Vulnerability and Risk to HIV Infection in Uganda: Multilevel Modelling of Uganda AIDS Indicator Survey Data.

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By

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Declaration of Authorship

I, **Patrick Igulot**, declare that this thesis and the work presented in it is my own and has been generated by me as the result of my own original research, titled, Vulnerability and Risk to HIV Infection in Uganda: multilevel modelling of Uganda AIDS Indicator Survey data.

I confirm that:

1. This work was done wholly while in candidature for a research degree at City, University of London;

2. Where I have consulted the published work of others, this is always clearly attributed;

3. Where I have quoted from the work of others, the source is always given. Except for such quotations, this thesis is entirely my own work;

4. I have acknowledged all main sources of help;

5. None of this work has been published before submission.

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Signed:

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Date:

Abstract

Context

HIV/AIDS continues to be a global problem; by 2013, there were 35.3 million people infected globally. Sub Saharan Africa (SSA) continues to be disproportionately affected with 70 percent of all cases, 73 percent all deaths, and 70 percent of all new infections. Although some progress has been made in the response to the epidemic, major challenges remain. For example, even though new infections have been declining in some countries, these are being offset by increases in others. Uganda is one of the countries where HIV infection rates have been increasing in the last 15 years, from 6.2 percent in 2000 to 6.4 percent in 2005 to 7.3 percent in 2012. Much as SSA is disproportionately affected by HIV/AIDS, the region has received considerable research attention, including the association between HIV/AIDS and socio-economic status (SES) and sexual and gender based violence (SGBV). However, there continues to be controversy surrounding the effect of SES and SGBV on the vulnerability of individuals to the risk of HIV infection.

Aims and research questions

To contribute to the above debates, this research utilises Bourdieu's Socio-Structural Theory of Practice (STOP) which argues that individuals are born into a field, which structures their habitus or world view but the field in turn is structured by habitus. To operationalize this theory, this research answers the following broad question, what is the influence of social factors on vulnerability and risk to HIV infection in Uganda? And the following specific questions: (1) what is the effect of SES (wealth status & educational attainment) on people's vulnerability to the risk of HIV infection in Uganda? (2) What is the effect of SGBV on vulnerability to the risk of HIV infection in Uganda? And, (3) what are the effects of social and structural factors on vulnerability to the risk of HIV infection in Uganda?

Data and methods

This research was based on a nationally representative sample of 22,979 women and 18,418 men of reproductive age from 20,869 households with 33,692 rural and 7,705 urban respondents in Uganda. The analyses were based on the application of Multilevel Logistic regression models to 2004-05 and 2011 Uganda AIDS Indicator Surveys, fitted in MLwiN. Chapter 5 about the influence of SES on HIV infection and Chapter 6 on the influence of community factors on HIV infection are based on pooled data of 2004–05 and 2011 surveys but Chapter 7 on the influence of SGBV on HIV infection is based on only the 2011 data.

Key findings

The results provide little evidence of a significant overall association between household wealth and HIV infection. However, there is some indication of increased risk among those in wealthier households that is explained by sexual behavior factors. The increased vulnerability of individuals in wealthier households is particularly apparent for women and rural residents. On the other hand, individuals with higher educational attainment have reduced odds of HIV infection. Those with secondary or higher educational attainment have 37 percent lower odds of being HIV-positive compared to those with no education in the general population when other socio-economic, socio-demographic, and socio-sexual factors are controlled for, and secondary or higher education is more effective in reducing vulnerability in urban than rural

areas, and in 2011 than 2004–05. However, incomplete or complete primary educational attainment is associated with increased odds of being HIV-positive in both 2004/5 and 2011 and among rural residents, when important socio-demographic and sexual behavior factors are controlled for. Sexual and gender based violence is associated with increased vulnerability to HIV infection by 34 percent at the individual-level.

Besides individual-level effects, community-level SES and SGBV are also important determinants of HIV vulnerability. When both community and individual-level factors were controlled for, living in a community with a higher proportion of wealthy households was associated with increased likelihood of being infected with HIV compared to living in communities with a lower proportion of wealthy households. For social factors, living in an area with higher proportions of: formerly married people, and people who were drunk with alcohol before unsafe sex was also associated with an increased likelihood of being infected with HIV compared to living in areas with lower proportions of people with these practices who had similar other characteristics. However, living in communities with a higher proportion of polygamous men was associated with a lower likelihood of being infected with HIV compared to living in communities with a lower proportion of polygamous men. Overall, community factors account for 10 percent of total variation in HIV prevalence.

Conclusions and policy implications

Individual-level and societal factors are both important in creating vulnerability to the risk of HIV infection in Uganda. These conclusions are largely consistent with Bourdieu's theoretical and methodological principles and have broad implications for the HIV/AIDS response that presently pays less attention to societal determinants of HIV vulnerability. To effectively prevent HIV infections, HIV/AIDS policies need to recognize the micro, macro, and complex nature of the AIDS epidemic in Uganda. Attention needs to be paid to how household and community wealth, educational attainment and SGBV influence vulnerability to the risk of HIV infection in Uganda and perhaps, similar settings elsewhere.

Key words: HIV/AIDS; vulnerability and risk; socio-economic status; socio-structural; sexual and Gender-based violence; multilevel modeling; Uganda

Abbreviations and Acronyms

ABC	Abstinence from sex by youth, including the delay of sexual debut and abstinence until marriage, being tested for HIV and being faithful in marriage and in monogamous relationships, and correct and consistent use of condoms for those who practice high-risk sexual behaviours. It is an approach to HIV prevention, originally linked to Uganda, and now adopted widely (www.pepfar.gov).
AIC	AIDS Information Centre is a semi-autonomous organization providing anonymous and voluntary HIV counselling and testing services in Uganda since 1990 (www.aicug.org).
AIDS	Acquired Immune Deficiency Syndrome is a decrease in the number of certain specific blood cells, called CD4+ T cells, which are crucial to helping the body fight disease; the decrease is caused by HIV which leads to a weakening of the immune system thus leading to the development of certain infections and/or cancers (www.cdc.gov/hiv/resources).
ART	Anti-Retroviral Therapy / Treatment is a combination of at least three antiretroviral (ARV) drugs that PLHIV take to maximally suppress the HIV virus and stop the progression of HIV disease (www.who.int/hiv/topics/treatment).
ARV	Anti-Retro-Virals are drugs that PLHIV take to stop or suppress the activity of HIV and to boost the body's natural immunity system.
CDC	Centres for Diseases Control and Prevention is United States of America's federal agency under the Department of Health and Human Services concerned with ensuring public health and safety (www.cdc.gov).
CI	Confidence Interval is a range of values so defined that there is a specified probability that the value of a parameter lies within it.
CSO	Civil Society Organisations are voluntary non-market and non-state organizations outside of the family in which people organize themselves to pursue shared interests in the public domain.
DFID	Department for International Development is an agency of the government of the United Kingdom that aims to end chronic poverty overseas (https://www.gov.uk/government/organisations/department-for-international-development/about).
DHS	Demographic and Health Survey (in Uganda, this is called Uganda Demographic and Health Survey (UDHS)) is an international program that

	supports developing countries world-wide to collect, analyze, and disseminate accurate and representative standardized health data for policy, programmes and research purposes (www.measuredhs.com).
GDP	Gross Domestic Product is a measure of the total output of a country that takes gross domestic product (GDP) and divides it by the number of people in the country (http://www.investopedia.com/terms/p/per-capita-gdp.asp).
GFATM	Global Fund for AIDS, Tuberculosis, and Malaria is an international financing mechanism established by the UN in 2002 to mobilize resources for the global response to the three main killer diseases (www.globalfund.org).
GHI	Global Health Initiatives are humanitarian initiatives that raise and disburse additional funds for infectious diseases, like AIDS, tuberculosis and malaria; for immunization; and for strengthening health systems in developing countries. (https://en.wikipedia.org/wiki/Global_Health_Initiatives).
HAART	Highly Active Anti-Retroviral Therapy refers to the use of combinations of various antiretroviral drugs with different mechanisms of action to treat HIV (https://www.verywell.com/haart-meaning-and-treatment-3132803).
HCT	HIV Counselling and Testing, also known as Voluntary Counseling and Testing (VCT), is a client-initiated HIV testing procedure that enables an individual to know their HIV sero-status (www.who.int).
HIV	Human Immunodeficiency Virus is the pathogen that can lead to Acquired Immuno-Deficiency Syndrome (AIDS). HIV damages a person's body by destroying specific blood cells, called CD4+ T cells, which are crucial to helping the body fight diseases (www.cdc.gov/hiv/resources).
HSSP	Health Sector Strategic Plan is an overall planning framework that guides the investment in the health sector by the government of Uganda (www.health.go.ug).
LAWU	Law and Advocacy for Women in Uganda is an organization that advocates for the rights of women in Uganda.
MGLSD	Ministry of Gender, Labour and Social Development is a government department responsible for empowering communities to harness their potential (http://www.mglsd.go.ug/?page_id=8).
MoES	Ministry of Education and Sports is a government department responsible for providing quality education and sports services in Uganda (http://www.education.go.ug/data/smenu/47/About%20the%20Ministry%20.html).

MoH	Ministry of Health is a department of the government responsible for ensuring the health of the population in Uganda (www.health.go.ug).
NPA	National Planning Authority is a statutory body responsible for long term planning in Uganda (http://npa.ug/about-npa/background/).
NSSF	National Social Security Fund is a statutory national saving scheme that provides social security services to private sector employees in Uganda. (https://www.nssfug.org/8/About_Us).
ONS	Office for National Statistics is the UK's independent producer of official statistics. It is responsible for collecting and publishing statistics related to the economy, population and society at national, regional and local levels. It also conducts the census in England and Wales every 10 years. (https://www.ons.gov.uk/aboutus).
OPM	Office of the Prime Minister is a government office responsible for coordinating the implementation of the policies of the government of Uganda (http://opm.go.ug/opm/mandate.html).
OR	Odds Ratio is a measure of association between an exposure and an outcome. The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2938757/).
PEP	Post-Exposure Prophylaxis, also known as Post-Exposure Prevention (PEP), is preventive medical treatment started immediately after exposure to HIV in order to prevent infection by HIV and the subsequent development of AIDS (https://en.wikipedia.org/wiki/Post-exposure_prophylaxis).
PEPFAR	The U.S President's Emergency Plan for AIDS Relief is part of the U. S's Government's global health initiative that aims to help save lives of those suffering from HIV/AIDS in developing countries around the world (www.pepfar.gov).
PLHIV	People Living with HIV – refers to persons who have an HIV positive diagnosis.
PMTCT	Prevention of Mother to Child Transmission of HIV refers to a combination of interventions including antiretroviral therapy for the mother and infant, implementation of safe delivery practices, and use of safer infant feeding practices to reduce the risk of transmission during pregnancy, during labour and delivery, or after delivery via breastfeeding (www.who.int).
RAT	Rational Action Theory, also known as Choice Theory or Rational Choice Theory, is a framework for understanding and often formally modelling social and economic behaviour whose basic premise is that aggregate social behaviour results from the behaviour of individual actors, each of whom is making their individual decisions (https://en.wikipedia.org/wiki/Rational_choice_theory).

SES	Socio-Economic Status refers to an individual's or group's position within a hierarchical social structure. Socioeconomic status depends on a combination of variables, including occupation, education, income, wealth, and place of residence.
SGBV	Sexual and Gender-Based Violence is any act of violence that results in, or is likely to result in, physical, sexual or mental harm or suffering, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life that is based on one's gender (http://www.who.int/mediacentre/factsheets/fs239/en/).
SSA	Sub-Saharan Africa is a geographical area of the continent of Africa that lies south of the Sahara desert. According to the UN, it consists of all African countries that are fully or partially located south of the Sahara (https://en.wikipedia.org/wiki/Sub-Saharan_Africa).
STI	Sexually Transmitted Infection is an infection that can be transferred from one person to another through sexual contact (www.medterms.com).
STOP	Socio-Structural Theory of Practice is a theory proposed by Pierre Bourdieu (1930–2002). It asserts that what people do results from a combination of people's dispositions, habits and norms, that he calls habitus and one's position in a social structure or field.
TASO	The AIDS Support Organization is Uganda's first, largest and leading indigenous non-governmental organization providing HIV/AIDS services since 1987 (www.tasouganda.org).
UAC	Uganda AIDS Commission is a statutory body established in 1992 under the Office of the President to ensure a focused and harmonized response to the AIDS epidemic. Its mandate is to oversee, plan and coordinate HIV/AIDS prevention and control activities in Uganda (www.aidsuganda.org).
UAIS	Uganda AIDS Indicator Survey is part of the MEASURE DHS international program that supports developing countries world-wide to collect, analyze, and disseminate accurate and representative standardized health data for policy, programmes and research purposes (www.measuredhs.com).
UBOS	Uganda Bureau of Statistics is a semi-autonomous statutory body that coordinates the development and maintenance of a National Statistical System which ensures the collection, analysis and dissemination of integrated, reliable and timely statistical information (www.ubos.org).

UN	United Nations is an international organization established by nations of the world in 1945 to ensure world peace and security and the advancement of humanity (www.un.org).
UNAIDS	United Nations joint programme for HIV&AIDS is a development agency of the UN established in 1996 to build political action against AIDS and to promote the rights of all people for better results for global health and development; it sets policy and is the source of HIV-related data (www.unaids.org).
UNFPA	United Nations Fund for Population Activities is an international development agency that promotes the right of every woman, man and child to enjoy a life of health and equal opportunity (www.unfpa.org).
UNICEF	United Nation's Children's Emergency Fund is an authority of the UN founded in 1946 to ensure protection and welfare of children through the realization of their rights (www.unicef.int).
USAID	United States Agency for International Development is U.S. Government agency that works to end extreme global poverty and enable resilient and democratic societies to realize their potential (http://www.usaid.gov/who-we-are).
USPA	Uganda Service Provision Assessment is a nationally representative survey conducted to provide detailed information on the availability and quality of facility infrastructure, resources, and management systems in the health sector (http://dhsprogram.com/pubs/pdf/SPA13/SPA13.pdf)
WHO	World Health Organization is an agency of the UN established in 1948 to direct and coordinate health. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends (www.who.int).

Chapter One

Introduction to the Research

Chapter 1

Introduction to the Research

1.0 Introduction to the Chapter

This chapter introduces the research. It starts with a brief overview of HIV/AIDS, showing the need for the research. This is followed by the research questions which encompass Socio-Economic Status (SES), Sexual and Gender-Based Violence (SGBV), and other community-level effects. The chapter also gives an account of my personal motivation to undertake this research, presents the strengths of the research, and concludes with an outline of the structure of the rest of thesis.

1.1 HIV/AIDS in Uganda Relative to other Settings of Sub Saharan Africa

Sub Saharan Africa continues to bear the brunt of HIV/AIDS, with nearly 70 percent of all the people with HIV in the world living in the region. This is where 70 percent of new infections and 73 percent of global AIDS-related deaths occur and 70 percent of people with HIV/AIDS, live (UNAIDS, 2013). Although new HIV infections are reported to be falling, new infections are still rising in some countries including Uganda. For example, among pregnant women 15–24 years old, HIV declined in 22 countries with a generalized epidemic (prevalence exceeding 1.0%) except Uganda. In terms of sexual practices, the proportion of young women with multiple sexual partners in some high HIV prevalence countries in Sub Saharan Africa (SSA) also declined but not in Uganda, and the proportion of young people using condoms increased in some SSA countries except Uganda (UNAIDS, 2011). This has been corroborated with Ugandan evidence that shows that HIV rates are increasing (Uganda AIDS Commission (UAC), 2012).

In Uganda, the controversy surrounding the widely acclaimed 'success' in controlling HIV during the early 1990s has never been fully resolved. The controversy pertains to the following: i), whether the rate of HIV prevalence ever reached 30%; ii), whether the data concerning HIV prevalence was reliable; and iii), whether HIV prevalence is a reliable measure of the rate of the infection (Allen & Heald, 2004; Stoneburner & Low-Beer, 2004; Green et al., 2006; Slutkin

et al., 2006). On prevalence peaking at 30%, there is evidence that this happened in Mbarara Hospital sentinel surveillance site (Parkhurst, 2002). Regarding quality of evidence, data collected outside research conditions is always prone to bias – in this case, selection bias (Allen & Heald, 2004). Data was collected among women, excluding men. On the possible explanation of the decline, some scholars argue that it was driven by change of sexual practices such as delayed initiation of sex, political commitment by the government (Green et al., 2006) and broader participation by all sections of society in the response to HIV/AIDS (e.g. Allen & Heald, 2004, Green et al., 2006). To respond to these concerns, this research takes advantage of the available nationally representative data of Uganda AIDS Indicator Survey for 2004-05 and 2011, to examine current patterns and trends over time.

1.2 Justification of the Research

The AIDS epidemic in SSA has received considerable research attention, including its association with SES and SGBV, among other predisposing factors. However, there continues to be controversy surrounding the effect of SES on people's vulnerability to the risk of HIV infection (Parkhurst, 2010). Some evidence indicates that HIV infections are driven by poverty (e.g. Dinkelman et al., 2007; Lopman et al., 2007; Dodoo et al., 2007) while others show that it is driven by wealth (Mishra et al., 2007; Johnson & Way, 2006; Fox, 2010, 2012). Likewise, some evidence shows that education is negatively associated with HIV infection but other evidence indicates that the association is positive. Similarly, the SGBV-HIV link remains controversial (e.g. Harling et al., 2010) with all studies cited here focusing on micro-level associations.

Available HIV/AIDS evidence is largely based on micro (individual-level) analysis (this is expounded in Chapter 3). However, from sociological theory, we know that social reality does not only reside in an individual actor. Social reality is multilevel and occurs at the micro e.g. individual, meso e.g. community, and macro e.g. country, sociological levels. The problem with previous HIV/AIDS research is that it has concentrated on the micro aspects of vulnerability to the risk of HIV infection and paid less attention to meso and macro aspects which also have a significant influence (a detailed discussion is also in Chapter 3) (e.g. Gupta et al., 2008; Parkhurst, 2012). I contend in this research that vulnerability to HIV infection occurs both at the micro and meso levels of society and that these are further influenced by the

macro environment. This thinking is informed by Bourdieu's Socio-Structural Theory of Practice (STOP) whose thrust is that individuals are born into a social structure which shapes their world view but the individuals in turn also shape their social environment (the details are in Chapter 3). Given this interaction between individual agency (actions of individuals) and social structure (influence of social conditions), an effective understanding of vulnerability needs an examination of both, and achieving this needs multilevel modeling (See details in Chapter 4). Additional methodological information is also contained in empirical chapters 5, 6, and 7.

Socio-structural factors operating at the community level refers to the social, economic, legal, and cultural environment that determines HIV vulnerability of the whole population (Parkhurst, 2012). They are conditions that influence the HIV vulnerability of individuals but are beyond the control of the individual (Auerbach et al., 2011). Community-level factors are important for two reasons: first, recognising individual action as being socially determined gives the prospect of tackling underlying causes of social practices (Link & Phelan, 1995); and second, some social factors may increase vulnerability and curtail the success of proven HIV/AIDS interventions (e.g. Tuller et al., 2010; Duff et al., 2010) while others might protect individuals from the risk of HIV infection. Further, social conditions are associated with resources and so by favourably altering these conditions, the community environment can be made facilitative (Aggleton, 1996; Parker, 2004). Details on individualism are in Chapter 3 and those on the role of the social context are in Chapter 6.

In investigating vulnerability to HIV infection in Uganda, this research is keen on three perspectives i.e. gender, urban-rural area of residence, and time. The interest in the gender dimension is because of the known higher HIV prevalence among women compared to men in SSA, which is widely associated with their social disadvantage (e.g. Jewkes & Morrell, 2010). According to Msisha et al., researching gender and HIV and rural-urban residential area and HIV in the African context is crucial because these perspectives substantially influence vulnerability and yet they are not well understood (Msisha et al., 2008). The focus on time was informed by the fact that time measures changes in policies and programmes and how these may increase HIV vulnerability. Time or period effects is also a measure of change in social and economic conditions in which people live and how these influence vulnerability (Obalenskaya, 2012). See more discussion of these concepts in Chapter 4. These concepts are also addressed well by STOP as shown in Chapter 3 and discussed throughout the findings.

It is on account of this background, literature and theory, and methodological concerns that I research individual- and community-level association between SES and SGBV, and HIV infection in Uganda (See Chapter 2 for details on Uganda) based on the following questions.

1.3 Research Questions

1.3.1 General Research Question

What is the influence of social factors on vulnerability and risk to HIV infection in Uganda?

1.3.2 Specific Research Questions

1.3.2.1 Questions on Individual Socio-Economic Status

1. What is the association between socio-economic status (household wealth/poverty and educational attainment) and HIV infection in Uganda?
2. How does gender and rural-urban place of residence moderate the association between SES and vulnerability to HIV infection in Uganda?
3. Did factors that determine vulnerability to the risk of HIV infection change between 2004-05 and 2011?

1.3.2.2 Questions on the Effects of Community Factors

4. What are the effects of community-level social factors (the proportion of people in a community with a particular characteristic including people who were formerly married, people who practice multiple sexual partnership – having more than 1 life time sexual partner, individuals less than 18 years old at first sex (early sex), individuals more than ≥20 years old at first marriage (early marriage), men who were polygamous – had 2 or more wives, people who were drunk with alcohol before their last risky sexual activity, people who had high AIDS knowledge, people who used condoms during their last risky sexual encounter, people who believe a woman can ask her husband/partner to use a condom, if she believes he has a sexually transmitted infection) on vulnerability to HIV infection?
5. What is the role of structural factors (represented by community-level wealth/poverty, and education) in influencing vulnerability to HIV infection?
6. What factors moderate the association between community-level socio-structural factors and HIV infection?

1.3.2.3 Questions on Sexual and Gender-Based Violence

7. What is the association between sexual and gender-based violence and vulnerability to the risk of HIV infection in Uganda?
8. What individual- and community-level factors mediate the association between sexual and gender-based violence and HIV infection?
9. What individual- and community-level factors are associated with HIV infection for people who suffer sexual and gender-based violence?

But what inspired me to research vulnerability and risk to HIV infection in Uganda?

1.4 Motivation to Research this Topic

I started HIV/AIDS work in 2003. I worked at The AIDS Support Organization, Uganda, popularly known as TASO Uganda, a 30-year old national NGO that has become a model in the response to HIV/AIDS in Uganda, Africa and globally. I worked in different branches as Data Input Officer, Research Officer, Programme Manager and overall Manager of a Branch. But throughout my 10-years HIV/AIDS career, I was not convinced about the adequacy of approaches adopted to prevent HIV infection. For example, in TASO, the core interventions are psychosocial support (counseling individuals about HIV/AIDS), complemented with medical care (treating individual patients). Attempts to transcend these largely individualistic interventions were minimal and peripheral and most of the time, less successful.

At the government level, HIV/AIDS policies have tended to be driven by funding considerations. This explains why there is a policy for HIV counseling and testing, for antiretroviral therapy (ART), for promotion and distribution of condoms, for preventing mother to child transmission of HIV (PMTCT), for control and management of sexually transmitted infections (STIs) in the context of HIV and others but there is no trace of AIDS policies that tackle the social dimensions of vulnerabilities to HIV infection (UAC, 2009). Despite the existence of bio-medical HIV policies, evidence shows that they have been less effective. For example, by 2009, coverage of PMTCT was only 52 percent while coverage of post exposure prophylaxis (PEP) was less than 10 percent (UAC, 2009). By 2012, coverage of HIV testing was 57% and enrolment to ART was about fifty percent of those eligible. In short, apart from blood safety, no bio-medical policy is near achieving universal coverage by 2012.

The dominance of bio-medical-individually oriented HIV policies has led to skewed resource allocation. First, more resources have been directed to HIV/AIDS; in 2005-2012, funding to AIDS increased from 1.4 to 2.9 percent of GDP (Lule & Haacker, 2012). Secondly, within this sub sector and period, funding to AIDS care and treatment was 36% of total financial resources. HIV prevention continued to be under funded; for example, whereas funding for AIDS care and treatment reduced by 3.1 percent between 2005 and 2008, funding for HIV prevention reduced by 9.3 percent. Across these four years, funding for the mitigation of the social consequences of AIDS constituted on average 8.7% (Lule & Haacker, 2012). And whenever donors increase financial allocation to HIV prevention, more funding is directed to behaviour change programmes especially campaigns for abstinence and being faithful (UAC, 2011). In short, despite the increase in AIDS funding over the last decade, Uganda failed to control the epidemic; implying that something is not right.

Whenever the government attempts to tackle the societal aspects of people's vulnerability to the risk of HIV infection, it focuses on mitigating the social consequence of AIDS. For example, in the 2007–2012 national HIV/AIDS strategic plan, the third strategic objective was about *mitigating* the social, cultural and economic consequences of HIV/AIDS. In the 2011–2015 national strategic plan for HIV/AIDS, strategic objective three is also about *mitigating* the underlying social, cultural, and gender drivers of HIV. Although the national HIV prevention strategy for Uganda 2011–2015 commits to intervening in the structural determinants of vulnerability, the lack of a policy framework to support the achievement of these aspirations remains a serious potential bottleneck.

These concerns, especially, the dominance of individualism in Uganda's HIV/AIDS research agenda, its resultant policies and programmes triggered my interest in the topic. As I have already shown, Uganda's failure to effectively control HIV can be explained in terms of the nature of knowledge that informs HIV & AIDS policies, and subsequently, interventions. My argument is that action to prevent HIV has concentrated more on risks to HIV infection and less on *conditions* that make people vulnerable to these risks; this is despite the knowledge that vulnerability to HIV infection is *multi-dimensional and multi-structural* (e.g. Pronyk et al., 2013). This is the reason why, based on my sociological background, I decided to conduct a research that highlights the social aspects of HIV vulnerability. My expectation is that this research contributes to the small but growing body of knowledge on the important role social

conditions play in *creating* and *sustaining* conditions for the transmission of HIV and for local and international actors to take concrete social action to prevent HIV infections.

1.5 Strengths of the Research

This research has six strengths: (a), analytically, the use of a recent nationally representative sample permitted generalization of findings (Mermin et al., 2008; Antai, 2011); (b), AIS data has a multilevel structure which is conducive for micro and macro analysis (Antai, 2011) and the use of MLwiN, a robust software for modelling such data; (c), this analysis relies on objective biomarkers—HIV status is ascertained through a blood test during the survey (Fox, 2010; Stockman et al., 2013); objective biomarkers are reliable measures of association between SGBV and HIV infection (Stockman et al., 2013); (d), this analysis uses clusters of urban and rural areas as well as for women and men and across time, which provided the opportunity to compare findings. In addition, several studies have been done on earlier data sets from other countries but this research is among the first to analyze the most recent UAIS data to model the influence of SES on HIV vulnerability and risk. This data has benefited from recent advances in survey research and expertise as explained further in Chapter 4.

Second, these findings are robust. For example, in the descriptive analysis, individuals in the highest wealth quintile (wealthiest 20% households) were 16 percent more likely to be infected with HIV in the pooled 2004-05 and 2011 data than individuals in the poorest 20 percent households. Similarly, individuals in rural areas were 36 percent more likely to be infected compared to individuals in the poorest households in rural areas. For education, individuals with secondary or higher educational attainment were 14–28 percent less likely to be infected while those with primary-level educational attainment were 19–43 percent more likely to be infected compared to people with no education. In the final analysis, these associations were confirmed. For instance, in the sub group analysis, the odds of having HIV for rural residents in the highest wealth category are 23% higher than for those in the lowest wealth category while for women residents, the odds of having HIV for those in the highest wealth category are 40% higher than for those in the lowest wealth category. Overall, individuals with secondary or higher educational attainment had 37 percent lower odds of HIV infection than individuals with no educational attainment but those with primary-level education attainment had 22–46 percent higher odds of being HIV-positive compared to individuals with no educational attainment. This demonstrates the stability of these findings.

Third, this research shows that there is a dichotomous AIDS epidemic in Uganda but holistic action is required. For example, there is an urban versus rural epidemic; epidemic for women and that for men; for the poor versus less poor; and young versus the old people's epidemic, among other dichotomies. However, as much as this dichotomy exists, dichotomising interventions is unnecessary because people interact and are bound by the same social conditions (Haram, 2004). Dichotomizing society in terms of HIV presumes that women do not relate with men, urban areas do not relate with rural areas, young people do not relate with the older persons and so on. Given Uganda's generalized epidemic, it is less effective to dichotomize the population or to target specific groups with interventions. Targeting particular groups tends to alienate "excluded" groups as is the case with PMTCT. These findings require re-thinking the effectiveness of targeted interventions.

Fourth, this research reveals that vulnerability is associated with gendered stereotypes. For example, the higher vulnerability of women generally, those in female headed households, those in economically better off households etc. can easily be attributed to women's subordinate role in society. This is the dominant version in the literature. At the end of this stereotyped discourse is that women's vulnerability can be explained in terms of men's patriarchal authority and power (Hunter, 2004; Silberschmidt, 2004). Whereas this may be true, it is imperative that these assumptions are questioned. This is because there is evidence that shows that women's greater vulnerability may be due to their agency and that assumed power of men has been challenged by the changing circumstances and has waned (Hunter, 2004; Silberschmidt, 2004). There is need to re-think these stereotypes.

