual transmission of HIV is negligible. This therefore, confirms the hypothesis that there is strong relationship between HIV prevalence and higher risk sexual behaviour. People who are engaged in higher risk sexual activities are more likely to be HIV positive than those who do not (GSS, 2003).

Two main hypotheses have surfaced from the literature. The first hold that there is a positive association between high economic status and higher-risk sexual behaviours. This school of thought argues that wealthy individuals put themselves at risk through the use of their resources in sexual networking (Kimuna and Djamba, 2005; Luke et al., 2005; Shelton et al., 2005). The other school of thought on the other hand believes that poverty is the root cause of higher-risk sexual behaviours. It is argued that risky sexual activities such as early

sexual debut, multiple sexual partnerships and unprotected sex can be linked to poverty (Zulu et al., 2002; Akwara et al., 2003; Channon and Madise, 2004).

Statement of Research Problem

Interestingly, in Ghana, HIV/AIDS awareness among young people is very high. It is estimated that about two-thirds of women and four-fifths of men know that using condoms and limiting sexual intercourse to one uninfected partner are important preventive measures in the fight against the spread of HIV/AIDS (GSS, 2003). Moreover, promotion of condom use has been increased to enable those who cannot abstain from sex to have access to protective measures to combat the spread of HIV and other STDs. Despite these efforts, young people still run the risk of infections by engaging in unsafe sexual activities.

Data on sexual activity for both males and females are available in the 1993, 1998 and 2003 Ghana Demographic and Health Surveys (GDHS). According to this data, among 15–19-year-olds, 38% of females and 19% of males had ever had sexual intercourse. The figure for females in the 1993 GDHS is 59%. Among adolescent men, 33% had ever had sex in 1993 and 19% had ever had sex in 1998. The surveys further reveal that nationally, among women aged 20–24, the median age at first intercourse has increased from 16.9 to 17.4 between 1993 and 1998. For males aged 20–24, the median age increased from 18.4 to 19.5. And that by aged 20-24 years only 9 per cent of the females had never had sex. Furthermore, from the 2003 GDHS, about 72% of girls and 98% of boys aged 15-19 have engaged in higher risk sexual activity. For the age group 15-24

about 50% of sexually active young women and 80% of sexually active young men are engaged in higher-risk behaviours (sexual intercourse with non-marital sexual partner or partners and unprotected sex (GSS, 2003).

The issue, therefore, is not about lack of knowledge on the modes of transmission or how to protect one self from contracting the virus; it is about the ability to change one's behaviour. If so, why then do young people engage in such practices in spite of the potentially very serious consequences they may lead to? Understanding the antecedent factors that confer vulnerability of unsafe sexual behaviors on young people is very important for the prevention of new infections which is considered to play a crucial role if the disease is ever to be brought under control. This study explores how relative social and economic status influences the number of sexual partners, condom use and sexual debut among young women and men aged 15-24 in Ghana

Objectives of the Study

The main of the objective the paper is to investigate the distal factors that promote the exposure of young people to HIV/AIDS risky sexual behaviours such as multiple sexual partnerships, non-use of condom and early sexual debut. Specifically, the study hopes to:

- i. Examine the association between household wealth and the young people engagement in HIV/AIDS risky sexual behaviours.
- ii. Determine and compare the HIV/AIDS infection risk levels for males and females.

Study Hypotheses

The following null hypotheses will be tested:

Ho₁: Low economic status is not associated with multiple sexual partnerships among young people in Ghana.

Ho₂: Low economic status is not associated with inconsistent use of condom during sexual intercourse with casual partner among young people in Ghana.

Ho₃: Low economic status is not associated with early sexual debut among young people in Ghana.

Ho₄: Young females are not more likely than their male counterparts to be exposed to sexual risk behaviours that can increase their risk of HIV/AIDS infection.

How Different is this Study?

Other comparable research on the determinants of adolescent and young people sexual behaviours has been undertaken in Ghana. While some focus on only some small communities, others limit the study to only a narrow range of variables. The study by Akwara et al. (2005) on Analysis of HIV Prevalence in Ghana was undertaken to examine the association between the HIV prevalence data and the data on socio-demographic characteristics and HIV/AIDS-related knowledge, attitudes, and sexual behavior from the 2003 Ghana Demographic and Health Survey (2003 GDHS). This study considered the entire data in the GDHS, hence particular consideration was not accorded young people. Similarly, the study by Adih and Alexander (1999), the only study which set to identify the

psychosocial and behavioral factors that influence condom use to reduce the risk of human immunodeficiency virus (HIV) infection was not only limited to condom use but also focused on young males only. Thus, it neglected young females and also other distal variables that could influenced safe sexual behaviour.

Benefo (2004) on mass media and prevention of HIV/AIDS in Ghana did not consider a wide range of variables. Apart from the fact that the study examined the structure of mass media on safe sexual behaviour, the study used only the use of condom as a proxy for HIV prevention. Other important proxies such as multiple sexual partnerships and age at sexual debut were not considered.

Furthermore, the work of Afenyadu and Goparaju (2003) on adolescent sexual and reproductive health behaviour in Dodowa, Ghana which found a significant association between risky sexual behaviours and poverty among other factors was limited to the Dodowa community only. In this case the results might not be a true reflection of the national situation.

Finally, the study by Kumi-Kyeremeh et al. (2005) which used 2004 nationally-representative survey data from 12-19 year olds and qualitative evidence from focus group discussions and in-depth interviews with adolescents in 2003, examined the relationship between connectedness of unmarried adolescents to parents, friends and key social institutions on one hand and sexual behaviour on the other. The focus of the study was on the role these groups play with respect to information, communication and monitoring about sexual and reproductive health as well as the association of parental monitoring and

communication with sexual activity and condom use. The study, therefore, paid little attention to household wealth as an important contextual factor. There are however, indications that young people's sexual decisions are strongly linked to level of wealth or poverty.

The uniqueness of the current study, therefore, lies in its combination of household wealth, social environment and psychosocial as well as demographic factors as important contextual factors that can influence young people's sexual behaviours. Moreover, unlike others, this study attempts to examine separately, the degree of the association between the selected explanatory variables and sexual behaviour for both young men and young women.

Significance of the Study

This paper has implications for more specific studies of the HIV/AIDS epidemic. Much of the existing work on behaviour change focuses on cultural barriers to changing behavior – fatalism, low levels of female bargaining power and others (Amuyunzu-Nyamongo et al, 1999; Varga, 1999;). Certainly this study does not rule out the importance of these variables. However, the results do suggest that standard economic theory may provide significant insight and explanatory power, without having to rely on cultural or taste-based differences across areas.

Moreover, from a policy standpoint, the results may provide guidance to HIV/AIDS prevention campaigns, especially since changing sexual behaviour is a primary focus of many of these efforts (Green, 2003; Stoneburner and Low Beer, 2004). NGOs, the government and other bodies involved in the development and

implementation of more targeted HIV/ STIs response strategies for the young people will find this as a relevant guide. In that, it will provide in-depth information on the state of risky behaviours among youth in the country.

Finally, policymakers, development specialists, public health personnel, and others in a position to influence the public response to HIV/AIDS will find this useful because, in addition to the epidemiological knowledge and the public health insights provided by other experts on the control of the disease, this study provides a necessary analytical framework (based on distal/background factors) for considering how the stakeholders can confront the epidemic.

Organization of the Work

The second chapter assembles some basic information about the nature of HIV/AIDS, the extent of the epidemic, and its current and likely future impact on such measures of well-being as life expectancy, health, and economic growth. The chapter also captures the history of HIV/AIDS in Ghana as well as the national response to the epidemic. The third chapter which is the literature review presents both the theoretical and empirical literature on the topic under review. The fourth chapter, the methodology chapter, has three important sections: the first discusses the conceptual framework of the study. The second gives a description, justification and the measurements of the variables. Then the third section presents theoretical and empirical models as well as the estimation techniques for the study. The fifth chapter is devoted to the analysis of the data and the discussion of the empirical results. Finally, the sixth chapter presents the

conclusions and then offers policy recommendations. It also suggests areas for future research.

CHAPTER TWO

HIV/AIDS IN GHANA

HIV/AIDS pandemic continues to spread despite the numerous efforts being implemented to combat it. In Ghana, although the spread of the disease is slow, it is firmly established within the society. This chapter traces the history of the infection of HIV/AIDS in Ghana. It gives the extent of the epidemic, as well as its likely impact. Finally, it outlines some of the major national policy efforts towards the fight against the epidemic. However, it is deemed interesting to begin the chapter with some basic epidemiological information on HIV/AIDS.

What is HIV/AIDS?

Human Immunodeficiency Virus (HIV) is a fatal, sexually transmitted virus (STV). Once introduced into the human body, HIV attacks mainly a subset of immune system cells, which bear a molecule called CD4. Specifically, the virus binds to two types of CD4-bearing cells: CD4+ T-cells and, to a lesser extent, macrophages. These cells perform various tasks critical to the normal functioning of the immune system. Macrophages engulf foreign invaders and prime the immune system to recognize these invaders in the future, and CD4+ T-cells organize the overall immune response by secreting chemicals to help other immune cells work properly. The mechanism — or mechanisms — by which HIV actually kills CD4+ T-cells is not well understood, but scientists do know that the

immune system is able to check the onslaught of HIV to some extent, at least in the early stages of infection (Hayne and Payne, 2003; World Bank, 1997).

The battle between HIV and the immune system is fought in three general stages. The first, known as primary (or acute) HIV infection, begins at the time of infection and lasts until the body's initial immune response gains some measure of control over viral replication, usually within a few weeks of infection. During this period, the CD4+ T-cell count drops dramatically, and between 30 and 70 percent of people experience flulike symptoms. These usually disappear within three weeks, as the CD4+ T-cell count rebounds. The disease then enters its second stage, which is generally asymptomatic and accounts for about 80 percent of the time from infection to death. Only at the beginning of the second stage do antibodies to HIV become detectable in the bloodstream. Since most HIV tests work by detecting these antibodies, it is usually not possible prior to this stage to determine if a person is infected (Hahn and Payne, 2003; World Bank 1997).

Most HIV-infected people remain clinically healthy during this stage, while the immune system wages an invisible but intense struggle against the virus. What makes HIV virus unique is that its struggle with the human immune system continues for about 8 to 10 years during which HIV virus advances strongly but inexorably. This period is called the latent or asymptomatic period. During this latent period, the epidemic spreads unobserved and undetected and the infected individuals can infect others. Each day, HIV destroys huge numbers of CD4+ T-cells. The bone marrow compensates by speeding up production of new cells, but the rate of replacement cannot quite keep up with the rate of loss. The

CD4+ T-cell count, which is about 800 to 1,000 per cubic millimeter of blood in an uninfected individual, gradually declines by about 50 to 70 cells each year. When the total CD4+ T-cell count diminishes to around 200 per cubic millimeter of blood, the rate of decline accelerates and the individual becomes susceptible to what is usually called opportunistic infections or illnesses. When the individual finally develops serious opportunistic diseases, we say that HIV has 'won' the battle. This marks the beginning of the final stage of HIV infection— Acquired Immune Deficiency Syndrome (AIDS). Meanwhile, the immune system continues to deteriorate, after this stage. Consequently, a number and variety of illnesses appear, thereby, leading to the death of the infected person (Hahn and Payne, 2003).

The length of survival after infection depends on many factors, including the strain and subtype of the virus, the general state of the person's health, and access to medical treatment for opportunistic illnesses. Most research on this question has focused on the industrial world. Prior to the use of triple-drug therapies, the median time from HIV-1 infection to death in industrial countries was around twelve years: the first two stages comprising eight to ten years and the final-stage, clinical AIDS comprising about fourteen to 25 months (Kitahata et al., 1996). Much less is known about the survival rates of HIV-infected people in developing countries, but both the time from infection to AIDS and the time from AIDS to death are believed to be much shorter, with a total survival time from infection to death of perhaps around seven years. Aside from the generally poorer health and nutritional status of many in the developing world, lack of treatment

for opportunistic infections that appear early in the course of AIDS is one factor in the shorter survival times (De Cock, 1993).

The Modes of Transmission

Like other STDs, HIV is difficult to transmit except by sex or other direct contact with the bodily fluids of an infected person. The major modes of transmission are sexual intercourse, reuse of contaminated syringes by injecting drug users, infection via birth or nursing from mother to child, reuse of needles in medical settings, and transfusions of contaminated blood or blood products. HIV cannot be transmitted by a sneeze, a handshake, or other casual contact (Ghana AIDS Commission, 2004). About three-quarters of HIV transmission worldwide is through sex; of these sexual transmissions, about three-quarters involve heterosexual intercourse and one-quarter involve sexual relations between men. In developing countries, such as Ghana, sex accounts for an even greater proportion of cases. Sexual transmission is overwhelmingly between men and women; less than 1 percent involves homosexual acts (Mann, Tarantola, and Netter, 1992).

The Reproductive Rate of HIV

The reproductive rate of HIV is the average number of susceptible people infected by an infected person over his or her lifetime (May and Anderson, 1987; Thomas and Tucker, 1996). Not every virus received from an infected person will be passed on to others. If each infected person transmits the infection, on average, to less than one other person over his or her lifetime, then the infection will eventually disappear; if to more than one other person, then the infection will

expand. If each person infected with a disease transmits it to exactly one other person, then the reproductive rate is 1. In populations in which HIV has a reproductive rate of less than 1, the epidemic will not be self-sustaining. Thus, the greater the reproductive rate of HIV, the more rapidly the epidemic will spread (May and Anderson, 1987; Thomas and Tucker, 1996).

Based on the fact that sexual contact is the most common mode of HIV transmission, Anderson, Gupta, and Ng (1990) identify three main factors which largely influence the reproductive rate of all sexually transmitted diseases (STDs), including HIV: these are : duration of infectiousness, the risk of transmission per sexual contact and the rate of acquisition of new partners. The number of exposures per partner and the type of sexual act also affect the spread of HIV through the population, but empirical evidence suggests that the rate of partner change is far more important (Anderson, Gupta and Ng, 1990). Each of these three factors is in turn influenced by the biology of the virus and by individual behaviour. While Biology influences both the amount of time a person remains infectious and the risk of transmission per contact, individual behaviour has a strong influence on the risk of transmission per contact—for example, through decisions on condom use, disinfecting shared needles, and seeking treatment for other STDs. Moreover, individual behavior has a direct relation with the rate of partner acquisition. Thus, until medical science discovers either a cure, the most important avenue for reducing the spread of HIV will continue to be changing individual behaviour.

The Duration of Infectiousness

This is the amount of time a person remains infectious of a disease. HIV/AIDS is different from the other STDs mainly because it has no cure and in addition, it has long duration of infectiousness. The long duration of HIV infectiousness increases the likelihood that an infected individual will pass the infection to others. Further, because a person with HIV typically remains asymptomatic for years, an infected individual and his or her sexual (or injecting) partners are often unaware of the risk of transmission. Thus, the long duration of asymptomatic HIV infection potentially puts many more partners at risk than is the case for other STDs (World Bank, 1997). That leaves two primary mechanisms for prevention—reductions in the risk of infection per contact and reductions in the acquisition of new partners.

The Risk of Infection per Contact

Risk of infection per contact refers to the probability that HIV-positive person will transfer the virus to an uninfected partner during an unprotected sexual contact. The average risk of infection with HIV per sexual exposure is much smaller than that for other sexually transmitted diseases; however, because of the long period of infectiousness and numerous cofactors that enhance HIV transmission, the chance that an HIV-positive person who does not take precautions will eventually infect others can be quite high.

The most extensive studies of the risk of HIV transmission per exposure have been conducted in industrial countries. Owing to the generally superior health levels and the ready availability of treatment for other STDs, the average

risk of HIV infection per sexual contact in industrial countries is quite small. For example, the average chance that an infected male will sexually transmit HIV to an uninfected female partner by unprotected vaginal sex is estimated at between 1 and 2 per 1,000 exposures. The risk of transmission from an infected female to an uninfected male partner through unprotected vaginal sex is one-third to one-half as great (Haverkos and Battjes, 1992). However, a review of sixteen studies that compared female-to-male and male-to-female transmission found female-to-male rates as low as 5 percent and male-to-female transmission rates as high as 140 percent (Haverkos and Battjes 1992). Thus, it is believed that women have a somewhat greater probability of becoming infected from an infected male partner than the reverse. Anal sex carries the highest risk, especially for the receptive partner. The risk of transmission in unprotected anal intercourse, based on a study of men, is estimated to be between 5 and 30 per 1,000 exposures for the receptive partner (Mastro and de Vincenzi, 1996).