The fifth strength is linguistic clarity. Throughout the literature, there is linguistic confusion where most sociological language has been replaced with epidemiological and psychological language. For example, every threat to health in the literature is referred to as risk, irrespective of whether it is an immediate or long term cause of a health problem. Secondly, the dominant literature calls all human action, behaviour—an expression which individualizes action. Throughout this thesis, I have consistently used risk to mean immediate cause e.g. unsafe sex and vulnerability to mean long term cause e.g. poverty or wealth. I have also avoided the epidemiological and psychological term behaviour which individualizes action and applied practice, a term which connotes a social construction of human action as suggested for example by Auerbach et al. (2011). I believe correcting these disciplinary taken for granted issues helps redeem the place of sociology in academia.

Sixth, this research also has philosophical strengths. Ontologically, most studies referred above where largely micro, with less or no regard for the social. My research recognizes that reality does not only reside in the micro but also in the social. In terms of epistemology, previous research relied on single level analysis as a method for establishing knowledge. This research demonstrates that knowing can be enhanced when multilevel analysis is applied. These two are modest contributions to how we know what we know. Theoretically, most of the previous studies were not informed by theory. This research is not just anchored on a theoretical framework but it is the first application of Bourdieusian theory to an analysis of HIV/AIDS and in an African context. Equally, unlike previous studies, this research demonstrates that a sociological framework offers a better strategy for researching AIDS. This research shows that individual level characteristics are the proximate causes of HIV infection (micro sociological level) but the micro level is influenced by the community level (meso sociological level). However, all these are structured by the national context (macro sociological level).

Finally, majority of existing research has fallen to the fallacy that African countries are too poor and unable to tackle the social determinants of HIV vulnerability. Because of this, research has not addressed the underlying determinants of vulnerability to HIV, preferring to recommend symptomatic solutions. As a result, the policy response to HIV has failed to contain the epidemic. My research recommends the difficult but more effective action to contain HIV infections and that is, to improve people's social circumstances. Specifically, as WHO (2008) as recommended, the conditions in which people are born, grow, live, work and age, need to be improved. It is no longer acceptable to avoid doing the right thing. Without providing mass access to higher education, ensuring employment and social protection, ensuring institutional effectiveness and overall effectiveness of government, the AIDS epidemic in Uganda is unlikely to be contained.

1.6 Organization of the Thesis

This thesis has eight chapters. The first four chapters focus on introduction to the research, Ugandan context; theoretical framework; and methodology of the research. The next three chapters are on empirical findings. Chapter 5 is about SES; Chapter 6 is on socio-structural factors; and Chapter 7 is on SGBV. Chapter 8 summarizes the findings, draws conclusions, and highlights the policy implications of the findings.

Chapter 1 presents a regional scale of the AIDS problem, noting the inequality in HIV infections, prevalence and death biased against SSA, which constitutes a rationale for researching the region and for this research. The nine specific research questions organized along three broad themes of SES, community effects, and SGBV are presented in this chapter. In addition, Chapter 1 covers the justification of the research, my motivation to research this topic and the strength of this research.

In Chapter 2, I present the social, economic, political as well as the cultural set up of the Ugandan society while paying special attention to the health system. I also discuss the trends and patterns in HIV/AIDS and the country's response to it. This chapter ends with an analysis of the HIV policy frameworks and the status of HIV/AIDS services which highlights serious gaps in services, resources and geographical distribution, aspects which build the case for researching Uganda, hitherto a global success case in the response to the AIDS epidemic.

The third Chapter is on the theoretical framework. The chapter starts with a critique of Rational Action Theory, a dominant paradigm in HIV/AIDS research and notes the need for an alternative theoretical explanation of HIV vulnerability in SSA. The chapter then discusses STOP and its key concepts of habitus, field, and capital as well as symbolic violence and how they fit in this research. This chapter ends with a discussion of STOP's multilevel methodological theory for effective social analysis.

In methodological Chapter 4, I highlight the link between STOP and deductivism before presenting secondary data of Uganda AIDS Indicator Surveys analyzed in the research as well as the procedure used to conduct the surveys. I then present the theoretical justification for using multilevel modelling, the modelling strategy adapted as well as the transformations applied to the data. This chapter also presents the estimation methods used to obtain the results before concluding with a discussion of the ethical issues considered in this research.

Chapter 5 contains findings about theme one on the SES-HIV association as measured at the individual level and is based on pooled 2004-05 and 2011 data. Chapter 6 presents findings of theme two on the association between community-level socio-structural factors and HIV positivity. These findings are also based on pooled data. Chapter 7 is based on theme three which examines the association between SGBV and HIV positivity. This chapter reports findings based on data of only 2011 survey. Each empirical chapter starts with an overview of

the literature, a highlight of the methods and a presentation of findings. It then concludes with a discussion of the findings which incorporates analysis, literature, and theory.

Chapter 8 concludes the thesis with a summary of key findings, a discussion of crosscutting issues that integrates theory, conclusions from the findings and a discussion of the implications of the findings for policies. This chapter argues for the need for a policy shift – from the dominance of bio-medical science in the response to HIV to encompass social science. This chapter concludes with a presentation of 10 contributions that this research makes, outlines the possible limitations to the study and suggests areas for future research.

The next chapter about Uganda contextualizes this research.

Chapter Two

Uganda in Perspective

Chapter 2

Uganda in Perspective

2.0 Introduction to the Chapter

Understanding the context within which this research was done is important because it provides a firm foundation for understanding its findings. This section presents a description of the social, economic, and political situation in Uganda beginning with an overview of the social and economic development indicators, followed by a discussion of the trends and patterns in the country's response to AIDS. The last part addresses the AIDS policy environment and a detailed analysis of HIV/AIDS services.

2.1 Social, Economic and Political Context of Uganda

The Republic of Uganda is a landlocked country bordered by Kenya in the East, Tanzania in the South, Rwanda in the Southwest, the Democratic Republic of Congo in the West, and South Sudan in the North (Uganda Bureau of Statistics [UBOS] & Macro, 2007). Uganda covers 241,038 sq. km. (93,072 sq. mi.), the size of the United Kingdom. The terrain comprises 27.9 percent of land area which is arable, 11.2 percent is permanent cropland, and 17.5 percent is forest. It has tropical climate with two rainy and dry seasons and is semi-arid in the North-East. About one fifth (eighteen percent) of the total land area is covered by water bodies that include Lake Victoria, the second largest fresh water body in the world and the source of the world's longest river – the Nile. Uganda is also blessed with three mountains including the snow-capped Mt Ruwenzori. The physical characteristics and natural resources of a country are key factors in understanding its development potential.

The political set up of a country is important because it provides a framework upon which it is governed and the institutional framework for national development. Uganda is a Republic that gained independence from Great Britain in 1962. It has a constitution and a multiparty electoral political system; the constitution provides a 5-year term for the president, parliament and all the other electoral positions. Uganda has a government that has three branches: the executive; legislature; and judiciary. The government is headed by an elected president. The key chief administrative units are districts, counties/municipalities (urban), sub counties/divisions (urban) and the village/ward (urban), in descending order of size. Except for the village, all

the other institutions are ideally equipped with the requisite bureaucratic structures. Kampala is the capital city with a population of about 1.5 million.

Economics is an important dimension of development; micro and macro-economic performance indicates the development status of a country and the welfare of its people. Uganda's gross domestic product is $17.01 billion (World Bank, 2010), exports are $3.1 billion and imports $4.3 billion (World Bank, 2009). Average economic growth rate is about 5.2 percent per annum. The World Bank in 2010 estimated inflation to be 9.1 percent; this, however exceeded 20 percent in 2011. The country's economy is dominated by services (50 percent), and agriculture and industries at 25 percent each (World Bank, 2009). Uganda's population is predominately rural with 87 percent of it living in rural areas. It is worth noting that even though over 80 percent of the population derives livelihoods from agriculture, government allocates only 4 percent of its national budget to agriculture. Twenty-four percent of the population is poor. However, this estimate is problematic in the sense that it considers absolute poverty which is defined as inability to have food (UBOS, 2010) but making poverty relative and defining it as more than access to food makes 65 percent of the Ugandan population poor (World Bank, 2010; National Planning Authority [Uganda] (NPA), 2012).

The demographic and social profiles of a country are equally critical because they measure the success of development efforts and in turn heavily influence human endeavour aimed at development. Uganda has 33.2 million people, with an estimated growth and fertility rates of 3.2 percent and 6.7 respectively (UBOS & Macro, 2007) see also (World Bank, 2010). A remarkably high proportion of the household population (53 percent) consists of children under the age 15 years. Females form 52 percent of the country's population. Individuals aged 15-49 represent 38 percent of the population, while those aged 50 and over account for only 9 percent of the population (MoH [Uganda] & ORC Macro, 2006).

Uganda is a multiethnic country with more than 50 ethnicities. The country is multi religious, though Christians make up the majority (85 percent), Muslims 12, and others 3.0 percent. Primary education completion rate is 56 percent and illiteracy of women 45–59 years is 38 percent. Infant mortality rate is 63 per 1000 live births, maternal mortality is 356 per 100,000 live births and life expectancy is 53.1 years. HIV prevalence is 7.3 percent (MoH [Uganda] & ICF, 2012). Other socio-economic indicators are: 9.0 percent of households have electricity (only 3.0 percent in the rural areas); 61 percent of households have access to clean water, and

85 percent of Ugandans use pit latrines. Majority of rural households (78 percent) have house floors made of earth; coverage of mobile phones stands 10 percent while that for internet is less than 10 percent (MoH [Uganda] & ORC Macro, 2006).

The foregone presentation of the development context of Uganda highlights the key physical, social, economic, and political aspects that underpin Uganda's development scenario. The picture is one of a mixture – high potential for development but currently posting grim development indicators. The analysis provides a context for understanding the organization of health care and the response to HIV/AIDS. Besides providing a context for understanding this research, the country's state-of-affairs in themselves constitute a rationale for the quest for better evidence informed development models – and this research fits within this aspiration.

2.2 Uganda's Public Health Care System

Table 2.1 illustrates the administrative and health structure of Uganda public health system. Uganda's national health system is mandated to ensure that the population is healthy and subsequently, productive (MoH [Uganda], 1999). Uganda has a referral health care system structured with five basic levels i.e. from Health Centre level 1 to level 5, which is a district hospital. The health facilities are modeled along political structures called Local Councils; Local Councils are from Local Council 1 to Local Council 5. For every political structure, there is an appropriate health facility e.g. Health Centre I at Local Council I. In this arrangement, higher level health facilities provide more services and technical support to lower ones. Beyond the district hospitals are regional referral and national hospitals; regional referral hospitals provide technical support to district health facilities and in addition undertake to train health care providers, national hospitals in addition to the duties of the regional referral hospitals also undertake research. The system also includes institutions associated with health care service delivery such as Uganda National Drug Authority, National Medical Stores and health training institutions to mention some (MoH [Uganda] & Macro, 2008).

Table 2. 1: Uganda's administrative units, governance and leadership structures and national public health system.

Administrative Unit		Governance Structure	Leadership	Health Facility	Function
Rural	**Urban**				
Central government				National Referral Hospital	Referral, training health care professionals and health research
There are no regional structures				Regional Referral Hospital	Specialized care, referral, and training health care workers
District	City	Local Council V (LCV)	Chairperson LCV	District Hospital	General care, plus referral services
County	Town council or Municipality	Local Council IV (LCIV)	Chairperson LCIV	Health Centre IV	Clinical care plus surgery, inpatient care & referral
Sub-county	Division	Local Council III (LCIII)	Chairperson LCIII	Health Centre III	Immunization plus clinical care & referral
Parish	Ward	Local Council II (LCII)	Chairperson LCII	Health Centre II	Health mobilization plus immunization
Village	Cell	Local Council I (LCI)	Chairperson LCI	Health Centre I	Village Health Team does health mobilization

Source: Author's formulation based on information from the Uganda national health policy, 1999

Uganda faces a high disease burden. Perinatal and maternal mortality constitutes 20.4 percent, malaria 15.4 percent, and respiratory infections 10.5 percent. In addition, mortality due to HIV/AIDS is 9.1 percent and diarrhea 8.4 percent. The health status is characterized by high disease burden because of high fertility of 6.7 children, high population growth rate of 3.2 percent and a broad-base population pyramid showing 53 percent of the population being 14 years or younger (MoH [Uganda] & Macro, 2008, UBOS, 2010). Child mortality which was previously 187/1,000 in 1990, 145/1,000 in 2000 now stands at 54 deaths per 1,000 live births while maternal mortality which was 435 is now 310 deaths per 100,000 births (NPA, 2012). This is in addition to a growing problem of non-communicable diseases due to fast changing life styles.

For the last two decades, Uganda's national health system has experienced many challenges including underfunding and its associated outcomes of inadequate medical supplies, poor motivation of health care workers and 'brain drain', and poor health infrastructure and equipment, to cite a few (MoH [Uganda] & Macro, 2008, Orem & Zikusooka, 2010). Underfunding is the greatest challenge facing Uganda's health sector. According to the World Bank,

> "Uganda currently allocates 10 percent of the government budget to health, compared to the Abuja target of 15 percent, and spends about US$15 per capita compared to the US$28 per capita required to fully finance implementation of the sector strategy (HSSP). WHO's Commission on Macroeconomics and Health recommends per capita expenditure on health of US$ 34 for low income countries" (Okwero et al., 2010).

These conditions provide a glimpse into the context in which HIV/AIDS is managed in Uganda.

2.3 Trends and Patterns of HIV/AIDS in Uganda

2.3.1 Trends in HIV/AIDS

Uganda is acclaimed as a global model in the response to the HIV/AIDS epidemic (Allen & Heald, 2004; Green et al., 2006; Johnson et al., 2006, UAC, 2011). It has been credited for reducing the epidemic from a high prevalence of 15–18 percent in the 1990s, before stabilizing at 6–6.2 percent in 2003 (Parikh, 2007; Wabwire-Mangen, 2009; UAC, 2013; UNAIDS, 2014). Some antenatal surveillance statistics showed that in urban areas such as Kampala, Mbarara, and Masaka, the prevalence was as high as 30 percent (Parikh, 2007).

The epidemic was detected on the shores of Lake Victoria in Rakai district, the initial epicentre of the illness in 1982. Thereafter, HIV infection spread quickly, initially in major urban areas and along highways (MoH [Uganda] & Macro, 2008). By 1986, HIV had reached all districts in the country, resulting in a generalised epidemic (population level HIV prevalence exceeding 1%) (MoH [Uganda] & ORC Macro, 2006; UAC, 2013). HIV infection continued to spread relentlessly throughout the 1980s and early 1990s and soon gave rise to a wave of AIDS as more HIV-infected people succumbed to opportunistic infections arising from their suppressed immune systems (MoH [Uganda] & ORC Macro, 2006). The AIDS epidemic in Uganda is viewed from roughly three epochs: the 1980s, characterized by rapid rise, the 1990s – rapid decline, the early 2000s – stabilization, with rising trend (UAC, 2009). It is estimated that 135,000 new infections occur in Uganda annually (Wabwire-Mangen, 2009).

As one of the first countries in Africa to report a case of HIV by then, known as slim, throughout the 1980's, Uganda grappled with understanding the new disease – a period characterized by lack of knowledge and lack of interventions. However, at the end of the

1980s, organized but less coordinated responses began to emerge. For example, Uganda AIDS Control Programme in Ministry of Health (MoH) and The AIDS Support Organization, (TASO), a Civil Society Organization (CSO) were established. Key interventions at this time included behaviour change communication with messages such as love carefully; AIDS kills and so on, defined this early response. During this time, there were no interventions such as ARVs, condoms, and so on. During this period also, there was a rapid rise in the number of HIV/AIDS cases to 18 percent and in some higher risk populations, it was reported to be higher (Wilson & Challa, 2009).

In the early 1990s, organized effort became visible. For example, Uganda AIDS Commission (UAC), a statutory body was established in 1992 to coordinate the national response. At this same period, there was a proliferation of CSOs, and funding (especially from the World Bank) to AIDS activities, and grass roots programmes (MoH [Uganda] & ORC Macro 2006). One of the CSOs formed was the semi-autonomous AIDS Information Centre (AIC), established to provide HIV testing services. The multi-sectoral approach for the prevention and control of AIDS was developed and mainstreamed in all sectors of government. Towards the end of the 1990s, ARVs began to be available, mainly in research settings. This period was also characterised by political commitment to responding to AIDS from all political parties and there was effective programme implementation (Slutkin et al., 2006). As a result of these initiatives, fear gripped the population and caused people to change sexually related social practices (Slutkin et al., 2006). During this period, the prevalence of HIV declined to about 6.2%. Wilson and Challa (2009) attribute this drastic reduction in HIV prevalence to partner reduction, political commitment and engagement, clear HIV prevention messages and strategies, multi-sectoral programming, community mobilization and good self-risk perception.

In the early 2000s, medicine for Prevention of Mother to Child Transmission of HIV infection (PMTCT) was discovered in 2001. In 2004, through Global Health Initiatives (GHI) such as the WHO-led "3 by 5", 3 million on ART by 2005, the Global Fund for AIDS, TB, and Malaria (GFATM), and President of United States of America Emergency Fund for AIDS Relief (PEPFAR), ARVs became widely available in Uganda. The ARVs were accompanied by significant amount of resources. However, attention seems to have focussed more on treatment and not prevention of new HIV infections. Further, the population appeared to become complacent about HIV, and there were cases of mismanagement of AIDS funds and consequent programme failure (Wabwire-Mangen, 2009). This was also a period that witnessed the West's

ideologically motivated conflict in HIV prevention, with some actors opting to emphasise abstinence and being faithful (AB) only, contrary to the national policy of Abstinence, Being faithful and using Condoms (ABC) plus other measures like HIV testing. It is perhaps for this reason that HIV prevalence stagnated at about six percent (Wabwire-Mangen, 2009).

In the second half of this decade, the epidemic in Uganda became severe, mature, generalized and heterogeneous, affecting different population sub-groups (UNAIDS, 2014) and despite enormous effort to prevent and control HIV/AIDS, the epidemic appears to be on the rise. The Uganda HIV Sero-Behavioural Survey conducted in 2004-05 revealed that the prevalence had increased to 6.4 percent (MoH [Uganda] & ORC Macro, 2006). Anecdotal evidence also suggests that it could have been 6.5 percent (World Bank, 2010) or 6.7 percent (UAC, 2009). The 2011 Uganda AIDS Indicator Survey (UAIS) shows that the prevalence of HIV has further increased to 7.3 percent (MoH [Uganda] & ICF, 2012). The epidemic has caused many consequences including the death of an estimated 1 million people, another 1 million living with the virus, about 2 million orphans, all with reverberating social, economic, and political consequences on the country (NPA, 2012).

2.3.2 Changing Patterns of HIV & AIDS

The patterns of the epidemic in Uganda have changed over time. Table 2.2 compares the 2004-05 and 2011 Uganda AIDS Indictor (AIS) Surveys and shows changes in HIV prevalence in Uganda by key population characteristics (See Chapter 4 for a discussion of AIS data). For example, HIV prevalence increased in 5 out of 9 regions, with the highest increase occurring in the previously low prevalence regions of North East and West Nile; it increased in 7 out 13 major ethnic groups; it increased among people with no education and among those with primary education; HIV prevalence increased across economic classes except among the less poor. HIV prevalence also increased across all religions except among Muslims who experienced a slight decline, it increased in rural areas among both men and women, as well as among all unemployed and working class men and women except among non-working women. Much as there were some declines in prevalence, the overall trend is one of increment (MoH [Uganda] & ORC Macro, 2006), MoH [Uganda] & ICF, 2012).

Table 2. 2: Change in HIV prevalence among women and men by socio-economic characteristics, 2004-05 and 2011 (Author's calculation from Uganda AIS 2004-05 &2011)

	Women			Men			Total		
Parameter	2004-5	2011	Change	2004-5	2011	Change	2004-5	2011	Change
Residence									
Urban	12.8	10.7	-2.8	6.7	6.1	-0.6	10.1	8.7	-1.4
Rural	6.5	7.7	1.2	4.7	6.1	1.4	5.7	7.0	1.3
Region									
Central	10.2	12.5	2.3	6.6	8.4	1.8	8.5	10.6	2.1
Kampala	11.8	9.5	-2.3	4.5	4.1	-0.4	8.5	7.1	-1.4
East Central	7.5	6.7	-0.8	5.2	4.8	-0.4	6.5	5.8	-0.7
Mid-Eastern	6.2	4.4	-1.8	4.4	3.8	-0.6	5.3	4.1	-1.2
North East	3.6	5.3	1.7	3.2	5.2	2.0	3.5	5.3	1.8
North Central	9.0	10.1	1.1	7.1	6.3	-0.8	8.2	8.3	0.1
West Nile	2.7	4.7	2.0	1.9	5.0	3.1	2.3	4.9	2.6
Mid-Western	7.8	9.1	1.4	5.7	7.1	1.4	6.9	8.2	1.3
South Western	7.1	9.0	1.9	4.4	6.6	2.2	5.9	8.0	2.1
Employment (last 12 months)									
Not employed	6.1	5.7	-0.4	2.5	3.1	0.6	4.7	5.0	0.3
Employed	8.4	9.4	1.0	6.1	6.5	0.4	7.3	8.0	0.7
Education									
No education	5.8	9.4	3.6	7.5	8.5	1.0	6.2	9.2	3.0
Incomplete primary	7.7	8.7	1.0	4.5	6.7	2.2	6.3	7.9	1.6
Complete primary	9.8	9.7	-0.1	6.5	6.7	0.2	8.2	8.3	0.1
Secondary and higher	7.6	6.4	-1.2	4.4	4.9	0.5	5.8	5.6	-0.3
Wealth									
Lowest	4.8	6.8	2.0	4.0	5.7	1.7	4.4	6.3	1.9
Second	6.6	7.5	0.9	4.2	5.1	0.9	5.5	6.4	0.9
Middle	6.7	7.3	0.6	5.1	6.5	1.4	6.0	6.9	0.9
Fourth	7.0	9.2	2.2	5.9	7.2	1.3	6.5	8.4	1.9
Highest	11.0	9.9	-1.1	5.5	5.9	0.4	8.6	8.2	-0.4
Ethnicity									
Baganda	10.1	10.7	0.6	5.8	6.2	0.4	8.2	8.7	0.5
Banyankore	7.6	10.5	2.9	5.9	7.1	1.2	6.9	9.1	2.2
Iteso	5.1	6.3	1.2	4.7	5.9	1.2	4.9	6.1	1.2
Lugbara/Madi	3.2	4.6	1.4	2.2	3.5	1.3	2.8	4.1	1.3
Basoga	5.6	6.4	0.8	5.6	4.6	-1.0	5.6	5.6	0.0
Langi	11.3	9.6	-1.7	7.3	4.9	-2.4	9.4	7.4	-2.0
Bakiga	8.5	9.6	1.1	4.1	8.2	4.1	6.5	9.0	2.5
Karimojong	2.1	3.5	1.4	1.1	3.2	2.1	1.7	3.4	1.7
Acholi	7.1	10.7	3.6	6.7	7.1	0.4	6.9	9.1	2.2
Bagisu/Sabiny	7.5	5.7	-1.8	3.5	4.0	0.5	5.4	4.9	-0.5
Alur/Japadhola	8.0	5.3	-2.7	4.3	5.5	1.2	6.3	5.4	-0.9
Banyoro	7.4	6.8	-0.6	6.8	5.8	-1.0	7.1	6.3	-0.8
Batoro	16.4	15.1	-1.3	12.8	10.2	-2.6	14.8	12.9	-1.9

Parameter	Women			Men			Total		
	2004-5	2011	Change	2004-5	2011	Change	2004-5	2011	Change
All others	6.5	7.2	0.7	3.2	7.2	4.0	5.1	7.2	2.1
Religion									
Catholic	7.1	8.7	1.6	5.4	6.8	1.4	6.3	7.8	1.5
Protestant	8.4	8.3	-0.1	5.5	6.5	1.0	7.1	7.5	0.4
Moslem	7.4	7.3	-0.1	4.5	3.6	-0.9	6.3	5.7	-0.6
Other Christian	6.5	8.7	2.2	3.0	3.7	0.7	5.0	6.4	1.4
Others/None	7.8	9.2	1.4	2.4	9.7	7.3	5.5	9.5	4.0
Total 15-49	7.5	8.3	0.8	5.0	6.3	1.3	6.4	6.6	0.2
Total 15-59	7.3	6.9	-0.4	5.2	6.1	0.9	6.3	7.3	1.0

The change in the epidemic is evidenced for instance by occurrence of significant proportions of new infections among discordant couples in union, and change from young people to adults. Other changes in the over 30-year old epidemic include the shift from a concentrated to a generalized epidemic (UAC, 2013; UNAIDS, 2014); it has also shifted from those below 30 years of age to 30–50 years (Wabwire-Mangen, 2009). Further changes show the epidemic shifting from the unmarried persons and populations such as commercial sex workers and truckers in the 1990s to those in stable marital relationships in the mid to late 2000s. In the Modes of HIV Transmission Study (Wabwire-Mangen, 2009) it was reported that 42 percent of new HIV infections were occurring among those in stable unions (See also MoH [Uganda] & ORC Macro, 2006). This new dynamic has caused practitioners to wonder what went wrong.

Shifts in socio-sexual practices, poverty, and socio-economic inequalities have been adduced as possible explanations. In a three-continent, four-country qualitative research called "Love, Marriage, and HIV" and implemented in Uganda under the title "Changing Sexual Relationships among Adults and Young People", Parikh made interesting observations. She observed that whereas AIDS messages about faithfulness and change in sexual practices were abound, men had modified their practices from openly engaging in extramarital relationships to highly secretive and sexually risky relationships. The nature of messages in the print and electronic media, laden with moral and religious connotations had made men shift from open extra marital liaisons to highly concealed ones, a strategy that they innovated to escape social stigma but at the expense of HIV risk (Parikh, 2007; Fox, 2012). Other observations were around the influence of occupational mobility on the sexuality of young men, and their masculinity. Although these observations appear plausible, health sociology is duty bound to

establish why such men continue with risky sexual practices despite efforts to stop it and despite the fact these men acknowledged the dangers of such actions. Jarvis and Wardle in Marmot and Wilkinson (2006) have asserted that instead of focussing on individual behaviour, questions regarding why the practice occurs in the first place and why it persists ought to be answered.

Poverty has been implicated for the rising cases of HIV infection (Seeley, 1994; Dodoo et al., 2007; Gillespie et al., 2007). But little is known about the poverty-HIV nexus in Uganda. What could be the influence of poverty on the vulnerability to diseases in a country where 24.5 percent (UBOS & Macro, 2010; see also World Bank 2010) of its population are living below the absolute poverty line? In an ethnographic study in Iganga town, South Eastern Uganda, Shanti Parikh established that relative poverty was causing young women to engage in transactional sex with relatively wealthy men, and that relative poverty among young men was causing them to delay to marry thereby creating a growing 'supply' of young, unmarried and unemployed women which increased the opportunities for premarital sex (Parikh, 2007). In this poverty debate, researchers are questioning whether it is absolute poverty or the influence of consumerism oriented popular culture driving sexual risk (Fox, 2012).

Further, Fox has tendered evidence that absolute poverty may not be influencing vulnerability to the HIV infection in Africa. Intrigued by the high prevalence of HIV in the relatively rich Southern African countries; she examined Demographic and Health Survey (DHS) data from SSA, and found that there was an inverse relationship between poverty and HIV (Fox, 2012). She concluded that AIDS was escalating in the Southern Africa region not because of absolute poverty but rather due to wide *social inequalities*. She supports her findings by citing the examples of Botswana, Swaziland, and South Africa which are relatively wealthy African countries but which also have the highest HIV rates. Therefore, in the event of such academic controversies, generation of additional evidence is necessary. In this country-specific analysis, my research re-visits the poverty/wealth-HIV relationship in Uganda.

2.4 HIV/AIDS Policies in Uganda

Policies influence health because they constitute decisions about health resource allocation and health decision making is essentially political (Daniels et al., 1999; Braveman & Tarimo, 2002). To understand the AIDS policy framework in Uganda, it is important to note that the HIV/AIDS response occurs within an extremely weak health care system with only 56 percent of the required staff, operates on half of the required funds, and has functionality[1] of 33% (NPA, 2012). This kind of system cannot effectively respond to the HIV/AIDS crisis.

The national policy framework within which HIV/AIDS planning is embedded includes the National Development Plan (NDP) 2010–2015, the National Health Policy (1999), the National HIV/AIDS Policy (2011), the National Orphans and Other Vulnerable Children (OVC) Policy (2004), the Gender Policy (2007), and the Local Government Act (1997), among other key policy guides. These documents all articulate different ways for responding to HIV/AIDS (UAC, 2011). For example, the gender policy identifies the vulnerabilities associated with gender, OVC policy provides the child dimension of vulnerability, and the decentralization policy provides a framework for local area service delivery. The HIV/AIDS response is also informed by the Education Policy, Population Policy, and a host of sector investment plans for agriculture, energy, water, roads, and education (UAC, 2011).