Transmission Rate per Partnership

A transmission rate per partnership, not taking into account the length of partnership, might be a more realistic measure of the risks of sexual transmission of HIV within relationships. Transmission rates per partnership are not much affected by the length of the partnership or number of exposures. This is because in a relatively long-term partnership, either the HIV-positive partner is truly infectious and transmission will occur relatively quickly, or the HIV-positive partner is relatively uninfected and transmission will not occur despite many contacts over a long period. A review of studies of per-partner transmission rates

among heterosexuals in the United States and Western Europe found an average transmission probability of about 23 percent from men to women, and of about half that rate (12 percent) from women to men (Mastro and de Vincenzi, 1996). Yet even these rates are probably lower than those faced in developing countries because many people in developing countries are infected with other STDs that enhance HIV transmission (WHO/GPA, 1995; Laga et al., 1993; Mastro et al., 1994).

The "per contact" risk of HIV transmission with a commercial or casual partner in developing countries is thus likely to be substantially higher. Notwithstanding these considerations, the average infectiousness of HIV is believed to be substantially less than that for other STDs. In the case of gonorrhoea, for example, the probability that an infected woman will transmit the disease to an uninfected male partner during intercourse is 20 to 30 percent per exposure, while the probability that an infected male will transmit the disease to his female partner is 50 to 70 percent (Hethcote and Yorke, 1984).

Factors that Influence the Risk of Infection per Contact

Three main factors have been identified as influencing the influencing the risk of HIV infection per contact. These are the time of infection, the presence of STDs and male circumcision. First, it noted that Risk may be highest soon after infection. Recent studies suggest that infectivity can vary dramatically according to the stage of HIV infection. The two peaks of infectivity are thought to coincide with the periods of highest viral load. The first and highest within the first few months of infection (before the production of antibodies to the virus), and the

second, which is thought to be lower, at the very end of the asymptomatic period, as the body loses its battle with HIV (Pinkerton and Abramson, 1996). Studies of homosexual men suggest that an individual faces a 10 to 30 percent chance of becoming infected during a single act of unprotected receptive anal intercourse if his partner is at the early, acute stage of the infection (Jacquez et al., 1994). In the middle stage, the likelihood of infection drops to between 0.01 and 0.1 percent, but at the end stage it rises again to between 0.1 and 1.0 percent.

Greater risk of transmission immediately after infection may be one reason that the epidemic has taken off so rapidly in some developing countries. In Thailand, the average female-to-male risk of sexual transmission was estimated to be 3 to 6 infections per 100 exposures—much higher than in other countries — perhaps because more people in Thailand were in the earliest, most infectious stage of the disease (Mastro et al., 1994). In addition, the likelihood of HIV transmission also differs by the type of the virus. HIV-1 is more easily transmitted and has a shorter incubation period than HIV-2 (De Cock and Brun-Vezinet, 1996). HIV-1 has many subtypes with specific geographic distributions. However, there is no conclusive epidemiological evidence to date that any of these subtypes are more or less infective than others (Anderson et al., 1996).

Secondly, it has been established that untreated STDs raise the risk of HIV infection per sexual exposure. STDs are far more common in developing countries than in industrial countries (WHO/GPA, 1995). Studies in both industrial and developing countries have found that people with current or past STDs are 2 to 9 times more likely to be infected with HIV (Laga et al., 1993;

Mastro et al., 1994). However, because HIV and other STDs are both highly correlated with risky sexual behavior—high rates of partner change in particular—it is difficult to disentangle the extent to which conventional STDs actually enhance the transmission of HIV. Nonetheless, there are compelling biological reasons for believing that untreated ulcerative STDs such as herpes, syphilis, and chancroid greatly increase the risk of HIV transmission per exposure: the lesions caused by these diseases provide a ready portal for transmission of HIV, whether they are on the HIV-infected or the uninfected partner. Enhanced HIV transmission in the presence of nonulcerative STDs such as gonorrhoea, chlamydia, or trichomoniasis is also biologically plausible but the epidemiological evidence to support it has been weaker, mainly for methodological reasons (Laga et al., 1993). For example, a recent study in Malawi found that the amount of HIV virus in the semen of HIV-positive men with urethritis was eight times higher than in a control group of HIV-positive men without it, and these concentrations diminished significantly when the urethritis was treated with antibiotics (Cohen et al. 1997).

Women are more likely than men to have STD infections without any apparent symptoms, and therefore many infections go untreated. Half of all women with gonorrhoea, for example, have no symptoms, compared with only 5 percent of men (Hethcote and Yorke, 1984). Thus, if nonulcerative STDs do facilitate HIV transmission, they are likely to differentially raise the transmission probabilities to and from women, since a higher percentage of women are likely to have asymptomatic STD infections that go untreated. A recent review found

that, in eleven African countries, from 5 to 17 percent of pregnant women tested positive for syphilis; in Jamaica the rate was 5 percent, and in Haiti more than 10 percent (Van Dam, Dallabetta, and Piot, 1997).

Thirdly, some researchers have found a correlation between HIV infection and lack of circumcision among men and believe that this may account in part for the rapid spread of HIV in Sub-Saharan Africa (Bongaarts et al., 1989; Caldwell and Caldwell, 1996; Moses et al., 1990, 1995). Ethnographic studies suggest that men are least likely to be circumcised in central, eastern, and southern Africa, along a north-south swath through the Rift Valley (Bongaarts et al. 1989). This also happens to be the area with the highest rates of HIV infection in urban areas. In 1989, in five countries where more than three-quarters of men were not circumcised, the urban prevalence of HIV was roughly 16 percent. In contrast, the average level of urban HIV infection was only 1 percent in 20 other countries where more than 90 percent of men were estimated to be circumcised (World Bank, 1997). One reason why uncircumcised men could be at higher risk of contracting HIV and passing it to others is that they are at higher risk of developing ulcerative STDs, particularly chancroid. Poorer genital hygiene among uncircumcised men may also play a role, particularly in low-income and unsanitary settings.

A study in Kenya found that, even among men without chancroid, uncircumcised men were more likely to sero-convert (29 percent) than those who were circumcised (2.5 percent) (Plummer et al., 1991). However, the amount of increased risk of HIV infection from lack of circumcision alone has not been

substantiated and whether such a risk exists is still debated. This is because circumcision is highly correlated with many other factors besides chancroid. In particular, ethnicity and religion are strong determinants of whether or not men are circumcised. It is therefore difficult to disentangle the effect of male circumcision (or lack of it) from that of other cultural norms that affect sexual behavior (World Bank, 1997). Clearly, even if male circumcision is protective against acquiring and spreading HIV, it is not sufficient to prevent infection. High proportions of men in West Africa are circumcised, yet HIV has nonetheless spread rapidly there. More than three-quarters of U.S.-born men are circumcised, but that has not prevented a sexually transmitted HIV epidemic in the United States (Laumann, Masi, and Zuckerman, 1997). Conversely, in Western Europe and South America, circumcision is uncommon, yet the HIV epidemics in those areas have not reached the scale of the one in eastern and central Africa (de Vincenzi and Mertens, 1994).

History and distribution of HIV/AIDS in Ghana

HIV was first identified in Ghana in March 1986 (GSS 2003). Since then the disease has spread slowly but steadily. Reports from National HIV/AIDS and STI surveillance over the years reveal that national HIV prevalence has not followed a uniform pattern (HSS, 2006). The HIV prevalence for instance, increased from 2.3% in 1998 to 2.1% in 2001 to 3.4%, and 3.6% in 2002 and 2003 respectively. It however, declined to 3.2% in 2004 and to 2.7% in 2005. The recent reports from the 2006 HIV sentinel survey (HSS) show an increase in prevalence rate from 2.7% to 3.2%, reverting to the levels in 2004 (Ghana

National AIDS Control Programme /Ghana Health Service, 2007).

HIV prevalence rates are not uniform across the country's regions. In 2003, the prevalence rates ranged from as low as 1.0 % in the Upper East region to as high as 3.7% in the Eastern region. Above average rates were seen in the Western region (3.0), Eastern (3.7%), Brong – Ahafo (2.7%) and Ashanti (2.3%) regions. According to the 2006 HIV Sentinel Survey (HSS) report, HIV prevalence at regional levels ranged from 1.3% in the Northern region to 4.9 % in the Eastern Region. This shows an increase in the prevalence rates. Western region had the second highest prevalence (4.3%), with Ashanti and Greater Accra following with 3.7 and 3.4 respectively. Five regions (Northern, Central, Upper West, Brong Ahafo and Volta) had prevalence of 3 % or less. Prevalence in Upper East moved upwards from 1.0% in 2003 to 3.2% in 2006. Prevalence in the urban and rural areas shows differences with urban areas recording a slightly higher prevalence (2.3% in 2003 and 3.5% in 2006) than rural areas (2.0 % in 2003 and 2.8% in 2006).

The HIV/AIDS prevalence in Ghana also varies according to economic, gender as well as age differences. About 56% of the reported cases are found among women, about 74% among the working class and about 53% among rural dwellers (GSS, 2003). The prevalence rate in women age 15 – 49 is about 3%, while that for men is about 2%. The ratio (female to male) is 1.8 to 1. The prevalence rate among the youth age 15 – 24 is estimated to be 2 % in 2003 but increased to 2.9 in 2006 (GSS, 2003; GHS, 2007). Since few HIV-infected children survive into their teenage years, the prevalence rate among the youth

represents cases that are more recent and therefore serve as an indicator of trends in both prevalence and incidence. The highest prevalence is found among the 25 – 29 age groups. However, According to the GSS (2003), these might have been infected at an earlier age (20 – 24) where risk of infection is high.

Available data from on Ghana show that demographic factors such as marital status, education and residence are related to HIV prevalence. Prevalence is higher among widowed women (7%), followed by divorced or separated women (6%). Among men, prevalence is higher among divorced or separated men (6%). Those who have no education have higher infection levels than those with at least secondary education. Employment status is also related to HIV infection among women and men, with prevalence twice as high among those currently working than those not currently working. Prevalence is highest among both women and men in the middle wealth quintile.

Impact of HIV/AIDS

It is clear that HIV/AIDS presents a major challenge to developing nations of which Ghana is no exception. HIV is catastrophic for millions of people because once infected, they get sick, and eventually die. The impact of HIV on the economy shall be considered at two main levels: micro and macro levels.

At the micro level, it is a tragedy for their families, who, in addition to suffering profound emotional loss, may also be impoverished because of the disease. Once an individual is infected with the HIV and enters the latency, they incur a number of costs. Direct costs refer to the value of scarce resources that must be diverted to prevent, diagnose, and treat AIDS (Bloom and Glied, 1993).

This includes expenses on testing and out-patient care. Indirect costs refer to the value of income foregone because of the HIV/AIDS related mortality and morbidity. It includes the reduced productivity of the infected household member, changes in consumption and investment patterns in anticipation of future medical expenditures, reallocation of family labour supply to tend the sick person and to compensate for the lost income, and the psychological costs to the infected individual and to other members of the family (Solon and Barrozo, 1993). In the event of death, the direct costs will include funeral expenses, legal fees, and other funeral related expenditures. Since AIDS kills mostly prime-age adults, it increases the number of children who lose one or both parents (USAID/GOG, 2003). Some of these orphans suffer permanent consequences, due to poor nutrition or withdrawal from school. Indeed, since each infection is a personal tragedy, figures cannot accurately describe the suffering caused by the disease (World Bank, 1997).

At the macro level, HIV/AIDS can hinder the social and economic development of countries by reducing the supply of skilled labour and in the extreme case, by reducing the actual labour force. It can also reduce the level of domestic savings as both the private and public sectors use more resource to cope with the impact of the disease. Foreign savings in the form of direct foreign investment are also likely to decline. An important determinant of the level of foreign savings is the country's economic performance, which is likely to deteriorate because of the shortage of skilled workers and the drop in investment following the fall in domestic savings (Lim, 1993). In addition, HIV/AIDS

reduces average life expectancy (sometimes dramatically), increases the demand for medical care, and is likely to exacerbate poverty and inequality (World Bank, 1997).

The treatment of the opportunistic infections resulting from AIDS is expensive and will place considerable strains on the delivery of health services in Ghana. The demand on health services as a result of AIDS can be seen by looking at health care expenditures. A study conducted by Nabila, et.al. (2001) on the impact of HIV/AIDS on the economy of Ghana indicated that the annual cost to treat the opportunistic infections experienced by an AIDS patient was about 4.2 million Cedis. This means that the individual will spend about three hundred and fifty thousand cedis every month on treatment. This amount is about 50% of the monthly salary of the average Ghanaian. The expenditures to treat these opportunistic infections disease would rise from about 59 billion Cedis in 1999 to 167 billion Cedis in 2014. It was also estimated in the study that the cost of full anti-retroviral treatment for one AIDS patient would be much more. Obviously this will result in huge increases in the required expenditures. The increasing need for funds to spend on AIDS care threatens to divert spending from other important health care needs, or to leave many AIDS patients with inadequate care. If funding is diverted from other health needs, then mortality and sickness not related to HIV is likely to increase as well, adding to the overall impact of the epidemic.

The National Response to HIV/AIDS

Nearly all developing countries have responded in some way to the

challenge of HIV/AIDS, often with the active assistance of donor countries and multilateral institutions. Ghana initially responded to HIV/AIDS as a health rather than a developmental issue. Consequently, the government directed the Ministry of Health (MOH) to handle the issue. The Ministry of Health was primarily responsible for implementing the early programmes, as was typical in African countries. However, over time, other public sector ministries, the private sector, non-governmental organizations (NGOs) and people living with HIV/AIDS (PLWHA) became more involved in programme implementation. A recent review of the national response to the HIV/AIDS epidemic stressed the importance of expanding a multi-sectoral approach to the epidemic. This section identifies the institutional structures and the strategic frameworks put in place to confront the HIV/AIDS epidemic.

Institutional structures

The main institutions that have been set up in Ghana's effort to fight HIV/AIDS are the Ghana National AIDS Control Programme (GNACP) and the Ghana AIDS Commission (GAC).

Ghana National AIDS Control Programme (GNACP)

In 1987, the National AIDS Control Programme (NACP) was established under the MOH to implement and coordinate the country's HIV/AIDS programme. NACP led in the development of a Short Term Plan (STP) for the prevention and control of HIV/AIDS that ran during 1987 and 1988. Subsequently, NACP developed the first Medium Term Plan (MTP1) that guided

HIV/AIDS prevention and control efforts over the 1989 – 1993 period. The MOH through the NACP has spearheaded various strategies to contain and limit the spread of HIV infection. These strategies include maintaining a safe blood supply, ensuring safe use of needles, and disseminating information through public campaigns to change social attitudes and behaviour (USAID/GOG, 2003).

Ghana AIDS Commission

The Government of Ghana, recognizing that HIV/AIDS is a serious health and developmental issue, set up the Ghana AIDS Commission for effective resource mobilization, management, and coordination of HIV/AIDS activities and targeted prevention measures expected to successfully raise awareness and promote behavioural change among the population. This commission is the highest policy-making body on HIV/AIDS. It is a supra-ministerial and multi-sectoral body located in Office of the President. The Commission is mandated to direct and coordinate all activities to fight the disease. It is to provide effective leadership in co-ordination of all programmes and activities of all stakeholders. The programmes are to be pursued through advocacy, joint planning, monitoring and evaluation to curb further spread of the epidemic.

Specifically the Ghana AIDS Commission is mandated to carry out the following functions in the prevention and control of HIV/AIDS. These include: formulating national policies and strategies ; providing high level Advocacy for HIV/AIDS prevention and control; providing effective leadership in the national planning of programmes; expanding and co-coordinating the national response; mobilising and managing resources and monitoring their allocation and

utilization; fostering linkages and networking among stakeholders.

The Ghana AIDS Commission is composed of the following membership: representatives of ministries, departments and agencies (MDAs), organised labour, National Union of Ghanaian Students, Ghana Employers Association, National Population Council, National Council on Women and Development, PLWHA, National House of Chiefs, and selected individuals and co-opted members. In collaboration with the MOH and the National Population Council, the GAC published a National Strategic Framework on HIV/AIDS for the period 2001 to 2005. The Policy was developed through a participatory process and spells out roles and responsibility for the various Ministries, Departments and Agencies (MDAs). The Policy outlines a clear need for a National Strategic Framework which provides the basis for the mobilisation of all sectors in the implementation of the Multi-sectoral approach advocated in the Policy. The Ghana AIDS Commission was launched at a Cabinet Retreat in Akosombo in September 2000 (National AIDS/STI Control Programme and MOH, 2001).

Policy Framework

National Policy on HIV/AIDS

In 1997, NACP led the drafting of a Policy Document on HIV/AIDS. The purpose of the policy was to create a favourable environment for all HIV/AIDS control and prevention programmes, and to mitigate the social and personal consequences of HIV infection on those persons living with the virus and on those persons who had already developed AIDS. The policy was set up to achieve the

following objectives: to reduce the impact of morbidity and mortality as a result of HIV/AIDS in the general population; to ensure that the basic human rights of persons infected with HIV and persons with AIDS are protected and upheld; to ensure that HIV infected persons and persons with AIDS are provided with adequate medical and social care, including counseling; to ensure that access to social and economic opportunities remain open to HIV infected persons and persons with AIDS; to ensure that adequate attention is paid to groups such as women who have been found to be vulnerable to HIV; to ensure that there is a consistent programme of information and education about HIV/AIDS among the general population, especially among youth, and that this increased knowledge is translated into an increase in attitudinal and behavioural change; and to decrease vulnerability to infection, reduce stigmatization and discrimination, and minimize the socio-economic impact of the epidemic. The policy emphasizes information and education leading to behavioural change, especially among youth, and the widespread availability and promotion of condoms as keys to limiting the spread of the virus (National AIDS/STI Control Programme and MOH, 2001).

National Strategic Framework

The Strategic Framework sets targets for HIV/AIDS infection reduction, addresses service delivery needs and individual and societal vulnerability, and promotes the establishment of a multi-sectoral, multidisciplinary framework for coordinated implementation of HIV/AIDS programmes. The Framework also sets out goals, objectives and specific activities for all sectors, including the Government and various Government Ministries, the private sector, non –

governmental organizations and civil societies. Five key intervention areas identified are as follows:

- i. Prevention of new transmission;
- ii. Care and support for people living with HIV/AIDS (PLWHA);
- iii. Creating an Enabling Environment for National Response;
- iv. Decentralized Implementation and Institutional arrangements;
- v. Research, Monitoring and Evaluation.

Each area is supported by a set of broad strategies that are to guide the development of action plans by all Ministries, Departments and Agencies, Non-Governmental Organizations and other Private Sector Institutions (PSIs). Sectoral plans – including those for the Ministry of Education, the Ministry of Health and the Local Government - have been developed (USAID/GOG, 2003).

The Ministry of Education is tasked to provide adequate information on HIV/AIDS to enrolled students. Several intervention strategies have been put in place. Key among them is the School HIV-Alert Model, an initiative that seeks to give momentum to school-based control efforts through nationwide campaigns. The specific objectives of the school alert programme are:

- to anchor and strengthen school based HIV/AIDS control programmes
- to provide a framework for harmonizing school based HIV/AIDS control programmes in schools
- to provide a tool to support a focused , expanded and sustained HIV/AIDS control programmes in school

- to provide a framework for assessing the state and depth of implementation of school based programmes.

The Ministry of Health concentrates on the provision of clinical services for STI management and the treatment of PLWHA. The MOH through the NACP has spearheaded various strategies to contain and limit the spread of HIV infection. These strategies include maintaining a safe blood supply, ensuring safe use of needles, and disseminating information through public campaigns to change social attitudes and behaviour (USAID/GOG, 2003).

In addition, the Ministry of Local Government is responsible for putting in place decentralized response structures for HIV/AIDS activities at the District levels. One of the structures put in place is the District Response Initiative (DRI) which was launched in 2000 at the urging of UNAIDS. Under the DRI, District Assemblies (DA) are to develop specific strategies for HIV/AIDS activities with their own funding and incorporated into their poverty alleviation programmes. In addition, the GAC embarks on programmes that support hundreds of NGOs at the community level. The GOG has successfully applied for a first round of Global Fund that largely supports the treatment of HIV/AIDS related conditions in the public sector. A second round of the applications for community mobilization is being prepared, including care and support through NGOs, and Anti – Retroviral (ARV) treatment and workplace prevention through the private sector (USAID/GOG, 2003).

Until recently, the involvement of the religious bodies was limited to initiatives coordinated through the health institutions of the Christian Health

Association of Ghana. These efforts have largely been in the area of care and support. Over the past years, however, there has been rapid growth and positive involvement of Christian and Muslims in the fight against the epidemic. Some of these groups are the Adventist Development Relief Agency (ADRA) and Catholic Relief Service (CRS).

Other key thrusts of Ghana's response outlined in its framework include blood screening for HIV and increased access of PLWHA to care and support services within a human rights framework. The framework also supports the promotion of safe sex behaviour among most at-risk groups (out-of-school youth, uniformed services, vulnerable women, commercial sex workers, mobile population including teachers). It also outlines efforts to develop an enabling political, social, legal, and economic environment; expands of MTCT and VCT services, supports ARV procurement /treatment, strengthens the national HIV and STI surveillance system; and supports orphans and PLWHA. Prevention of MTCT was introduced on a pilot basis in 2002. Through the Ghana Poverty Reduction Strategy/HIPC funding, Global Funds limited and USAID support, ART was expected to be available for 4000 persons by mid-2003 on a pilot basis through Public Health System (USAID/GOG, 2003).

Strategic Planning and Priorities in Ghana

In April 1998, a team of national and international representatives reviewed the national response to the HIV/AIDS epidemic to date in Ghana. Rising prevalence levels suggest the need for an expanded response and this team suggested some key elements for an effective strategic programme.

1. An expanded multi-sectoral approach is a necessity. To be effective, the national response must involve many different government ministries and departments at all levels, NGOs, the private sector, and people living with HIV/AIDS.
2. Government has a key role to play, in part through its own activities and in part through its ability to mobilise other sectors of Ghanaian society. Central to the government role is the formulation of appropriate policies and laws, which establish a framework and a set of key principles for public and private action. These laws and policies should also ensure that all those affected by the epidemic are protected from discrimination and stigmatisation.
3. Communities need to be fundamentally involved in the design and implementation of programmes. Community participation at all levels is essential for effective HIV/AIDS prevention, control, and care.
4. An efficient surveillance and evaluation programme is an absolute necessity to guide and target programmes and to make the most efficient use of scarce resources. Biomedical and behavioural research is also needed to help determine which programmes work and which do not.
5. Improvement in STD treatment and prevention is now recognised to be one of the most effective ways to reduce HIV transmission. However, curable STDs often go undetected, untreated, or inadequately treated. Improved STD diagnosis and service provision will have to be an essential

part of an expanded HIV/AIDS programme. This issue receives minimal attention in the draft policy.

6. Providing support services for HIV-infected individuals and for those otherwise affected by the epidemic – orphans, for example – is an integral component of a comprehensive approach. Strengthening care and support services will become ever more challenging as the number of HIV-infected persons, the number of AIDS cases and the number of AIDS deaths continue to rise.

In conclusion, it could be noted from the chapter that the HIV/AIDS epidemic has stayed in Ghana for more than two decades. It is indeed undermining social and economic development in Ghana, although improved information is needed for a better understanding of the current and future impacts. The government of Ghana should be commended for her efforts in the fight against the HIV/AIDS pandemic. The five key intervention areas outlined in the national strategic framework - prevention of new transmission; care and support for people living with HIV/AIDS (PLWHA); creating an enabling environment for national response; decentralized implementation and institutional arrangements; and research, monitoring and evaluation – appear to a step in the right direction. What are needed are the political will and the necessary commitment of all stake holders in ensuring that all bottlenecks to the smooth implementation of those programmes are removed.

CHAPTER THREE

LITERATURE REVIEW

HIV/AIDS epidemic is a complex phenomenon hence no single theory is capable of fully capturing the full gamut of the reality of its complexity. In this chapter an attempt has been made to draw on a number of explanatory theories to help explain the phenomenon. The chapter has two main sections: the theoretical literature and the empirical literature. Under the theoretical literature, apart from the discussing the Von Neumann – Morgenstern(VNM) expected utility theory which form the foundation theory for analyzing decision making under uncertainty in the field of economics, other behaviour theories such as the Health Belief Model (HBM), Problem Behaviour Model(PBM) and as well as other Life-style based theories are presented. The empirical literature on the other hand reviews the findings of studies on the correlates of young people's sexual behaviour.

The Health Belief Model (HBM)

The HBM is one of the oldest and most widely used behaviour change theories used to explain health behaviour (Janz and Becker, 1984). According to the HBM, whether or not an individual will engage in a risky behaviour depends on five factors:

1. Severity of the consequences – the belief that the outcome of behaviour is serious. For example, knowing that risky sexual behaviour can lead to AIDS which can kill.
2. Perceived risk/threat – the belief that one is susceptible to the problem. For example, knowing that one is at risk of HIV/AIDS infection
3. Self efficacy – the belief that one has the ability to change one's behaviour.
4. Perceived barriers – these are factors that undermine people's efforts to change behaviour. They may be economic, social, environmental or psychological.
5. Perceived benefits or expectations – this is the value one places on the expected outcome of the behaviour. If result is important to the person, the behaviour that will yield the result is more likely to happen. (Janz and Becker, 1984).

The HBM constitutes a good theoretical foundation for the study not only because it provides insights into why people make health decisions and creates a process for encouraging behaviour change, but also because of its connection to the VNM Expected Utility hypothesis, an important rational choice theory used to examine the economic behaviour of individuals under conditions of uncertainty.

Expected Utility Hypothesis

The mathematician John von Neumann and the economist Oskar Morgenstern show axiomatically that a rational individual should choose among

risky alternatives by maximizing the expected value of a cardinal utility function. Consider two gambles, A and B. Gamble A offers two mutually exclusive outcomes: X_A , with probability of p and Y_A with probability of $(1 - p)$. Gamble B also offers two mutually exclusive outcomes: X_B , with probability of t , and Y_B , with a probability of $(1 - t)$. Showing the expected utilities of both gambles:

$$E(U_A) = p \cdot U(X_A) + (1 - p) \cdot U(Y_A) \quad (1)$$

$$E(U_B) = t \cdot U(X_B) + (1 - t) \cdot U(Y_B) \quad (2)$$

Assume a Neumann- Morgenstern utility index numbers for (X_A) (Y_A) (X_B) (Y_B) to be π_1, π_2, π_3 and π_4 respectively. Substituting the utility numbers into equations 1 and 2 give:

$$E(U_A) = p \cdot \pi_1 + (1 - p) \cdot \pi_2 \quad (3)$$

$$E(U_B) = t \cdot \pi_3 + (1 - t) \cdot \pi_4 \quad (4)$$

Individuals will presumably prefer the gamble with the highest probability of winning the best prize. It can be shown that the individual prefers gamble one to gamble two if and only if $E(U_A) > E(U_B)$, i.e

$$p \cdot \pi_1 + (1 - p) \cdot \pi_2 > t \cdot \pi_3 + (1 - t) \cdot \pi_4 \quad (5)$$

Equation 5 shows that an individual will choose the gamble that provides the highest level of expected utility. It implies that if individuals obey the von Neumann- Morgenstern axioms of rationality in an uncertain situations, they will act as if they choose the option that maximizes the expected value of their von Neumann- Morgenstern utility index (Nicholson, 2002).

One important extension of the expected utility hypothesis which is related to the issue of risk taking underscores the fact that individuals can be put into three categories of risk: loving, averse and neutral. An individual is said to be risk loving when he prefers gamble to some certain outcome. This means that the individual places a higher premium on an uncertain prospect with higher expected utility than a certain outcome with lower expected utility. On the other hand, an individual is risk neutral if he is indifferent between a certain outcome and a gamble. Finally, an individual is risk averse if he always prefers to avoid a gamble. This means that he places a higher value on a prospect arriving with certainty than on uncertain prospect even with the same expected outcome (Nicholson, 2002).

Wealth and Risk Aversion

Two important issues need to be addressed. The first relates to how risk aversion is measured. In this study, the most widely used measure of risk aversion in the study of economic choices in risky situations, Pratt's risk aversion measure, developed by J.W. Pratt (Pratt, 1964), is adopted. This risk aversion measure, $r(w)$, is defined as:

$$r(w) = -\frac{U''(w)}{U'(w)} \quad (6)$$

Where, U is utility, W is wealth of the individual.

One distinctive feature of risk-averse individuals is a diminishing marginal utility of wealth [$U''(w) < 0$], hence, Pratt's measure is positive in such cases (Nicholson, 2002).

The second issue is about whether risk aversion increases or decreases with higher levels of wealth. To answer this question, we first consider the argument below. Given that an individual has a current wealth w^* and a von Neumann – Morgenstern utility index that reflects how he or she feels about various levels of wealth to be $v(w)$. It is further assumed that this person is offered two gambles, that has a 50-50 chance of winning or losing $\$h$ or a 50-50 chance of winning or losing $\$2h$. The utility of present wealth is $v(w)$.

The expected utility if he participates in gamble 1 is given by $v^h(w^*)$:

$$v^h(w^*) = \frac{1}{2}v(w^* + h) + \frac{1}{2}v(w^* - h) \quad (7)$$

The expected utility of gamble two is given by $v^{2h}(w^*)$:

$$v^{2h}(w^*) = \frac{1}{2}v(w^* + 2h) + \frac{1}{2}v(w^* - 2h) \quad (8)$$

Notice that the expected utilities are simply the average of the utilities from a favorable and an unfavorable outcome. Because w^* is half way between $w^* + h$ and $w^* - h$, v^h is also halfway between $v(w^* + h)$ and $v(w^* - h)$. It can be shown geometrically that

$$U(w^*) > U^h(w^*) > U^{2h}(w^*). \quad (9)$$

Equation (8) shows that the individual will prefer current wealth to that wealth combined with a fair gamble. The reason is that winning a gamble adds to enjoyment less than losing hurts. The intuitive reason behind this is that it is usually assumed that the marginal utility from an extra income declines with an increase in wealth (Nicholson, 2002).

Moreover, using Pratt's measure of risk, it can be shown that given an individual's VNM utility function for wealth to be:

$$U(w) = \alpha + \beta w + \delta w^2 \quad (10)$$

Where $\beta > 0, \delta < 0, w > 0$, Pratt's risk aversion measure is

$$r(w) = -\frac{U''(w)}{U'(w)} = \frac{-2\delta}{\beta + 2\delta w}, \quad (11)$$

which increases as wealth increases. Equation (11) proves that the higher the level of wealth the more willing one is to avoid uncertain gambles (i.e. the lesser likelihood of taking risk). In this sense, risk averse people will always avoid behaviours that have uncertain outcomes

Equations (9) and (11) have two important implications for this study. First, an individual who is a risk averse will be prepared to avoid a risky behaviour to avoid the likelihood of contracting a deadly disease such as HIV. Second, young people from high income households will be more risk averse i.e.

less likely to embrace risky activities (involved in risky sexual behaviours that may increase the probability of acquiring HIV) than their counterparts from low income households.

In a simple theoretical framework for analyzing choices of sexual behaviour in a world with HIV, Oster (2007) demonstrates that people who are richer will decrease their risky behaviour more in response to increases in the HIV rate. He assumes that an individual lives a maximum of two periods. He lives for certain in period 1, and there is a chance, p , of surviving through period 2. Each individual receives utility from certain income, y , which is the same in each period, as well as from sexual partners in each period, σ_1 and σ_2 . Total utility in period i is $u(y, \sigma_i)$. It is further assumed that $u(\cdot)$ is concave in both y and σ_i . Moreover, it assumes that $u_{\sigma\sigma}(\sigma, y) = 0$.

In a world without HIV, total lifetime utility can be written

$$U_{tot} = u(y, \sigma_1) + pu(y, \sigma_2) \quad (11)$$

Income is fixed in each period so the only choices individuals make are about sexual behavior. The first order condition defining the choice of σ_i is $u_{\sigma_i}(y, \sigma_i) = 0$. Note that optimal choice of σ_i can vary with y in this framework. The direction of that relationship will depend on the sign of $u_{\sigma y}$: if the cross partial is positive, richer people will have more sexual partners; if it is negative, they will have fewer. It is assumed that if an individual is infected with HIV in period 1 he has no chance of living until period 2. Given σ 1 sexual partners in period 1, an HIV rate of h and a transmission rate (chance of infection per partnership with an

infected person) of β , the chance of infection is approximately $\sigma_1\beta h$. The overall chance of survival to period 2 is $p(1 - \sigma_1\beta h)$. In this case, total lifetime utility is

$$U_{tot} = u(y, \sigma_1) + p(1 - \sigma_1\beta h)u(y, \sigma_2) \quad (12)$$

The choice of σ_2 is unaffected, as sexual partners in the second period do not affect survival. However, the choice of σ_1 is now defined by a new first order

condition:
$$u_{\sigma_1}(y, \sigma_1) - p\beta hu(y, \sigma_2) = 0. \quad (13)$$

Taking a partial differentiation of the first order condition, it could be verified that

$$\frac{\partial \sigma_1}{\partial h} = \frac{\rho\beta u(y, \sigma_2)}{u_{\sigma\sigma}(y, \sigma_2)}. \quad (14)$$

Since $u(\cdot)$ is concave in σ the denominator is negative. The numerator is positive, since utility is assumed to be positive, as are the probability of living to period 2 and the transmission rate.

$$\frac{d\left(\frac{\partial \sigma_1}{\partial h}\right)}{\partial y} = \rho\beta \frac{u_{\sigma\sigma}(y, \sigma_1)u_y(y, \sigma_2) - u(y, \sigma_2)u_{\sigma\sigma y}(y, \sigma_1)}{[u_{\sigma\sigma}(y, \sigma_1)]^2}. \quad (15)$$

In this case, the denominator is positive, as is the $\rho\beta$ multiplier so the overall sign depends on the sign of the fraction numerator.