Uganda's policy is to prevent HIV infection. This is achieved through *ABC plus* (Abstinence – for those who are not in sexual union, Being faithful – for those who are in marital union, Condom use, if abstinence and faithfulness fail, plus: 1) testing for HIV; 2) PMTCT; 3) diagnosis and treatment of sexually transmitted infections (STIs); 4) medical prevention through blood and injection safety; and 5) AIDS treatment, among other policies. Uganda's strategy to achieve its HIV & AIDS policies is a multi-sectoral approach – a holistic approach in which all sectors of government and other sections of society mainstream HIV/AIDS activities into their business (UAC, 2011, Lule & Haacker, 2012).

To achieve the above policies, Uganda has formulated biomedical HIV/AIDS policies that include that for PMTCT, HIV/AIDS Counselling and Testing (HCT), Condom Promotion, Blood Safety, treatment of STIs, Medical Infection Control and Post HIV Exposure

[1] This is judged by the health sector's performance of its core mandate e.g. Health Centre IV being able to carry out surgery.

Prophylaxis, and for HIV education in schools. However, policies dealing with societal factors for AIDS prevention are few (Wabwire-Mangen, 2009). Whereas there are medical HIV/AIDS interventions, coverage of services remains low; about 30 percent of the adult population still don't know their HIV sero status, while over 50 percent of pregnant women don't have access to PMTCT services; 60 percent of the people in need of ART don't have access while an estimated 135,000 new infections occur annually in an estimated population of 35 million (UAC, 2011; Lule & Haacker, 2012). These gaps have implications for the further transmission of the virus.

There are two major problems with Uganda's HIV policy framework and these are: the lack of policies dealing with the social aspects of vulnerability to HIV/AIDS and inadequate funding to the health sector. In terms of policy, the focus of government was emphasized by the Minister of Health while releasing the results of 2011 AIDS Indicator Survey (AIS) who said that the survey had identified a continued need for change in individual socio-sexual practices, and scale-up of evidence-based prevention interventions such as PMTCT services and safe male circumcision, as well as increased treatment coverage for people living with HIV. This medical obsession by the government, which has persisted over the last 3 decades, is unlikely to prevent new HIV infections.

The second issue regards funding to the health sector. The government of Uganda annually allocates about 8 percent of the national budget to health; this is half the 15 percent target agreed in the Abuja Declaration of 2000. Out of a projected per capita expenditure US$40-$60 per person, the government for the last five years has provided only about US$7 (Lule & Haacker, 2012). Uganda has only 56 percent health care positions filled. Gross inadequate funding to Ministry of Health has totally compromised the functionality and efficiency of the Ministry. Between 2006 and 2009, 80 percent health centre level II facilities experienced stock out of supplies while only half could provide immunization and antenatal care services (Orem & Zikusooka, 2010). Antenatal care services are a key component of the national HIV prevention package. Whereas the government is strengthening the health sector, progress is yet to be made. The above situation calls for new measures to curtail the epidemic.

2.5 HIV/AIDS Services in Uganda

2.5.1 Basic HIV/AIDS Services

Table 2.3 illustrates the status of basic HIV/AIDS services in Uganda. We see that Uganda provides HCT services to facilitate individuals to know their HIV status, and subsequently to receive care and support services to improve the lives of people living with HIV, antiretroviral therapy to treat HIV, and prophylactic ARV drugs to prevent infection in people who have been exposed. The others are PMTCT services to prevent children from being infected by their parents.

Each of these services has standards (MoH [Uganda] & ICF, 2012). For example, in the provision of HCT, the counseling must precede testing, there must be informed consent including for vulnerable people, confidentiality must be guaranteed, referral must be provided, and HIV test results preferably be provided in one day (MoH [Uganda] & Macro, 2008). Given that people with HIV have a higher likelihood of developing opportunistic infections, they should be offered care services (MoH [Uganda] & ICF, 2012). In the provision of care and support services, PLHIV should be treated for TB, STIs, malaria, and pneumonia, among others. In the management of opportunistic infections, quality standards such as diagnostic capacity are tracked (MoH [Uganda] & Macro, 2008).

Uganda has adapted the globally agreed indicators for assessing the provision of HIV/AIDS services. These include capacity to provide basic services for HIV/AIDS, capacity to provide advanced HIV/AIDS services, availability of record keeping systems for monitoring services, capacity to provide services for PMTCT, and availability of youth friendly services (MoH [Uganda] & Macro, 2008). By 2007, only 29 percent of all health facilities in Uganda were providing HCT services. Hospitals and level IV health centres and those located in Kampala, were the majority providing HCT services. There were 61 and 57 percent facilities providing care and support, and clinical care, respectively. Care services were mainly provided in Kampala, at Health Centre IVs and hospitals and in private sector facilities. Slightly over half of facilities providing care services also provided TB services. STI management was available in almost all facilities providing services (MoH [Uganda] & Macro, 2008).

In the management of bacterial infections, only three quarters of all health facilities provided cotrimoxazole (Septrin) routinely. Unlike government facilities, private facilities were more likely to have stock of Septrin. Youth friendly HCT services were only available in five percent of facilities. In PMTCT, only half of all facilities providing PMTCT services had all the four components of the programme (primary prevention of HIV, prevention of unwanted pregnancy, prevention of maternal transmission of HIV, and care for the mother, baby, and family). Pre-exposure prophylaxis—ARVs to prevent HIV infection in the case of accidental occupational transmission or during sexual violence were only available in six percent of health facilities by 2007 (MoH [Uganda] & Macro, 2008). Much as this service is supposed to be available in all sites providing ART, three quarters of available services were in Kampala.

Table 2. 3: Availability of basic HIV/AIDS services, USPA 2008

Availability of services	Percent of facilities reporting an HIV testing system	Percent of facilities offering care & support services	Percent of facilities offering ART services	Percent of facilities offering PMTCT services	Percent of facilities offering cotrimoxazole (Septrin) routinely	Percent of facilities offering Pre-exposure prophylaxis	Percent of facilities offering youth friendly services
Type of health facility							
Hospital	98	98	84	89	93	74	27
Health Centre IV	97	99	52	91	96	34	30
Health Centre III	46	71	5	40	79	3	5
Health Centre II	9	49	1	12	67	1	2
Management authority							
Government	28	60	7	28	81	5	4
Private	34	64	11	28	62	9	9
Region							
Central	47	80	12	58	66	7	9
Kampala	98	94	68	45	88	60	43
East Central	23	37	5	21	73	4	3
Eastern	18	55	5	16	71	5	2
North East	13	25	5	16	70	2	3
North Central	38	54	12	31	87	8	8
West Nile	17	48	5	16	79	5	4
Western	32	50	6	22	74	4	5
South West	21	94	5	20	85	7	2
Total	**29**	**61**	**8**	**28**	**76**	**6**	**5**

Source: Uganda Service Provision Assessment, 2008

2.5.2 Advanced HIV/AIDS Services

Table 2.4 shows the status of advanced AIDS services provided in Uganda. Services considered advanced care and supportive services such as laboratory also had imbalance. For example, only eight percent of health facilities provided ART with 36.7 percent (212,218 out of 330,000) of people in need, receiving ART. Majority of ART were dispensed in hospitals and in Kampala. In facilities providing ART, 29 percent of facilities had guidelines for the clinical management of ART. Over 70% of health facilities providing ART reported stock out of ARVs used as first line treatment of HIV. PMTCT was provided in only 28 percent of health facilities. There were substantial regional variations in the provision of PMTCT services. Laboratory diagnosis is one of the cornerstones of quality HIV services. However, by 2007, less than 30 percent of all health facilities providing AIDS clinical and social support services could use their laboratories to manage ART, do a hemoglobin test, and do white blood cell count, liver function test or platelet count (MoH [Uganda] & Macro, 2008).

Table 2. 4: Availability of advanced care services for HIV/AIDS, USPA 2008

Availability of advanced services	Percent of facilities offering clinical care & support services with laboratory capacity to conduct hemoglobin or hematocrit	Percent of facilities offering clinical care & support services with laboratory capacity to conduct white blood cell count	Percent of facilities offering clinical care & support services with laboratory capacity to conduct liver function test	Percent of facilities offering clinical care & support services with laboratory capacity to conduct platelet count	Percent of facilities offering ART with laboratory capacity for monitoring ART	Percent of facilities offering ART with no stock out of any normally stocked first line ARV in past 6 months
Type of health facility						
Hospital	91	24	36	24	34	17
Health Centre IV	65	14	4	14	18	26
Health Centre III	20	0	2	0	0	8
Health Centre II	7	2	2	2	93	0
Management authority						
Government	18	2	1	2	17	21
Private	40	8	14	8	46	11
Region						
Central	25	5	6	5	32	19
Kampala	73	33	41	33	39	15
East Central	33	4	2	4	18	36
Eastern	15	2	1	2	13	0
North East	51	0	4	0	0	16
North Central	17	4	2	4	23	22
West Nile	40	3	2	3	27	18
Western	30	6	5	6	28	10
South West	9	1	2	1	26	9
Total	**23**	**4**	**4**	**4**	**27**	**17**

Source: Uganda Service Provision Assessment, 2008

2.5.3 Policy Guidelines for Provision HIV/AIDS Services

Adherence to standard guidelines is a pre-requisite for the provision of quality HIV services. Table 2.5 shows that by 2007, 28 percent of all facilities in Uganda had a policy for informed consent during HCT. Over 70 percent of Health Centre III and II facilities, facilities nearest to majority of people, did not have informed consent policy. In health facilities providing AIDS care, only 39 percent had TB treatment protocols. Less than 50 percent hospitals and health centres alike had these guidelines. Government managed facilities; those in Kampala and North

Central region were most likely to have these guidelines. Sixty-four percent of all facilities providing AIDS care services had guidelines for management of STIs (MoH [Uganda] & Macro, 2008). However, taken together, only 24 percent of facilities had all items considered essential for the management of STIs (guidelines, medicines to treat four of the commonest STIs, & condoms). In the provision of cotrimoxazole anti-biotic, only five percent of facilities had guidelines (MoH [Uganda] & Macro, 2008).

Facilities also had gaps in record keeping and monitoring services. For example, only half of facilities providing PMTCT had a record of women who tested for HIV while less than half of facilities had a record of women given a full course of ARVs for PMTCT. Thirty percent of facilities providing PEP had a record of people who received ARVs as PEP and six percent had a record for monitoring the administration of PEP. In other services, such as ART and HCT, client record maintenance was not optimal either (MoH [Uganda] & Macro, 2008).

Table 2. 5: Availability of policy guidelines for HIV/AIDS services, USPA 2008

Availability of guidelines	Percent of facilities with observed written policy for routine provision of pre- and post-test counseling for HIV	Percent of facilities with observed ART treatment guidelines for adults & children	Percent of facilities with all PMTCT guidelines	Percent of facilities offering care & support services with TB treatment protocol	Percent of facilities offering care & support services with observed STI protocol	Percent of facilities offering youth friendly services with observed policy guidelines
Type of health facility						
Hospital	42	29	51	40	36	10
Health Centre IV	35	31	59	48	40	14
Health Centre III	26	33	34	38	67	21
Health Centre II	14	7	22	33	69	0
Management authority						
Government	29	31	40	39	65	18
Private	25	25	32	38	60	3
Region						
Central	37	24	30	29	58	18
Kampala	17	26	55	18	41	27
East Central	27	17	38	39	55	0
Eastern	25	38	42	58	88	40
North East	28	16	33	30	68	0
North Central	34	33	41	29	60	5
West Nile	8	56	37	66	50	10
Western	15	44	31	55	72	6
South West	27	28	61	28	68	8
Total	**28**	**29**	**38**	**39**	**64**	**13**

Source: Uganda Service Provision Assessment, 2008

2.5.4 Human Resources for Provision of HIV/AIDS Services

Qualified and well trained health care workers and deployed in the right patient-provider ratio are critical for the provision of quality services for HIV/AIDs (Herbst et al., 2009). In Table 2.6, we see that human resource capacity for the HIV care in Uganda is less than optimal (MoH [Uganda] & Macro, 2008). In the provision of cotrimoxazole prophylaxis, only 25 percent of health facilities providing care services had a health service provider trained in the three years preceding the survey. In facilities providing ART, only 30 percent had a health service provider trained in ART provision including prescription and counseling for adherence to treatment. In

health facilities providing HCT services, nearly 80 percent had a health care provider trained in the provision of youth friendly HIVAIDS services. Among health facilities providing care services, less than 50 percent had a provider trained in psychosocial counseling (MoH [Uganda] & Macro, 2008). For provision of palliative care, pediatric AIDS services, and treatment of opportunistic infections, less than 30 percent facilities had a trained health worker.

Table 2. 6: Availability of human resources for HIV/AIDS services, USPA 2008

Availability of human resources	Percent of facilities prescribing ART with trained service providers	Percent of facilities prescribing ART counselling for adherence	Percent of facilities offering care & support services at least 1 trained provider for psychosocial counseling	Percent of facilities offering care & support services at least 1 trained provider for treatment of opportunistic infections	Percent of facilities offering care & support services with at least 1 trained provider for palliative care	Percent of facilities offering care & support services at least 1 trained provider for AIDS in children
Type of health facility						
Hospital	19	21	95	63	37	37
Health Centre IV	42	42	87	65	27	22
Health Centre III	41	41	49	27	12	11
Health Centre II	29	29	34	18	3	1
Management authority						
Government	30	32	50	29	8	7
Private	34	33	44	27	19	13
Region						
Central	29	29	48	36	10	8
Kampala	52	55	83	61	39	31
East Central	28	28	58	25	7	19
Eastern	13	13	41	19	6	8
North East	27	27	43	31	21	12
North Central	29	33	76	63	24	15
West Nile	28	28	74	22	5	2
Western	40	40	58	25	15	9
South West	19	23	28	15	6	4
Total	**31**	**32**	**48**	**28**	**11**	**9**

Source: Uganda Service Provision Assessment, 2008

2.5.5 Distribution of HIV/AIDS Services

The availability of AIDS services in Uganda shows great imbalances between hospitals and health centres (small hospitals) and between regions. Evidence shows that services were more likely to be available in hospitals than the largely rural based health centres. Secondly, services were also concentrated in Kampala, the country's capital city than in the rural regions. This distribution is significant for two reasons: first, Uganda operates a *decentralized system* of governance and services delivery (Table 2.1). Under decentralization policy, people are supposed to receive health and other services at facilities in their communities. Secondly, 80 percent of Uganda's population is rural; therefore, having fewer services at health centres II and III which are nearer to people, limits access. Utilization of HIV/AIDS services has been shown to reduce vulnerability to HIV infection (Montaner et al., 2010). Having AIDS services concentrated in the urban based hospitals and in Kampala raises concerns about the effectiveness of AIDS services in reducing the likelihood of HIV spreading.

In the next paragraph, I discuss the health/HIV/AIDS policy environment 5 years after the first Uganda Service Provision Assessment. Since USPA has not been repeated, I use the latest health sector performance report, the overall government report by Office of Prime Minister and the national development report by the National Planning Authority as proxies for the detailed USPA to track changes in the overall framework for the provision of health/HIV/AIDS services in Uganda.

The health policy environment in Uganda has not changed much in the last 5 years; the government policy is to deliver Minimum National Health Care Package (MoH [Uganda], 1999). Essentially, this means providing primary health services such as health promotion, maternal and child health, and epidemic surveillance and this determines the amount of government investment in the sector (MoH [Uganda], 2013). Table 2.7 shows the trend in the performance of the health sector from 2008 to 2012. It can be seen that except for child immunization, whose performance was above 80%, performance in all indicators was about 50%. In terms of human resources, as much as there was an improvement in the number of health workers, the country still lacks nearly 40% of the required health workforce (MoH [Uganda], 2013; NPA, 2012). The performance of the health sector is principally undermined by the level of investment in health by the government. "The amounts of investments (human resources and finances) for health from GOU [Government of Uganda] continue to be below

the HSSIP [Health Sector Strategic Investment Plan] targets which were already below the globally recommended targets. Financial investment in health by GOU shows a further decline over the years from 9.6% in 2009-10 to 7.4% in 2012-13. The percentage of approved posts filled by health workers (Public facilities) increased from 58% in 2011-12 to 63% in 2012-13" (MoH [Uganda], 2013: ivx). See also Okwero et al. (2010). This is the context under which AIDS is managed.

Table 2. 7: Percentage performance of Uganda's health sector by key indicators 2008–12

Indicator	2008	2009	2010	2011	2012
Government allocation to health as a proportion of the government budget	8.5	9.6	8.9	8.3	7.4
Job positions filled in the health sector	56	56	56	58	63
Health facilities without stock out of 6 tracer medicines[2] in 6 months	26	21	43	48	53
Functionality of Health Centre IV (able to conduct delivery by caesarean section)	-	23	24	25	36
People receiving ant-retroviral therapy	48	53	48	56	76
Pregnant women attending antennal care	39	47	32	34	31
Pregnant women delivering at the health facility	34	33	39	38.1	41
Children under 1 year immunized	85	76	90	85	87
1-year-olds immunized against measles	81	72	88	89	85
Pregnant women who completed intermittent preventive treatment for malaria	44	47	43	44.2	47
Children exposed to HIV from parents tested within 12 month of birth	-	29	30	32	46
T.B. case detection rate	57.4	56	53.9	57	54.5

Source: Uganda Annual Health Sector Performance Report, 2012-13.

[2] First line antimalarial, depoprovera, sulphadine/pyrimethamine, measles vaccine, oral rehydration salts, & contrimoxazole or septrin

2.6 Why Research Uganda?

An outstanding and widely acclaimed success was recorded in the past, the result of a high degree of solidary among the people of Uganda, led by their President. But the rate of new infections is rising again and the epidemic continues to devastate communities. So, we need to go back to the drawing board; study what has gone wrong, and mount a strong, well-coordinated effort to eliminate this deadly epidemic. Prof. Vinand Nantulya, Chairperson, Uganda AIDS Commission.

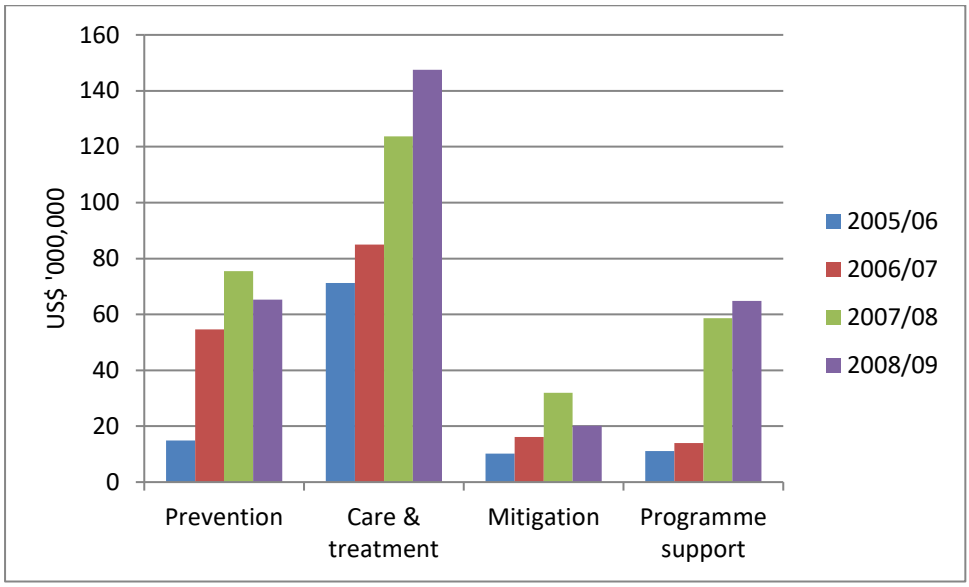
Uganda is the only country in the Eastern and Southern Africa with rising HIV/AIDS infection rates. Uganda that was at the forefront of managing, planning, implementing and monitoring HIV/AIDS for almost two decades, but is now taking lessons from other countries Musa Bungudu, UNAIDS Coordinator, Uganda (Daily Monitor: 18th/05/2013).

Uganda has been acclaimed as a global model in the response to the AIDS epidemic; see for example Allen & Heald, 2004; Green et al., 2006; Lisk, 2009; UAC, 2011; Lule & Haacker, 2012; UAC, 2013; UNAIDS, 2014). This is because it was credited for reducing the prevalence of HIV from a high prevalence rate of 15–18 percent in the 1990s, before stabilizing at 6–6.2 percent in the early 2000s, see Parikh, 2007; Wabwire-Mangen, 2009; Wilson & Challa, 2009, among others. Some antenatal surveillance statistics even showed that in urban areas, the prevalence was as high as 30 percent (Parikh, 2007).

Uganda AIDS Commission identifies several factors working in synergy attributed to this decline including: first, supportive political leadership and openness right from the President of Uganda to leaders across the political hierarchy. This openness facilitated dialogue on the AIDS problem; second, multi-sectoral programming since 1992. This strategy mobilized the entire country to respond; third, correct packaging and delivery of HIV messages, this resulted into awareness about the dangers of HIV; fourth, effective community mobilization, which led to community ownership of the AIDS response; and, fifth, personalization of risk and fear, this led to changes in socio-sexual practices since people feared the deadly nature of AIDS (Wilson & Challa, 2009). It is important to underscore that all these achievements occurred when knowledge about HIV/AIDS was limited, resources to effectively respond to HIV and AIDS were equally limited, there were no antiretroviral drugs; Uganda's economy was weak and small and was being restructured, governance, particularly democratization, was being re-established and Uganda was embroiled in a protracted armed rebellion in North of the country.

However, during the 2000s, despite accumulated knowledge and experience, reasonable economic and political stability in the country, availability of HIV policies and systems, a massive flow of financial resources to support the AIDS response, and availability of ARVs and other remedies, the rate of HIV incidence has increased. For example, Uganda AIDS Commission estimated that the number of new HIV cases almost doubled from 93,000 in 2002 to 130,000 in 2009 (Wabwire-Mangen, 2009). Likewise, the prevalence of HIV also increased, from 6.2 percent in early 2000 to 6.4 in 2006 and to 7.3 percent in 2012. Across all these periods, women have had a higher prevalence of HIV compared to men. In terms of funding, Figure 2.1 shows that there has been a surge in funds intended for responding to the AIDS epidemic from the early 2000s following the establishment of the Global Fund for AIDS, Tuberculosis and Malaria (GFATM or Global Fund) in 2002, the establishment of PEPFAR in 2003, and a host of other global health initiatives, which Uganda benefited from. Between 2003 and 2009, overall external funding to Uganda's AIDS response increased from 84–89 percent and between 2005 and 2012, AIDS funding as a proportion of GDP increased from 1.4 to 2.9 percent (Lule & Haacker, 2012).

Figure 2. 1: Actual HIV/AIDS-related spending between 2005-06 & 2008-09



Source: Lule and Haacker, 2012

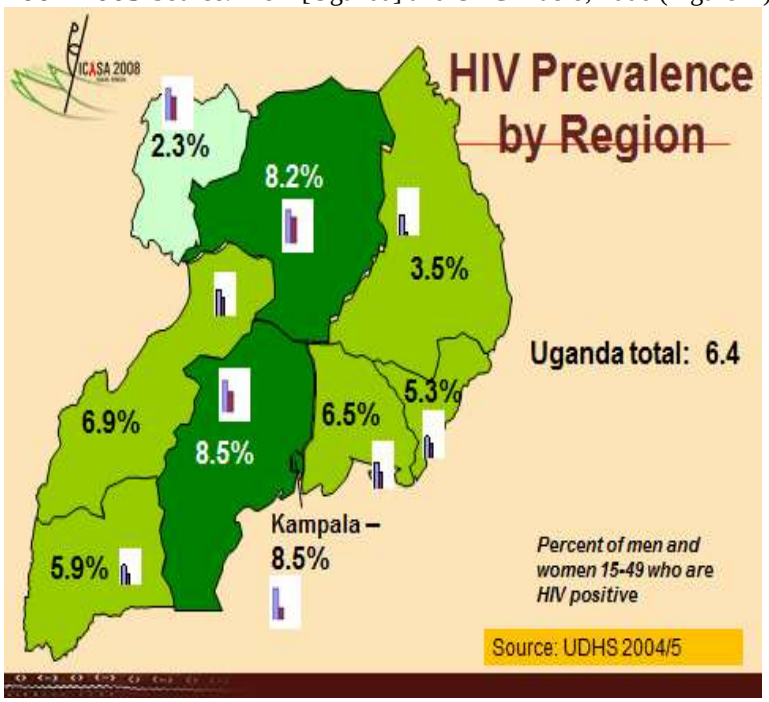
Further to the above, recent evidence by UNAIDS shows that between 2001 and 2009, new HIV infections declined in 33 countries, 22 of them in SSA but not in Uganda and in 12 African countries, antenatal surveillance showed that HIV prevalence declined among young people 15–24 years except in Uganda (UNAIDS, 2011). In Uganda, UAC laments over the country's

failure to tame the prevalence of HIV within the national target of five percent adult HIV prevalence over the last decade. Figure 2.2A and B show changes in the geographical patterns of HIV/AIDS prevalence. Several arguments have been advanced to account for the new spate of HIV infection rates in Uganda.

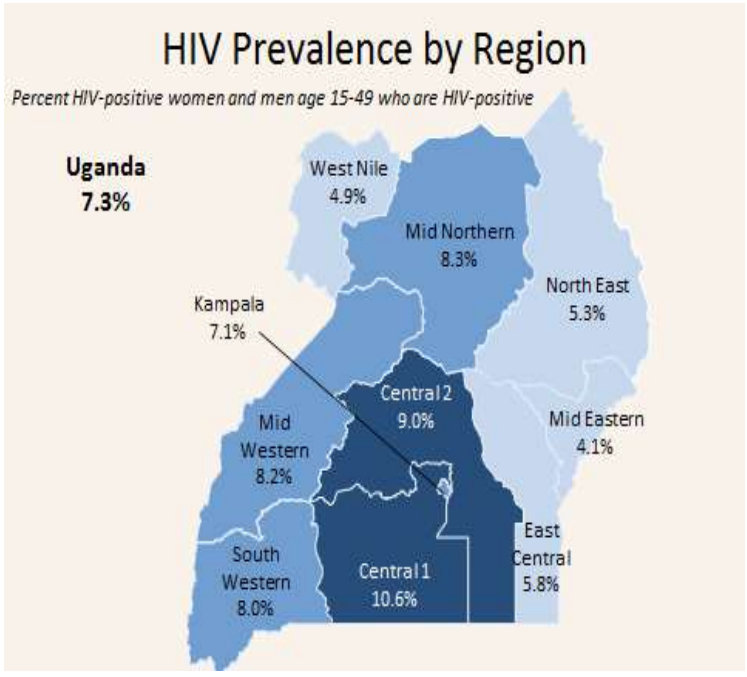
Some of the leading argument include: PLHIV living longer; reduction of AIDS related mortality; and new infections (UNAIDS, 2014). Other explanations are: normalizing attitude due to increased awareness and knowledge about HIV. This has removed fear of HIV/AIDS among people who no longer regard it as a deadly disease; and linked to the previous point, given the introduction and availability of ARVs and other prophylactic remedies such as Septrin antibiotics that reduce the severity of opportunistic infections, people have developed complacence. This may explain why people's socio-sexual practices are reported to be worsening. For example, whereas change in practices (reduction of multiple sexual partners and condom use during (high-HIV-risky-sex) is credited for the declining trend in HIV prevalence in some African countries, this is not the case in Uganda (UNAIDS, 2012). Other reasons include mismanagement. For example, in 2005, US$ 367 million of aid for HIV/AIDS programmes was mismanaged, which resulted in the suspension of Global Fund grants to Uganda (Kapiriri & Martin, 2006).

Figure 2. 2: Map of Uganda showing geographic trends in the prevalence of HIV in UAIS, 2004-05 and 2011

2004-2005 Source: MoH [Uganda] and ORC Macro, 2006 (Figure A)



2011 Source: MoH [Uganda] and ICF, 2012 (Figure B)



In view of these circumstance and availability of good quality population level HIV prevalence data, which is less utilized, it was imperative to carry out this research to attempt to account for social factors that may explain the resurgence of an epidemic hitherto under control.

To summarize, I have presented Uganda's social, economic, and political context emphasizing that these aspects influence health broadly and the HIV epidemic specifically. I have also presented Uganda's health (care) system, mainly showing its set up but more importantly, its limitations against which HIV is controlled and managed. I also tracked the HIV epidemic in Uganda showing how the social context has mutated and how the policy response to the disease has also evolved over time. I concluded this chapter with an analysis of HIV/AIDS services, which shows persistent gross inadequacies. I have also shown consistent increase in the rate of HIV, to rationalize the research. It is thus evident that researching Uganda cannot be more urgent for a country that was hitherto a global model in the response to HIV but which is now experiencing an upsurge of the epidemic as already noted (UNAIDS, 2011).

In view of the social and structural problems influencing HIV/AIDS in Uganda that have been discussed in the preceding sections, a social and structural study is appropriate. In the next chapter, I present the socio-structural theoretical framework upon which this research is anchored.

Chapter Three

Theoretical Framework

Chapter 3

Theoretical Framework

3.0 Introduction to the Chapter

This chapter discusses the theoretical framework upon which this research is anchored. The chapter begins with an interrogation of Rational Action Theory (RAT), the predominant perspective utilised by previous HIV/AIDS research, exploring its premises and limitations. It then makes the case for an alternative theoretical explanation for HIV vulnerability and methodological approach to examine it. In this regard, the chapter discusses Bourdieu's social-structural theory of practice and concludes with its favoured methodological theory.

3.1 Rational Action Theory

Rational Action Theory (RAT) or Rational Choice Theory states that the behaviour of individuals is based on a set of logical cognitions; that individuals are motivated to achieve goals and that beliefs and attitude of the individual and the subjective social norms determine the choice of action taken (Terry et al., 1993). Others define RAT more broadly as any theoretical approach that seeks to explain social phenomena as an outcome of individual action that is rational in view of the actor's goals and conditions of action (Goldthorpe, 2000). This definition acknowledges the different versions of RAT such as Health Belief Model, Theory of Planned Behaviour Change, and Theory of Stages of Behaviour Change, to mention some.

The central thesis of the theory is that intention of individuals to engage in a practice is determined by their beliefs (what an individual knows) about a situation. Beliefs/knowledge, in turn influences one's attitude (negative or positive evaluation) to a situation. Knowledge enables individuals to consider alternative courses of action, which are subjected to an appraisal by significant others. Significant others either approve or disapprove of a behaviour (Munro et al., 2007). In the case of HIV, the theory argues that individual motivation to prevent infection depends on their knowledge of: their susceptibility to infection; the severity of consequences of HIV infection; the benefits of preventing infection; and the barriers to taking preventive action (Terry et al., 1993; Munro et al., 2007). See Table 3.1 and 3.2 showing levels of HIV/AIDS knowledge in Uganda.

Table 3. 1: Percentage levels of HIV/AIDS knowledge in Uganda, UAIS, 2004-05 (n=18,403)

Parameter	No	Yes	Don't know	Total
Have you ever heard of HIV/AIDS?	1.2	98	0.0	100
Can the risk of getting HIV be reduced by not having sex at all?	10.4	86.6	3.0	100
Can HIV risk be reduced by always using condoms during sex?	13.6	71.3	15.2	100
Can HIV risk be reduced by having 1 sex partner?	6.5	89.7	3.8	100
Can a person get HIV from mosquito bites?	57.1	24.5	18.4	100
Can a person get HIV by sharing food with an infected person?	78.8	10.8	10.4	100
Can a healthy-looking person have HIV?	14.5	79.2	6.2	100
Can HIV be transmitted during pregnancy?	35.1	49.6	15.3	100
Can HIV be transmitted during delivery?	12.8	74.3	12.9	100
Can HIV be transmitted during breast feeding?	23.7	56.5	19.8	100
Have you ever heard about other STIs?	1.1	98.9	0.0	100

Table 3. 1: Percentage levels of HIV/AIDS knowledge in Uganda, UAIS, 2011 (n=21,366)

Parameter	No	Yes	Don't know	Total
Have you ever heard of HIV/AIDS?	1.1	98.9	0.0	100
Can the risk of getting HIV be reduced by not having sex at all?	7.6	89.6	2.8	100
Can HIV risk be reduced by always using condoms during sex?	7.9	80.7	11.5	100
Can HIV risk be reduced by having 1 sex partner?	4.8	91.5	3.7	100
Can a person get HIV from mosquito bites?	56.8	26.5	16.7	100
Can a person get HIV by sharing food with an infected person?	77.0	12.4	10.6	100
Can a healthy-looking person have HIV?	7.1	89.3	3.6	100
Can HIV be transmitted during pregnancy?	21.0	69.8	9.2	100
Can HIV be transmitted during delivery?	5.0	88.5	6.5	100
Can HIV be transmitted during breast feeding?	7.4	82.9	9.7	100
Have you ever heard about other STIs?	0.6	99.4	0.0	100

From Table 3.1 and 3.2, approximately 80 percent of the population is aware of the different ways through which HIV infection can occur or reject myth about HIV/AIDS and in 2011, the awareness increased. According to RAT, such high levels of HIV/AIDS awareness should be

sufficient conditions for individuals to avoid HIV infection. However, despite such high levels of awareness, HIV infections continue to occur, a situation which lends credence to the criticisms labelled against RAT that knowledge is not a sufficient condition to effect change in social practice associated with HIV infection. See Section 3.1.2 for a critique of the theory.

3.1.1 Methodology of Rational Action Theory

Rational Action Theory favours methodological individualism, an approach that believes that individual attributes and characteristics must be measured to understand social phenomena. As per this approach, there is need to understand individual HIV risks and address them (Aggleton, 1996; Parker, 2001; 2004; Maziak & Ward, 2009). However, as has already been mentioned, the individual approach "ignores the wider influences on behaviour" (Maziak & Ward, 2009: 2134). For example, because the individual is assumed to be rational, he/she can choose when to have sex, with whom to have sex, where to have sex, under what conditions to have sex, what type of sex and whether to use protection or not. As both a unit of analysis and a centre of intervention (Parker, 2004), targeting the individual with interventions reduces risk (Aggleton, 1996; Parker, 2001; 2004). This argument is problematic as discussed in section 3.1.2.

Bourdieu identifies four specific objections to RAT: first, to him, RAT substitutes interest for culturally defined and historically variable rationalities and interests of real life; second, RAT, substitutes the social scientist's analytical model for reality; third, RAT, in locating the dynamic of social life in individuals' conscious decision making, ignores the individual and collective histories which consciously generate the ongoing reality of social life; and fourth, methodological individualism and RAT prevent theoretical apprehension of the relationship between individuals and between individuals and their environment – the proper objective of social science (Bridge, 2001). It is these vehement objections to RAT in social science that makes the case for an alternative theoretical explanation to HIV vulnerability, especially in SSA.

The dominance of individualism has also been associated to politics and capitalism. For example, Aggleton (1996:13), Cheru (2002), Benatar (2002), De Vogli & Birbeck (2005) believe that emphasis on the biomedical approach is motivated by politics in international health and the business interests of Western multinationals that fund HIV/AIDS research in

SSA. Similarly, Link and Phelan have associated individualism to the dominant Western capitalist ideology (Link & Phelan, 1995). According to other researchers, this philosophy assumes market competent individuals – those with self-will, an assumption which is largely irrelevant to Africa where life is largely collective (Aggleton, 1996; Parker, 2001; 2004).

3.1.2 Criticism of Rational Action Theory

Rational Action Theory has heavily been criticised (Aggleton, 1996; Parker, et al., 2000; Parker, 2001:164-165; 2004). Goldthorpe, an ardent proponent of RAT, acknowledges some of the criticisms labelled against it. He observes that, as much as individuals may occasionally be rational, they have a higher tendency to be irrational. Further, although individuals have a high propensity to reason, they may not have goals or the goals may be inconsistent (Goldthorpe, 2000). Further attacks are on the assumption that beliefs drive action, that "individuals [beliefs] may not be well grounded, may be ill-informed, uncritically held, muddled or just plain wrong" (Goldthorpe, 2000: 104). About the choice of courses of action, "individuals may fail to consider all possibilities, miscalculate possibilities, or not calculate at all but act in habitual or impulsive ways" (Goldthorpe, 2000: 104).

Ration Action Theory has also been heavily criticized for over reliance on individual's cognitive structures to understand social phenomena. Kippax and Crawford argue that "the theory ignores the *connections* between individuals, both interpersonal and social relations in which they act and the broader structures which govern social practices" Kippax and Crawford in (Terry, Gallois, and McCamish, 1993: 255; see also Parker, 2001; 2004). According to this view, beliefs and attitudes of individuals are constituted during the process of interaction and because of this; they have a shared meaning and are collectively held (Kippax & Crawford, 2000). In the case of AIDS, a largely sexual epidemic, it is important to construe infection as an outcome of sexual practices—acts which are "socially constructed, relational, situational, and culturally specific" (Kippax & Crawford, 2000: 261). They argue that constructing sexuality in this way accords the possibility of concentrating on the patterns of the act rather than specific practices.

Rational Action Theory attempts to address the social aspects of human action. The theory claims that the intention of individual actors is first driven by their belief about, and attitude towards the action, and second by their *perception* of others towards the action. It contends

that individuals consider the perception of society to receive its approval or to avoid sanction (Terry et al., 1993). However, confining the influence of society to a mere perception of society's reaction falls short of capturing the full extent to which society influences human agency. Besides, this view of society narrows it to only individuals and by restricting social influence to individual perception of others; it ignores the powerful influence of social processes and systems on human action (Kippax & Crawford, 2000).

3.1.3 Consequences of Rational Action Theory

Many researchers (e.g. Parker, 2001; Shaw et al., 2006) contend that failing to recognize the influence of the social context leads to ineffective policies. Policy outcomes of an individually oriented HIV/AIDS research are often erroneous. For instance, in the four cities research (Auvert et al., 2001), even though marriage was found to be a *key* social factor for HIV transmission, the study recommended circumcision and HIV testing as preventive policy interventions, an illustration of how an inappropriate research paradigm inevitably leads to conclusions and policy recommendations that may either be infective or counterproductive (Link & Phelan, 1995; Wolffers, 2000; Shaw et al., 2006). Beyond knowledge of risk, there are social, economic, and political imperatives that determine human action.

A social approach, unlike the individual one, is concerned with conditions that produce risk. The thrust of the argument is that underlying social, economic, and political conditions in society make people vulnerable to risk (Link & Phelan, 1995; Wolffers, 2000). This is because social conditions are associated with *resources* that people use to prevent vulnerability. These resources may include knowledge, prestige, power, money, networks and others. For example, no matter how knowledgeable one may be about ways of avoiding HIV infection, if they do not have material requirements, these, often more compelling needs may make individuals to ignore the distant risk posed by HIV, and engage in practices that make then vulnerable to the risk of HIV infection for the sake of meeting the more immediate needs of survival (Link & Phelan, 1995; Aggleton, 1996; Parker, 2004; Durevall & Lindskog, 2012).

Focusing on conditions of vulnerability is critical because these conditions cause *multiple risks* and *multiple disease outcomes* (Phelan et al., (2010). People whose social practices are potentially harmful [and] are also less powerful, cannot be expected to take responsibility for their vulnerability (Wolffers, 2000). Link and others argue that an attempt to reduce individual risk by changing practice alone, without understanding the processes that lead to the practice

are bound to fail (Link & Phelan, 1995; Parker, 2001, 2004). Unfortunately, this is what has characterized the dominant AIDS intervention models today. It also explains why despite enormous effort and increased awareness and knowledge about HIV, as illustrated in Table 3.1 and Photo 3.1, new infections continue to occur. As Silberschmidt puts it, "Africans have been educated by AIDS programs to know that the disease is deadly and is largely spread among them by high-risk sexual behaviour [but] the epidemic cannot be defeated by more education" (Silberschmidt, 2004: 42). To her, "HIV/AIDS prevention campaigns that lead to behaviour change will only be successful if proper attention is given to the wider socio-economic context, and issues of gender, gender relations and sexuality" (2004: 43).

Photo 3. 1: A health information sign, outside Tiriri School in Katine, which reads AIDS, has no cure. Photograph: Guardian/Dan Chung 2008. Such education campaigns are insufficient to prevent vulnerability to HIV infection.

It is for this reasons that this research is being proposed – to contest the current dominant individualistic research paradigms, by producing compelling evidence in support of a socio-structural approach to AIDS research. An approach that is cognizant of proximate influences to vulnerability but which transcends it.

3.2 Alternative Theoretical Explanation of HIV Vulnerability

Given the massive criticisms of action theory and in a quest to transcend its accounts of change in practices through individual explanations, a socio-structural theoretical framework is necessary. Scholars believe that, "In the end, we need a paradigm shift from preaching healthy

choices to the public to creating environments in which healthy choices become not only feasible but also more affordable" (Maziak & Ward, 2009: 2138). Similarly, a theoretical and methodological approach that integrates the bio-medical (e.g. medical male circumcision, condom use, treatment etc.,) and socio-structural factors (e.g. public policy, legal framework, education, poverty and wealth issues, gender, culture, and religion, migration and mobility, social change, social disruption and conflict) is necessary (Kippax, 2008). It is in view of a quest for a new way of thinking about HIV vulnerability that this study uses Bourdieu's socio-structural theory (DiGiorgio, 2010).

3.3 Bourdieu's Social-Structural Theory of Practice

Pierre Bourdieu 1930–2002, is one of the most influential social philosophers of the last century (Shusterman, 1999, Lahire, 2002; Thapan, 2002; Swartz, 2002; Grenfell, 2008). His work has found relevance in a wide range of disciplines. Bourdieu's work is important in two ways: first, he tries to resolve the division between micro and macro levels of society or the structure versus agency debate (Mottier, 2002, Chambers, 2005; Lunnay et al., 2011). Secondly, Bourdieu proposes what he calls thinking tools – a set of concepts for overcoming this problem of dichotomy (Thapan, 2002). As Thomson notes, instead of being drawn into the social structure-human agency debate, Bourdieu argues for a methodology that harmonizes the two (Cockerham & Hinote, 2009). That is why he proposes the use of field, habitus, and capital, with none being more important. To him, each of them was integral in understanding the social world (Thomson, 2008).

To demonstrate the application of his ideas to social research, Bourdieu advanced a social structural theory that he called the Theory of Practice but referred here as socio-structural theory of practice (STOP). The theory asserts that practice – what people do whether in terms of HIV/AIDS or other practices, result from a combination of people's dispositions, habits and norms, what he calls habitus and one's position in a social structure or field (Wachs & Chase, 2013). The participation of individuals in the field depends on their status or resources (social, economic, cultural, and symbolic capital) at the disposal of the individual as well as doxa, the rules governing a field (Maton, 2008). As already pointed out, Bourdieu believes that 'habitus', 'field' and 'capital' are conceptually related and therefore need to be considered together. These concepts are discussed in details in the sections that follow.

As a research that seeks to determine the influence of different levels of the social structure on people's vulnerability to the risk of HIV infection, and given Bourdieu's approach that encompasses in an integrated way micro and macro structures, I find his theoretical approach appealing and appropriate for this research as I discuss in later sections. This research seeks to demonstrate the relevance of Bourdieu's theory in explaining vulnerability to HIV in an African context. In the following sections, I explain each of the building blocks of the theory and how they fit in this research.

3.3.1 Field or Social Structure

Field is the launch pad for Bourdieu's theory. His theory proposes that individuals are born into a social space such as a religious and cultural grouping. According to the theory, the field structures habitus but habitus also determines the field (Chambers, 2005). Bourdieu argues that understanding events as a means to understanding social phenomena or social relations was insufficient because an examination of the social space e.g. volume and type of capital, enables situating the object of analysis within its context – local, national or international (Thomson, 2008). Therefore, despite of what is generally already known about socio-economic status and HIV, examining it and the field of HIV/AIDS generally, in the Ugandan context is important. And within Uganda, examining places – rural and urban areas where people live, relationships, and other social dynamics, is even more important.

The field has positions that participants occupy. Participants may be individuals, groups or institutions. There are many fields but in the case of the AIDS field, actors include the general population, people living with HIV, organizations engaged in AIDS work, government ministries, and other institutions. The field is bounded and has limits which are determined by the conditions in a field. What is done in the AIDS field occurs within a set framework of HIV/AIDS laws, policies, and strategic plans. For example, all agencies in the AIDS sub sector operate under policy, technical guidelines, and standards set by the government. Bourdieu argues that the limits of a field make it predictable and orderly – conditions necessary for its smooth operation (Thomson, 2008).

Bourdieu argues that fields are characterised by competition among actors to maintain or improve their position in a field. Participants use capital to negotiate their way around the field and are motivated by the need to accumulate more capital (Samuel, 2013). In the competitive

field, some actors are more advantaged than others and those with advantage use it to acquire more capital, at the expense of the less fortunate (DiGiorgio, 2010). This argument seems plausible when one considers why HIV tends to be more prevalent among disadvantaged populations such as women, prisoners, members of the armed forces, the poor and commercial sex workers, amongst others. To him, fields have dominant and dominated actors and that dominant actors determine the field's agenda.

Bourdieu argues that although a field is semi-autonomous (Mottier, 2002); it is inter-dependent on others (Samuel, 2013). For example, the AIDS field relates and relies much on the mainstream health sector, finance, legislature, and political power sectors, just to mention some. Because of this relationship of interdependence, fields mutually influence each other. For example, the state of the health, finance or political sectors determines how the AIDS field is. If the political sector allocates few resources to the health sector, this will affect the performance of the AIDS sector too. Still within inter-field relations, there is exchange. For example, the quality of AIDS services provided depends on the nature of resources used to provide it. Bourdieu's argument is that the (AIDS) field gets these resources from other fields (Thomson, 2008). The interdependence of fields also makes them vulnerable to influence from other fields. For example, the AIDS field is subject to influence from the demographic, gender and technological fields.

Bourdieu believes that all resources in a field – economic, social, cultural, and symbolic capital are important (Samuel, 2013). This is because ownership of any resource can easily be translated into advantage. However, he believes that economic capital was more important than cultural capital because economic capital attracts more status and power. Because of this, Bourdieu sees the economic field as being dominant and superior to the cultural field. For example, having awareness about HIV may not be sufficient for an individual to avoid being infected with it. They may need money to alter their conditions of living or even to facilitate HIV preventive actions.

In a field, there are sub fields. For example, within the AIDS field, there is HIV prevention, AIDS care and treatment, and impact mitigation. Within these three major components of AIDS, there are several sub sections. For instance, within HIV prevention there is creation of awareness, HIV testing, use of condoms, among some. Bourdieu argues that each of these sub fields has its own rules and regulations, what he calls logics (Samuel, 2013). However, despite

of these different rules and frameworks, sub fields operate within the overall framework/logic of the main field. In in-field relationships, some fields are more dominant than others. For instance, the sub field of AIDS treatment tends to take more resources than HIV prevention or mitigation (See Figure 2.1). This imbalance in the field relations affects the operation, especially of the dominated fields.

Bourdieu believes fields change; first, as a natural process of improvement. For example, the AIDS arena in Uganda periodically conducts reviews that inform its change agenda. Second, even if a field is structured with dominant and subservient actors, there is room for change; he argues that dominance does not eliminate agency. The other sources of change are external – adjacent fields influencing change in a nearby social structure. Some of the external conditions that can cause a field to change include natural disasters, demographic changes, and changes in education, fluctuating funding, war, global crisis, and many such factors. Fields change to remain relevant.

Bourdieu argues that in researching a field, the position of the field should be studied in relation to three aspects: first, in relation to the field of power; second, in relation to the structure of relations between the position occupied by social agents or institutions; and third, in relation to the habitus of the social agents in that field (e.g. Thomson, 2008). As already mentioned, Bourdieu believes that power or the political sector shapes other sectors. So, to study fields and exclude politics would be insufficient. At a micro level, he strongly believes that fields are characterized by people who dominate and who are dominated. This results in relationships of inequality and struggle for either emancipation or maintenance of the status quo. Lastly, the different resource and power endowments of agents determines strategies they use to achieve their goals. It is therefore the duty of the social researcher to study the different configurations, mixes and contestations in a field (Lunnay et al., 2011).

In summary, there are two lenses through which I consider the application of the concept of field to HIV/AIDS in Uganda/Africa. The first lens is field being a vulnerability space and second, being an arena of AIDS response. In the first lens, Bourdieu's argument relates to HIV/AIDS in the sense that there are many ways through which the different backgrounds make people more vulnerable to HIV infection. For example, different cultural or ethnic groups by their values, beliefs and practices etc. make their members vulnerable to HIV infection. Similarly, belonging to certain religious entities exposes people to vulnerability based on the

ideals and practices of such religions. Spatially, individuals residing in rural or urban areas will have different levels of vulnerabilities based on the set up of their social environments. Economically, living in poverty or wealth or in inequality may shape vulnerability to HIV infection differently.

The second lens is that of HIV/AIDS as a field that responds to HIV/AIDS. This view is important because how the AIDS sector is organized determines the effectiveness of AIDS programmes and level of vulnerability to HIV infection. The first issue here is that HIV/AIDS has an operational framework. However, the AIDS policy framework is shaped by the wider health sector policy. Secondly, whereas the AIDS sub field is semi-autonomous, it relies on Ministry of Health for the bulk of its operations. As I discussed in the last part of section 2.5 and show in Table 2.7, the effectiveness of the AIDS sub sector is knotted with that of MoH. Thirdly, within the AIDS field there are sub fields (prevention, treatment, and mitigation). However, within this, treatment is more dominant (attracting more funding and research) than prevention and mitigation and partly explains the extent of effectiveness of Uganda's AIDS response. The application of field in HIV/AIDS is further illustrated in the empirical chapters.

3.3.2 Habitus or Normative Framework

For Bourdieu, the starting point of any social analysis is the habitus, "a system of classification that defines what we do (practice), how we do it (techniques), how we like to do it (taste), and what we think (beliefs)" (Wachs & Chase, 2013: 116). Other scholars view habitus as the underlying mechanisms driving people's practices (Lahire, 2002; Grenfell, 2008). Habitus develops as individuals respond to their social environment and as they act (Chambers, 2005). Chambers adds further that habitus is a structured structure – resulting from actions of individuals and a structuring structure – being a constraint to individual action. To Bourdieu, habitus is important because of its durable nature, resulting from long periods of acquisition and becoming durably incorporated in the body as a permanent disposition (Samuel, 2013).

Bourdieu outlines two main features of habitus and these are: the underlying principles behind it and its relational nature (Maton, 2008).

Bourdieu addressed the principles behind habitus first. As his focus on mechanisms that underlie practice, Bourdieu criticized previous research for focusing on what he calls regular

manifestations such habits and behaviours (Thapan, 2002). This is akin to the dominant wave of research in Africa that is largely behavioural. He contends that attention should be paid to *mechanisms* that give rise to the habits, and not the symptoms. Revealing what lies beneath people's normative framework, what he calls, generative principles, is what analysis should centre on (Maton, 2008). By this, Bourdieu was calling upon researchers to pay attention to aspects such as culture, politics, power, demography, and status which influence peoples practice (Swartz, 2002).

The second element of habitus is its relational nature. Habitus needs a context to operate. It is for this reason that habitus engages in a mutual relationship with a field or social structure (Thapan, 2002). In their relationship, structure shapes habits and internalized structure and habits in turn shape structure (Samuel, 2013). To Bourdieu, this is the reason why the individual and the social are linked – individual tendencies or dispositions and social conditions of existence, although autonomous, are mutually constitutive (Maton, 2008, Moore, 2008). In the case of the AIDS field, AIDS circumstances and processes such as policies, programmes and services influence people's sexual practices and how people behave in turn influence how organizational actors respond. Therefore, policies are re-formulated to accommodate new realities of people's practices.

In the relationship between people's practice and their material conditions of living, there is sometimes a mismatch between people's habitus such as knowledge, experience, taste, and expectation, and field – the social, economic, and other obtaining conditions. This disjuncture, which Bourdieu calls hysteresis effect, tends to produce social dichotomies of advantaged and disadvantaged people (Maton, 2008). To him, suffering or symbolic violence, in this case becoming infected with HIV is a result of a hysteresis effect – several social, economic, and political changes sweeping through a society and leaving some people unable to cope. In Uganda's case, social instabilities occasioned by war and social and economic reforms have destroyed the traditional coping mechanisms and yet formal systems to cushion the population remain a distant dream.

Bourdieu argues that practices are a result of habits but that habits reflect the habitus that structures them (Thapan, 2002; Wachs & Chase, 2013) and according to Mottier, habitus "generates thoughts, perceptions, expressions and actions with a freedom that is limited by historical and social conditions of their production" (Mottier, 2002: 349). Research should

therefore have as it aims, uncovering the generative mechanisms beneath habitus. In AIDS research terms, Bourdieu's argument calls for transcending the manifest such as sexual practices, to inquiring about what leads to such practices. Distant social conditions such as status and power should be the focus of research (Mottier, 2002). It is against this background that Bourdieu strongly argues for a research agenda that is framed around understanding social normatives in relation to the social context. To him, social norms only make meaning if they are understood in relation to their social arena.

According to the STOP, people's practices are guided by circumstances in their social operational arena and these circumstances are mainly capital (Wachs & Chase, 2013). Capital and status are important because they determine the success of an individual within a given field, often characterized by stiff competition (Samuel, 2013). It is one's position in the social structure that determines how they fare (Maton, 2008). In this case for example, avoiding HIV infection or accessing services depends on the amount of social, economic, and cultural as well as symbolic resources that one commands. However, these resources are structured by the social context.

The preceding section has explored the relationship between habitus and field but this relationship, as briefly highlighted, is incomplete without involving capital, what Bourdieu calls the mechanics of the field. The next section explores Bourdieu's notion of capital in detail.

3.3.3 Capital or Resources

Bourdieu is famous for broadening the understanding of capital (Crossley, 2008, Moore, 2008). He identified four types of capital including: economic, cultural, symbolic, and social capital (Thomson, 2008). Economic capital is accumulated money or assets that can be deployed for economic or social purposes. Cultural capital refers to education, skills, knowledge, experience, and confidence that enable an individual or group to acquire cultural authority that they can use to their advantage. Social capital entails advantages such as mutual help, fellowship, good will and other forms of cooperative or supportive behaviours derived from social networks. In Africa, marriage and kinship ties are the main source of social capital. Symbolic capital is an outcome from other forms of capital. This includes honour, attention, and symbols (Wachs & Chase, 2013). Like the other forms of capital, these credentials can be used to acquire advantage.

Bourdieu also broadened the implications of capital. He believed that the implications of capital transcended economic motive (Moore, 2008). He argues that capital works by defining the tastes, values and lifestyle of individuals or groups and this gives them advantage over others. Secondly, capital works by creating consciousness – making individuals or groups to develop an attitude, behaviour or values (Crossley, 2008). This is how capital leads to social class formation. In the case of HIV vulnerability, such social classes may include: rural dwellers versus urban dwellers, within rural people, rural rich versus rural poor, and within urban residents, urban rich versus urban poor. Other social groups may include commercial sex workers, and orphans, among others. However, in all, Bourdieu acknowledges that the economic aspects of capital were more important than other forms of capital.

Capital manifests in several ways notably, objectification, embodiment, and habitus. Capital can be objectified in books, art work, and in scientific instruments. Capital can be embodied in the physical such as physical appearance, body language, speech, accent, intonation and life choices (Samuel, 2013; Wachs & Chase, 2013). Following this reasoning, and as the results show, the tendency to engage in multiple sexual partnerships, a practice which is highly prevalent among commercial and transaction sex workers who use their bodies as 'physical capital', which is converted to economic capital. Capital can also be embodied in the form of knowledge, skills, and experience. Again, as the findings later show, those endowed with a significant amount of cultural capital are generally less vulnerable compared to those with less or no education.

Addressing the development of capital, Bourdieu believes habitus develops at home – through socialization (Samuel, 2013). The socialization process entails cultural inculcation and assimilation over a long period (DiGiorgio, 2010). However, he believes that institutionalized forms of capital such education and jobs are more instrumental in the formation of habitus. The formation of capital is like the formation of habitus because in both, it is through integration of the mind and body which are adapted to specialized fields. Unlike economic capital, cultural capital is embodied and acquired over a long period. To illustrate, a person can become wealthy in a short time but to become a Professor, one must invest a lot of effort and time in their field of practice.

Cultural and symbolic capitals determine the returns from economic capital. They either multiply or reduce the returns that accrue to individuals and groups. Fields of cultural and

symbolic capital are linked and it is this linkage that determines the position an individual occupies in the social structure. For example, one's level of education determines their positioning in the job market. Social positioning determines population clustering or social inequality. Bourdieu argues that current inequalities associated with cultural capital reflect inequalities in capacities to acquire capital, which also reflects prior inequalities in the possession of cultural capital (Moore, 2008). For instance, lack of educational attainment reflects lack of prior resources and opportunities to acquire education. The way capital is distributed has implication for social ordering. Bourdieu's theory posits that individuals or groups with more resources tend to dominate those with less or no resources, a phenomenon that he termed symbolic violence, a notion of power relations that is explored in the next section.

3.3.4 Symbolic Violence

According to STOP, symbolic violence is the advantage that persons and groups exert against others because of their high social status (DiGiorgio, 2010). Symbolic violence occurs when advantaged individuals or groups in society use their social advantage to dominate disadvantaged individuals or groups (Parkin & Coomber, 2009). The idea of domination and dominated invoke power relations. Symbolic violence thrives in a context marked by power differentials— where individuals or groups with limited social capital come to be defined inferior while those with various forms of capital, superior (Thapan, 2002; DiGiorgio, 2010).

Unlike physical violence, symbolic violence is exercised upon an agent with their complicity (Mottier, 2002; Chambers, 2005; Wachs & Chase, 2013). Symbolic violence, or consent domination is achieved through social norms. It is the imposition of a cultural arbitrary by an arbitrary power—meaning, imposing rules and values of the dominant group without the consciousness of the dominated who misrecognize domination—viewing it as natural or just (Chambers, 2005). It is through this tacit internalization of domination that the dominated come to perpetuate symbolic violence (Mottier, 2002). As much as symbolic violence is not physical, it is still violence because of the constraining effect that it imposes on the victims and the disadvantage that accrues due to it (Parkin & Coomber, 2009).