Two important comparative statics derived from the above relation are: the effect of changes in the HIV rate on behaviour and the mediating effects of

income are summarized below.

Proposition 1: $\frac{\partial \sigma_1}{\partial h} < 0$, this implies that on average, individuals should

decrease their number of sexual partners when the HIV rate increases.

Proposition 2: $\frac{d\left(\frac{\partial \sigma_1}{\partial h}\right)}{\partial y} < 0$: if

$$u_{\sigma\sigma}(y, \sigma_1)u_y(y, \sigma_2) - u(y, \sigma_2)u_{\sigma\sigma y}(y, \sigma_1) < 0 \quad (16)$$

Proposition 2 implies that people who are richer will decrease their risky behavior more in response to increases in the HIV rate. Put differently, poorer people are more likely to increase their risky behaviours even in the face of increasing rates of HIV. It is important to mention that the comparative static on income is ambiguous and hinges, in large part, on the sign and magnitude of $u_{\sigma\sigma y}$. If this is positive (i.e. concavity of $u(\cdot)$ with respect to sigma is decreasing with income), zero, or negative and small, then the comparative static holds. On the other hand, if $u_{\sigma\sigma y}$ is negative and large it is possible that the comparative static could be positive. Oster (2007) argues that the value of $u_{\sigma\sigma y}$ is very close to zero, in which case this condition holds and we would expect richer people more likely to decrease their risky behaviour in response to increases in the HIV rate.

The assertion that poorer people are less likely to reduce risky behaviour in response to higher HIV prevalence rates finds some basis in the Drive Theory. This theory arises from the idea that *drives* are the motivating force behind human behaviour. The theory dates back to 1930 during the heyday of behaviourism and

indicates that there are certain necessities of life without which human beings cannot survive, and that the drive to obtain these necessities is part and parcel of human life. Therefore, when a need arises, e.g. basic survival needs like hunger and thirst, it leads people to act in ways that are aimed at satisfying that need (Jordaan & Jordaan, 1989). The application of the theory to this study lies in the fact that poverty influences or explains the risk of HIV/AIDS infection because poverty deprives people of the necessities of life, e.g. food and shelter, thus causing them to respond in ways that, although harmful, will ensure that they obtain these necessities.

Problem Behaviour Model

Jessor's (1991) Problem Behaviour Model (PBM), another important behaviour model, proposes that adolescent risk behaviour can be understood in terms of antecedent risk and protective factors— both proximal and distal whose explanation is seen to be beyond early dispositional and contextual simplifications. Whereas protective factors have both direct and indirect effects; they lessen the likelihood of involvement in risk behaviour, or of adverse outcomes from having engaged in them, but they also can serve as moderators or buffers against exposure to risk factors or actual involvement in risky behaviour. Risk factors are conceptualized as leading to an increase in adolescent risk behaviour. Owing to the relationship between risk and protective factors, increase or decrease in risk behaviour can only be explained by considering the presence of both risk and protective factors (Astake et al., 2004). The theory identifies the antecedent risk and protective factors in three explanatory domains

which include the personality of the individual, his or her behaviour and his or her environment. The relevant personality variables include low expectancies for success in school, high values for independence and absence of personal characteristics that constrain deviant behaviour (e.g. low religiosity, tolerant attitude towards deviant behaviour, low self-esteem, etc.). According to the theory, important characteristics of the social environment include the influence of peer groups, opportunity to engage in problem behaviour (e.g. absence of control and support from parents etc.), the presence of deviant models and attitudes that is conducive to deviant behaviour, and the perception that socially acceptable behaviours are not adequately rewarded. It is explained that as personality system controls weaken, deviant role models become more influential and deviant behaviours become more likely (Foshee et al., 1992).

Jessor's framework is important for two reasons: first, it allows for the identification of risk and protective factors that could be addressed by adolescent and young adults' HIV/AIDS prevention programmes. Second, in addition to the treatment of individual risk factors, it allows for the incorporation of socio-economic factors which happen to be of special interest in this study. For, example, it allows for variables such as family income, education and ethnicity as important antecedent variables that interact with personality and social environment to predict behaviour.

Empirical Literature

That wealth and health are inextricably linked is widely accepted. Recent research has extended this link to HIV/AIDS. This section presents the findings of

some of the studies that establish an association between high economic status and risk of HIV infection as well as those that establish an association between low economic status and risk of HIV infection.

Economic Status and HIV Infection

In urban areas of Butare, Rwanda, for example, HIV incidence was found to be higher among women in low-income households (Bulterys et al., 1994). Moreover, Booyesen (2004) shows that while it is only a small percentage of women (less than 4%) who are knowledgeable about HIV/AIDS and has engaged in risky sexual behaviour, the likelihood of engaging in risky sexual behaviour that leads to HIV infection is higher among people from poorer households relative to those from more affluent ones. Upchurch et al. (1999) on their part specifically observe that lower family income is associated with a greater likelihood of teenage intercourse.

Studies that confirm the poverty-induced vulnerability to HIV infection argue that different levels of poverty (individual, household and community) and their related characteristics create a 'fertile terrain' for HIV/AIDS to flourish at the different stages of infection (Barnett & Whiteside, 2002; Wojciki, 2005). It is explained that poverty increases HIV infection through its influences on risky sexual behaviours such as early sexual debut, multiple sexual partnership and nonuse of condom. Poverty and low socioeconomic status constrain the decisions people make about risky behaviours. Those with low incomes, for example, may not be able to afford to treat STDs or to buy condoms. Poor families may see commercial sex as a lucrative occupation for young and poorly educated

daughters. A woman, who is poor, either absolutely or relative to men, will find it harder to insist that her sex partner abstain from sex with other partners or use a condom or take other steps to protect herself from becoming infected with HIV. Similarly, poverty may make a man more prone to having multiple casual partners, by preventing him from attracting a wife or by causing him to leave home in search of work. (UNAIDS/WHO, 2005). Meanwhile, wealthy people can afford to be selective about sexual partners and may not have to resort to prostitutes in the case of males, and high-risk men like truck drivers in the case of females.

Nevertheless, several studies challenge the long-held assumptions that poverty is the key factor in the spread of HIV. Ryder et al. (1990) in a study on heterosexual transmission of HIV-1 among employees and their spouses found that higher-income adults in Central and Eastern Africa were more likely to be infected than those with lower incomes. They discovered that the workers in the (higher-paying) bank had higher HIV infection rates than those in the (lower-paying) textile mill and, within each firm, managerial worker had higher HIV prevalence than manual workers. Similarly, in Rakai District(Uganda), heads of household with higher-quality dwellings were half as likely to be infected as those without, controlling for age, gender, marital status, education, and occupation (Menon et al., 1996b).

A study by Mishra et al. (2007) on the association of HIV infection with wealth in sub-Saharan Africa, also reveal that in each country HIV prevalence tends to be much higher among adults belonging to the wealthiest 20 percent of

households than among those from the poorest 20 percent. This pattern holds for men and women separately, with the exception of men in Ghana and Lesotho where HIV prevalence in the highest wealth quintile is slightly lower than in the lowest quintile. In most cases, HIV prevalence increases monotonically with household wealth status. However, in Lesotho and Ghana, there is an inverted U-shaped relationship between wealth status and HIV prevalence among men; in other terms, the odds of HIV infection peak in the middle wealth quintile. Higher HIV prevalence by wealth status is also observed for women. The study finally finds that the positive association between wealth status and HIV prevalence tends to be stronger for women than for men in most countries, suggesting disproportionately greater vulnerability of women in the wealthier groups.

Level of education is also found to be associated with HIV prevalence. Menon et al. (1996b) discovers that in rural areas of Kenya, Tanzania, and Zimbabwe, educated women are more likely to engage in casual sex than uneducated women, but in urban areas the relation is reversed. It is associated with a higher probability of casual partnerships among men in DHS data from Burkina Faso, the Central African Republic, Côte d'Ivoire, and Uganda. In Côte d'Ivoire, men and women from wealthier households (with a car and good housing) were more likely to have casual partners.

Interestingly, the positive association between high education and HIV prevalence has been found not only at the micro level as cited above but also, at the macro level. Study done in Africa reveals that relatively rich countries (measured by per capita income, income inequality, or absolute poverty) such as

South Africa, Kenya, Botswana etc have relatively higher HIV prevalence rates (Bloom et al. 2001).

Several mechanisms have been put forward to explain this positive association. First, relatively rich and better educated men and women have higher rates of partner change because they will find it easier to attract and support additional commercial and casual sexual partners. Secondly, it is reasoned that men and women with more education and higher incomes are likely to travel more and thus have more opportunities for a variety of sexual contacts (World Bank, 1997). Thus, wealthier adults, especially men, tend to be more mobile, more likely to have multiple partners, and more likely to engage in sex with nonregular partners – behaviours that tend to be associated with higher HIV prevalence. Thirdly, the wealthier are more likely to live in urban areas and to live in wealthier communities, where HIV is more prevalent (Mishra et al., 2007).

Economic Status and Sexual Debut

The onset of sexual experience in any society is a pointer to the overall level of sexual health. Earlier reported age at sexual debut and widespread sexual activity among young people do not only portend great danger for the spread of sexually transmitted infections, particularly, given the general disposition of youngsters to unprotected sex (Adeboyejo and Onyeonoru, 2002) but have also been associated with a higher number of subsequent sexual partners per reporting period in later adolescence and early adulthood (Greenburg, Magder, and Aral, 1992).

A major goal of HIV prevention programs is encouraging young people to

delay first sex. Older age at first sex (along with a reduction in the number of sexual partners) appears to have contributed to declines in HIV infection rates among young people in Uganda (Fabiani et al., 2001, quoted in Magnani et al., 2003). Late sexual initiation also reduces the risk of sexually transmitted infections which are noted to be co-factors for the infection of HIV (World Bank, 1997).

Using a variety of data sources, Jejeebhoy and Bott (2003) concludes that the national average for sexual debut is 15 years for girls and 14 years for boys. The study concludes that there is a great heterogeneity of experiences: significant numbers of young people report having their sexual debut well before age 14, while many report still being virgins at age 18. Boys are reported to start sexual activity earlier and in higher proportions than girls.

A review of the sexual experiences of young people in developing countries reveals that while rape and emotional pressure are common in young people's first sexual experiences (Campbell, 2003). However, majority of young people "really wanted" or "wanted" to have sex their first time (Pettifor et al., 2004). Notwithstanding, in most countries, wealthier youth (15-24) are less likely to have abstained from sex (never had sex) than poorer youth (Mishra, 2007).

Examining the extent to which socioeconomic disadvantage is associated with "unhealthy" adolescent sexual and reproductive behaviours and outcomes in more developed countries, Singh, Darroch, and Frost (2001), show that relative socioeconomic disadvantage is associated with earlier age at first intercourse. In Africa, for instance, Kelly and Parker (2000) indicate that household poverty is

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associated with earlier sexual debut among 15–19-year-old females and males pooled across different sites in South Africa. Analysis from Transitions data in South Africa also show statistically significant differences by wealth status in the percentage of young women and men who have ever had sex within both the 14–19 and 20–24 year age groups. It shows a negative effect of wealth on earlier sexual debut for females and males, however, it is larger and more significant for females.

Moreover, analysing the relationships among socioeconomic status, risk factors for HIV infection, and HIV status in an urban population with high HIV prevalence in Kenya, using 1996 data, Hargreaves et al. (2002) finds that young women in the lowest socioeconomic status group have a significantly younger median age at first intercourse. Similarly, in a gender-pooled sample of 12–20-year-old females and 12–25-year-old males in Cameroon (Rwenge, 2003), father's unemployment and low household living standards contribute to earlier sexual debut. In Lesotho, Cameroon, and Burkina Faso, Akwara et al. (2005) finds that wealthier young men tend to have their first sexual intercourse more than one year earlier than poorer young men, whereas in other countries men's median age at first sex varies little by wealth status.

Other indicators such as residing in a more highly educated household delays age at first sex for females but not males, while not residing with a living mother leads to earlier female sexual debut. Maternal orphan results in younger age at sexual initiation among males, while being a paternal orphan hastens the sexual debut of females and males. Males residing in urban areas have their first

sexual experience at younger ages than rural males (Hallman, 2004).

Furthermore, young people with higher educational aspirations and better academic performance tend to postpone first intercourse (Miller and Sneesby, 1988). Time spent in academic activities is also negatively related to early intercourse, especially for girls (Crockett et al., 1996; Whitbeck et al., 1999). Similarly, more permissive attitudes about sex predict young people's level of coital and precoital experience and their initiation of intercourse (Treboux and Busch-Rossnagel, 1990; Whitbeck et al., 1999). Young men hold more permissive sexual attitudes than young women (Feldman, Turner & Araujo, 1999).

Economic Status and Multiple Sexual Partnerships

Reducing the number of concurrent sexual partners is the second pillar of HIV prevention. A drop in the number of sexual partners appears to have been a contributing factor to the decline in HIV among young people in Uganda (Fabiani et al. 2001, quoted in Magnani et al. 2003). Reasons for engaging in multiple sexual partnerships may differ among different geographical and cultural settings.

Reviewing psychology literature, Rodgers (1999) revealed that among US teenagers females are more likely to equate sexual intimacy with love or emotional commitment and are thus less likely to have multiple sex partners, all else being equal. Young women largely perceive sex as a form of caring that results in the integration of identity and intimacy. Young men, on the other hand, are more influenced by external factors such as peer pressure and parental control. In developing countries, however, the reasons for women to have multiple sex partners are largely described as economic. Meekers and Calvès (1997) indicate

that in Cameroon, economic need may increase the likelihood of multiple sexual partners for both females and males. Similarly, a gender pooled analysis by Rwenge (2003) reveals that socioeconomic disadvantage increases the odds of having multiple sex partners for young people in Cameroon.

In South Africa, 9 percent of females and 23 percent of young males had more than one sexual partner in the year before the survey. Results from the Transitions study conducted using national South Africa surveys also indicate that 8 percent of females and 35 percent of males have multiple partners in the year before the survey. While there is no clear wealth patterns for females, males in the highest wealth quintile have the lowest rates of multiple partners (Pettifor et al., 2004). Exploring the reasons for maintaining multiple sexual partners among young people, Luke and Kurz (2005) review of a number of studies reveal that active social agent girls have learned that sex is a valued resource and therefore maintain relationships with multiple partners simultaneously to maximize these benefits (Wood et al., 1998). For men, it is revealed that in a number of settings, males having multiple sex partners is accepted by both genders and may even be encouraged by male peers or elders because having multiple partners is culturally seen as a conquest and a status marking. Luke and Kurz (2002) further report that even in the face of declining traditional polygyny, multiple partnerships for men have continued, but this time through informal polygyny or the custom of having one legitimate wife and numerous "outside" wives or girlfriends (Wood et al., 1998; Vos, 1994). The sexual networks of men have broadened to include non-marital partners such as casual girlfriends and prostitutes (Caldwell et al. 1993).

Mann (1997) also discovers that having multiple partners is an economic survival tactic for women. The study of Edet (1997) provides an example of a young woman having concurrent sexual partners to fulfill different needs, both economic and emotional.

Economic Status and Condom Use

As with delaying age at sexual debut and reducing the number of concurrent sexual partners, increasing condom use is one of the three cornerstones of most HIV prevention programmes. The use of condom represents the C component of the popular ABC campaign. The relationship between poverty and the use of condom is well documented. Transitions study in South Africa shows that, among males, those in the upper three wealth quintiles have much greater condom use than those in the lowest two quintiles. Moreover, young women residing in households with higher wealth have greater odds of condom use. Similar but smaller wealth effects were found for young men (Hallman, 2004). Different studies in Africa also indicate that ever use of condom, condom use with a non-regular partner in last 12 months, and consistent condom use (with all partners) in last 12 months increased consistently with an increase in wealth status for both men and women (Kaufman and Stavrou, 2002; Abdool-Karim, 1998).

Research among young people has revealed that condom use is a difficult topic to introduce in conversation related to sexual and reproductive health for the fear that it could lead to negative economic consequences because young people, especially women, engage in exchanges of sex for money, goods, or favors (Varga and Makabulo, 1996; Wood and Jewkes 1997). Luke and Kurz's (2002)

review of studies from sub-Saharan Africa indicates that reports of this behaviour vary greatly by country, ranging from 5 percent of girls aged 12–17 in Cameroon (Meekers and Calvès, 1997) to 66 percent of girls aged 10–18 in Malawi (Weiss et al. 1996), to 80 percent of girls aged 14–19 in urban Tanzania (Komba-Malekela and Liljestrom, 1994).