The aim of symbolic violence by the powerful is to ensure the perpetuation of their interests at the expense of the dominated in such a manner that they are neither aware nor able to wage

any form of resistance. Symbolic violence is the surest way to produce and reproduce disadvantage without hurting its victims or using physical violence over the dominated group (Parkin & Coomber, 2008; DiGiorgio, 201). Bourdieu's idea of symbolic violence is that within a given society, symbolic violence is maintained by doxa – rules that define the "superior" and "inferior" categories and habitus—consciousness about oneself and this is enforced by social and cultural norms (DiGiorgio, 2010). The task of sociology, Swartz argues, is to unmask and debunk the hidden and taken for granted power relations in daily social life (Swartz, 2002).

The imposition of symbolic violence by powerful groups over less powerful ones generates inequalities at micro, meso and macro social levels. For example, gender inequalities limiting women's access to opportunities, resources, and privileges (DiGiorgio, 2010). Symbolic violence further has the effect of making weak individuals to devalue themselves as a "natural" process of consenting to domination. According to Parkin and Coomber, the most important aspects of symbolic violence is that it involves non-violent coercion by means of social and cultural control that is premised upon domination, complicity, and misrecognition (Parkin & Coomber, 2009). On her part, Carla DiGiorgio equally underscores the importance of social norms in maintaining marginalization and resisting structural changes (DiGiorgio, 2010).

Symbolic violence has application to AIDS research in several ways. First, is the idea of socio-economic status where people with higher status exploit people with low status. This may include rich people exploiting poor people and infecting them, conversely, it may be poor people engaging in commercial or transactional sex trade as a means of earning a livelihood. It may also include older people exploiting young people in cross generational sex and infecting them. Secondly, based on the idea of power relations, we can see that higher HIV prevalence rates are mainly concentrated among weaker social groups such as women. A combination of low social status and lack of power can be used to explain why women suffer SGBV than men and by extension why victims of SGBV are more vulnerable to HIV infection. Thirdly, regarding the administration of symbolic violence through normative mechanisms, we can relate this to various cultural practices that make people more vulnerable to HIV infection – practices such as widow inheritance, traditional circumcision, especially of women, widow cleansing practices, and forced marriage, all in the name of culture. Lastly, symbolic violence may be in the form of forced and coerced sex (See Chapter 7). Further application of this theory can be found in the chapters on findings.

3.3.5 Social Change

Bourdieu also proposes modalities for attaining social change based on his habitus-field dialectic. His view is that the dynamic nature of a field creates the necessity for change (Hardy, 2008). He argues further that capital is crucial in enabling actors cope – people with more capital cope better while those with less or none are relegated to the margins of society. He believes in the possibility of structural change but was skeptical in the change of habitus, given its durable nature. That is why he argues for social change through structural change but structural change without raising consciousness – to change habitus would be incomplete change (Chambers, 2005).

Bourdieu's prescription for change is useful for two reasons: first, it emphasizes the importance of resources in the adoptive capacity of agents. Individuals with less capital lag in the event of socio-economic adversity (Goldthorpe, 2007; Lunnay et al., 2011). Therefore, attaining change in people's practices ought to consider their material conditions. Secondly, it explains why despite decades of AIDS awareness campaigns, HIV infections continue to occur. This is largely because AIDS awareness campaigns have tended to target individual practices, leaving the structural basis of such practices intact; this is a negation from Bourdieu's dualistic conception of society.

3.3.6 Bourdieu's Methodological Theory

Bourdieu rejected research techniques (e.g. single level modelling) which did not consider the complex nature of interrelationships (Labaron, 2009). He opted for statistical methods of analysis that allow the examination of relationships in a social space. This was informed by his theoretical view of the dialectical relationship between actors and structures and further by the different relationships between elements of space such as different types of capital. In view of this, Bourdieu favoured correspondence analysis technique to examine the relationships (between field, habitus, and capital). This technique allows the examination of interrelationships in a field. However, this technique is incapable of testing hypothesis (Cockerham & Hinote, 2009).

To disentangle the effect of habitus (internalized social structures) on individual actions, scholars have improved Bourdieu's thinking. Cockerham and Hinote rightly propose the

application of multilevel modelling technique. Their argument is that multilevel modelling which simultaneously determines the relative effects of each level on the outcome variable "makes it feasible to test hypothesis about relationships occurring at different levels (individuals, households, communities, social classes etc.) and assess the amount of variation explained at each level" (Cockerham & Hinote, 2009: 210). It is this idea of attempting a theoretical and methodological reconciliation of structure-agency tension in sociology (Williams, 1995; Chambers, 2005) that informs the methodology in this research.

In the pursuit of objective truth, Bourdieu argued for reflexivity. His argument is that since a researcher is usually a member of the society/context he/she is studying, there was a risk of subjectivity. Being conscious of the privileged position of the researcher, a position characterized by power over the researched was critical (Rhynas, 2005). In this research, as an "insider" in the AIDS field – having worked there, one would argue that there is a possibility of researcher bias. To minimise this likelihood, I adopted a standard approach to analysis of HIVAIDS. For example, I use the standard wealth index and quintiles developed and recommended by DHS. Similarly, all the other variables that I use are standard and where I made modifications, I justified my deviation from the convention. Further details about these are contained in the methodology Chapter 4 and in the empirical chapters 5, 6, and 7. By adopting this approach, I minimized against the risk of bias in the analysis.

In summary, Bourdieu's thesis is that individuals are born into a field. The field determines habitus – an individual's world view. Individual's habitus in turn shapes the field. It is habitus that determines the thoughts, perceptions, and actions of agents. The field is a dynamic arena characterized by interrelationships and competition. The success of individuals in a field depends on capital – social, economic, cultural, and symbolic resources needed to succeed. The amount of resources owned by an individual actor determines their social status/position in a social space. In the dynamics of the field, individuals or groups with more resources dominate those with few or no resources in what he terms, symbolic violence.

Methodologically, it is Bourdieu's quest to measure interrelationships that motivated his preference for quantitative analytic techniques. More than measuring relationships, it is his life-long ambition to be able to separate social effects from those of individuals that informed his preference for multilevel modelling techniques applied in this research and presented in Chapter 4 that follows.

Chapter Four

Research Methodology

Chapter 4

Research Methodology

4.0 Introduction to the Chapter

As already elaborated in the theoretical framework, Bourdieu's Socio-Structural Theory of Practice favours an analysis that considers the influence of both the micro and macro levels of society on social phenomena. Following this idea and as a core thesis of this research, the research utilizes multilevel logistic regression modelling to analyse data of Uganda AIDS Indicators Survey for 2004-05 and 2011. This chapter discusses the design of the research, data and variables used in the analysis, the definition of variables, and the transformation of data performed. The chapter also discusses the modelling strategy adapted and its justification before wrapping up with a plan for disseminating the research findings.

4.1 Research Design

A deductive approach to examine the proposed associations is used. According to deductivism, a research should have a guiding theory, formulate hypothesis, identify concepts and variables, and analyse the variables to arrive at conclusions (Tarling; 2008). Research questions that this research seeks to answer were introduced in Chapter 1 and are also given in the empirical chapters. The variables analysed in this research are detailed in section 4.3.2, Table 4.2. To answer the research questions, multilevel modelling is used. Being HIV positive is predicted by one's SES and SGBV variables that are hypothesized to be mediated by a host of social, demographic factors, and sexual practices.

4.2 Uganda HIV Sero-Behavioural Survey, 2004-05 & UAIS, 2011

This research utilises secondary data of Uganda HIV Sero-Behavioural Survey, 2004-05 and Uganda AIDS Indicator Survey (UAIS), 2011 both known here as Uganda AIDS Indicator Survey (UAIS). These data are part of a global standard practice of the DHS programme to routinely collect data to inform national health and other social policies and programmes, and to facilitate international comparison. Since 1984, these 5-year periodic surveys have provided up-to-date information for policy makers, planners, researchers and programmers, to use in the planning, implementing, monitoring and evaluation of AIDS programs in over 70 mainly developing countries worldwide (Mishra et al., 2006). See Table 4.1 for the response rates.

The surveys were conducted by the Government of Uganda through its various institutions under the leadership of Ministry of Health (MoH) and Uganda Bureau of Statistics (UBOS). Financial and technical support was provided by development partners such as USAID and the US's Centres for Disease Control and Prevention (CDC) of the United States of America, PEPFAR; UK's Department for International Development (DFID); Danish International Development Agency (DANIDA); and the Health Partnership Fund, among others. Funders slightly differ in each survey.

For the purpose of the survey, Uganda was divided into 10 regions based on cultural, linguistic and ethnic considerations. The sample size was then distributed equally across the regions. Given the non-proportionality of the sample, weighting factors e.g. rural/urban place of residence and region were applied so as to produce nationally representative analysis (Rutstein & Johnson, 2004). Secondly, a two-stage sampling strategy is applied, starting with the selection of clusters in each region and then sampling 25 households in every cluster (MoH [Uganda] & ICF, 2012). All women age 15–49 and men age 15–59 years that were either permanent residents or who spent a night in the household on the night of the survey were eligible to be interviewed.

Two standardized questionnaires loaded on Personal Digital Assistants were used for interviews i.e. a household questionnaire and individual respondent questionnaire for women and men. The household questionnaire collected data on the characteristics of the household like assets such as land, animals, and consumables; materials used to build the house (wall, floor, and roof); and facilities like type of energy used, source of water and type of sanitation facility. The household questionnaire also served to identify household members eligible for individual interviews and respondents eligible to answer questions on sexual and gender-based violence. The individual respondent questionnaire collected data on the characteristics of the individual respondents. Beside the two questionnaires, two forms were used to record HIV field test results, one for adults and the other for children (Mishra et al., 2006).

Women aged 15–49 and men aged 15–59 years who were interviewed were requested to voluntarily give blood for HIV and syphilis testing. Children under five years were also requested to provide their blood samples for HIV testing. Human Immuno-Deficiency Virus and syphilis was tested at the household and results given instantly. Rapid HIV tests based on the national testing algorism was used in the field. Samples were first tested using Determine

and if it was negative, a negative result would be declared. A sample testing positive would be subjected to a second test using Stat Pack. If there was a disagreement between the two tests (the first giving positive and the second negative result), it would be resolved with the final test of Uni-gold. Adults who tested HIV positive had their blood later tested for CD4 cells at the CDC laboratories at Entebbe to determine their eligibility to start taking ARVs.

In addition to field tests, HIV and syphilis samples were tested at Uganda Virus Research Institute at Entebbe. Internal quality control measures were followed and for external quality control, all samples that tested positive were re-tested at the CDC laboratory. Through the external quality control processes, 94 percent of samples were confirmed positive and used to calculate the HIV prevalence rate. The survey protocols were approved by the Science and Ethics Committee of Uganda Virus Research Institute, ICF Macro Institutional Review Board, and Ethics Review Committee at CDC, Atlanta as well as the Ethics Committee of Uganda Council for Science and Technology.

Experienced professionals that were trained for two weeks took part in surveys as Supervisors, Interviewers, Laboratory Technicians, and HIV Counsellors. Senior staff of Uganda AIS, Uganda Bureau of Statistics, ICF, Uganda Virus Research Institute and Uganda's Ministry of Health conducted the training. Questionnaires were pilot tested and data was collected by 20 teams comprising a Supervisor, male and female Interviewers, Laboratory Technicians, and male and female HIV Counsellors. Data was collected in a period of six–eight months.

In 2011, there was minimal data entry since Personal Digital Assistants were used to collect data. Only field HIV test results were written on paper but were also computerized by the Supervisor in the field. A web based system allowed Interviewers to transfer data to the Supervisor using Blue Tooth Technology. Data was then transferred from the field to the central office using internet. A separate system was designed in the laboratories to track samples (Mishra et al. 2006). The data used in this study excludes about 20,000 children also tested for HIV in the two surveys.

Table 4. 1: Survey response rates for Uganda HIV Sero-Behavioural Survey, 2004-05 & Uganda AIDS Indicators Survey, 2011

Response area	Uganda HIV Sero-Behavioural Survey, 2004-05	Uganda AIDS Indicators Survey, 2011	Total
Clusters	417	470	887
Households	9,529	11,340	20,869
Households response rate	96.8%	99%	97.9%
Women (15–49 years)	10,826	12,153	22,982
Women's response rate	94.5%	98%	96.3%
Men (15–59 years)	8,830	9,588	18,418
Men's response rate	89.1%	96%	92.6%

Source: Uganda HIV Sero-Behavioral Survey, 2004-05 & Uganda AIDS Indicators Survey, 2011, final reports

As already pointed out, the primary analysis of these surveys was done in the context of their primary objectives; using these data, no published analysis has been done on this topic so far. However, the government of Uganda encourages academicians and other researchers to analyse the data further to maximize its value. Secondly, MEASURE DHS requires that all research done on DHS/AIS data be published by it. However, an examination of published work available on MEASURE DHS website so far shows that there is no research addressing this topic in Uganda. For example, out of 132 papers published on DHS data worldwide between 2003 and 2012, 14 articles or 11 percent are only about Uganda but none on SES.

4.3 Variables and Methods of Analysis

4.3.1 Variables

For Chapter 5 and the first part of Chapter 7, the predictor variables used as proxies for SES are household wealth/poverty and educational attainment of respondents. Household wealth/poverty was classified into five quintiles (Lowest, Second, Middle, Fourth, and Highest) recommended by DHS (Rutstein & Johnson, 2004). Educational attainment was similarly categorized into five ordinal levels (no education, incomplete primary, complete primary, incomplete secondary, and complete secondary & higher). Complete secondary and higher education levels were merged in this analysis because higher education category had 2063 (5.2%) out of 39,086 cases, which would have been small for sub sample analysis. Researchers have argued that categorizing educational achievement in this way is useful for

policy oriented research (Kolenikov & Angeles, 2009). See Annex 5.1 for details of data transformation.

For Chapter 6, community-level variables derived from individual-level variables are the predictors. See Chapter 6, Section 6.4.1 for details pertaining to the construction of community-level variables.

Covariates used in this analysis are categorized into socio-economic, socio-demographic and socio-sexual (sexual practices). An extensive list of covariates is used in this analysis because scholars argue that including such covariates narrows the confounding effect these factors have on the relationships being investigated (Fotso & Kuate-defo, 2005; Msisha et al., 2008).

4.3.2 Definition of Variables

Table 4.2 shows all the variables used in this analysis with their operational definitions. I first define variables used at the individual level of analysis and then those used at the community-level of analysis. See variable-related information in Annex 5.1 about recoding of individual-level variables and in Annex 6.1 about recording of community-level variables.

Table 4. 2: Definition of individual and community-level variables

Level	Variable	Definition
Individual	HIV positive (outcome variable)	Having Human Immune-deficiency Virus (HIV), the virus that causes Acquired Immuno-Deficiency Syndrome (AIDS) determined by an HIV test.
	Wealth	Household wealth/poverty classified into five quintiles (Lowest, Second, Middle, Fourth, and Highest)
	Education	Education attained classified into 5 ordinal categories (no education, incomplete primary, complete primary, incomplete secondary, and complete secondary & higher).
	Age of respondent	Age in full years
	Sex of respondent	Female or male
	Sex of household head	Self-reported female or male head of household
	Place of residence	Respondent resident either in an urban or rural area.
	Current marital status	Never been in any sexual union, being formally married or living with a sexual partner, being separated, divorced, and widowed.
	Time	Year of Uganda AIDS Indicator survey, 2004-05 and 2011.

Level	Variable	Definition
	Drunk	Whether the respondent or their partner drank alcohol before they had risky sex in the 12 months preceding the survey and if they drank alcohol, whether the respondent or their partner or both were drunk. The question required yes, no, or do not know response.
	Ethnicity	Ethnic group of respondent i.e. Banyankole, Bakiga, Iteso, Karimojong, Lugbara, Madi, Basoga, Langi, Acholi, Bagisu, Sabiny, Alur, Japadhola, Banyoro, Batoro and others.
	Religion	Religion of respondent i.e. Catholic, Protestant, Moslem or other.
	Condom use	Using a condom in sexual encounters with sexual partners of unknown HIV status (high HIV risky sex), classified as 0, if no (respondent did not use condom) and 1, if yes (respondent used condom).
	Comprehensive HIV/AIDS knowledge	Knowing 3 ways of preventing HIV infection i.e. having only 1 uninfected sexual partner, who has no other sexual partners, using a condom during every sexual encounter with an HIV infected person or a person of unknown HIV status, and not having sex at all. This was classified as 0, if no knowledge (knows no method), 1, if lowest knowledge (knows 1 method), 2, if medium knowledge (knows 2 methods), and 3, if highest knowledge (knows 3 methods). For community-level analysis, this was further re-coded as 0, 0–2 (no knowledge to knowledge of 2 methods) and 1, 3 (knowledge of all the 3 methods).
	Multiple sexual partners	Number of sexual partners with whom a respondent had sex in the 12 months preceding the survey or in a life time.
	Concurrent sexual partners (related to multiple sexual partnership)	Overlapping sexual partnership where sexual intercourse occurs between 2 acts of intercourse with another partner. For example, a person has sexual intercourse with partner 1, then has intercourse with partner 2, and then again with partner 1.
	Forced sex	Being physically forced to have sex against one's will ever in life and in the 12 months preceding the survey. The question required no, yes, refused to answer or do not know response.
	Coerced sex	Being coerced to have sex against one's will ever in life and in the 12 months preceding the survey but without the use of physical force.
	Sexual violence	Ever experiencing forced or coerced sex or both.
Community	Wealth	Proportion of people in a cluster residing in households categorised as wealthy (belonging to 40% of the wealthiest households).
	Education	Proportion of people in a cluster who have higher education (having secondary or higher education).
	Age at first sex/early sexual debut	Proportion of people in a cluster who had sex for the first time when they were 17 years or younger.

Level	Variable	Definition
	Early marriage	Proportion of people in a cluster who married or cohabited for the first time when they were 20 years or older.
	Polygamy	Proportion of men in a cluster with more than 1 wife.
	Drunk	Proportion of people in a cluster who were or whose partner was drunk with alcohol before having higher risky sex in the last 12 months.
	Multiple sexual partners	Proportion of people in a cluster with more than 1 sexual partner.
	Comprehensive knowledge	Proportion of people in a cluster who know 3 ways of preventing HIV infection.
	Condom use	Proportion of people in a cluster who use condoms during higher risk sex.
	Attitudes towards women asking their husbands to use condoms when there is an STI.	Proportion of people in a cluster who believe a woman is right to ask her husband to use a condom if he has an STI.

4.3.3 Methods of Analysis

Multilevel logistic regression is used in this analysis to model the relationship between SES, socio-structural factors and SGBV and the probability of being infected with HIV and to determine the background and moderating factors facilitating these relationships. In this study, HIV status determined confidentially by a blood test among consenting respondents during UAIS is a dichotomous outcome variable. The analysis predicts the probability of having HIV, represented by 1, against the probability of not having HIV, which is represented by 0 (Msisha et al., 2008). Respondents with indeterminate HIV test results were excluded from analysis. Multilevel logistic regression was used in this analysis because UAIS data is hierarchical. See Section 4.5 for further discussion.

4.4 Justification for Multilevel Modelling

Research in many disciplines now collects data which has a hierarchical structure (Pickett, 2001, Rasbash, et al., 2009, Khan & Shaw, 2011). These data are usually collected from individuals who live in households, from where they are sampled. The households are also found within an administrative or geographical area. The area may also be nested in a bigger area such as a region in a country or country in global region. Table 4.3 illustrates the multilevel nature of UAIS data.

Table 4. 3: Sampling approach and data structure UAIS, 2004-05 & 2011

Levels		2004-05	2011	Merged
Level 4	Region	09	10	10
Level 3	Cluster	417	470	887
Level 2	Household	9,529	11,340	20,869
Level 1	Individual	19,656	21,741	41,397

Data with a hierarchical structure cannot effectively be analysed using (the single-level) traditional logistic regression. This is because such models assume independence of observations and uncorrelated errors. Multilevel logistic regression is suited for analysis of data from nested observations because it can *simultaneously* estimate the effects of the higher structures as well as those of individual-level variables on the individual. In addition, multilevel logistic regression can account for the non-independence of observations at group level, measure between group differences and with-in group differences, among other capabilities (Mauny, 2004; Field, 2009; Khan & Shaw, 2011).

4.5 Modelling Strategy

The choice of variables to analyse should be based on theory or existing knowledge (Hair et al., 1998). Selecting variables on this basis allows results to be compared with theory or current knowledge (Tarling, 2008). In this research, variables were categorized according to their theoretical and conceptual relationship. Fotso and Kuate-defo argue that wealth and education influence HIV risk through proximate conditions such as sexual practices and biological factors (Fotso & Kuate-defo, 2005).

Modelling started with single-level models as recommended by Rasbash et al. (2009). The aim of single-level analysis done in IBM SPSS 22 was to identify significant relationships before doing analysis in MLwiN 2.33. Their argument is that, "fitting single level models before proceeding to multilevel models is a good idea as the fixed effects estimates from single level models should generally be similar to those achieved by corresponding multilevel models" (Rasbash et al. 2009). Once the data was read into MLwiN, it was sorted by cluster and case identification, the hierarchy in this analysis. It is argued that sorting data by the hierarchy intended in the analysis allows all units in a cluster (level 2) to be grouped together and all

individual units (level 1) to be grouped within their respective level 2 units (Rasbash et al., 2009; Tarling, 2008; Khan & Shaw, 2011).

Using the logit model, this research adapted sequential modelling to fit two-level nested models. The aim of step by step analysis was to be able to determine the effect of additional variables to the model on the independent variables and their relationship to HIV infection. In this approach, analysis started by running a variance components model, in line with the recommendation by Rasbash et al. (2009) – one with only the intercept. The second step included a model with only predictor variables. In the third step, other explanatory variables were then introduced block by block. For example, socio-demographic variables were entered and then fitted. Subsequently, variables on sexual practices were introduced and the model fitted and so on. The strategy enabled the effect of each successive block of factors to be measured.

After obtaining initial results, analysis was refined further. In this progressive approach, interactions of key variables theoretically and empirically known to be highly associated with the risk of HIV infection were obtained; in obtaining interaction effects, an interaction of gender, rural/urban place of residence, and time and other socio-economic, socio-demographic and socio-sexual determinants of HIV positivity were modelled. Interactions with gender and place of residence were necessary because they are important dimensions of SES and are very significant in the construction of HIV vulnerability and yet these concepts are less explored in SSA (Msisha et al., 2008). This analysis focussed on urban and rural areas because they represent physical spaces and networks for the spread of HIV (Kayeyi et al., 2009) and present different conditions with influence on vulnerability to the risk of HIV infection (Fotso & Kuate-defo 2005); for example, availability of services between and within rural and urban areas often differs. Time on the other hand was used because of its relevance to changes in policies and programmes and how these influence HIV vulnerability and risk (Obalenskaya, 2012). The final results are presented in Table 5.4, 5.5, 5.6, and 5.7.

4.5.1 Parameter Estimation

Parameter estimates are based on transformed linearization using Iterative Generalized Least Squares (IGLS) or Re-weighted/Restricted Generalized Least Square (RGLS). These estimation procedures transform discrete response models to continuous models (Rasbash et

al., 2009). In this research, IGLS is used because it performs better when level 2 units are many. This analysis had 887 clusters at the highest level 2 which were sufficient for multilevel analysis. After the model was estimated using IGLS, it was approximated using Marginal Quasi-likelihood (MQL), or Penalized Quasi-likelihood (PQL).

For all models, First Order MQL was used to obtain initial estimates using the 'start' facility in MLwiN. Estimation was then extended using Second Order PQL using the 'more' facility in MLwiN. In addition to other advantages, starting with MQL reduces the risk of the model failing to converge (Rasbash et al., 2009). Second Order PQL was preferred in this research because much as all estimation methods in multilevel modelling have been found to either under or overestimate parameters, estimation by especially Second Order PQL has been found to be more accurate (Hair et al., 1998; Khan & Shaw, 2011).

Statistical tests for the model estimates were obtained through the standard procedure of obtaining Wald statistics and probability values in MLwiN, while effect sizes were obtained by exponentiating parameter estimates produced by MLwiN using excel. Since MLwiN generates estimates in log odds, exponentiating estimates converts log odds into odds ratios which are convenient to interpret and use.

UAIS allocated an equal sample to regions to facilitate regional comparison and because of this, UAIS data is not self-weighting. To obtain nationally representative estimates, HIV weights[3] were applied to the data to obtain descriptive results (Rutstein & Rojas, 2006). Estimates of multilevel modelling were not based on weighted data because analysis included variables like region and rural-urban residence upon which sample weights are based (Winship & Radbill, 1994). As discussed in the study limitations, unsystematic non-response does not have much effect on findings. This was tested and confirmed by including HIV weights as covariates in the models. However, although there was insignificant effect of non-response, HIV weights were retained in the models to adjust for any unobserved effect.

[3] Adjustments made to cater for the effects of refusal to test for HIV and to correct for non-representativeness of the sample

4.5.2 Data Transformation

UAIS data is provided ready to use. However, some adjustments had to be made to make it more fit for analysis. For example, different data files had to be merged; some variables had to be re-categorized while others had to be computed as explained in the sections that follow.

Wealth/poverty status is one of the two predictor variables in this study. However, its measurement varies depending on the context. In most of sub Saharan Africa countries, wealth/poverty is measured by an index generated based on general resources available in the household as well as characteristics of the dwelling. This study used an improved wealth quintile based on the standard index generated by MEASURE DHS[4]. MEASURE DHS uses a three-step procedure to generate the wealth index as explained below.

First, a subset of indicators common to rural and urban areas is used to create wealth *scores* for households in both areas. To measure access to mass media, the surveys collect information on ownership of a radio and television; to measure access to efficient means of communication, data is collected on ownership of fixed and mobile telephones; to measure the household's capacity to afford pricy items and to hygienically store food, data on ownership of refrigerators is collected; to measure access to public services, markets and exposure to other development areas, data on ownership of means of transport such as bicycle, motorcycle and car, and others is collected. In addition, data on ownership of agricultural land is collected to measure the access of households to means of production as well as ownership of different farm animals and birds as measures of the capacity of the household to meet its demands. Data was also collected on characteristics of the dwelling (floor, wall, and roofing materials), type of drinking water source, type of energy used, and type of toilet facilities that a household uses as measures of social standing. Principal Component Analysis was then used to produce a component score for each household.

In the second step, separate component scores are produced for households in urban and rural areas using area-specific indicators. The third step entails combining the separate area-specific scores to produce a nationally applicable combined wealth index, by adjusting the area-specific

[4] MEASURE DHS is a USAID-funded project implemented by ICF International. Before ICF, the project was implemented by ICF/Macro, Macro International Inc., ORC Macro, and Institute for Resource Development, Inc.). Its mandate is to collect standardized demographic and health data across over 90 mainly developing countries.

score through regression on the common component score. National-level wealth quintiles are obtained by assigning the household score to each de jure (usual or permanent) household member, ranking each person in the population by their score and then dividing the ranking into five quintiles (Lowest, Second, Middle, Fourth, and Highest) with about 20% of the population in each quintile (MoH [Uganda]& Macro, 2006), MoH [Uganda]& ICF, 2008: 19-20). In the absence of income data, these indirect measures have been found to be accurate measures of wealth in such situations and it is for this reason that DHS has adopted it (Rutstein & Johnson, 2004; Beegle & De Walque, 2009).

Based on this index, a wealth quintile was obtained that placed people in five categories of approximately 20% in each. However, obtaining quintiles in this standard way classifies more poor people into rural areas and more rich people into urban areas. To make the quintile sensitive to differential definitions of wealth in rural and urban areas, this research categorized the index by rural-urban residence. In addition, whereas UAIS uses categories such as Poorest, Poorer, Middle, Richer, and Richest, this research uses the nomenclature recommended by Rutstein and Johnson of Lowest, Second, Middle, Fourth, and Highest (Rutstein & Johnson, 2004). See Table 4.4 for the performance of the wealth quintile used in this study when assessed with direct measures of wealth/poverty.

Table 4. 4: Performance of the wealth index against direct measures of wealth/poverty (units are in percentage), UAIS, 2004-05, & 2011 (N=41,397)

Direct wealth/poverty indicator	Lowest	Second	Middle	Fourth	Highest
Electricity in the house	0.7	7.2	20.3	27	44.8
Household has a flush toilet	0.6	4.6	9.5	22.2	63.1
Household has a radio	0.5	2.4	14.2	29.4	53.5
Source of drinking water: piped water in house	1.3	4.8	9.2	8.9	75.8
Type of cooking fuel used: charcoal	9.8	16.9	17	21.7	34.5
House has a car or a truck	0.0	1.7	3.0	11.5	83.8
Wall made of burnt bricks & cement	3.2	10.3	15.2	25.6	45.7
House has earth floor	27.7	22.6	22.1	22.6	6.1
House has thatched wall[5]	47.6	29	15.9	7.4	0.0
No educational attainment	34.8	22.3	18.8	15.5	8.7
Complete secondary or more education	3.4	9.8	14.9	22.9	49.0

[5] The picture for thatched roof is similar. For example, 47.1% of households with thatched roof are in the lowest wealth quintile, 31.2% are in the second and 14.0% are in the middle wealth quintile.

As already mentioned, UAIS data files are stored differently. For example, data for individual respondents, data for household characteristics, and data for results of HIV test are all filed separately. Data for HIV test results particularly is stored separately to maintain the confidentiality of respondents (Mishra et al., 2006). Data for this research was merged based on the procedure recommended by DHS (Rutstein & Rojas, 2006). A unique identifier for the data of individual characteristics and for their results of HIV test was created. The data set for results of individuals' HIV test was matched to their personal characteristics based on a unique identifier. This was done using the procedure for adding variables in SPSS. The individual characteristics and results of HIV test were weighted based on the weighting system recommended by DHS. Human Immuno-Deficiency Virus weighting is recommended so to adjust for differences in the probability of selection and interview and to correct non-probability errors introduced by over or under sampling of certain populations (Rutstein & Rojas, 2006). The same procedure for merging data was repeated for the second survey. Data for the two surveys was then aggregated using the add cases facility in SPSS. Data transformations such as recoding were done using SPSS because of its capabilities compared to MLwiN (See Annex 5.1 for details of transformations).

For Chapters 6 and analysis of community effects in Chapter 7, factors theoretically linked to the outcome were used to compute community-level variables. Community-level variables were computed by dichotomizing (0, 1) non-continuous individual-level variables in MLwiN (See Annex 6.1). The transformation was carried out using MLwiN's recode by range facility under data manipulation. The variable was then computed using MLwiN's multilevel data manipulation facility. The last step involved appropriately naming the new variable in the names window and adding it into the model (See Annex 6.1).

4.5.3 Multilevel analysis using Windows (MLwiN)

As already mentioned, this research aimed to establish the effects of both micro and macro factors on HIV vulnerability and risk. However, SPSS, the dominant software in social science analysis has a weakness related to its inability to fit multilevel models whose data has a binary outcome (Tarling, 2008; Field, 2009). For this reason, Multilevel Analysis using Windows (MLwiN) was used. The MLwiN software has advantages that include being able to fit models whose outcomes are multinomial, ordinal, and binary, among others (Mauny et al., 2004). Much as MLwiN is a good software, it has some limitations. For example, it tends to produce

contradictory results at different levels, such as a positive relationship at individual level and negative relationship at household level. However, Tarling attributes this to the use of fewer cases (<50) especially at higher levels (Tarling, 2008). However, this problem did not arise in this study because the cases at every level of analysis far exceed the minimum required.

4.6 Ethical Considerations and Dissemination of Findings

MEASURE DHS gives three conditions for using its data: 1) All DHS data should be treated as confidential, and no effort should be made to identify any household or individual respondent interviewed in the survey; 2) the data sets must not be passed on to other researchers without the written consent of DHS; and 3) users must submit a copy of any reports/publications resulting from using the DHS data. These conditions were strictly adhered to.

As part of dissemination, the thesis submitted to City, University of London, for the Award of the PhD degree will be stored in university's repository where scholars will have access to. Several papers and a book will be published. Findings will also be disseminated to relevant stakeholders in Uganda for policy and programme improvement. In addition, the findings will continue to be presented at various conferences as part of continuous dissemination. Copies of the thesis will be provided to strategic stakeholders such as Uganda's Ministry of Health, Parliament of Uganda, World Health Organization and UNAIDS Uganda country offices.

To summarize, this chapter has discussed the deductive approach informed by STOP. Specifically, data, procedure adopted for analysis, and justification for the use of multilevel modelling have been discussed. I have also discussed the process for transforming data and the modelling strategy adopted. The following three near autonomous empirical chapters do present findings based on the three grand themes of the research – the association between HIV infection and SES; effects of community factors on vulnerability to the risk of HIV infection, and effects of SGBV on vulnerability to the risk of HIV infection. The relationship between SES and HIV infection is the subject of Chapter 5, which is presented next.

Chapter Five

Socio-Economic Status and HIV Infection in Uganda

Chapter 5

Socio-Economic Status and HIV Infection in Uganda

5.0 Introduction to the Chapter

This chapter reports findings of the association between socio-economic status (SES) and HIV infection in Uganda. It begins with an introduction to the concept of SES. It then goes on to define SES as applied in this research. Specifically, the chapter discusses wealth/poverty status and educational attainment the proxy measures of SES used in this research. It justifies the exclusion of occupation/employment and highlights the methods of analysis used in this chapter. This is then followed by findings which are divided into descriptive and multilevel findings. This chapter ends with a discussion of the findings.

By the early 2000's, the association between SES and HIV infection had become recognised (Hargreaves et al., 2002; Wojcicki, 2005). More recently, using diverse evidence from population based surveys from across SSA, more evidence supporting this relationship has been tendered (e.g. Lachaud, 2007; Gillespie, 2007; Gillespie et al., 2007; Msisha et al., 2008a; Uchudi et al., 2012; Durevall & Lindskog, 2012). In all these studies evidence shows that people with low as well as high socio-economic status are vulnerable to HIV infection, depending on the context (e.g. Fortson, 2008; Parkhurst, 2010; Fox, 2012).

As much as the concept of socio-economic status is widely used in research, its definition in the Sub Saharan African context is problematic because there is no agreement (Fotso & Kuate-defo, 2005). Because of the lack of an agreed definition, researchers have used proxy indicators to represent SES (Hargreaves et al., 2002) and there is also no agreed set of indicators that represent SES. Researchers have typically used wealth, education, and occupation as indicators of SES. In some cases, place of residence has been included (Msisha et al., 2008b). However, in this analysis, only wealth/poverty status and educational attainment are used as explanatory factors for an individual's or household's SES.

Occupation as a proxy measure of SES could not be used in this research because of two related problems: first, occupational categories in the AIDS Indicator Survey (AIS) are not distinct (Table 5.1) and second; because of validity and reliability issues in the measurement of

employment. The data includes categories such as domestic, clerical, unskilled-manual, skilled-manual, agricultural, professional and so on, categories which are overlapping. Equally important, occupational categories in HIV/AIDS analysis are important in gauging occupational exposure to HIV infection and earning capacity. Given the structure of occupations in Uganda, it was difficult to reliably determine the HIV hazard associated with occupations using UAIS data. These difficulties necessitated the exclusion of occupational status in this analysis.

Table 5. 1: Categories of occupation in UAIS, 2004-05 and 2011

Category	Cases	% positive
Not working	9,769	4.3
Professional/technical/managerial	1,805	8.0
Clerical	135	8.1
Sales	3,471	10.7
Agricultural - self employed	11,787	5.8
Agricultural - employee	707	7.1
Household & domestic	191	10.5
Services	2,382	9.9
Skilled – manual	3,113	9.4
Unskilled – manual	6,338	7.8
Total	**39,698**	**6.9**

The above situation markedly differs from the classification of occupations in other countries. For example, according to the UK Office for National Statistics (ONS, 2010), occupations are categorized into 9 distinct categories:

1. Managers, directors, and senior officials;
2. Professional occupations;
3. Associate professionals and technical occupations;
4. Administrative and secretarial occupations;
5. Skilled trades occupations;
6. Caring, leisure, and other service occupations;
7. Sales and customer service occupations;
8. Process, plant, and machine operatives;
9. Elementary occupations.

Taking the case of the first 3, one can realize that managers, directors, and senior officials are occupations whose tasks consist of planning, directing, and coordinating resources to achieve the efficient functioning of organisations and businesses. Most occupations in this major group require a *significant amount of knowledge and experience* of the production processes, administrative procedures or service requirements associated with the efficient functioning of organisations and businesses (ONS, 2010).

The next category is professional occupations which refers to occupations whose main tasks require a *high level of knowledge and experience* in the natural sciences, engineering, life sciences, social sciences, humanities and related fields. The main tasks consist of the practical application of an extensive body of theoretical knowledge, increasing the stock of knowledge by means of research and communicating such knowledge by teaching methods and other means. Most occupations in this major group require a degree or equivalent qualification, with some occupations requiring postgraduate qualifications and/or a formal period of experience-related training (ONS, 2010).

The third category is associate professionals and technical occupations whose main tasks require *experience and knowledge of principles and practices* necessary to assume operational responsibility and to give technical support to Professionals and to Managers, Directors, and Senior Officials. The main tasks involve the operation and maintenance of complex equipment; legal, business, financial, and design services; the provision of information technology services; providing skilled support to health and social care professionals; serving in protective service occupations; and managing areas of the natural environment. Most occupations in this major group will have an associated high-level vocational qualification, often involving a substantial period of full-time training or further study (ONS, 2010).

From the above examples, three things are consistent: the job; purpose of the job; and the qualifications for doing the job. The classification provides a logical link for classifying occupational groups, which is not the case in Uganda and most of Africa. Because of the lack of logic in the classification of occupations, it makes it difficult to determine the implication of an occupation on health/HIV and vice versa. This plays out in this research as shown in section 5.4.1.

On the issue of validity and reliability, respondents in UAIS were asked the following questions about their employment/occupation. Men were asked, "Have you done any work in the last 7 days?" This question was followed by, "What is your occupation, that is, what kind of work do you mainly do?" On the other hand, women were asked, "Aside from your own work, have you done any work in the last 7 days?" This was followed by, "As you know, some women take up jobs for which they are paid in cash or in kind. Others sell things, have a small business or work on the family farm or in the family business. In the last 7 days, have you done any of these things or any other work?" and "What is your occupation, that is, what kind of work do you mainly do?" (MoH (Uganda) & ICF, 2012).

From the above questions, 85% of men (15–49 years) were employed compared to 66% of women of the same age. More people in rural areas were *unusually* employed than urban people. For example, 68 percent of rural women were employed compared to 55 percent of urban women while 86 percent of rural men were employed compared to 82 percent of urban men (MoH (Uganda) & ICF, 2012). This evidence is unreliable for three reasons: first, such high levels of employment contradict evidence showing very high unemployment in Uganda. For example, the rate of unemployment among youth (15–24 years old) is 83 percent (World Bank, 2009); 64 percent among 18–30 year-olds (National Labour Force and Child Activities Survey (NLFCA, 2011-12); and 62 percent among 12–30 year-olds (Action Aid Uganda (AAU), 2012); and second, having more employed people in rural than urban areas contradicts evidence in this research showing that 79.4 percent of rural residents had primary or no education; third, it is a contradiction to have nearly all adults in employment but at the same time have 65 percent of the population living under 2 US$ a day (World Bank, 2010).

Further evidence on the limitations of measuring occupation in developing countries has been produced by Howe et al., 2012 who argue:

> "In addition to limitations common to all settings, the greater complexity of occupational life in many LMIC compared with the majority of people in HIC makes occupation difficult to measure in LMIC. People may have multiple jobs, be reliant on casual/temporary jobs or employment may be seasonal. In some countries, many households rely on subsistence farming or small home enterprises. The need to differentiate small farmers to accurately identify their social status and the difficulty of determining if farmers are commercial, subsistence or managing even less than subsistence has been recognized for African countries. The application of simple occupational classifications may then be quite difficult and, without a careful interpretation, broad categorization of occupation, such as 'farmer', may not be the best indicator to measure social stratification". Howe et al., 2012.

According to the evidence above, the high employment rates should be associated with higher social and economic status but the contradictions and misrepresentation of employment makes, and as Howe et al., 2012 argue, an unreliable measure of socio-economic status. This is the reason why I could not use it as a good measure of socio-economic status in this research.

5.1 Proxy Measures of Socio-Economic Status

5.1.1 Wealth as a Proxy for Socio-Economic Status

Socio-economic status operates through various mechanisms to influence vulnerability to the risk of HIV infection. Fotso and Kuate-defo (2005) have linked wealth to HIV through what they call the income effect. In this mechanism, people with money tend to lead lifestyles associated with an increased number of sexual partners that increases their vulnerability to HIV infection. At the other end of the earnings distribution, those without money are unable to access condoms or HIV services that might protect them from HIV infection thereby increasing HIV vulnerability for poor people too (Fotso & Kuate-defo, 2005). Other scholars have advanced similar views that wealth status is linked to HIV through HIV high risk practices such as engaging in commercial and transaction sex and having multiple sexual partners (Gillespie et al. 2007; Durevall & Lindskog, 2012). Poverty also predisposes people to HIV infection in diverse ways such as dropping out of school, marrying early, loss of livelihood, and being homeless because of insecurity or war. Patel et al. discuss vulnerability to HIV infection associated with breakdown of social networks and loss of livelihoods due to war (Patel et al. 2012).

However, the evidence associating SES with HIV is not consistent (Gillespie et al., 2007; Ishida et al., 2012). Some studies show that vulnerability to HIV infection is associated with being poor or living in a poor household. For instance, Dinkelman et al. in the South African Panel that studied 14–22-year-old women and men in 2002-05 found a negative association between household income and early sexual initiation (Dinkelman et al., 2007). Lopman et al. also found that being in the highest wealth category was negatively associated with being HIV positive among women and men in Zimbabwe (Lopman et al., 2007) while evidence from Kenya using a mixture of DHS and qualitative data reported that being poor was associated with risky sexual outcomes (Dodoo et al., 2007). A more recent defining study of 20 SSA countries showed that urban poverty was associated with HIV infection (Magadi, 2013; 2016).

Other studies suggest that being categorized as, or belonging to a household categorized as wealthy is associated with increased vulnerability to HIV infection. Mishra's study in eight SSA countries based on DHS data produced evidence that challenged the long held hypothesis that HIV infection was due to poverty. This study showed a positive association between HIV infection and belonging to the highest wealth categories in all the countries studied (Mishra et al., 2007; see also Johnson & Way, 2006). Further supporting evidence has been advanced by Fox (2012:459) using population-level data from 16 SSA countries, with 170 regions which revealed a paradoxical relationship between economic status and HIV infection. The findings showed that "in wealthy regions/countries, individuals with less wealth were more likely to be infected with HIV, whereas in poorer regions/countries, individuals with more wealth were more likely to be infected with HIV".

5.1.2 Education as a Proxy for Socio-Economic Status

There are many ways through which education may reduce vulnerability to HIV infection: through schooling and the knowledge acquired from school (Jukes et al., 2008). For young people, good education provides protection against vulnerability to the risk of HIV infection in four ways. First, schools provide physical protection. Therefore, staying in school alone should protect a person against the risk of HIV infection; second, by being at school, students operate in low vulnerability sexual networks because they are likely to be less sexually active or not at all; third, schools keep young people away from environments which make them more vulnerable to HIV infections such as places for drinking alcohol and keep students occupied – unable to think about issues of sex; and fourth, education inspires students to develop long term goals – to have a sense of the future. This attitude makes young people to value life, delay sex, and thus avoid being infected with HIV (De Walque, 2009; Zuilkowski & Jukes 2012).

Education may reduce vulnerability to the risk of HIV infection among schooling young people in three ways: First, education provides knowledge, which enhances the capacity of individuals to comprehend health information including ways to avoid being infected with HIV (Bradley et al., 2007; Durevall & Lindskog, 2012); secondly, education leads to delay in sexual activity, marriage, and child bearing, factors associated with increased vulnerability to the risk of HIV infection; and thirdly; educated people are more likely to engage in safer sexual practices such as having fewer sexual partners and are more likely to use condoms (Zuilkowski & Jukes 2012).

There is also mixed evidence of the association between vulnerability to HIV infection and educational attainment. Some studies indicate that educational attainment is negatively associated with HIV infection. For example, Gupta and Mahy using Tanzania's DHS data found a negative association between HIV infection and educational attainment among women (18–24-year-old) and men (20–29-year-old) (Gupta & Mahy, 2003); and Glynn et al. researching in four African cities, Coutonou (Benin), Ndola (Zambia), Kisumu (Kenya) and Yaoundé (Cameroon) also found a negative association in women and men in Ndola (Glynn et al., 2004).

On the other hand, studies such as that by Gregson et al. (2001), Hargreaves et al. (2008), Fortson (2008), Magadi (2011a), and Magadi & Desta (2011) have reported positive education-HIV association. For example, using DHS for Burkina Faso, Kenya, Tanzania, Cameroon, and Ghana, Fortson found that women and men with primary education in these countries were three times, more likely to be infected with HIV compared to those with no education (Fortson, 2008). However, Fortson's results, just like all others showing a positive education-HIV association are not surprising because primary-level education is not expected to reduce vulnerability to HIV infection.

In addition to the conflicting results already identified, available evidence further varies by country, gender, time, and areas of residence. For example, the association between primary education and HIV positivity was positive among women but non-significant among men in SSA, all compared to people with no education (Magadi & Desta, 2011). In a different study, a negative association was reported among females in Masaka in Uganda and among most educated males in Mwanza, Tanzania, when compared to individuals with no education (Gregson et al., 2001). For rural and urban areas of residence, the association between HIV infection and secondary or higher educational attainment was positive in rural areas but non-significant in urban areas of SSA, compared to people with no education (Magadi, 2011a). Regarding time, Gregson et al. show negative, positive and non-significant results in different countries, with studies conducted before 1996 being more likely to report a positive association between educational attainment and HIV infection (Gregson et al., 2001). For example, among Zambian women, education and HIV were positively associated but in 2003, the same association could not be observed. It is in view of these inconsistent patterns that gender, area of residence, and time were examined in this research.

From the preceding discussion, the evidence about the relationship between SES and HIV positivity as well as its mechanisms is mixed and context specific. Whereas SES has been studied, its understanding and that of the mechanisms through which it operates to heighten vulnerability to HIV infection is far from being conclusive. Further, whereas some of the previous researchers have used cross sectional population-based data, only one study (Parkhurst, 2010) examined the impact of time on the association between SES and HIV infection risk in Tanzania. Available evidence has also not adequately addressed the important role that place of residence and gender roles play in the construction of HIV risk. In this research, interaction models between rural/urban place of residence, gender, and time and other important socio-demographic, socio-economic, and socio-sexual factors were performed to close this gap. Majority of the studies used single level modelling, a method that is known not to account for the effect of context. In addition, studies that used multilevel modelling are scarce and have not adequately highlighted the role of social context.

To contribute to increased understanding of the importance of SES on HIV vulnerability and the mechanisms underpinning this association as well as establish the trend of these associations, this analysis sought to answer the following specific research questions:

1. What is the association between socio-economic status (wealth/poverty status and educational attainment) and HIV infection in Uganda?
2. How does gender and rural-urban place of residence moderate the association between SES and vulnerability to the risk of HIV infection in Uganda?
3. Did factors that determine vulnerability to the risk of HIV infection change between 2004-05 and 2011?

This chapter answers these questions first, by briefly describing the data of UAIS and methods used to analyze it. Particularly, strategies used for statistical modeling and for estimating parameters are given. In presenting results, analysis is broken down into descriptive and multilevel analysis. Results of multilevel analysis are presented per the three research questions.

5.2 Data, Variables and Methods of Analysis

Analysis in this chapter is based on pooled 2004-05 and 2011 data of UAIS whose details are covered in Chapter 4, section 4.2 and the predictor variables of wealth/poverty status and educational attainment of respondents used in this chapter are also covered Chapter 4, section 4.3.

Modelling started with single-level models as recommended by Rasbash et al. The aim of this analysis was to identify significant relationships before doing the final analysis in MLwiN. Fitting single level models before multilevel models is recommended because the estimates from single-level models always tend to be like those achieved by corresponding multilevel models (Rasbash et al. 2009). Data was sorted by cluster and case identification in MLwiN, the hierarchy in this analysis. Sorting data by the hierarchy intended in the analysis allows all units in a cluster (level 2) to be grouped together and all individual units (level 1) to be grouped within their respective level 2 units (Rasbash et al., 2009; Tarling, 2008; Khan & Shaw, 2011). Modelling was based on the random intercepts (Tarling, 2008: 114) expressed as:

$$y_{ij} = b_0 + b_1 x_{1ij} + b_2 z_{2j} + u_{oj} + e_{ij}$$

Where:

y_{ij} = HIV positivity for an individual i, in a cluster, j

b_0 = Regression constant

b_1 = Co-efficient of wealth, education and other covariates

x_{1ij} = Characteristics for an individual, i (e.g. age, education, gender), in a cluster, j

b_2 = Coefficient of cluster-level explanatory factors

z_2 = Characteristics of clusters e.g. wealth, cluster education etc.

u_{oj} = Variation at community level

e_{ij} = Variation at individual level

From the above equation, sequential modelling was adopted to fit two-level nested logit models. Step by step analysis sought to determine the effect of additional variables to the model on the independent variables. In this type of analysis, analysis started by running a variance components model, in line with the recommendation by Rasbash et al. (2009). The second step

included a model with only socio-economic predictor variables. In the third step, variables were then introduced block by block. This strategy enabled the effect of successive blocks of factors to be determined.

After obtaining initial results, analysis was refined further by fitting models of interactions between gender, rural-urban place of residence, time, and other important predictors of HIV infection. In the following sections, I first present descriptive results and later results of modelling.

5.3 Descriptive Findings

5.3.1 Population Characteristics

This analysis is based on data collected in 887 clusters from where 20,869 households were sampled. In total, 39,766 individual cases aged 15–59 years (men) and 15–49 years (women) with HIV test results were analysed (46.3 in 2004-05 and 53.7 percent in 2011). The age range of 15–59 years was included in the analysis to make the study representative of all reproductive ages in the population (Mermin et al., 2008). Sixty-five percent of the respondents were under 35 years of age, reflecting the youthful demographic structure of the Ugandan population. There was no big difference in the average age of female and male respondents, which was 30.5 years. There were 82.7 percent rural residents in the surveys compared to urban ones, also reflecting the 83 percent proportion of the general population living in rural areas of Uganda (UBOS, 2007). Women respondents were 55.6 percent, a characteristic of the data which also depicts the proportion of women in the general population.

Most respondents had low educational attainment. Respondents with primary or no educational attainment comprised 72.9 percent, 20.9 percent had secondary education while 6.2 percent had higher. In terms of gender, more men had higher education than women. Most people with low education level lived in rural areas. Among rural residents, 79.4 percent had primary or no education at all. Approximately 20 percent of respondents were categorized in each of the five wealth/poverty quintiles in rural and urban areas. This is because I re-classified the wealth/poverty index by rural-urban residence to accommodate its different meaning in rural and urban areas.

5.3.2 HIV Prevalence by Population Characteristics

Table 5.2 displays overall HIV prevalence in the merged data by key characteristics. HIV prevalence was 6.4 percent in 2004-05 but it increased to 7.3 percent in 2011 and was higher among women than in men. High HIV prevalence among women may be attributable to: (1) women being biologically disadvantaged as has been reported for instance by Parkhurst (2010); (2) women suffer social, cultural, and economic disadvantage more than men; (3) women's higher HIV prevalence may also be due men's undue cultural and social advantage over women; and (4), women's greater vulnerability may also be due to them marrying men who are more than 10 years older (Kelly et al., 2003). In terms of age, HIV prevalence in 2004-05 was highest among women and men aged 25–34 years but shifted to 35–44-year-olds in 2011, possibly due to cohort effect, where it peaked at the same age for women and men but prevalence in women was higher than among men in this group.

Women and men with complete primary level educational attainment had the highest prevalence of HIV in 2004-05 and 2011. HIV prevalence among women was nearly four percentage points higher than among men in 2004-05. In 2011, this inequality persisted much as it reduced slightly. The prevalence of HIV was higher among urban than rural residents. HIV prevalence among urban women was five percentage points higher than among rural residents. Although this gap reduced slightly in 2011, it remained wide. As will be seen, the higher prevalence in urban areas may be explained by several factors including tough livelihoods and urban poverty (e.g. Ngom et al., 2003; Magadi, 2013; 2016), population density and proximity (Dyson, 2003), low social cohesion (Parker, 2004), and lack of cultural restraints (Madise et al., 2012). Although HIV prevalence was higher in urban areas, it is worth being aware that for Uganda, a country with poor rural health services, the high prevalence in towns could be due to HIV infected people migrating to towns to access AIDS treatment. See Chapter 2, Section 2.5.5 about area-based inequalities in HIV/AIDS services.

In terms of marriage, HIV prevalence is extremely high among the widowed, followed by among the separated/divorced. These observations raise several issues: (1) in a country where 99 percent of HIV is transmitted through heterosexual sex, HIV prevalence among married people may indicate a deterioration in married people's sexual practices such as increased extra-marital sex, having multiple sexual partners, and lack of condom use; (2) higher HIV prevalence among separated/divorced individuals suggests marital instability could be an

explanation for infections in this group. However, HIV infection in this group could be a cause of marital instability as much as it could also be due to the death of the spouses of these people, thus reverse causality – high HIV prevalence being an effect rather than a cause (De Walque, 2009; Camlin el at., 2013); (3) it could also be due to positive selection—HIV positive individuals marrying each other (Reniers, 2008); and (4), the higher prevalence among some men may imply men are more likely to re-marry than women, a phenomenon which increases their vulnerability further as has been suggested. Because the above discussion, interpretation of findings on marital history and HIV requires caution.

HIV prevalence among women in female headed households is nearly twice that in male headed households in 2004-05 and 2011. The high prevalence among women in female headed household may be due to: (1) female heads themselves being infected since they are also more likely to be (AIDS) widows; (2) hard conditions of living that result into HIV risky sexual practices by both the head and members, especially if it is in urban areas as has been reported. This observation is supported by the fact that in households headed by females, the number of female members is more than double that of males, which is a signal of *concentration* of disadvantage in such a household; and (3) early initiation of sex by girls associated with the absence of a father (Ngom et al., 2003). Magadi and Olayo (2011) report high HIV prevalence and teenage pregnancies among girls living in female headed households in Nairobi's slums. Credence is given to these arguments by the fact that such vulnerable women and girls do not have *any* formal social protection.

Table 5. 2: Weighted HIV prevalence by key characteristics, UAIS, 2004-05 & 2011

Characteristic	UAIS, 2004-05				UAIS, 2011			
	Women		Men		Women		Men	
	% HIV+	Cases	% HIV+	Cases	% HIV+	Cases	% HIV+	Cases
Age Group	*		*		*		*	
15-24	4.3	3842	1.1	3089	4.9	4504	2.1	3450
25-34	10.3	3035	7.0	2248	10.3	3331	6.3	2493
35-44	9.3	1741	9.3	1603	11.5	2247	11.1	2006
45-59	6.6	1448	6.6	1295	8.5	1760	8.1	1574
Wealth/poverty Status	ns		ns		ns		ns	
Lowest	6.4	1767	4.3	1360	8.1	2278	6.9	1677
Second	7.4	1948	5.4	1583	9.2	2358	5.1	1933
Middle	7.5	2070	5.2	1688	7.4	2303	6.2	1901
Fourth	7.3	2145	5.7	1692	7.4	2407	6.5	2012
Highest	7.9	2236	5.2	1914	8.9	2495	6.0	2001
Educational Attainment	*		*		*		*	
No education	5.6	2531	7.2	741	8.6	1923	7.5	597
Incomplete primary	7.6	4657	4.8	3862	8.7	5481	6.6	4055
Complete primary	9.9	1100	6.2	1178	9.4	1441	7.0	1390
Incomplete secondary	7.3	1579	4.8	1919	6.7	2334	5.2	2493
Complete sec & higher	8.6	279	4.4	524	5.4	662	4.6	989
Area of Residence	*		*		ns		*	
Rural	6.4	8672	4.9	7087	7.6	9407	6.1	7711
Urban	12.6	1493	7.0	1151	10.8	2436	6.3	1813
Current Marital Status	*		*		*		*	
Never been in union	2.8	2084	0.8	2915	3.9	3204	2.0	2604
Married/living together	5.7	6428	6.6	4624	7.0	5710	7.4	7430
Widowed	24.0	803	27	141	24.0	75	22.7	692
Divorced/separated	14.0	850	11.1	557	16.4	534	15.0	1117
Sex of Household Head	*		*		*		*	
Male headed household	5.4	6864	5.6	7073	6.1	7264	6.4	7992
Female headed household	11.4	3301	2.9	1165	11.6	4578	4.7	1532
Total	7.3	10165	5.2	8238	8.2	11842	6.1	9524

*- Statistically significant based on x^2statistic, $P < 0.05$
ns- Not significant based on x^2 statistic, $P > 0.05$

5.4 Findings Adjusting for Wealth and Education

5.4.1 Household Wealth/Poverty

To explore the relationships in the previous sections further, this analysis first examined the relationship between SES factors with HIV positivity. Wealth/poverty status and educational attainment were modelled. No other covariates were added. Including wealth and education in the same model was in accordance with their known correlation.

Table 5.3 indicates that there is a clear positive association between belonging to a higher wealth category and being infected with HIV among residents of rural areas. This pattern is likely to be influenced by an increase in household incomes as has been reported in the various studies in Uganda (UBOS, 2010). It can also be seen that the observed positive wealth-HIV relationship is backed by a corresponding increase in HIV prevalence in the economically better off regions (Figure 5.1).

The positive wealth-HIV relationship trend in rural areas is likely to be driven by: (1) the high number of rural regions regarded economically better off (e.g. Central, Southern, and Western) (Msisha et al., 2008b). In these regions, which are also the most populated in Uganda, an increase in household wealth is associated with an increase in HIV prevalence (Figure 5.1). In these regions, HIV prevalence and wealth (NPA, 2012) are both higher than in other regions; and (2) the trend may also be driven by the wealth-HIV pattern observed in rural areas which shows that an increase in wealth in rural areas is associated with an increase in HIV prevalence (Figure 5.2). It can also be deduced that the trend observed in rural areas is likely to be driving prevalence trends observed in the general population, and that this rural scenario may be an explanation for the general increase in HIV prevalence observed in 2011 when the likelihood of rural people being infected was 17% higher in 2011 than 2004-05.