Using data from Demographic and Health Surveys collected in five sub-Saharan African countries between 1994 and 1998 that included a question on exchanging sex, the Population Reference Bureau (2001) reports that the prevalence of recent exchanges among unmarried women aged 15–19 at 13 percent in Zimbabwe, 21 percent in Kenya, 26 percent in Mali, 31 percent in Uganda, and 38 percent in Zambia.

The findings of Machel (2001) on urban Mozambique reveal that adolescent girls attending secondary school in a working-class neighborhood were much more likely to have received material support from their sexual partners than girls attending a middle-class secondary school. Also, in a study of Nigerian university students, Edet (1997), quoted in Barnett and Whiteside (2002) discovers that a young woman may end up having as many as three simultaneous sexual relationships to make her way through university — her teacher (to ensure good marks), a “sugar daddy” or “sponsor” (to pay her living expenses and school fees), and her boyfriend.

In Tanzania, Nnko and Pool (1997) finds that since money and rewards are important in sexual relationships among adolescents and that sex does not occur without economic exchange of some form, women are often expected to

give priority to their partners' needs and wishes. This means that women often decide not to ask men to use condoms, or do not persist in asking, because of concerns about men's sexual pleasure (Wood, 2000, quoted in Jewkes et al. 2003). Thus, young women of lower socioeconomic status are compelled to be less assertive, wield poor negotiating skills, and be more accepting of traditional gender roles (Singh, Darroch, and Frost, 2001).

Indeed, in settings where few economic opportunities exist, young women may have difficulty separating sex from economic survival (Archavanitkul and Guest, 1994; Schoepf, 1989). Social and economic disadvantage often make it difficult for women to avoid coercive relationships and negotiate for safer sex within relationships (Worth, 1989; Rwenge, 2003; Jejeebhoy and Bott, 2003).

Hunter (2002), on his part, distinguishes between sex linked to subsistence needs and sex linked to socially motivated consumption desires in KwaZulu-Natal. The former behaviour is more common in rural informal settlements where various economic circumstances have severely limited the livelihood opportunities of young women. The latter behaviour is more characteristic of urban townships where fashionable consumer goods are highly socially valued; here young women are more likely to assert their agency and exercise greater freedom of movement, both of which facilitate relationships with men including "sponsors."

The health concern regarding female exchanges of sex is that a condom is less likely to be used, since the male partner is apt to be older and the one with the greater bargaining power to dictate the terms of the sexual encounter or

relationship. Kaufman and Stavrou (2002), therefore, conclude that money and gifts influence African girls, young girls in particular, not to suggest condom use. This is confirmed in a study on Adolescent Sexual and Reproductive Health Behaviour in Dodowa, Ghana, Afenyadu and Goparaju (2003) found that female adolescents do not insist on condom use because they are afraid of losing their *boy lovers*, or the monetary support from older partners.

Apart from the issue of poverty, other demographic and psychological factors are identified as having significant positive effect on condom use for both genders. For example, in a DHS data on developing countries, it is confirmed that in all of the developing countries studied, the more education men and women have, the greater is the likelihood that they use condoms.

Other variables that are found to be significant include respondent's age, respondent's marital status, AIDS knowledge, and age at first although other studies report that younger subjects are significantly more likely to report higher frequency of condom use during intercourse (Anderson et al., 1990). The use of condoms in long-term relationships may also be viewed as a lack of trust or an admission of infidelity, and is therefore often avoided (Varga, 1999; Worth, 1989; Abdool-Karim, 2001).

Family Relationship and Sexual Behaviour of Young People

Parent-child relationships, parental control, and parent-child communication have all been implicated in adolescent sexual behaviour of young people. Better parent-child relationships are associated with postponing intercourse, less frequent intercourse and fewer sexual partners (Miller, Benson,

and Galbraith, 2001). Although most studies are cross-sectional, similar relations have been found longitudinally (Feldman & Brown, 1993; K. Miller et al., 1998.)

Effects of mother-child relationship quality have emerged for both sons and daughters (Jaccard, Dittus, & Gordon, 1996), and the quality of the father-child relationship is influential for boys (Feldman & Brown, 1993). Effects of parent-child closeness have been found among blacks and whites and in multiethnic samples (Dittus & Jaccard, 2000). Several mechanisms may underlie the associations between family relationships and adolescent sexual activity. Poor parent-child relationships may enhance susceptibility to peer influences or increase the propensity to associate with deviant friends (Whitbeck, Conger, and Kao, 1993). Mechanisms may differ for girls and boys: Whitbeck et al. (1999) found that, for girls, the relation between low parental warmth and sexual behavior was mediated by depressed mood, whereas for boys it operated through alcohol use. In a study of boys, those from families characterized by low support, high indulgence, and paternal rejection had lower self-restraint and more sexual partners (Feldman & Brown, 1993).

Parental control is also related to adolescent sexual activity. Typically, better monitoring is associated with postponing intercourse (Jacobson & Crockett, 2000) or less frequent intercourse (Benda and DiBlasio, 1994), although not all studies find this pattern (e.g., East, 1996). Presumably, parental monitoring and supervision reduce adolescent intercourse by restricting opportunities for sexual activity; however, some studies indicate that sexual activity is more likely when parental control is excessive (Miller et al., 1986) or intrusive (Upchurch et al.,

1999).

The evidence from Ghana on the relationship between family communication about sex and the sexual behaviour of adolescents is decidedly weak. One study of the 1998 nationally-representative survey data from Ghana of 12-24 year olds found that communication with family members about avoiding sex was negatively associated with ever having had sex for unmarried males but had no effect for unmarried females (Mehryar et al., 2003).

Similar observation is made by Kumi-Kyeremeh et al. (2005) in a study to examine the current state of unmarried adolescents' connectedness to parents, friends and social institutions like school and religion, the roles that these groups, particularly parents, play in providing sexual and health information to adolescents and the influence that they have on adolescent sexual activity and condom use. The findings indicate that there is a negative relationship between monitoring and recent sexual activity for both males and females and the higher the level of monitoring, the lower the likelihood of recent sexual activity. Parental communication with adolescents about sex-related matters is not associated with sexual activity, with the one exception for female adolescents.

Peers are presumed to exert a major social influence on adolescent sexual behavior. Peer effects may operate at several levels. Same-sex peers are a major source of information about sex (Davis and Harris, 1982), and peers provide settings (e.g., cars, parties) where sex can occur (Rowe and Linver, 1995). Same-sex friends may influence the perceived acceptability of sexual behavior, and sexually experienced friends may serve as role models. Finally, romantic partners

provide opportunities for sexual experimentation and may also exert pressure for sex (Wyatt and Riederle, 1994).

Mass Media and Sexual Behaviour

Although existing theoretical debates indicate that it is not yet clear how they do so, there is considerable empirical evidence showing that the mass media can be used to influence health related ideas and behaviour (Benefo, 2004). Yoder et al. (1996) also observes that an AIDS radio drama in Zambia increased assessment of risk, knowledge about AIDS transmission and condom use. Moreover, it has been shown in Tanzania that a radio entertainment programme reduced partner numbers and increased condom use (Vaughan et al. 2000). Similar observations have been made by other studies that mass communication systems have positive effects on condom use and/or abstinence in Zimbabwe, Zambia, Uganda and South Africa (Kim et al., 2001; Lewicky et al. 1998; Underwood, 2001).

Most available cross-sectional studies in the African context suggest that mass media can have strong effects on a variety of health related behaviours even with controls for life cycle, socioeconomic and residential covariates. For HIV/AIDS related behaviours, Cleland's (1995) analyses of the WHO/GPA surveys in the nine hardest hit African countries finds that mass media exposure and education are the most important predictors of AIDS awareness and risk behaviour. Gregson et al. (1998) also finds that media exposure is a major predictor of AIDS awareness in rural Zimbabwe.

In Tanzania, Agha (2002) discovered that mass media exposure

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significantly increased intentions to use female condoms by first increasing the likelihood that a man or woman would discuss use of the female condom with a partner. Similarly, in a study to examine how exposure to HIV/AIDS information in the mass media influences knowledge of the disease and risk behaviours in Ghana, Benefo (2004) indicate that mass media exposure increases awareness of partner fidelity and condom use as ways of preventing infection. The study further reveals that the radio media's effect on inducing people to increase partner fidelity and start condom use is larger than the effects for television and print media. Radio's ability to get women to avoid commercial sex is significant whereas other mass media variables are insignificant in the abstinence. On the other hand, the radio media variable has a negative and significant coefficient for the age at sexual debut for females indicating that women who rely on the radio as a major source of information are not more likely than other women to delay sex as a protective strategy.

Examining the sexual content of information carried by the media, some researchers however, doubt the role of the media in shaping adolescent sexuality. These researchers have expressed that young people are not only frequently exposed to sexual material on television, in movies, and in magazines but also most of these sexual behaviours on television take place between unmarried young people. It is clear that some of these scenes ignore the potential negative consequences of sexual intercourse and music videos which often combine sex and violence. Experimental studies by Huston et al. (1998) show that exposure to such contents can lead to more permissive attitudes about premarital sex.

Risk Perception and Risk Behaviour

The relationship between perceived risk or vulnerability to a disease and health behaviour is basic in most models of health behaviour. Perceptions of risk are often found to be positively related to preventive health behaviour (Cummings, et al., 1979; McCusker, et al., 1989).

Some studies however, found the opposite, i.e., a negative relationship between perceived risk and preventive behaviour. These findings explained that an increased sense of risk — combined with low expectations of success in dealing with the risk — may provoke a helplessness reaction, and hence, decrease intentions to behave adaptively (Beck and Frankel, 1981; Joseph, et al., 1987). Findings from a study by Adih et al. (1999) on the determinants of condom use to prevent HIV infection among male youth in Ghana indicate that perceived susceptibility to HIV infection, perceived self-efficacy to use condoms, perceived barriers to condom use, and perceived social support are significant predictors of condom use. Subjects who perceived a high level of susceptibility to HIV infection and a low level of barriers to condom use were almost six times as likely to have used condoms at last intercourse, compared to others.

On their part, Gerrard, Gibbons and Bushman (1996) investigated the relationship between perceived vulnerability to HIV and precautionary sexual behaviour, and concluded that the often dramatic changes in sexual risk behaviour of high risk groups are only marginally related to beliefs about being at risk. In addition, Otten en Van der Pligt (1992) tested whether risky behaviour in the past leads to higher risk appraisals for future negative events. They tested this for a

variety of health risks. Overall, their findings reveal a clear relationship between past behaviour and risk appraisal, and between past behaviour and future behaviour. Their results suggest a modest role of risk appraisal as a determinant of future behaviour.

Weinstein and Klein (1995) argue that when health problems have not yet appeared and are controllable, a tendency to underestimate one's risks may interfere with appropriate preventive action. Generally, when asked to compare their risk to the "average" person or to comparable others (e.g. in terms of age, gender and educational background), people tend to estimate their risk of experiencing a negative event as below average. This illusion of (relative) invulnerability has been obtained for a wide variety of health risks, ranging from "catching a cold" to more serious risks such as heart disease, cancers and AIDS (Weinstein, 1980, 1984).

It can be seen from the above chapter that the relationship between poverty and HIV/AIDS infection may be seen in the relationship between poverty and risky sexual behaviours. Most of the studies reviewed document that poverty plays a role in creating an environment in which individuals are particularly susceptible and vulnerable to HIV/AIDS. This is consistent with standard economic theory that poor people are more likely to be risk averse; nevertheless, other studies have discovered a positive relationship between high economic status and HIV/AIDS infection, thereby challenging this assumption.

The conclusion gathered from this chapter underscores the need to re-examine the assumption that poverty drives risky sexual behaviour. Poverty may

be solely or partially responsible for high HIV/AIDS prevalence rate in some communities and countries, but in other communities, may not be in any way responsible. Other factors other than economic, such as media influence individual perception of vulnerability, etc. may be responsible. This means that policies/programs to halt the spread of HIV/AIDS are evidence-based.

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CHAPTER FOUR

METHODOLOGY

This chapter has three important sections: the first discusses the conceptual framework of the study. The second gives a description, justification and the measurements of the variables. Then the third section presents theoretical and empirical models as well as the estimation techniques for the study.

Conceptual Framework

The route to the risk of HIV infection is conceptualized on three levels - the distal level, the proximate level and finally the outcome level. Distal level factors are in not risky in themselves but are believed to operate through risky proximate factors (risky sexual behaviours) to expose young people to the undesirable outcome i.e. HIV infection. Between the distal level factors and the undesirable outcome are three proximate factors: age at sexual debut, multiple sexual partnerships and nonuse of condom. To be infected with HIV/AIDS, the distal level factors must expose young people to one or more of the risky sexual behaviours at the proximate level, which in turn influence the likelihood of HIV/AIDS infection. Based on both theoretical and empirical literature, several distal level factors have been identified. These are economic status, level of education, type and location of residence, marital status, knowledge of the consequences of the behaviour, personal risk perception, exposure to media

information and number of times one lives away from home. These factors have the tendency to directly or indirectly predispose young people to risky sexual behaviours.

A Conceptual Framework Showing the Link between Distal Factors and Risk of HIV Infection

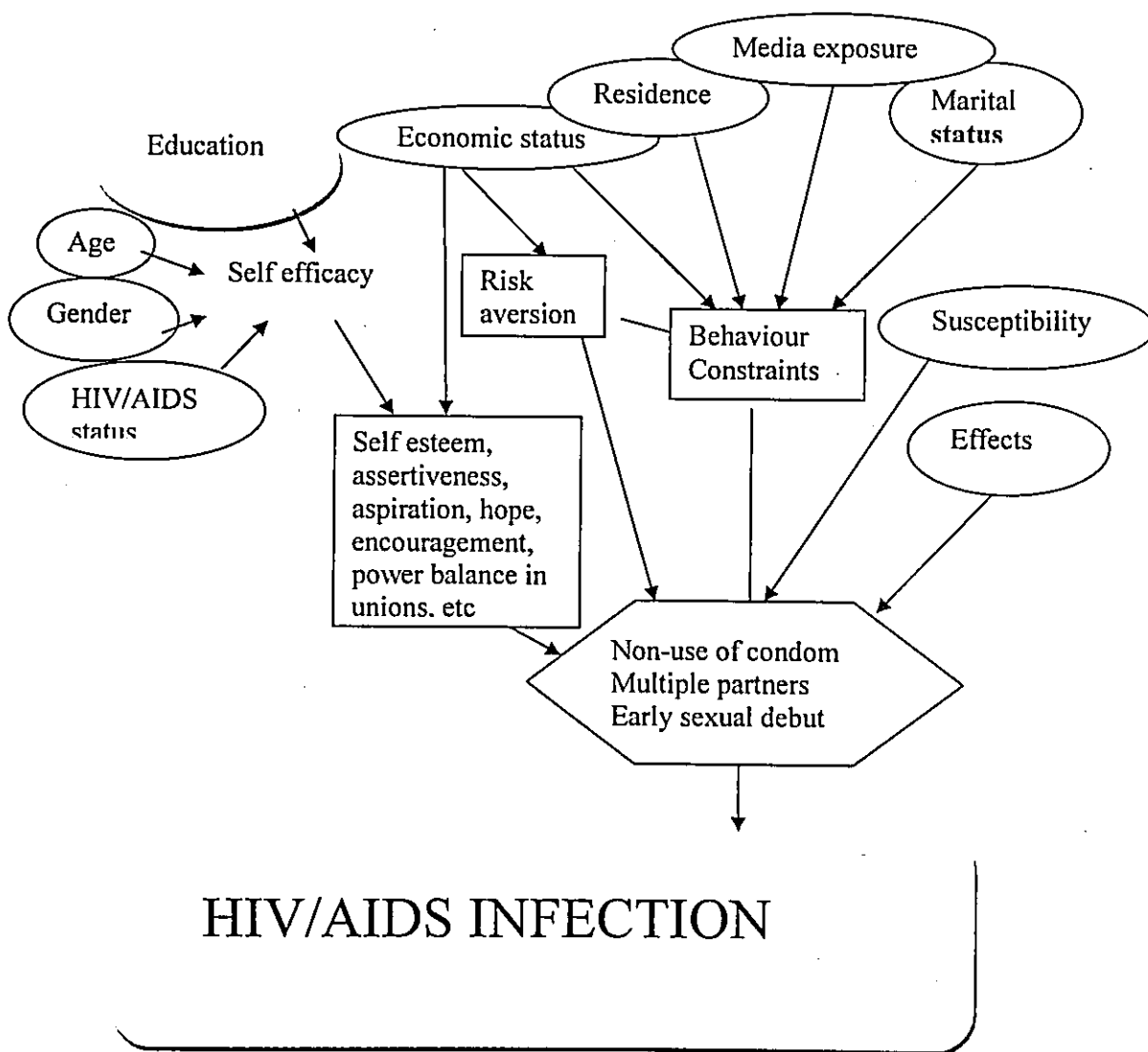


Figure 1

In figure 1, variables such as one's level of education, age, gender and knowledge of one's HIV/AIDS status which are believed to be very critical in determining human behaviour capability elements such as self esteem, encouragement and hope, acceptance, power balance in sexual unions, future aspirations, etc. can affect sexual behaviour of young people. For example, education improves one's self esteem, makes one more assertive and therefore improves the ability to negotiate for safer sex. At the same time, individuals with little or no education tend to have poor access to safe sex information and are less likely to use condoms. Moreover, it is expected that, *ceteris paribus*, older individuals possess stronger ability to control the conditions under which sex occur.

The constraints to behaviour change could be economic, social and environmental. Economic status is considered as an economic barrier to behaviour change because poverty and other economic pressures deprive people of the necessities of life, e.g. food and shelter, thus causing them to respond in ways that, although harmful, will ensure that they obtain these necessities. Moreover, the poor may be aware of the risk involved in practicing unsafe sex but lack the resources to depend on and thus may not have control over negotiating protective sex (Kronick, 1997). Poverty, thus, reduces the ability to buy condom and increases the willingness to have multiple sexual partners. It also compels young people to be sexually active at an early age. This means that improved economic status can be a protective factor. Thus, it is expected that the poor are more likely

to engage in sex at an early age, engage in multiple sex, and fail to use condom as a protection against HIV/AIDS infection. On a more theoretical ground, there exists a positive relationship between risk aversion and level of wealth (Nicholson, 2002). If higher wealth is associated with higher risk aversion, then we reason that those from high income households will place little premium on additional income hence will be less willing to engage in risky sexual behaviour if it is expected to yield some income. In this regard, young people from low income households will be expected to be less averse to risky sexual behaviours because they will place higher value on the outcome of the risky sexual behaviour in as much as the objective was a material possession.

Exposure to media information; whether or not the individual lives in a rural area, and the region of residence are considered to be important aspects of the individual's environment which have dynamic relationship with the sexual behaviour of the individual (Bandura, 1977). For example, it is argued that young people who are frequently exposed to both print and electronic media are more likely to have high risk of HIV/AIDS infection because it is evident that nowadays, the media is full of sex-enticing pictures (Greenberg et al., 1981; Greenberg and Busselle, 1996). It is also believed that those in rural areas do not have access to good health facilities, and information that may help them overcome the barriers of safe sexual behaviours hence they are more likely to engage in risky sexual behaviours. Another issue is where rural parents push their adolescent daughters into marriages to elderly polygamous men whose behaviour makes these young women susceptible to HIV infection. Also the perception of

rural dwellers on those who buy condom lives much to be desired. Other social factors such as marital status and the number of times an individual lives away from home are also important in influencing sexual behaviours.

Under risk/threat perception and severity of the consequences of risky behaviour the argument is that individuals, who perceive themselves as not at risk or have low perceived personal risk, and those who have no knowledge of the extent of the severity of the outcome of the behaviour are considered to be at high risk of HIV/AIDS infection (Adih et al., 1999).

Data Design

The source of data for this study is the 2003 GDHS, a nationally representative survey of 5,691 women age 15-49 and 5,015 men age 15-59. The 2003 GDHS used a two-stage stratified sample design based on the 2000 Ghana Population and Housing Census. At the first stage, 412 enumeration areas (EAs) were selected, each with probability proportional to size, based on the number of households. The second stage of sampling involved systematic sampling of households. The sample selected per EA varied by the population size of each region. The sample was selected to provide estimates for key variables, such as HIV prevalence, with acceptable statistical precision for the country as a whole, for each of the 10 regions in Ghana, as well as for urban and rural areas separately. Because of the disproportional number of EAs and different sample sizes selected per EA among regions, the household sample for the 2003 GDHS is not self-weighted at the national level (GSS, 2003).

In households selected for the 2003 GDHS, all women age 15-49 and men

age 15-59 were eligible for interview and HIV testing. The protocol for HIV testing was approved by the Ghana Health Service Ethical Review Committee in Accra and the ORC Macro Institutional Review Board in Calverton, Maryland. The procedure, the confidentiality of the data, and the fact that the test results would not be made available to the subject were explained to the respondents. Specimens were taken from respondents after they had consented to be tested. The testing procedure is discussed in detail in the final report (GSS et al., 2004). Dried blood spots for HIV testing were collected from 89 percent of the 5,949 eligible (interviewed and not interviewed) women and 80 percent of the 5,345 eligible men.

To determine the level of awareness and practice with regard to the transmission of the AIDS virus, female and male respondents who indicated that they had heard of AIDS (98 percent of women and 99 percent of men) were asked several questions on HIV/AIDS-related knowledge and attitudes. Sexual behaviour questions were only asked of sexually experienced (ever had sex) respondents (82 percent of women and 77 percent of men), and those sexual behavior questions that required a recall period were asked of respondents who had been sexually active in the 12 months preceding the survey (68 percent of women and 67 percent of men) (GSS, 2003).

For this study, a total of 2616(828 females and 1787 males) young men and women aged 15–24 years were extracted from the 2003 GDHS sample. However, the observation used per estimation varies by the dependent variable. For instance, the number of those who did not use condom in their last sexual

encounter is different from the number of those of age at sexual debut. In all a total of 1931 (1649 males and 282 females) respondents are involved in the estimation. This study focuses on young people. For the purpose of this research, young people are identified as those youngsters between the ages of 15 and 24 years. This class of people possesses distinctive socioeconomic and psychobiological lifestyles characterised by: personality identity search/crises; desire to be free from strict parental control; deviance behaviour, insatiable desire for the excitement and sophistication of modern (urban) life styles etc. This period has been described as a time of emotional, physical, social and biological development which contributes substantially to the well being of the individual in adulthood (Torotich-Ruto, 1997). The choice was based primarily on the fact that the age group of 15 – 24 is considered as at most risk of HIV/AIDS infection (GSS, 2003).

Measurement of Variables and Apriori Expectations

The main dependent variable for the study is risk of HIV infection. It measures the extent to which the young people in Ghana are at risk of contracting HIV. In this study, three risky sexual behaviours are used as proxies for risk of HIV infection. These are (a) engaging in multiple sexual partnerships (b) nonuse of condom during sexual intercourse with non marital or non-cohabiting partner and (c) age at sexual debut. Multiple sexual partnerships as a dichotomous variable is derived from the question 'have you had sex with any other person apart from your regular partner?' with "yes (1)" or "no (0)" response options. Nonuse of condom is also a dichotomous variable. It is derived from respondents'

response to the question “did you use a condom during the last intercourse with other partner?” with response options “yes (1)” or “no (0)”. Sexual debut is measured by the age at which one had first sexual intercourse. The age at first sexual intercourse is used to capture this variable.

Explanatory Variables

Four set of explanatory variables are captured in this study. The explanatory variables are based on the conceptual framework. The first set comprises level of education, age and Knowledge of HIV/AIDS status. *Knowledge of HIV/AIDS Status* is a dichotomous variable indicating whether or not an individual knows his/ her HIV/AIDS status. The value 1 is assigned to those who know their HIV/AIDS status while 0 is assigned to those who do not know their HIV/AIDS status. This variable is measured from two questions: (1) whether the respondent has done HIV/AIDS test, with yes or no as responses (2) whether he/she received results, with yes or no as responses. A composite variable is built from the responses of the two questions. All those who answer ‘no’ for the first and second questions are assigned zero(0) in the new variable indicating that the respondent does not know his/her HIV/AIDS status while those who answer yes in the second question are assigned one(1) indicating that the respondent knows the HIV/AIDS status. Individuals who know their HIV status are expected to abstain from risky sexual behaviours; hence in this study we expect this variable to be positively associated with condom use and age at sexual debut. However, it is expect to be negatively associated with multiple partners.

Age is measured in years and is expected to be positively related to the use

of condom. This is due to the belief that as one grows he is more capable to resist peer influence. Moreover, the fear and the shyness that surround the buying and possession of condom is reduced as one grows. However, it is expected that the freedom and somehow independence enjoyed by young people as they grow will urge them to engage in serial or multiple sexual partnerships. Thus in this study we expect age to be positively associated with multiple sexual partnerships.

Education is measured in years of schooling. The higher the level of education, the more one is expected to appreciate the need for good reproductive health; higher levels of education is also noted to build the confidence of people in the use of condom. Hence the higher the years of schooling, the more he/she is expected to avoid unsafe sexual activities. Level of education is, therefore, expected to be negatively associated with multiple sexual partnerships, but positively related with age at sexual debut and condom use during last sexual intercourse with a casual partner.

The second set covers household economic status, type of residence, exposure to media information, marital status, and number of times respondents stay away from home. Type of residence is measured by indicating whether or not respondent live in urban area. This is a dummy variable with yes (1) or no (0) response. Since social cohesion is very strong in rural areas than in urban areas, we expect young people in urban areas to be more likely to engage in risky sexual behaviours than those in the rural areas. For region of residence, each of the ten regions of Ghana is assigned a number (1= Western, 2=Central, 3 = Greater Accra, 4 = Volta, 5 = Eastern, 6 = Ashanti, 7 = Brong-Ahafo, 8 = Northern, 9 =

Upper West and 10 = Upper East). The expectation for region is expected to be a mixed and very complex. We expect young people from regions that have history of high HIV prevalence rates to be more likely to engage in risky sexual behaviours. For instance, we expect young people from Eastern and Central regions to be more involved in risky sexual behaviours than those in the three northern regions. However, at the same time, we expect those from the three northern regions to be more involved in risky sexual behaviours because of the level of poverty in these regions.

Three items are considered under exposure to media. These are 'whether or not one frequently reads newspapers/magazines'; 'one frequently watches television'; and finally 'one frequently listens to radio'. These variables determine the level of exposure of the individual to information. Of course, the type of information may include religious tracts as well as pornographic information. These items are measured on a four-point scale [not at all (0), less than once a week (1) at least once a week (2) and almost everyday (3)]. The signs for these media variables are expected to vary depending on the kind of information consumed by the individual. While Health education programmes often generate *behavioral change*, i.e., induce preventive behaviour or reduce the frequency or intensity of risky practices, exposure to indecent messages and images often arouse people's desire for sexual activities hence may fail to induce preventive behaviour. Marital status and employment status are also dichotomous variables.

Household economic status is the main explanatory variable of interest in this study. Household wealth quintile is used as a measure for socioeconomic

status of the respondents. Household wealth quintile is represented by wealth index, as computed in the GDHS. The index ranges from poorest (1), poorer (2), middle (3), richer (4) to richest (5) (GSS, 2003). However, in this study, poorest and poorer category have been combined to form low wealth index, middle remains as middle wealth index while richer and richest are combined into high wealth index. The reason for this aggregation is just to make it quite simple to compare the economic statuses. Wealth effects are reported here since wealth is more strictly exogenous in a model of health behaviours (Strauss and Thomas 1998) and is less subject to reporting error. As already stated, since poverty and other economic pressures constrain young people's behaviour, it is expected those from low income households to have early sexual debut, engage in unprotected sex and also have multiple sexual partners.

The Computation of Wealth Index

DHS surveys do not include direct questions on income or expenditure, but collect information on several items that measure household ownership of consumer durable assets (such as television and bicycle; cars, radios, sofas, ; dwelling characteristics such as type of flooring material or the existence of overcrowding materials used for housing construction; and availability of amenities such as electricity, source of drinking water, type of toilet facility and type of cooking fuel), which tend to be correlated with household wealth status. Using these survey items, Filmer and Pritchett (2001) developed a standard procedure to construct a "wealth index" to quantify differences in household economic status.

The wealth index is generated using the principal-components analysis. Each household asset is assigned a weight or factor score, and the resulting asset scores are standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. This composite considers the cumulative living standard of a household and places individual households on a continuous scale of relative wealth. The population is divided into quintiles—five categories, with the lowest quintile representing the poorest 20 percent and the highest quintile representing the wealthiest 20 percent households within each country. DHS/World Bank (DHS/WB) asset index measures the distribution of wealth across a country.

The Reliability of the Assets-Oriented Approach (wealth index) in Measuring Household Economic Status

Reliance on an index of assets to measure socioeconomic status is somewhat unconventional in research about economic disparities, which has traditionally been based on measurements of consumption or income. DHS surveys are often implemented in countries where income itself may not be the most reliable or even available way of measuring socioeconomic status. Large proportions of the population often work in the agricultural or informal sectors, receiving no cash payment for their work. Instead, they may be paid in kind — for example, being given the right to use someone else's land for farming or being given animals to rear. The difficulty in assessing socioeconomic status in such countries can be surmounted by means of the asset-based approach. Since ownership of assets has been found to be an accurate proxy for consumption, the

DHS/WB asset index indirectly measures the long-term economic status of a household.

The asset index has been compared against the poverty rates and the gross product per capita for India. At the microeconomic level, expenditures data are compared with assets data for the same households for Nepal, Pakistan, Indonesia (Filmer and Pritchett, 2001), and Guatemala (Rutstein and Johnson, 2004). Evidence from those studies show that the DHS/WB asset index is highly comparable to conventional measures of consumption expenditures. This approach has the advantage of producing information directly relevant to the underlying question of interest— specifically, the health status of the poor or access to services for the poor in the population as a whole. The approach also facilitates making comparisons across indicators for the same quintiles; since the quintile denominators remain unchanged across indicators

Perceived threat of the outcome of the behaviour has only one variable, *Perceived susceptibility to HIV/AIDS*. This is a dichotomous variable indicating whether or not the individual sees himself/herself as at risk of HIV/AIDS infection. The question for the measurement of perceived susceptibility to HIV infection was adapted from the GDHS (2003). The question is ‘can a healthy person get HIV/AIDS?’. The response options are “yes” (1) or “no” (0). Generally, the perception of personal vulnerability to health risks seems a necessary requirement for people to consider behavioral change. In that sense, perceived susceptibility to HIV/AIDS is expected to be positively associated with condom use during last casual sex, age at sexual debut but negatively related

multiple sexual partnerships.

The fourth, *Knowledge of the consequences of HIV/AIDS* is also a dichotomous variable indicating whether or not the individual knows the severity of the consequences of the HIV/AIDS disease. This variable is measured from the question adopted from the GDHS data (2003) "do you know someone who has or died of HIV/AIDS?" with yes (1) or no (0) as responses. We expect this variable to be negatively associated risky sexual behaviour leading to HIV infection.

Finally, level of wealth, is the only variable considered under the last set. Wealth is measured in quintiles. The computation of the wealth quintile is already discussed above.

Analytical Techniques

Two tests were performed to ascertain the validity and the appropriateness of the 2003 Ghana Demographic and Health Survey (GDHS) data used for the study. First, region-wealth index crosstabulation was done. The results were then compared with the Ghana living standard survey to see if they have similar poverty distribution patterns. This is done to test the appropriateness of the data for the study.

A Test for Multicollinearity

Multicollinearity may be defined as the existence of perfect or exact, linear relationship among some or all the explanatory variables of a regression model (Davidson and Mackinnon, 1993). For a k-variable regression involving

explanatory variables X_1, X_2, \dots, X_k , for example, (where $X_1 = 1$ for all observations to allow for the intercept term), an exact linear relationship exist if :

$$\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + v_i = 0 \quad (4.1)$$

β_1, β_2 and β_k are constants such that not all of them are zero simultaneously and v_i is a stochastic disturbance term. Given the above equation it could be shown that X_2 is exactly linearly related to other variables or it can be derived from a linear combination of other X variables. Assuming that $\beta_2 \neq 0$

$$X_{2i} = -\frac{\beta_1}{\beta_2} X_{1i} - \frac{\beta_3}{\beta_2} X_{3i} - \dots - \frac{\beta_k}{\beta_2} X_{ki} - \frac{1}{\beta_2} v_i \quad (4.2)$$

In this situation, the coefficient of the correlation between the variable X_2 and the linear combination on the right side of equation 4.2 is bound to be unity. The equation also shows that X_2 is also determined by the stochastic disturbance term. The presence of multicollinearity was tested for by estimating variance-covariance matrix for all the explanatory variables. Two explanatory variables are collinear if the correlation coefficient (obtain in the variance covariance matrix) is very high (above 0.5) (Davidson and Mackinnon, 1993). The results of the correlation matrix are presented in appendices 1 and 2.

Having established that the patterns of poverty distribution in the Ghana Demographic and Health survey data are similar to the patterns in other national data sets, the next step was to systematically examine the association between

household wealth and Risk of HIV infection. In a multivariate analysis, the independent relationship between wealth and the other underlying (distal) factors on one hand and each of the three HIV risk behaviours - multiple sexual partnerships, nonuse of condom, and age at sexual debut were estimated. Separate estimations were performed for each of the three HIV risk sexual behaviours. The relationship between the distal variables and the two of the three dependent variables (multiple sexual partnerships and nonuse of condom) were estimated using logistic regressions. The reason is that these dependent variables are qualitative and dichotomous (binary). The odds ratios for the explanatory variables were reported. However, OLS regressions were used to estimate the relationship between the distal variables and age at sexual debut. The reason is that the dependent variable, age at first sexual debut, is a quantitative variable (Davidson and Mackinnon, 1993).