Figure 5.1: Percentage prevalence of HIV by wealth categories in the wealthiest regions of Uganda, UAIS 2004-05 and 2011 (n=39,737)

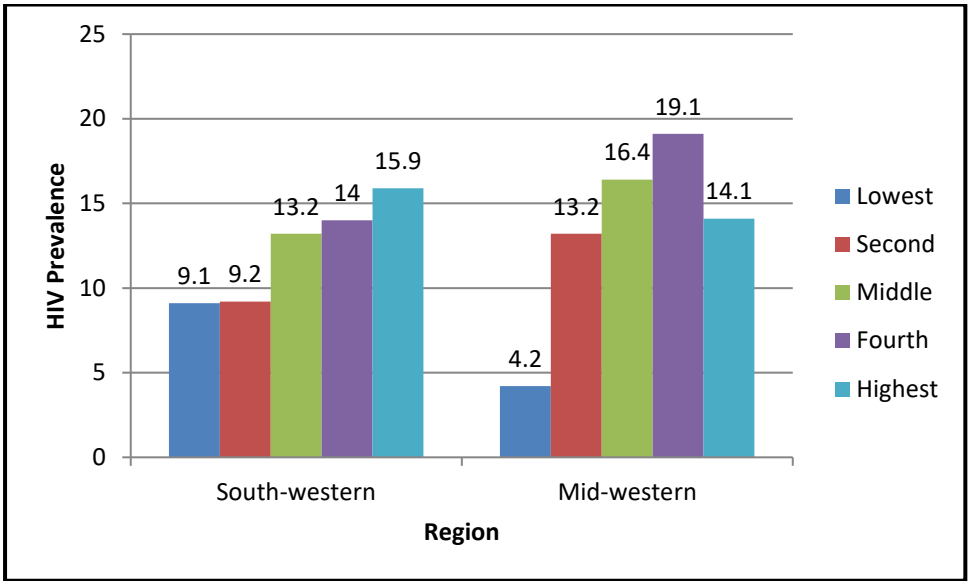


Figure 5.1 shows that an increase in household wealth is associated with an increase in HIV prevalence in South-Western and Mid-Western regions.

Figure 5.2: Prevalence of HIV by wealth categories in rural and urban area of residence, UAIS 2004-05 and 2011 (n=39,767)

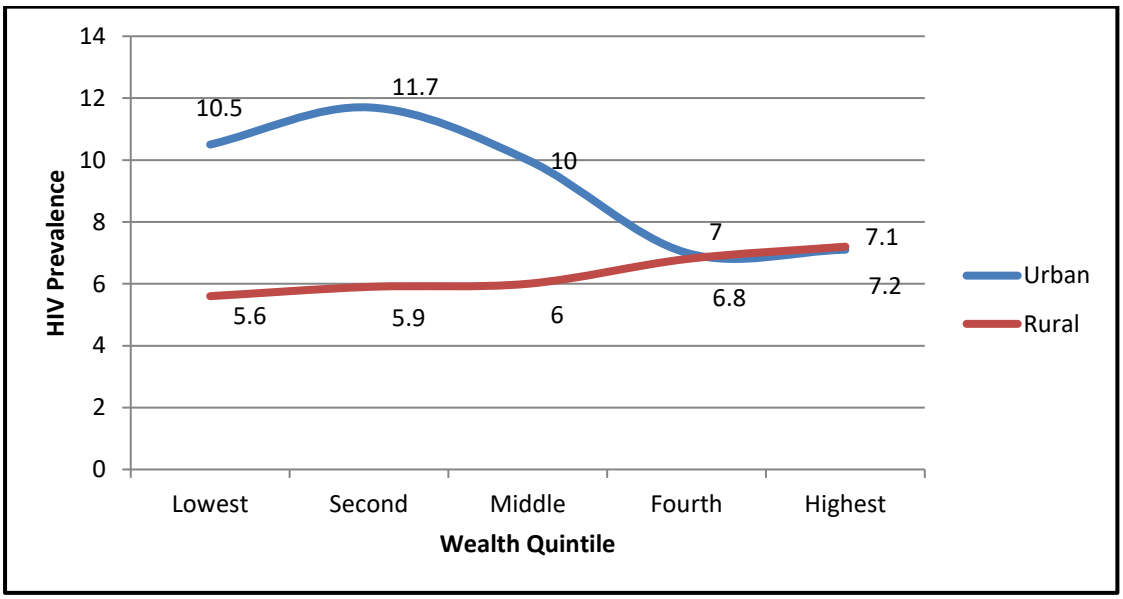


Figure 5.2 shows that an increase in household wealth in rural areas is associated with an increase in HIV prevalence. In urban areas, the reverse is true.

This finding communicates two issues: (1) it supports available evidence that HIV vulnerability in urban areas is driven by urban poverty (See for example Mbonye et al., 2013) and that the trend in urban areas is likely to be driven by slums – shanty towns where conditions of living are precarious as Magadi (2013) and Madise et al. (2012) found; and (2) also, urban residents tend to delay to marry and because of this, they tend to engage in an extended period of pre-marital sex, which has been argued, increases their vulnerability (Adair, 2008; Haram, 2004).

5.4.2 Educational Attainment

Table 5.3 shows that, compared to people with no educational attainment, the odds of being infected with HIV are higher for individuals with complete primary educational attainment and lower for individuals with secondary or higher educational attainment compared to individuals with no educational attainment. The positive trend suggests three things: (1) primary level educational attainment does not provide the knowledge, attitude, and competences necessary to avoid HIV infection; (2) people with complete primary level education have inadequate knowledge that it is unlikely to debunk myths about HIV and AIDS; and (3) as already pointed, the relative increase in HIV prevalence in rural areas associated with education is an explanation. Generally, low or no educational attainment denotes low social capital which is associated with increased vulnerability to the risk of HIV infection (Magadi, 2016).

The negative association is in line with the expected direction of the education-HIV relationship. This trend indicates that higher educational achievement equips people with knowledge, attitudes, and competences to avoid HIV infection. People with secondary and tertiary education can comprehend complex HIV information and are more likely to be employed, which potentially provides an income to facilitate HIV prevention practices such as testing for HIV, buying condoms or accessing other HIV services, all, which help to avoid HIV infection.

In terms of gender, this analysis shows that the positive association between primary educational attainment and HIV infection is more substantial for women. For example, those with incomplete primary education are 16 percent more likely to be infected while those with complete primary education are 43 percent more likely to be infected when compared to those with no educational attainment. For men, the relationship between education and HIV

prevalence is negative, indicating that education advantages men more than women, and that these advantages enable men to avoid HIV infection.

The negative education-HIV association is enjoyed most by people in urban areas, where all educational attainment is negatively associated with HIV. According to available evidence, it is people with more education that tend to live in urban areas in Africa because they have the requisite capabilities to survive there. We can discern three points from this trend: (1) the expansion[6] of access to education in Uganda may be contributing to reduction of vulnerability to HIV risk among this group; nearly all good schools in Uganda are urban-based (Jones et al., 2014); (2) it supports the established view that urban areas are better served with social services than rural areas; and (3) the negative education-HIV relationship and negative wealth-HIV relationship in urban areas suggests both are necessary for reducing vulnerability to the risk of HIV infection.

Unlike 2011, individuals with complete primary educational attainment in 2004-05 had 1.34 [1.08–1.67] times higher odds of being infected with HIV than people with no educational attainment. The quality of primary level education in Uganda has been questioned since Universal Primary Education was introduced in 1997. Sumra and Mugo report findings from a large regional study assessing the quality of education among 5–16-year-olds in Uganda, Kenya, and Tanzania, where they found that enrolment in Ugandan primary schools had compromised the quality of education (Sumra & Mugo, 2012; see also Jones et al., 2014). For example, they found that 90% of children in primary three could not read and understand a primary two level text and that 70 percent could not solve a primary two math problem.

In 2011, the education-HIV relationship was negative for people with only secondary or higher education. Dyson (2003) has proposed, educated people who often live in urban areas are easily reached with services. It is possible other factors such as AIDS awareness may have benefited educated people more than the less educated. Across the two-time periods, it can be observed that having higher educational attainment as opposed to primary and no education reduces vulnerability to HIV risk.

[6] Uganda has been implementing Universal Primary Education (UPE) since 1997 – a programme in which all children of school going age are given access to education. Relatedly the Government of Uganda has also been implementing Universal Secondary Education (USE) since 2005. Much as the quality of UPE and government's contribution to USE has been debated, it appears that people educated to secondary and higher levels are reaping the benefits of education.

Table 5. 3: Odds ratios of HIV prevalence by SES and gender, place, and time UAIS, 2004-05 & 2011 (N=39,766)

Socio-economic status	2004-05 & 2011		Women 2004-05 & 2011		Men 2004-05 & 2011		Rural 2004-05 & 2011		Urban 2004-05 & 2011		2004-05		2011	
	O.R	C.I	O.R	C.I	O.R	C.I	O.R	C.I	O.R	C.I	O.R	C.I	O.R	C.I
Wealth Status (Ref: Lowest)														
Second	1.05	[0.93 - 1.20]	1.11	[0.94 - 1.30]	0.96	[0.78 - 1.19]	1.03	[0.88 - 1.21]	1.28	[1.01 - 1.62]*	1.15	[0.94 - 1.41]	0.98	[0.83 - 1.16]
Middle	1.05	[0.92 - 1.19]	1.04	[0.88 - 1.23]	1.04	[0.84 - 1.28]	1.07	[0.92 - 1.25]	1.22	[0.95 - 1.57]	1.14	[0.93 - 1.41]	0.97	[0.82 - 1.15]
Fourth	1.07	[0.94 - 1.22]	1.03	[0.87 - 1.22]	1.11	[0.90 - 1.37]	1.23	[1.05 - 1.43]*	0.94	[0.72 - 1.23]	1.21	[0.98 - 1.49]	0.98	[0.82 - 1.16]
Highest	1.16	[1.01 - 1.32]*	1.17	[0.99 - 1.39]	1.06	[0.85 - 1.32]	1.36	[1.16 - 1.59]*	0.93	[0.70 - 1.24]	1.16	[0.94 - 1.44]	1.13	[0.95 - 1.35]
Educational (Ref: No education)														
Incomplete primary	1.01	[0.90 - 1.41]	1.16	[1.01 - 1.33]*	0.85	[0.67 - 1.08]	0.98	[0.86 - 1.11]	0.66	[0.48 - 0.91]*	1.02	[0.86 - 1.22]	0.92	[0.78 - 1.08]
Complete primary	1.19	[1.03 - 1.38]*	1.43	[1.19 - 1.71]*	1.00	[0.76 - 1.32]	1.15	[0.97 - 1.35]	0.55	[0.38 - 0.79]*	1.34	[1.08 - 1.67]*	0.99	[0.81 - 1.21]
Incomplete secondary	0.86	[0.75 - 0.99]*	1.02	[0.85 - 1.21]	0.76	[0.58 - 0.98]*	0.76	[0.64 - 0.90]*	0.36	[0.26 - 0.50]*	1.03	[0.84 - 1.27]	0.67	[0.57 - 0.83]*
Complete sec & higher	0.72	[0.58 - 0.89]*	0.94	[0.70 - 1.25]	0.61	[0.43 - 0.87]*	0.70	[0.51 - 0.95]*	0.26	[0.17 - 0.38]*	1.00	[0.71 - 1.40]	0.54	[0.41 - 0.71]*

O.R.: Odds ratios
C.I.: Confidence intervals
*: statistical significance at 5% level, $P < 0.05$

Unadjusted analysis or analysis that has limited adjustment is vulnerable to the effect of factors that confound vulnerability to HIV infection (Magadi & Desta, 2011). Because of this, multilevel modelling, a method which measures the effect of predictor variables and simultaneously the effect of other factors as well as separating the effect of individual level factors from that of factors at the top of the hierarchy was used. The aim of multilevel analysis was to isolate precisely the factors independently predicting HIV vulnerability. Analysis in the rest of this chapter and thesis adjusts for potential mediating and confounding factors.

5.5 Multilevel Findings

Section 5.5.1 and 5.5.2 address the first research question about the association between socio-economic status and vulnerability to HIV infection, section 5.5.3 to 5.5.5 deals with the second research question about factors that moderate any such association and section 5.6 focusses on research question three on change in vulnerability to the risk of HIV infection over 5 years.

5.5.1 Household Wealth and Poverty

In Step 1, I investigate further the associations reported in section 5.4; Table 5.4 shows four models that were fitted. Model 1 contained only wealth/poverty status and educational attainment. This model showed that there was no association between wealth/poverty status and HIV infection. When other socio-economic factors were introduced in Model 2, still no association could be observed. But when socio-demographic factors were controlled for in Model 3, the odds of HIV for individuals in households in the highest wealth category became 20% (2%-40%) higher than the odds of infection for individuals in the lowest wealth/poverty category. After introducing factors for sexual practices in Model 4, the effect of highest wealth status was attenuated 1.15 [0.98–1.35] and became insignificant, suggesting that sexual practices explain the apparent association between wealth status and vulnerability to HIV infection.

5.5.2 Educational Attainment

In Step 1, Table 5.4 shows that incomplete secondary and complete secondary or higher education was negatively associated with the likelihood of being HIV positive. When other socio-economic factors were introduced in Model 2, the negative association remained and strengthened. However, when socio-demographic factors were included in Model 3, the association between incomplete or complete primary education and HIV became positive and significant e.g. the odds ratio for incomplete primary was 1.23 [1.08–1.41] and complete primary 1.32 [1.12–1.56] times higher, implying that holding other factors constant, these categories of education were associated with an increase in HIV vulnerability relative to no education. The association with complete secondary or higher education remained negative, relative to no education. After controlling for factors of sexual practices in Model 4, the association with complete secondary or higher education remained negative and significant 0.63 [0.49–0.81] compared to no education but that for primary education was attenuated.

In Step 2, interactions between educational attainment and place of residence, gender, and time were obtained (Annex 5.2). It showed that there was an interaction between higher educational attainment and rural-urban place of residence. There was no interaction between education and gender (Annex 5.3) or time (Annex 5.4).

5.5.3 Association between SES and HIV Infection

To answer the question on factors confounding the association between SES with HIV infection, Table 5.4 shows four models. The first model was for SES. When other socio-economic factors were controlled for in Model 2, the Odds Ratios (OR) for HIV infection associated with wealth status remained non-significant. When socio-demographic factors were considered in Model 3, the OR for HIV infection associated with the highest wealth status and primary education became positive and significant. When factors for sexual practice and AIDS knowledge were introduced in Model 4, the positive association between HIV infection and highest wealth status ceased.

Table 5. 4: Odds ratios of HIV prevalence in Uganda, Uganda AIS, 2004-05&2011 (n=39,766)

	Model 1		Model 2		Model 3		Model 4	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects								
Constant	0.06	[0.06 - 0.08]*	0.14	[0.12 - 0.18]*	0.02	[0.02 - 0.03]*	0.01	[0.00 - 0.01]*
Model 1: Socio-economic factors								
Wealth (Ref: Lowest)								
Second	1.04	[0.90 - 1.20]	1.03	[0.90 - 1.17]	1.07	[0.93 - 1.24]	1.04	[0.90 - 1.20]
Middle	1.00	[0.86 - 1.15]	0.98	[0.85 - 1.13]	1.06	[0.91 - 1.23]	1.02	[0.88 - 1.19]
Fourth	1.02	[0.88 - 1.18]	1.00	[0.87 - 1.15]	1.09	[0.93 - 1.27]	1.05	[0.90 - 1.22]
Highest	1.05	[0.90 - 1.22]	1.07	[0.92 - 1.24]	1.20	[1.02 - 1.40]*	1.15	[0.98 - 1.35]
Education (Ref: No)								
Incomplete primary	0.91	[0.80 - 1.04]	0.87	[0.77 - 0.99]	1.23	[1.08 - 1.41]*	1.12	[0.98 - 1.28]
Complete primary	1.00	[0.86 - 1.18]	0.92	[0.79 - 1.07]	1.32	[1.12 - 1.56]*	1.17	[0.99 - 1.39]
Incomplete secondary	0.67	[0.57 - 0.78]*	0.59	[0.51 - 0.68]*	1.10	[0.93 - 1.30]	0.95	[0.80 - 1.13]
Complete secondary & higher	0.54	[0.43 - 0.68]*	0.44	[0.35 - 0.55]*	0.74	[0.58 - 0.94]*	0.63	[0.49 - 0.81]*
Missing	1.20	[0.34 - 4.23]	1.21	[0.36 - 4.10]	1.70	[0.47 - 6.10]	1.58	[0.44 - 5.65]
Model 2: Other socio-economic factors								
Place of residence (Ref: Urban)								
Rural			0.53	[0.46 - 0.62]*	0.52	[0.44 - 0.60]*	0.60	[0.51 - 0.70]*
Ethnicity (Ref: Baganda)								
Banyankole/Bakiga			1.12	[0.95 - 1.32]	1.18	[0.99 - 1.40]	1.43	[1.21 - 1.70]*
Iteso/Karimojong			0.68	[0.55 - 0.84]*	0.75	[0.60 - 0.93]*	0.86	[0.69 - 1.07]
Lubgbara/Madi			0.46	[0.36 - 0.59]*	0.48	[0.36 - 0.62]*	0.61	[0.47 - 0.80]*
Basoga			0.77	[0.62 - 0.94]*	0.79	[0.63 - 0.98]*	0.76	[0.62 - 0.95]*
Langi/Acholi			1.13	[0.92 - 1.38]	1.22	[0.99 - 1.50]	1.42	[1.16 - 1.75]*
Bagisu/Sabiny			0.76	[0.59 - 0.98]*	0.80	[0.61 - 1.05]	0.73	[0.56 - 0.95]*
Alur/Japadhola			0.74	[0.58 - 0.96]*	0.79	[0.61 - 1.03]	0.83	[0.64 - 1.08]
Banyoro/Batoro			1.28	[1.05 - 1.56]*	1.36	[1.11 - 1.67]*	1.33	[1.08 - 1.64]*
All others			0.83	[0.70 - 0.99]*	0.87	[0.72 - 1.04]	0.95	[0.80 - 1.14]
Time in years (Ref: 2004-05)								
2011			1.20	[1.06 - 1.35]*	1.23	[1.09 - 1.39]*	1.23	[1.09 - 1.38]*
Model 3: Socio-demographic factors								
Age of respondent (Ref: 45-59 years)								
15-24 years					0.82	[0.69 - 0.97]*	1.08	[0.91 - 1.29]
25-34 years					1.53	[1.34 - 1.75]*	1.71	[1.49 - 1.96]*
35-44 years					1.69	[1.48 - 1.93]*	1.77	[1.54 - 2.03]*
Marital status (Ref: Never been married)								
Married/living together					2.32	[1.94 - 2.77]*	2.22	[1.81 - 2.73]*
Widowed					11.12	[8.88 - 13.93]*	7.94	[6.24 - 10.11]*
Divorced/separated					5.22	[4.28 - 6.36]*	3.60	[2.90 - 4.47]*
Sex of respondent (Ref: Men)								
Women					1.13	[1.03 - 1.24]*	1.72	[1.54 - 1.91]*
Model 4: Sexual practices								

	Model 1		Model 2		Model 3		Model 4	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Drunk with alcohol (Ref: No)								
Drunk							1.25	[1.12 - 1.40]*
Not applicable							0.27	[0.02 - 4.84]
Condom use during risky sex (Ref: No)								
Usedcondm1: Used condom							2.31	[2.00 - 2.67]*
Usedcondm1: Not applicable							5.83	[0.33 - 103.37]
Multiple sexual partners (Ref: 1 partner)								
2-4 partners							2.13	[1.86 – 2.44]*
>4 partners							3.87	[3.29 – 4.54]*
Not applicable							0.82	[0.58 – 1.14]
HIV/AIDS knowledge (Ref: No knowledge)								
Lowest knowledge							1.13	[0.80 - 1.59]
Medium knowledge							1.12	[0.82 - 1.52]
Highest knowledge							1.39	[1.03 - 1.89]*
Random effects								
Cluster constant	0.566	0.049*	0.394	0.037*	0.363	0.039*	0.313	0.036*
Clusters	887		887		887		887	
Individual	39766		39766		39766		39766	

O.R.: Odds ratios | C.I.: Confidence intervals | * = statistical significance at 5%, $P < 0.05$

5.5.4 Rural-Urban Residential Factors Moderating SES-HIV Association

Section 5.5.4 and 5.5.5 is on the effect of rural and urban place of residence and gender on vulnerability to HIV infection and the factors that moderate any such relationships. In this section, I establish the effect of area of residence on the SES-HIV association by fitting three separate models for rural and urban areas. In Table 5.5, which is based on only Models 1 and 3, I found that highest wealth status was significantly associated with HIV in rural areas. However, sexual practice confounds the wealth-HIV association; when they are controlled for, the OR for highest wealth status reduced from 1.32 [1.10–1.58] (in Model 2) to 1.23 [1.02–1.47] (in Model 3).

In terms of the effect of residential area on the education-HIV association, when wealth status is controlled for in Model 1, all educational categories were significant in urban areas but only higher education in rural areas as seen in Table 5.5. However, when socio-demographics were controlled for in Model 2, the education-HIV association in urban areas lost significance except for secondary or higher education. However, in rural areas, the complete primary education-HIV association became positive after controlling for socio-demographics. Higher education

ceased to be significant. Similarly, after controlling for sexual practices, the odds ratios of HIV reduced. These findings suggest that socio-demographic factors and sexual practices influence the SES-HIV association differently in rural and urban areas. See related information in Annex 5.2.

Table 5. 5: Odds Ratios of HIV prevalence among rural and urban residents, Uganda AIS, 2004-05&2011

Parameter	Rural				Urban			
	Model 1		Model 3		Model 1		Model 3	
	OR	CI	OR	CI	OR	CI	OR	CI
Fixed effects								
Constant	0.05	[0.04 - 0.06]*	0.00	[0.00 - 0.00]*	0.21	[0.15 - 0.29]*	0.02	[0.01 - 0.03]*
Model 1: Socio-economic factors								
Wealth status (Ref: Lowest quintile)								
Second	1.04	[0.88 - 1.23]	1.06	[0.89 - 1.26]	1.18	[0.92 - 1.52]	1.13	[0.87 - 1.46]
Middle	1.01	[0.85 - 1.20]	1.05	[0.88 - 1.25]	1.15	[0.88 - 1.50]	1.18	[0.89 - 1.55]
Fourth	1.13	[0.95 - 1.34]	1.17	[0.98 - 1.39]	0.88	[0.66 - 1.18]	0.89	[0.66 - 1.21]
Highest	1.17	[0.98 - 1.40]	1.23	[1.02 - 1.47]*	0.87	[0.64 - 1.19]	0.99	[0.71 - 1.36]
Education (Ref: No education)								
Incomplete primary	0.91	[0.79 - 1.04]	1.15	[0.99 - 1.33]	0.67	[0.48 - 0.92]*	0.93	[0.66 - 1.32]
Complete primary	1.04	[0.87 - 1.24]	1.30	[1.08 - 1.57]*	0.54	[0.37 - 0.78]*	0.73	[0.49 - 1.07]
Incomplete secondary	0.68	[0.57 - 0.82]*	1.07	[0.88 - 1.30]	0.35	[0.25 - 0.49]*	0.64	[0.45 - 0.93]*
Complete secondary & higher	0.63	[0.45 - 0.87]*	0.83	[0.59 - 1.17]	0.25	[0.17 - 0.38]*	0.43	[0.28 - 0.67]*
Missing	1.05	[0.23 - 4.84]	1.21	[0.26 - 5.71]	1.27	[0.12 - 13.37]	2.49	[0.21 - 29.13]
Model 2: Socio-demographic factors								
Age of respondents (Ref: 45–59 years)								
15-24 years			1.12	[0.91 - 1.37]			0.89	[0.63 - 1.27]
25-34 years			1.80	[1.54 - 2.12]*			1.46	[1.08 - 1.96]*
35-44 years			1.90	[1.62 - 2.22]*			1.53	[1.13 - 2.07]*
Current marital status (Ref: Never been in union)								
Married/living together			2.28	[1.75 - 2.97]*			2.03	[1.45 - 2.83]*
Widowed			8.75	[6.47 - 11.83]*			6.14	[3.97 - 9.49]*
Divorced/separated			3.92	[2.97 - 5.16]*			2.97	[2.09 - 4.21]*
Sex of respondent (Ref: Men)								
Women			1.61	[1.42 - 1.82]*			2.13	[1.71 - 2.64]*
Time in years (Ref: 2004-05)								
2011			1.33	[1.14 - 1.54]*			0.97	[0.78 - 1.21]
Model 3: Sexual practices								
Condom during risky sex (Ref: No)								
Used condom			2.50	[2.09 - 2.99]*			1.89	[1.47 - 2.43]*
Not applicable			1.50	[1.27 - 1.79]*			1.20	[0.90 - 1.60]
Total life time sexual partners (Ref: 1 partner)								
2-4 partners			2.14	[1.83 - 2.49]*			1.92	[1.45 - 2.55]*
>4 partners			3.93	[3.27 - 4.72]*			3.38	[2.46 - 4.66]*
Not applicable			0.96	[0.65 - 1.42]			0.51	[0.26 - 1.04]
Random effects								
Cluster constant	0.584	0.058*	0.487	0.053*	0.175	0.052*	0.162	0.052*
Clusters	719		719		168		168	
Individuals	32506		32506		7260		7260	

O.R.: Odds ratios C.I.: Confidence intervals | *: statistical significance at 5% level, $P < 0.05$

5.5.5 Gender Factors Moderating SES-HIV Association

In this section, I analyse the effect of gender on the SES-HIV association. Table 5.6 shows that wealth/poverty status is not significantly associated with HIV status among women (See also Annex 5.3). However, after controlling for socio-demographic factors in Model 2, the OR for women belonging to the highest wealth category became 1.40 [1.15–3.17]. When sexual practices were controlled for in Model 3, the OR for women did not change. The odds ratios for men were positive but insignificant and smaller than those for women.

For education-HIV association, its effect in Model 1 was negative among women and among men. Women with complete primary education were initially 22 percent more likely to be infected compared to those with no education and after controlling for socio-demographic factors in Model 2, the positive and significant effect among women persisted and increased. However, in the third model that controlled for sexual practices, this effect ceased being significant, suggesting that sexual practices (in this case multiple sexual partnerism) more than socio-demographic factors, confound the effect of educational attainment on HIV positivity. The effect of complete secondary or higher education among women remained negative and significant, OR 0.55 [0.39–0.76]. For example, the odds of HIV for men with incomplete secondary education were 0.68 times the odds for those with no education, and the odds HIV for men with complete secondary or higher education were 0.55 times the odds for those with no education. In the final model, the odds of HIV for those with complete secondary or higher education remained smaller than (0.51 times) the odds of HIV for those with no education.

Table 5. 6: Odds Ratios of HIV prevalence among women and men, Uganda AIS, 2004-05 &2011

Parameter	Women				Men			
	Model 1		Model 3		Model 1		Model 3	
	OR	CI	OR	CI	OR	CI	OR	CI
Fixed effects								
Constant	0.06	[0.05 - 0.07]*	0.02	[0.01 - 0.03]*	0.06	[0.04 - 0.08]*	0.02	[0.01 - 0.03]*
Model 1: Socio-economic factors								
Wealth status (Ref: Lowest quintile)								
Second	1.10	[0.92 - 1.31]	1.15	[0.96 - 1.38]	0.97	[0.77 - 1.22]	0.98	[0.78 - 1.24]
Middle	1.02	[0.85 - 1.22]	1.12	[0.93 - 1.35]	1.03	[0.81 - 1.29]	1.06	[0.84 - 1.34]
Fourth	0.99	[0.83 - 1.20]	1.15	[0.95 - 1.39]	1.10	[0.87 - 1.39]	1.17	[0.92 - 1.48]
Highest	1.13	[0.94 - 1.37]	1.40	[1.15 - 1.70]*	1.02	[0.80 - 1.30]	1.16	[0.90 - 1.49]
Education (Ref: No education)								
Incomplete primary	1.08	[0.93 - 1.25]	1.12	[0.96 - 1.31]	0.80	[0.61 - 1.04]	0.97	[0.74 - 1.26]
Complete primary	1.22	[1.00 - 1.48]*	1.17	[0.95 - 1.44]	0.92	[0.68 - 1.23]	0.98	[0.73 - 1.33]
Incomplete secondary	0.80	[0.66 - 0.97]*	0.84	[0.68 - 1.03]	0.68	[0.51 - 0.91]*	0.88	[0.65 - 1.19]
Complete secondary & higher	0.70	[0.51 - 0.97]*	0.55	[0.39 - 0.76]*	0.55	[0.38 - 0.81]*	0.51	[0.34 - 0.75]*
Missing	0.73	[0.09 - 0.25]*	0.54	[0.06 - 4.61]*	1.80	[0.35 - 9.16]	2.29	[0.43 - 12.25]
Model 2: Socio-demographic factors								
Age of respondents (Ref: 45–59 years)								
15-24 years			1.27	[1.03 - 1.56]*			0.34	[0.25 - 0.47]*
25-34 years			2.09	[1.74 - 2.51]*			1.07	[0.87 - 1.31]
35-44 years			1.83	[1.52 - 2.21]*			1.50	[1.24 - 1.83]*
Areas of residence (Ref: Urban)								
Rural			0.56	[0.47 - 0.66]*			0.65	[0.52 - 0.81]*
Drunk with alcohol before risky sex (Ref: No)								
Drunk			1.23	[1.07 - 1.43]*			1.24	[0.23 - 6.83]
Not applicable			1.97	[1.70 - 2.28]*			1.91	[1.51 - 2.41]*
Sex of household head (Ref: Male)								
Female			1.68	[1.49 - 1.89]*			1.07	[0.85 - 1.36]
Time in years (Ref: 2004-05)								
2011			1.14	[0.99 - 1.31]			1.26	[1.06 - 1.50]*
Model 3: Factors for sexual practices								
Total life time sexual partners (Ref: 1 partner)								
2-4 partners			2.29	[1.98 - 2.64]*			2.72	[1.79 - 4.14]*
>4 partners			4.68	[3.88 - 5.65]*			4.60	[3.03 - 6.98]*
Not applicable			0.23	[0.16 - 0.34]*			0.72	[0.40 - 1.32]
Random effects								
Cluster constant	0.526	0.059*	0.382	0.051*	0.472	0.078*	0.399	0.074*
Clusters	887		887		887		887	
Individuals	22127		22127		17639		17639	

*: statistical significance at 5% level, $P < 0.05$

5.5.6 Change in HIV Vulnerability between 2004-05 and 2011

5.5.6.1 Changes Associated with Socio-Economic Status

This section explores the relationship between HIV infection and vulnerability over time (2004-05 to 2011) captured in the third research question. Based on Table 5.7 (See also Annex 5.4), findings indicate that the odds of HIV infection for all categories of wealth/poverty are not statistically significantly different from each other.