Specification of the Theoretical Econometric Model

The Logit model is systematically specified below: Beginning from a Linear Probability Model (LPM)

$$P_i(y = 1|X) = p(y = 1|X_1 + X_2 + \dots X_k) \quad (4.3)$$

P_i is the probability that an individual engages in a risky behaviour

$X_1, X_2 \dots X_k$ denote explanatory variables. $y = 1$ means the event does occur (an individual engages in a risky behaviour)

The LPM above assumes that $P_i(y = 1|X)$ increases linearly with X i.e.

the marginal or incremental effect of X remains constant throughout. This seems unrealistic since most economic variables tend to be nonlinearly related. Moreover, since $E(y = 1|X)$ in linear probability models measures the conditional probability of an event occurring given X , it must necessarily lie between 1 and 0. Although this is true a priori, there is nothing in the procedure that guarantees that \hat{y}_i , the estimators of the estimated probabilities, $E(y|x)$ will necessarily fulfill this restriction, and this is the real problem with OLS estimation of the LPM (Davidson and Mackinnon, 1993). The more common and more prudent procedure is to model the probabilities by some distribution function other than the cumulative normal. The logit model which uses Cumulative Distribution Densities (CDF) to model regressions where the response variable is dichotomous, does not only guarantee that the estimated probabilities fall between the logical limits 0 and 1 but also ensures that the relationship between P_i and X_i is nonlinear.

Then the logistic model specifies that the probability of engaging in a risky sexual behaviour is given by

$$P_i(y = 1|X_i) = \frac{\exp(x\beta)}{1 + \exp(x\beta)} \quad (4.4)$$

Where $x\beta$ is $\beta_1X + \dots + \beta_kX_k$

Equation (4.4) implies that the probability of not engaging in a risky sexual behaviour ($1-P_i$) can be written as

$$1 - P_i = \frac{1}{1 + \exp^{x\beta}} \quad (4.5)$$

We can, therefore, write

$$\frac{P_i}{1 - P_i} = \frac{\exp^{(x\beta)}}{1 + \exp^{(x\beta)}} \left(\frac{1 + \exp^{x\beta}}{1} \right) = \exp^{x\beta} \quad (4.6)$$

$\frac{P_i}{1 - P_i}$ is simply the **odds ratio (OR)** in favour of engaging in a risky behaviour – the ratio of the probability that an individual will indulge in a risky behaviour to the probability that she/he will not indulge in a risky behaviour. The odds ratio is equal to $\exp(\beta)$. This shows the probability of engaging in a risky sexual behaviour for a given value of an explanatory variable, holding all other explanatory variables in the model constant. When both the dependent variable (Y) and the explanatory variable (X) are dichotomous, the odds ratio is the probability that Y is 1 when X is 1 compared to the probability that Y is 1 when X is 0.

Taking the natural log of equation (4.6) gives the Logit Model as specified below:

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = Z_i = \beta_1 + \beta_2 X_i + \mu_i \quad (4.7)$$

The Empirical Model

Substituting the explanatory variables into equation (4.7), the empirical [Logit] model for the study appears in the form:

$$\begin{aligned}
L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = & \beta_1 + \beta_2 wthindx + \beta_3 age + \beta_4 reg + \beta_5 urb + \beta_6 knwHIVst \\
& + \beta_7 knwseHIV + \beta_8 perc vul + \beta_9 schyrs + \beta_{10} frqtv \\
& + \beta_{11} frqradio + \beta_{12} awayhme + \beta_{13} marstat + u_i
\end{aligned}
\tag{4.8}$$

In the model, wealth index (*Wthindx*) is a measure for economic status of individual. Wealth index is used as a proxy; *age* is the current age of the respondent. This is measured in years; urban residence (*Urb*) is a dichotomous variable indicating whether or not the respondent lives at an urban area; knowledge of HIV status (*knwHIVst*) is a dichotomous variable indicating whether or not the respondent knows the HIV status and knowledge of the severity of the consequences of HIV (*knwseHIV*) is a dichotomous variable indicating whether or not the respondent knows the severity of the consequences of HIV/AIDS status. The proxy for this variable is that a respondent should have seen an HIV/AIDS patient before. Others are perceived vulnerability to HIV infection (*Percvul*) is a dichotomous variable indicating whether the individual perceives himself as at risk of HIV/AIDS infection; years of schooling (*Schyrs*) is the level of schooling of the respondent; frequency of watching television (*Frqtv*) is a dichotomous variable indicating whether or not the respondent watches the television frequently; frequency of listening to radio (*Frqradio*) is a dichotomous variable indicating whether or not indicating whether or not the respondent listens to the radio frequently; frequency of reading magazine or newspaper (*Frqreadn*) is a dichotomous variable indicating whether or not the respondent reads newspapers/magazines frequently; stay away from home (*Awayhme*) measures

the number of times a respondent is away from home; marital status (*Marstat*) is a dichotomous variable indicating whether or not the respondent is currently married age at first sex (*Fsex*) measures the age at sexual debut; β_s are the coefficient of the explanatory variables and μ_i is stochastic disturbance term

Interpretation of the Logit Model

Since the maximum likelihood is used; the estimated standard errors are asymptotic. The standard normal (Z statistic) is used, instead of the t statistic, to evaluate the statistical significance of the coefficient. The reason is that if the sample size is large enough, the t distribution converges to the normal distribution. If L_i , the logit, is positive, it means that when the value of the regressor(s) increases, the odds that the regressand equals 1 (meaning that some event of interest occurs) increases. If L_i is negative, it means that the odds that the regressand equals 1 decrease as the value of X increases.

Specification of the Ordinary Least Square (OLS) Model

The OLS model to be estimated for the relationship between age at sexual debut and the explanatory variables is of the form

$$y_i = \alpha + \beta\chi_i + \nu_i \quad i = 1, \dots, n$$

Where y is the dependent variable or the explained variable; χ is the matrix of explanatory variables and ε is the stochastic disturbance term. α and β are parameters, while i indexes the n sample observations.

The empirical model, therefore, is in the form

$$\begin{aligned}
fsex = & \beta_1 + \beta_2 wthindx + \beta_3 age + \beta_4 reg + \beta_5 urb + \beta_6 knwHIVst \\
& + \beta_6 knwscHIV + \beta_7 perevul + \beta_8 schyrs + \beta_9 rqreadn + \beta_{10} frqtv \\
& + \beta_{11} frqradio + \beta_{12} awayhme + \beta_{13} marstat + u, \quad (4.10)
\end{aligned}$$

The explanations of the variables are the same as in the logit model.

CHAPTER FIVE

ESTIMATION RESULTS

It was hypothesized earlier that low economic status increases the risk of HIV infection, since the poor are more likely to have unsafe sexual behaviours, due partly to lack of knowledge as a result of poverty as well as harsh circumstances that force them to resort to unsafe sexual practices for survival. In this chapter, the outcome of the analysis of the data is presented. Whether or not the hypotheses are confirmed is also presented. Three logistics regression results are presented; each gives information on the each of the three dependent variables - nonuse of condom use during last sexual intercourse, multiple sexual partnerships and age at sexual debut.

Results from Crosstabulations and Multicollinearity Test

The region of residence-wealth index crosstabulation results show that in 2003 Ghana Demographic and Health Survey, the three northern regions were the three poorest regions. This trend is consistent with that of the Ghana living standard survey (GLSS), a proof that the data is a reflection of national pattern. The multicollinearity test shows that the pair-wise correlations among the

explanatory variables are below 0.5. This means that there exists no correlation among the explanatory variables.

Results for Multiple Sexual Partnerships

One of the dependent variable is multiple sexual partnerships. The results from the estimation are presented in table 1.

Table 1: Logistic Regression for Multiple Sexual Partnerships

Variable	Males		Females	
	Odds Ratio	p>[z]	Odds Ratio	p>[z]
Middle wealth(r)				
High wealth	1.1822	(0.4320)	0.1672	(0.9910)
Low wealth	3.4658	(0.6760)	1.2430	(0.7720)
Age	1.2216	(0.0010)	1.2332	(0.1870)
Working	3.9670***	(0.0000)	0.5092	(0.3490)
Marital status	4.7943	(0.8970)	0.4390	(0.3150)
Urban	0.7689	(0.2970)	1.8403	(0.7640)
Years of schooling	1.1168*	(0.0590)	0.0744**	(0.0410)
Away home (> 1 month)	1.9799*	(0.0620)	1.9698*	(0.0520)
Freq. TV	1.0313*	(0.0610)	1.1064*	(0.0750)
Freq. radio	0.8552	(0.1430)	0.8994	(0.2240)
Freq of reading	0.9719	(0.1690)	1.7130	(0.4430)
Know HIV status	0.3004**	(0.0340)	0.2776**	(0.0480)
Know HIV severity	1.1161	(0.2040)	1.1987	(0.6060)
Perceived vulnerability	1.2332	(0.4320)	0.9609*	(0.0570)

Source: Researcher's calculation based on 2003 GDHS data.

The number of observations for young men is 407 and that for young women is 236. Pseudo R² is 0.06165 and Log likelihood is -236.48897. From

table 1, odds ratios with one asterisk sign (*) denote significance at $p < 0.1$; double asterisk sign (**) denotes significance at $p < 0.05$; while three asterisk signs (***) denote significance at $p < 0.01$. The letter r represents reference variable.

The results in table 1 shows that the probability that a young person (female and male) will have multiple sexual partners is not found to be significantly associated with household wealth even after other distal factors variables were controlled for one after the other. Although this finding is consistent with the findings of Kumi-Kyeremeh et al. (2005) and Agyei-Mensah (2006), it does not confirm the hypothesis that low economic status influences young people's involvement in multiple sexual partnerships.

Also, the probability that a young female who knows her HIV status will not have multiple sexual partners is 0.72(odds ratio of 0.28). Similarly, a young man who knows his HIV status is 70% less likely to have multiple sexual partners compared to his colleague who does not know his personal HIV/AIDS status. It is realized that the probability that a male will not engage in multiple sexual partnership is lesser compared with that of females given that both know their HIV/AIDS status. The differences may reflect the different risk assessment levels by the two opposite sex. We should note that information informs risk perception (Demoz, 2003). However, although people may have uniform information about the risky nature of an activity, they may not have a uniform perception on risk (Wilde 1994, 2002). Thus, risk perception may depend on other factors rather than information alone. Gender differences can also play key role in how

individuals react to risky activities. There is also the tendency that people will underestimate or overestimate their risk because of the belief that certain outcomes may belong to some particular group. Perhaps the reason young men are less likely to reduce the number of sexual partners compared with young women is that young men judge that the likelihood of contracting HIV is higher among women.

Economic theory holds that individuals could be risk averse, neuter or lover, an attitude which is linked to utility. Naturally, young women are more risk averse and the more risk-averse one is, the more one should be willing to take precautions to reduce infection risks (Lammers, 2008). Male, on the other hand, may be more risk loving. Thus, they have an increasing expected marginal utility while females have a decreasing expected marginal utility for an activity and hence will always avoid behaviours that have uncertain outcomes.

The analysis also reveals that young women who perceive themselves as susceptible to HIV/AIDS infection are about 4% less likely to engage in multiple sexual partnerships. Perception of high risk is often found to be positively related to preventive health behavior (Cummings, et al., 1979; McCusker, et al., 1989). The situation for the male counterpart is not supported by evidence from the data at hand. The probability that young people will have multiple partners is significantly associated with age. As shown in other studies, age is positively associated with multiple partnerships for males. Age is associated with occupation, education and income hence can attract a lot of casual sex partners. With regards to media exposure, although frequency of watching television does

not have the expected sign, it is the only media variable found to be significantly associated with young people's indulgence in multiple sexual partnership. Young females who frequently watch television are found to be 10 % more likely to have multiple partners than their colleagues who watch television less frequently. Similarly, young men who watch television frequently are found to be 3 times more likely to have multiple partners. This is consistent with the reasoning of Huston et al. (1998) and Greenberg et al. (1981) that young people are frequently exposed to sexual materials on the Television and this has the effect of producing more permissive attitude towards premarital sex.

One important variable that is identified to have a positive association with multiple sexual partnerships is *number of times away from home*. Young men and women who are away from home for more than a month are about 97% and 96% more likely to have multiple partners than those who do same for less than a month. This confirms the findings of Feldman and Brown (1993) that weak family child relationship leads to low self restrain and more sexual partners. When a young man or woman is more frequently away from home, it breaks him/her away from family cohesiveness. Poor parent-child relationships may also enhance susceptibility to peer influences or increase the propensity to associate with deviant friends (Whitbeck, Conger, & Kao, 1993). Peers are presumed to exert a major social influence on adolescent sexual behaviour by not only providing information about sex (Davis & Harris, 1982), but also providing settings (e.g., cars, parties) where sex can occur (Rowe and Linver, 1995).

Kumi-Kyeremeh et al. (2005) observed in a study conducted on

adolescent in Ghana that the larger the number of closed friends an adolescent reported the higher the likelihood the adolescent was sexually active. This was observed for both males and females. Moreover, when young people are away from home most of the time, the parents do not have the opportunity to monitor their movements. By keeping a close eye on one's child (know where he/she goes out at night, how she/he spends the free time and who his/her friends are) has a positive influence on sexual behaviour of both males females (Kumi-Kyeremeh et al., 2005).

Years of schooling is another variable found to be significantly associated with multiple sexual partnerships for both young males and females. An interesting discovery is made here: while young females who have more years of schooling are about 7% less likely than those with less years of schooling to have multiple partners, the reverse is seen for the males. Young males with more years of schooling are found to be about 11% more likely than their counterparts with comparably less years of schooling to have multiple partners. Even though this finding contradicts some studies (Kumi-Kyeremeh et al., 2005) it may reflect the belief that young men hold more permissive sexual attitudes than young women (Feldman, Turner & Araujo, 1999). Moreover, with the introduction of a safety measure such as condom, youngmen may find the rewards of risk taking as more attractive and therefore tend to engage in more casual partners (Richens et al., 2003).

Results for Consistent Use of Condom

Consistent condom use is considered to be one of the preventive

measures for the spread of HIV/AIDS. In this study it is hypothesized that young people from households with low economic status are less likely to use condom consistently. The logistic regression results for use of condom are presented in table 2.

Table 2: Logistic regression for condom use

Variable	Males		Females	
	Odds Ratio	p>[z]	Odds Ratio	p>[z]
Middle wealth(r)				
High wealth	2.5116*	(0.1000)	0.226	(0.3560)
Low wealth	0.4502*	(0.0860)	0.4596	(0.4350)
Age	1.9588 *	(0.0470)	1.9420	(0.6320)
Working	1.0906	(0.2060)	0.5146	(0.5510)
Marital status	0.2720 ***	(0.0060)	2.0041	(1.1760)
Urban	1.6687	(0.4320)	1.0332	(0.7290)
Years of schooling	1.0984**	(0.0160)	1.1755**	(0.0280)
away home (> 1 month)	1.3623	(0.4180)	0.9698	(0.3450)
Freq. TV	0.9179	(0.1530)	1.1208	(0.2750)
Freq. radio	1.2937	(0.4300)	0.6283	(0.2390)
Freq of reading	1.0993	(0.2850)	1.1752	(0.4360)
Know HIV status	1.7703 **	(0.0220)	1.9722**	(0.0350)
Know HIV severity	0.8860	(0.2680)	1.3762	(0.5830)
Perceived vulnerability	1.3920*	(0.0810)	0.9085	(0.1390)

Source: Researcher's calculation based on 2003 GDHS data.

The number of observations for young men is 464 and that for young women is 282. Pseudo R² is 0.06165 and Log likelihood is -236.48897. From table 2, odds ratios with one asterisk sign (*) denote significance at p < 0.1; double asterisk sign (**) denotes significance at p < 0.05; while three asterisk

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signs (**) denote significance at $p < 0.01$. The letter r represents reference variable.

On the use of condom with non-marital and non-cohabitating partners, the explanatory variable of interest, household wealth, is found to be insignificant for young females even when other variables are controlled for. The case is different for the male counterpart. Without controlling for any distal variable, males in the lower wealth index are found to be 55% less likely to use condom than those in the middle wealth index. This is significant at less than 10%. Those in the high wealth index are found to be significantly 2.5 times more likely to use condom during last intercourse with casual partner than their counterparts in the middle income households. The pattern does not change even when risk perception, environmental and demographic factors are controlled for one after the other. However, the probabilities change slightly in each case. The probabilities that those in the lower wealth index will not use condom decreases to 54% and increases to 57% respectively when risk perception and environmental factors are controlled for. Those in the higher wealth index are still between 2.0 and 2.5 times more likely to use condom than those in the middle wealth index. The performance of the variable of interest in the condom use model gives two important revelations. First it reveals that economic status does not have a hundred percent and straight forward association with young people's sexual behaviour. This does not confirm the general hypothesis that there is a positive relationship between low economic status and unprotected sex. Second, the analysis reveals that household economic status has different influence on the

young females and young males as far as unprotected sex is concerned. It reveals that young males in the higher income households are more likely to engage in protected sex than their counterparts in the lower income households. This indicate that it is only the young male, not the female, who is influenced by household economic status, a revelation which refuses to accept the hypothesis that young females are more by household economic status.

One variable that is found to be significantly associated with condom use among both young males and females is knowledge of one's HIV/AIDS status. The odds ratios in favour of knowledge of HIV/AIDS status are 1.77 and 1.972 respectively for young men and women. This means that young men who know their personal HIV/AIDS status are about 77% more likely to use condom during sexual intercourse with non-marital and non-cohabiting partner than those who do not know their personal HIV/AIDS status. Similarly, young women who know their personal HIV/AIDS status are about 97% more likely to use condom with casual partners under unrestricted conditions than those who do not know their personal HIV/AIDS status. It is reasoned that knowledge of HIV/AIDS status affects personal attitudes and behaviour. In Ghana HIV/AIDS testing is always accompanied with counseling. One is not left alone even when is found to be HIV positive. The counseling that follows up usually affects attitudes and behaviour positively. On the other side, those who are HIV negative are congratulated and then encouraged to maintain their status.

Condom use as a safe sex practice is positively associated with years of schooling. Young women with more years of schooling are 17% more likely to

use condom during intercourse with other men than those with less years of schooling. Indeed, educated women or girls are better able to negotiate for safer sex. Across the world, girls who have completed secondary school have lower risk of HIV infection and practise safer sex than girls who have only finished primary education. Education is said to be the key to building girls power in that more educated girls are more likely to insist on condom during a sexual relation with non-marital partner. The finding also agrees with that of Gupta (2000) which also found that in northeast Brazil, adolescent women with secondary education were at least two and half times more likely to practise contraception than those with only primary or no schooling. The underlying reason is that adolescent with more education may better appreciate the health and social consequences of unsafe sexual activity and therefore more likely to protect themselves. For the young male, the odds ratio in favour of condom use during last intercourse with casual partners is 1.09 which means that male with more years of schooling are about 9% more likely to use condom during last sexual intercourse with casual partners.

The analysis further reveals that age of the respondent is significantly associated with condom use for males. The odds ratio in favour of age is 1.96 which means that those in the upper age bracket are about 96% more likely to use condom than those in the lower age bracket. This is a dissension from the findings of Anderson et al. (1990) that younger subjects are significantly more likely to report higher frequency of condom use during intercourse. Nonetheless, it is consistent with current findings by Adih et al. (1999) in the case of Ghana where

older respondents are found to be more likely ever to use a condom. A possible explanation for this observation is that in Ghana, where contraceptive services traditionally cater for adults, younger people may find it more difficult to obtain condoms; they may not have the money to buy condoms. In addition, even if they have the means, they may feel uncomfortable to go to the drugstore or family planning centers to buy them.

For adolescent and young adult females age was not found to be significant. This may reveal the general vulnerability of women at all age. Women's economic dependency on their male partners and lack of power in the relationship make it difficult for them to negotiate safe sex, and may force them into transactional sex (Kim et al., 2001).

Results for Age at Sexual Debut

OLS regression for age at first sexual debut reveals that household wealth, the variable of interest, is positively related to sexual debut, however, the association is not significant either at 1%, 5% or 10%, even after controlling for the other underlying factors. This is in consonant with the findings of Kumi-Kyeremeh et al. (2005). Yet it fails to accept the hypothesis that low economic status exposes young men and women to early sexual activity. The regression results are shown in table 3.

Table 3: Multivariate OLS regression for age at first sexual debut

Variable	Males		Females	
	coef.	p> [t]	coef	p> [t]
High wealth	0.5730	(0.1280)	-0.0125	(0.2310)
Low wealth	-0.8612	(0.2050)	-0.0360	(0.1120)
Working	1.3643	(0.5160)	0.0081*	(0.0630)
Urban living	0.6340	(0.6070)	0.0323	(0.3570)
Years of schooling	0.0673	(0.1640)	0.0024**	(0.0310)
Away home (> 1 month)	-0.9270*	(0.0550)	-0.0017	(0.7020)
Freq. TV	0.0866	(0.2830)	-0.0067**	(0.0300)
Freq. radio	0.1073	(0.3340)	0.0036	(0.6250)
Freq of reading	-0.2250	(0.323)	0.0488***	(0.0000)
Know HIV status	1.3332 **	(0.0220)	-0.0279**	(0.4540)
Know HIV severity	0.5423	(0.4170)	0.0267	(0.2580)
Perceived vulnerability	-0.5905	(0.6010)	-0.0009	(0.5410)

Source: Researcher's calculation based on 2003 GDHS data

The number of observations for young men is 1649 and that for young women is 282. Adjusted R² are 0.8135 and 0.7624 for young men and young women respectively. From table 3, coefficients with one asterisk sign (*) denote significance at $p < 0.1$; double asterisk sign (**) denotes significance at $p < 0.05$; while three asterisk signs (***) denote significance at $p < 0.01$.

The results from the estimation reveal that frequency of watching television is negatively associated with young women's age at sexual debut. This means that a unit increase in the frequency of watching TV reduces young women's age at sexual debut by about 0.06%. Frequency of reading newspapers

and magazines is also positively associated with young females' age at sexual debut. Thus young females who frequently read magazines or newspapers are more likely to delay sexual activity while those who frequently watch TV are more likely to initiate sex at early age. It is believed that television is a powerful medium because its visual images support vicarious interaction and consumption. However, frequent exposure to sexual content of soap operas on TV may influence young people's sexual initiation (Greenberg, et al., 1981, Greenberg and Busselle, 1996).

Years of schooling also has a significant positive association with sexual debut of young women. This is true in the sense that as young women decide to pursue their academic ambitions they decide to delay the time for the initiation of sexual relations. This confirms the study conducted in Northeast Brazil by Gupta (2000) which revealed that young women with at least five or more years of schooling were at a lower risk of sexual initiation relative to those with a primary education at most, all other things held constant. For the young man, years of schooling are positively associated with sexual debut but not significant.

In conclusion, it is observed that the contention that low household wealth is significantly associated with higher risk sexual behaviours that could increase the risk of HIV/AIDS infection among young people in Ghana is not confirmed. Even after controlling for the other underlying factors, household wealth was still found to be insignificant for almost all the dependent variables. Young people's vulnerability to risky sexual behaviours is tied to a host of individual, family, and community factors such as frequency of watching television, frequently away

from home; years of schooling and age; and more importantly psychosocial factors such as knowledge of one's HIV/AIDS status. Admittedly, this revelation is not a surprise in that portions of the literature review gave similar indications.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

This chapter presents a summary of the research findings. It includes some conclusions drawn from the study in general and suggested recommendations derived from analysis of the available data. The chapter also outlines the limitations and the delimitations associated with the study.

Summary

The study set out to investigate background factors that influence the likelihood of engaging in risky sexual behaviours that may increase the risk HIV/AIDS infection. It was hypothesized that low economic status predisposes young people in Ghana to higher risk sexual behaviours such as inconsistent use of condom during casual sexual affairs, multiple sexual partnerships, and early sexual initiation. These hypotheses were based on the theses that the poor may be aware of the risk involved in practicing unsafe sex but may lack the resources to depend on and thus may not have control over negotiating protective sex (Kronick, 1997). It is explained that the poor take risk as part of their survival strategies, given the thin line between survival and deprivation and or death; poverty-induced vulnerability put poor people at risk of HIV/AIDS infection (Awusabo-Asare and Annim, 2005). Poverty and low socioeconomic status constrain the decisions people make about risky behaviour. Those with low

incomes, for example, may not be able to afford to treat STDs or to buy condoms. Poor families may see commercial sex as a lucrative occupation for young and poorly educated daughters. A woman, who is poor, either absolutely or relative to men, will find it difficult to insist that her sex partner abstain from sex with other partners or use a condom or take other steps to protect her from becoming infected with HIV. Poverty may also make a man more prone to having multiple casual partners, by preventing him from attracting a wife or by causing him to leave home in search of work. People with less education may have less access to information about the dangers of high-risk behavior or be less able to understand prevention messages (UNAIDS/WHO 2005).

The study employed the both logit model and OLS to estimate relationship between the dependent variables and the explanatory variables. Three separate regressions were estimated, one each for each of the three dependent variables – multiple sexual partnerships, condom use and age at sexual debut. Before the estimations were made, the data was checked for the presence of multicollinearity. The data for the study was extracted from the 2003 Ghana Demographic and Health Survey data collected nationwide by the Ghana Statistical Service. The data was analysed with the help of Stata computer software.

Conclusions

Although the available data did not confirm, it did not also reject the null hypothesis that low economic status exposes young people in Ghana to HIV/AIDS risky sexual behaviours. It is interesting to note that most of the

findings in this study are consistent with findings from within and outside Ghana (Rwenge 2003; Luke, 2005; Deheneffe, et al., 1998; Kumi-Kyeremeh et al., 2005; Agyei-Mensah, 2006). The abysmal performance of household wealth as an explanatory variable could be attributed to the fact that household income may not have any bearing on lives of the young people in the household. Sometimes young people are admonished by parent not to rely on the household wealth. They are advised to work hard to acquire theirs. Such information can make young people feel alienated from the household wealth which could have otherwise influence their sexual behaviour. Moreover, there are instances where children from well to do households have had to struggle to survive whereas those from relatively low income households have been well catered for. In such a case the actions of the individual may be independent of the status of the household. Situations like these could produce porous association between household wealth and the behaviour of young people. From a more technical perspective risk-taking is associated with the individual attitude towards risk. Unsafe sex increases the risk of getting infected, so the more risk-averse one is, the more one will be willing to take precautions to reduce infection risks. Interestingly, risk aversion is related to the individual von Neumann-Morgenstern utility function for wealth. If it is quadratic then it can be proved that risk aversion increases as wealth increases (Nicholson 2002). It therefore means that if von Neumann-Morgenstern utility function for wealth is not quadratic then it is possible to have a situation where risk aversion will have negative or no association with the level of wealth.

Moreover, there is some evidence, even though few empirical studies

exist, that sexual behaviour is associated time preferences instead of current household income. Using hypothetical questions and survey data in the United States, Chesson et al. (2006) showed that time preferences are significantly associated with a range of sexual behaviours and experiences, like ever having had sex and having sex before the age 16 years. Unsafe sex trades off current benefits (presumably) against future costs; therefore, the more the future is discounted, the less the weight one attaches to avoiding those costs.

Furthermore, from the study protective factors and risk factors have been identified for all the risky sexual behaviours. A protective factor is a factor whose presence reduces the risk of HIV infection while a risk factor increases the likelihood of HIV infection. The protective factors for multiple casual sex partners are knowledge of one's HIV/AIDS status, and more years of years of schooling (for young females). This means that the presence of these variables lessens the likelihood that one will have multiple casual partners. Frequency of watching television (for young females), being away from home for one month or more, and living in the central and the eastern regions are risk factors for multiple sexual partnerships. This means that the presence of these variables increases the likelihood that one will have multiple partners. The protective factors for condom use are shown to be knowledge of one's HIV/AIDS status, more years of schooling and men preparedness to use condom. Although the last factor was not included in the model for estimation, it could be inferred from conventional wisdom that not only do men dominate sexual relationships but also it is not typical of women to carry condoms about. This leaves the control and use of

condom in the hands of men. The presence of these variables increases the probability of using condom as a protective measure against HIV/AIDS infection. The risk factors for condom are low wealth (for young men).

More Years of schooling and frequency of watching television are identified as protective factor and risk factor respectively for age at first sexual debut. Comparing male and females on the risk factors, the analysis indicates that frequent watching of TV makes a young woman 10 times more likely to have multiple partners while it makes the young man 3 times more likely to have multiple partners. The same television reduces the age of sexual debut of the young woman but does not have any impact on the young man's age of sexual debut. In the same way, living in the central and eastern regions is a risk factor for young women. This means that young women in these regions are under severe influence than their colleagues in the northern region to have multiple sexual partners hence increases the likelihood of contracting HIV. This shows that regional conditions have more influence on young females than males. From the discussions so far, there is reason to believe that young females are more exposed to HIV/AIDS infection than young men.

Policy Implications

The findings indicate that knowledge of HIV/AIDS status makes young men 77% more likely and young women 97% more likely to use condom. At the same time it reduces young ladies and young men involvement in multiple sexual partnerships by 72% and 70% respectively. This means that encouraging people

to patronize voluntary testing and counseling (VCT) will be a vital move in the fight against the epidemic. It is therefore recommended that government should be actively involved in motivating young people to patronize voluntary testing and counseling. It is being suggested young people who gain admission to Junior High school (JHS), Senior High school (SHS), and even tertiary institutions be made to undergo HIV/AIDS VCT. Cash offers should be given to young people who do not attend school to motivate them to go for the VCT. Leaders of religious groups should also encourage their congregation to go for VCT. Church leaders should ensure that young people who want to marry must know their HIV status. This will persuade young people to engage in health-enhancing behaviours (HEBs) - behaviours that facilitate the maintenance of good health and the prevention of diseases and health problems. Government should also liaise with health NGOs to set up of an institution that will exclusively provide focused extension services and outreaches to young people in different urban and rural neighborhoods and areas where young people congregates as well as major activity areas, such as schools, sports stadia, clubs, and restaurants.

The study has again revealed that more years of schooling is an important protective factor: it increases age at sexual debut, increases the use of condom and reduces the probability of engaging in multiple partnerships. Based on the findings of this study, it is therefore recommended that girl's education should be promoted vigorously as way of reducing the spread of HIV/AIDS. Their education is vital to ensuring better health for whole families, while their

empowerment will give them a better chance of avoiding infection of HIV as the epidemic matures and their risk of infection continually increases.

From the findings, watching television more frequently has influence on engaging in multiple sexual partnerships and sexual debut. The national media commission should ensure that the content of programmes on the television should be devoid of sexual connotations. Specifically, music and movies that feature 'indecent' scenes should be screened during the night where most young people especially the younger adolescent are sleeping.

The study has also revealed that young women are more exposed to HIV/AIDS infection than young men. This means that girls and young women remain irreplaceable key to fighting the HIV epidemic. Interventions to reduce the vulnerability of girls and young women to HIV should aim at helping the young woman to enjoy greater autonomy and authority in decision making, self-expression, self-confidence, and assertiveness to enable them control the circumstances under which sex occur. Thus, Effective self-protection action against HIV infection requires that an individual develops self-regulative skills and a sense of personal power to be able to use condoms consistently during sexual intercourse. This can be developed through education.

Limitations

There are several limitations to this study that should be kept in mind when interpreting our findings. One important limitation is that DHS surveys do not collect data on household income or expenditure, the traditional indicators

used to measure wealth. The assets-based wealth index used here is only a proxy indicator for household economic status, and it does not always produce results similar to those obtained from direct measurements of income and expenditure where such data are available or can be collected reliably.

A second issue is that the choice of assets included in the construction of the index varies somewhat from country to country, which makes difficult comparing wealth index scores across countries. Moreover, because the level and distribution of wealth differs from one country to another, wealth index scores cannot be compared across countries. The wealthiest 20 percent of households in one country do not necessarily correspond to the wealthiest 20 percent of households in another country.

Furthermore, survey data only gave the wealth index for each household. There was no indication as to whether young people have satisfactory access to the household wealth or not. This situation will make it rather difficult to attribute any observed behaviours to the influence of household wealth. It is, therefore, recommended that any future researches could be extended to include the extent to which young people have access to the family wealth before they explore the influence on the sexual behaviours.

Delimitations

The first delimitation for the study was that it was impossible to add other plausible explanatory variables even though they were found significant in explaining young people's sexual behaviours in other studies. The reason is that

the study relied solely on the data from the Ghana Demographic and Health Survey (2003). Variables such as participation in religious activities, the sexual behaviour of older siblings, etc. could not be used. Moreover, since the researcher was not part of the team that collected the data it was impossible for the researcher to observe the circumstances within which the interviews and questionnaires were administered let alone to probe into some of the responses.

Suggestions for Further Research

This study can be extended to a number of directions. First the data obtained on young people was an aggregated. An interesting research could investigate into the same issue but this time disaggregate the data into regions so that factors that influence young people at the various regions can be identified. It will also be interesting to look at the same issue using panel data instead of cross-section data.

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