Findings on education were double sided. In both 2004-05 and 2011, Model 1 shows that secondary or higher education was negatively associated with HIV. However, as much as this was the case, educational attainment was more protective in 2011 than 2004-05. When socio-demographics were controlled in Model 2, primary educational attainment became positively associated with HIV infection in both 2004-05 and in 2011. However, the effect of complete primary educational attainment in 2004-05 was more substantial than 2011. When sexual practices were controlled for, the positive effect of incomplete and complete primary educational attainment persisted in 2004-05 and 2011 compared to no education, with the effect being more substantial in 2004-05 than 2011. In other words, as much as the effect of primary education was positive in 2011, it represented a reduction from 2004-05. Similarly, as much as the effect of complete secondary and higher education was negative in 2004-05 and 2011, the effect was greater (more protective) in 2011 than 2004-05.

5.5.6.2 Other Social and Demographic Changes

Vulnerability associated with living in rural areas increased. In 2004-05, rural residents were 57 percent less likely to be infected but in 2011, this reduced to 40 percent. In terms of alcohol, the odds of HIV infection for people who drunk alcohol before sex significantly reduced by 171 percentage points, from OR 3.04 [2.58–3.60] in 2004-05 to 1.33 [1.14–1.54] in 2011 compared to the no alcohol group. There was also reduction in vulnerability related to gender. For example, the odds of HIV for women compared to men *reduced* by 14 percentage points, from 1.54 [1.33–1.77] in 2004-05 to 1.40 [1.24–1.58] in 2011. Compared to people who did not use condoms, people who used a condom at their last risky sexual encounter had increased odds of being HIV positive by 142 percentage points, from 1.94 [1.55–2.42] to 3.36 [2.83–3.99]. This strengthens the assertion that the positive association between the use of condoms

and HIV may be related to prevention with positives[7] that expanded in the late 2000s because of scale up of HIV services (Bunnel et al., 2006) (Table 5.7).

Overall, Table 5.7 shows that most indicators improved, with a narrowing of gap between various sub groups. The positive effect of primary education reduced just as the negative effect of complete secondary or higher education also increased, relative to no education. For example, compared to no education, the odds ratio for complete primary educational attainment reduced from 1.42 [1.14–1.87] to 1.26 [1.01–1.57]. Similarly, the vulnerability of women relative to men reduced from odds ratio 1.54 [1.33–1.77] to 1.40 [1.24–1.58] and the vulnerability of 35–44-year-olds relative to 45–59-year-olds also reduced from odds ratio 1.49 [1.20–1.85] to 1.39 [1.18–1.65]. Also, as much as prevalence remains relatively lower in rural than in urban areas, the odds ratio increased from 0.43 [0.33–0.56] to 0.60 [0.49–0.74], suggesting a slight narrowing of urban-rural gap. However, the key exception was the higher odds among people who used condoms where the odds ratio increased from 1.94 [1.55–2.42] to 3.36 [2.83–3.99] relative to those who did not use condoms.

The increase in relative vulnerability for rural residents in 2011 may be explained by: (1) the opening of communities that were hitherto closed. For example, after peace and security was restored in North-Eastern Uganda in the mid-2000s following the disarmament of the semi-nomadic Karamojong warriors inhabiting this area, HIV prevalence nearly doubled; (2) the establishment of peace in the neighbouring Republic of South Sudan and the resultant increased volume of trade between Uganda and South Sudan accelerated trade related internal and cross border migration. Other explanations for the new spate of HIV in 2011 include: (3) the establishment of peace in Northern Uganda, a region that was engulfed in a 2-decade war. A combination of the legacy of war and increased volume of activities to re-integrate this region into the country may be a good explanation for very high levels of HIV prevalence in this region (See Patel et al., 2012); (4) the completion of the road to the West Nile region, that also opened this area by linking it to the rest of the country, South Sudan, and the Democratic Republic of the Congo saw HIV prevalence double in this region in 2011; and (5) increase in Central, South-western and Western regions may be related to the better economic conditions that have been reported in these areas (NPA, 2012) (See Figure 5.1), liberal sexual practices

[7] Positive prevention is an effort to prevent the transmission of HIV infections by working not only with HIV uninfected individuals but also HIV infected individuals. The rationale is that beyond the goals of improving the quality of life of PLHIV, changing their sexual practices can reduce the transmission of HIV infections.

associated with these areas and economic inequalities. See Durevall and Lindskog (2012) and Fox (2012) on the association between regional inequalities and HIV prevalence.

5.5.6.3 Time Factors Influencing the SES-HIV Association

Annex 5.4 on interaction between time and other predictors of HIV infection shows that the odds of HIV infection among people who used condoms during a risky sexual encounter was higher in 2011 than in 2004-05.

Table 5. 7: Odds Ratios of HIV prevalence in Uganda in 2004-05 and 2011, Uganda AIS, 2004-05&2011

Parameter	2004-05				2011			
	Model 1		Model 3		Model 1		Model 3	
	OR	CI	OR	CI	OR	CI	OR	CI
Fixed effects								
Constant	0.05	[0.04 - 0.06]*	0.06	[0.04 - 0.08]*	0.08	[0.07 - 0.10]*	0.07	[0.05 - 0.09]*
Model 1: Socio-economic factors								
Wealth status (Ref: Lowest quintile)								
Second	1.13	[0.90 - 1.42]	1.18	[0.93 - 1.48]	0.99	[0.83 - 1.19]	1.01	[0.84 - 1.21]
Middle	1.07	[0.85 - 1.35]	1.13	[0.89 - 1.42]	0.96	[0.80 - 1.16]	0.99	[0.82 - 1.19]
Fourth	1.17	[0.93 - 1.48]	1.23	[0.98 - 1.56]	0.94	[0.77 - 1.13]	0.95	[0.79 - 1.16]
Highest	1.10	[0.86 - 1.41]	1.20	[0.94 - 1.54]	1.03	[0.84 - 1.25]	1.05	[0.86 - 1.29]
Education (Ref: No education)								
Incomplete primary	0.90	[0.75 - 1.09]	1.22	[1.00 - 1.48]*	0.89	[0.75 - 1.06]	1.24	[1.03 - 1.48]*
Complete primary	1.09	[0.86 - 1.39]	1.46	[1.14 - 1.87]*	0.91	[0.74 - 1.13]	1.26	[1.01 - 1.57]*
Incomplete secondary	0.76	[0.60 - 0.96]*	1.09	[0.84 - 1.40]	0.59	[0.48 - 0.73]*	0.90	[0.72 - 1.13]
Complete secondary & higher	0.66	[0.45 - 0.95]*	0.63	[0.43 - 0.94]*	0.46	[0.34 - 0.62]*	0.53	[0.38 - 0.73]*
Missing	1.30	[0.36 - 4.68]	1.67	[0.46 - 6.03]	1.00	[1.00 - 1.00]*	1.00	[1.00 - 1.00]*
Model 2: Socio-demographic factors								
Area of residence (Ref: Urban)								
Rural			0.43	[0.33 - 0.56]*			0.60	[0.49 - 0.74]*
Sex of respondent (Ref: Men)								
Women			1.54	[1.33 - 1.77]*			1.40	[1.24 - 1.58]*
Age of respondent (Ref: 45–59 years)								
15-24 years			0.33	[0.26 - 0.42]*			0.32	[0.26 - 0.39]*
25-34 years			1.29	[1.05 - 1.59]*			1.03	[0.87 - 1.22]
35-44 years			1.49	[1.20 - 1.85]*			1.39	[1.18 - 1.65]*
Drunk with alcohol before risky sex (Ref: No)								
Drunk			3.04	[2.58 - 3.60]*			1.33	[1.14 - 1.54]*
Not applicable			0.25	[0.02 - 2.84]			1.67	[1.44 - 1.94]*
Model 3: Factors for sexual practices								
Condom use during risky sex (Ref: No)								
Used condom			1.94	[1.55 - 2.42]*			3.36	[2.83 - 3.99]*
Not applicable			5.25	[0.34 - 82.34]			1.00	[1.00 - 1.00]*
Random effects								
Cluster constant	0.698	0.086*	0.597	0.079*	0.438	0.055*	0.358	0.050*
Clusters	417		417		470		470	
Individuals	18400		18400		21366		21366	

OR = Odds Ratio; CI = Confidence Interval
(*): statistical significance at 5% level, $p < 0.05$

5.6 Discussion of Findings

This chapter sought to answer three specific research questions about the association between SES and HIV infection in Uganda, the factors that moderate the association between SES and HIV infection, and whether the influence of these factors changed between 2004-05 and 2011.

5.6.1 Household Wealth/Poverty Status

In the analysis of pooled data of 2004-05 and 2011, the association between HIV infection and being in the wealthiest 20% households was positive but not significant; individuals in these households are not significantly more likely to be infected than those in poor households (Table 5.4). However, this effect was positive and significant among residents of rural areas whereas those living in the highest wealth ranked households were 23 percent more likely to be infected with HIV than poor residents of similar other social and economic characteristics but also resident in rural areas (Table 5.5). The overall wealth-HIV association was also positive and significant among women in wealthy households who were 40 percent more likely to be infected with HIV compared to women in the lowest wealth households who shared similar other socio-economic characteristics (Table 5.6). These findings are consistent with those from previous research (e.g. Mishra et al., 2007; Adair, 2008) and suggest that gender disparity may be higher in relatively wealthy households compared to less wealthy ones.

The greater vulnerability of women in highest wealth households to HIV infection is surprising but plausible at the same time. It is surprising because African women are known to be marginalized. According to STOP's social capital argument, marginalization is an expression of lack of resources (Lunnay et al., 2011). Therefore, it is for this reason that a marginalized group is less likely to be expected to be wealthy. This illustrates that the wealth at play here is household wealth, which is mostly controlled and owned by men. In view of this, it is credible to argue that the observed association is due to men using their privileged socio-economic position to increase women's vulnerability to HIV infection. For example, based on the thesis of symbolic violence, we can deduce that wealthy African men are more likely to marry an extra wife (ives) or have other sexual partners including inheriting a widow (Reniers & Watkins, 2010). In all this, the first woman generally has no say.

However, this finding is plausible because even if women in wealthy households were genuinely wealthy, wealth alone is not sufficient to escape HIV infection (Williams, 1995). Bourdieu makes the argument that for actors to successfully negotiate their way around in a social system; they need multiple forms of capital (e.g. Carpiano, 2006). Therefore, as much as some women may be in "wealthy" households, the habitus of Ugandan women may be putting put them under pressure to act within the expectations of society e.g. being subordinate to her husband to fulfill society's definition of a good wife (Lunnay et al., 2011). Again, despite of women's better wealth status, they can still be vulnerable to HIV infection.

5.6.2 Educational Attainment

These findings show that people who have higher educational attainment are generally less likely to be infected with HIV. These findings are in line with previous research (e.g. Barnighausen et al., 2007; Asiedu et al., 2012). The preventive benefits of educational attainment are greater for people in urban areas than those in rural areas whose findings were non-significant (Table 5.5). The greater benefit urbanites derive from education is likely related to the fact that most urban residents have greater access to other services which they can use to escape HIV. For gender, the effect of higher educational attainment in reducing vulnerability to the risk of HIV was nearly similar among women and men (Table 5.6). The slight edge men have over women shown in Table 5.6 may be due to their access to other resources necessary to avoid HIV infection and their 'privileged' status in society.

In terms of time, the HIV protective benefits of educational attainment increased by 10 percentage points for people with higher educational attainment in 2011 compared to 2004-05. This observation agrees with research that shows a negative education-HIV relationship (e.g. Magnani et al., 2002; Gupta & Mahy, 2003; Glynn et al., 2004). However, as noted earlier, for example in Table 5.3, I observe that primary level educational attainment is associated with 24–46 percent greater vulnerability to HIV infection, a finding which is also consistent with previous evidence. For example, Adair, 2008 compared women in Cameroon with no or incomplete primary educational attainment and women with complete primary education and those with incomplete secondary or higher educational attainment and found that women with complete primary educational attainment were 61 percent while those with incomplete secondary or higher educational attainment were 69 percent more likely to be HIV positive.

The negative association between educational attainment and HIV infection is in tandem with Bourdieu's proposition. To him, the possession of cultural capital has direct welfare benefits. In the introduction to this chapter, I already discussed the benefits of education. Secondly, cultural capital can be translated into economic and symbolic capital both which the actor can use to improve their welfare (Carpiano, 2006). Further, cultural capital also improves the overall position of the actor in a field. This is important because a good overall social standing is necessary in the symbolic struggles that characterize the social field (Lunnay et al., 2011). For example, individuals with more cultural and symbolic capital are in a better position to choose a spouse and have control over a relationship. So, we can conclude that cultural capital is instrumental in escaping HIV infection.

5.6.3 Factors Associated with Vulnerability to HIV Infection

Based on results displayed in Table 5.4, Annex 5.2, and reported in section 5.5.3, I found that several background factors confound the relationship between SES and HIV positivity. Specifically, individuals who belonged to households in the highest wealth category had 1.20 [1.02–1.40] times higher odds of being infected compared to those in the lowest quintile. However, I show further that after controlling for socio-demographic factors in Model 4, the effect of household wealth status on HIV infection became insignificant, suggesting that social factors and sexual practices included in this model confound the relationship between household wealth and HIV infection.

For education, factors of sexual practice diminished the positive association between primary educational attainment and HIV infection and at the same time, weakened the association with higher educational attainment. In rural areas, controlling for sexual practices in Table 5.5 reduced the positive effect of complete primary education on HIV infection and in urban areas, sexual practices attenuated the negative effect of complete primary education. Among women, sexual practices attenuated the positive effect of complete primary educational attainment compared to no education as shown in Table 5.6. This suggests that multiple sexual partnerism and other social factors included in this model partly explain the effect of educational attainment on HIV positivity. In both waves of the survey (2004-05 and 2011), area of residence, age, gender, condom use during unsafe sex, and drunk with alcohol confound the relationship between primary educational attainment and HIV infection as shown in Table 5.7.

Sexual practices influence the association between SES and HIV infection. For example, sexual practices diminished the association between complete primary education and HIV infection among women. Similarly, sexual practices attenuated the effect of primary educational attainment on HIV infection in urban areas. The mechanisms through which sexual practices influence vulnerability to the risk of HIV infection are discussed in various sections of this thesis. For example, arguments about the role of wealth in the procurement of multiple sexual partners are contained in Chapter 6: section 6.5.1.1 while the role of alcohol is discussed in Chapter 7: section 7.3.3, among other areas.

Theoretically, multiple sexual practices are associated with resources. Several explanations can be deduced from Bourdieu's theory (See Chapter 6, Section 6.6.2 for additional discussion). Bourdieu argues that the body is physical capital which can be converted to other forms of capital (Williams, 1995; Gatrell et al., 2004; Moore, 2008). Majority of people who practice multiple sexual partnerships are commercial sex workers, people who remarry and people who engage in pre-marital and extra marital sex. Based on this view, practicing multiple sexual partnerships by people who do not have a sustainable means of livelihood can be regarded as an attempt to convert their 'physical capital' into economic capital. Similarly, marriage/cohabitating and re-marriage is driven by the need to deploy physical capital to negotiate around a social system.

5.6.4 Impact of Time

The association between educational attainment and HIV infection shown in Table 5.7 improved in 2011 compared to 2004-05. First, the association with primary educational attainment, although positive in both 2004-05 and 2011, reduced in 2011. Likewise, although the protective benefit of complete secondary or higher educational attainment was apparent in both years, it was more protective (by 10 percentage points) in 2011. As much as HIV prevalence remained lower in rural compared to urban areas, HIV vulnerability associated with living in rural areas increased by 17 percentage points in 2011, an observation which suggests that social change coupled with inadequate social services in these areas and the high proportion of people with lower or no educational attainment in rural areas may be explanations for the trend of increasing prevalence of HIV/AIDS in Uganda's rural areas.

These findings highlight further the disparities between rural and urban areas, observations reported in previous studies,

> "Inequalities exist between rural and urban areas and the different regions of the country. Thirty-four percent of the population in rural areas live below the poverty line compared to 14 percent in urban areas, while 61 percent of the population in Northern Uganda live below the poverty line compared to 16 in Central region" (Orem & Zikusooka, 2010: 2).

The findings above also show that women's vulnerability reduced in 2011, although the fact that women were significantly more likely to be infected than men, remains a cause for concern.

5.6.5 Effect of Community-level Factors

Overall, 9% of the *residual variance*, after accounting for the individual-level factors included in the model, occurs at the cluster-level. This might be due to spillover effects of things that were not measured, other pertinent differences between the populations of different clusters, or differences between localities in, for example, their remoteness or service provision (Table 5.4). However, in the disaggregated analyses, there were important variations. The urban social environment accounts for 5% of unexplained variance in vulnerability but the environment in rural areas accounts for 15 percent (Table 5.5). For time, the community environments accounts for 15 percent unexplained variance in HIV vulnerability in 2004-05 compared to 10 percent in 2011 (Table 5.7). There was no notable difference by gender - about 10% of unexplained variance among women and men was explained by community-level factors. Please see section 6.5.2.4 and 7.7.2 for more detailed information about community-level analysis.

The observations above are slightly lower than those from previous research. For example, basing on community acceptance of people living with HIV, Chiao et al. showed that community factors accounted for 32 percent and 23 percent among women of unexplained variance (Chaio et al., 2009). Similarly, these results are comparable to the country effects reported in previous literature. For example, despite low statistical power (<30 cases at the highest level of the model) Magadi (2011a) found 30 percent; Magadi (2013) found 28.5 percent; Magadi, 2011b) found 10–15 percent; and Magadi & Desta (2011) found 15–30 percent of unexplained variance was accounted for by factors at the community level.

As much as HIV prevalence is higher among women and men, the effects of the community environment were nearly similar among women and men. This is somewhat inconsistent with the claim that practices such as alcoholism, multiple sexual partnerism, mobility etc., that men engage in increase their vulnerability, with women being victims (Durevall & Lindskog, 2013). It is perplexing that much as the community environment improved in 2011 (16.7% unexplained variance in HIV vulnerability in 2004-05 compared to 10.7% in 2011), HIV prevalence increased. This may also constitute evidence in support of arguments that the increase in prevalence may be due increased rates of survival resulting from expanded access to treatment (UAC, 2013; UNAIDS, 2014). Despite of all these, the community effect is greater in rural areas of Uganda than urban areas. These findings fit in the argument about structural change espoused by STOP and the development-HIV argument discussed in Chapter 8.

5.7 Conclusion from the Findings

Overall, women and rural residents in wealthier households were significantly more likely to be infected with HIV than people in poor households, men, and urban residents, respectively. These findings are consistent with previous research already cited. Gender inequalities are the greatest explanations for the relationship between SES and HIV and the gendered disadvantaged suffered by women was *worse* in urban areas where urban women had significantly higher odds of being infected than women in rural areas (Table 5.5). The high infection rate among urban women has been associated with poverty (e.g. Feldacker et al., 2010). See also Bryceson and Fonseca (2006) and Bird & Prowse (2009), who describe the livelihood pressures of poor people and the mechanisms they adapt to cope in Malawi and Zimbabwe, respectively, and the vivid tales of sex workers in Kampala, Uganda (Shoemaker & Twikirize, 2010; Mbonye et al., 2013).

Regarding marriage, these findings show that currently married people or persons living with a spouse were vulnerable but those who had either separated or divorced were more vulnerable while people who had lost a spouse were most vulnerable in comparison with people who had never been in any sexual union but also had similar other characteristics (Table 5.4). These rates were slightly higher in rural than urban areas but an interaction with residence was not significant, indicating that vulnerability associated with marriage was similar in rural and urban areas (Table 5.5 and Annex 5.2). People who used condoms during their last unsafe sexual encounter 12 months before the survey had a higher prevalence than those who did not, with

rural people being more likely to have HIV despite using condoms compared to urbanites (Table 5.5). Condoms use varied between rural and urban areas and between 2004-05 and 2011.

Rural areas, although still having lower HIV prevalence rates than urban areas, presented conditions for increase in HIV vulnerability than the urban areas, significantly increasing vulnerability by 17 percentage points in 2011 (Table 5.7). However, as much as HIV prevalence relatively increased in rural compared to urban areas, the greater clustering of HIV cases noted in rural areas suggests strategies to prevent HIV in these areas may be having a positive effect. As already illustrated, the structural and other confounding factors underpinning vulnerability among women may be the same spurring vulnerability in rural areas as shown in Table 5.6. Based on the evidence above, it is fit to conclude that gender and residential area are the principal *background* drivers of HIV vulnerability in Uganda. It needs to be emphasized that the situation observed in Uganda's rural AIDS epidemic is consistent with previous studies (e.g. Feldecker et al., 2010; Messina et al., 2010; Magadi, 2011a, 2013).

Overall, the level of educational attainment appears to be at the centre of minimizing vulnerability to the risk of HIV infection, especially, among urban residents. From this empirical observation, it appears that formal education offers the prospect for reducing HIV vulnerability. This conclusion fits well within Bourdieu's theory of social capital where he argues that as much as economic capital is important in facilitating material existence; formal education offers the prospect of developing durable capital. As already expounded, good education provides prospects for multiple benefits ranging from knowledge, attitudes and capabilities, aspects that are transformable into income and other sources of welfare. Focusing attention on Uganda's education is particularly urgent given astounding evidence which shows its gradual decline at pre-secondary level (Sumra & Mugo, 2012; Jones et al., 2014).

This chapter has dealt mainly with individual-level aspects of SES and vulnerability. However, Bourdieu claims that analyzing practices generated by habitus without analysing social structures that generate habitus is futile (Grenfell, 2008). This is more so in view of Bourdieu's central claim that his concepts were relational (Williams, 1995; Lunnay et al., 2011). He counsels that the focus of analysis should be on the forces that structure practices. This is the reason why Chapter 6 that follows focuses on the effects of community-level factors on vulnerability to the risk of HIV infection, including the role of community-level SES.

Chapter Six

Socio-Structural Factors and HIV Infection in Uganda

Chapter 6

Social-Structural Vulnerability to HIV Infection in Uganda

6.0 Introduction to the Chapter

This chapter examines the role of social and structural factors in influencing vulnerability to the risk of HIV infection. It begins by drawing the link between socio-structural factors and HIV vulnerability, defines socio-structural factors and outlines their importance in HIV/AIDS before detailing the social and structural factors analysed. In the second part, it presents a highlight of the pooled data of 2004-05 and 2011 AIDS Indicator Surveys and the step by step method of analysis used. The third part presents findings categorized into bivariate and multilevel findings and the last part features a discussion of results of the final adjusted multilevel models.

The response to HIV/AIDS has been dominated by the individual oriented paradigm (e.g. Gupta et al., 2008; Parkhurst, 2012). The individualistic paradigm views HIV infection risk as a responsibility of the individual and that, individuals become infected due to their sexual practices. Therefore, to prevent HIV infection, it was necessary to change the (sexual) practices of individuals (e.g. Campbell & Williams, 1999; Wolffers, 2000). It is against this background that individual-centred, often medical, behavioural, and psychosocial interventions have been implemented either to prevent or control HIV/AIDS. However, much as these interventions have undoubtedly played a major role in the AIDS response (e.g. Hargreaves, 2013), they have been criticized (e.g. Gibbs et al., 2012). Critics argue that an individually oriented AIDS response fails to recognize the societal dimensions of vulnerability to HIV infection (e.g. Seeley et al., 2012; Heisi & Watts, 2013).

Scholars critical of individualism have based their criticisms on the increasing new HIV infections and shifting prevalence within and across countries (Gibbs et al., 2013). For example, for every one person put on HIV treatment (antiretroviral therapy), there are 2.5 new infections (See for example Hargreaves, 2013; Pronyk & Lutz, 2013). Efforts to scale up access to HIV services such as testing and Prevention of Mother to Child Transmission of HIV (PMTCT) have also been less successful. On account of this evidence, there have been calls to focus on the social, economic, cultural, and political circumstances of people. It is argued that

whereas human practice is the immediate risk factor for HIV infection, social and structural factors shape it (Westerhaus, 2007) by influencing both HIV infection risk as well as compromising the success of proven interventions (See for instance Pronyk & Lutz, 2013).

Structural factors have been defined as "characteristics of the social, economic, legal, and cultural environment that act as determinants of HIV risk for whole populations and how risk is distributed within populations" (Hargreaves, 2013:3). Others define structural factors as all those conditions that are beyond the control of the individual but which have influence on the individual. Structural factors can be distinguished into social and structural factors. Social factors are those which include relationships and networks while structural factors are the institutional or patterned social arrangements (Auerbach et al. 2011; Parkhurst, 2012). There are many socio-structural factors but in this research, I consider the following social factors at the community level and defined as the proportion of individuals in a community: who are formerly married; who are in polygamous marriage; who use condoms during risky sex; who have multiple sexual partners; who have comprehensive HIV/AIDS knowledge; whose attitudes towards women's sexuality is supportive of women demanding condom use from their spouses during risky sex, whose age of first sex is 17 years or lower, and whose age at first marriage is at least 20 years. For structural factors, community wealth/poverty, and community educational attainment are considered (Refer to Table 4.2 for definition of study variables). The three sections that follow elaborate on these factors and their relationship with HIV vulnerability.

6.1 Socio-Structural Factors and HIV Vulnerability

6.1.1 Social Factors

6.1.1.1 Relationships and Marriage

Relationships, especially marital ones, are some of the chief social mechanisms through which people are vulnerable to the risk of HIV infection (Clark, 2004). Historically, marriage in Africa was enacted for social, economic, and to some extent, political reasons (Nour, 2006). In a context characterized by lack of opportunities, marriage was the institution through which people's aspirations were realized and was a pre-condition for adulthood (Arnfred, 2004) and manhood (Hunter, 2004). Women particularly married to be *cared for* and to have *children* while her family benefited *socially* and *economically* from the new marriage ties (Nour, 2006).

In this arrangement, which was based on a patriarchal system, men, unlike women, had *sexual freedom, resources,* and *power* (Silberschmidt, 2001; Hunter, 2004). However, in the last five decades or so, conditions have interfered with this structure. For example, marriage has become costly, economic hardships are rampant, modern life is expensive, and men's masculinity, power, and freedom have been *challenged* (Silberschmidt, 2001; 2004; Mensch et al., 2006; Parikh, 2007*).* Therefore, marital HIV vulnerability ought to be viewed in terms of a *social conflict* – one of how to fulfil old goals, expectations, and life styles but in a new (AIDS) context (e.g. Smith, 2007).

Whereas marriage is still valued, poverty is prohibiting young men from marrying (Mensch et al., 2006). Hunter reports that 80 percent of young and poor African men in South Africa were never married compared to economically better off white young men (Hunter, 2004). The failure of men to marry has made women to be a destabilizing factor in marriages (Haram, 2004; Parikh, 2007). For instance, among Meru women in Northern Tanzania, unmarried women prefer married men. As this quote captures it, "the best 'projects' for these women are those married and relatively wealthy men since they can provide more than young and poor men still saving to marry…" (Haram, 2004: 222). Polygamy which was formal, is now discouraged and less practiced but married men continue with it in secretive and in risky ways (Haram, 2004; Parikh, 2007). Widow inheritance which was an alternative marital avenue, is no longer practiced (Reniers & Watkins, 2010), further narrowing 'opportunities' for widows to get socio-economic support (Ambasa-Shisanya, 2007).

For men, high social status was exhibited by the amount of economic resources, and *women* and children that men had (Haram, 2004; Hunter, 2004); today, men, especially married ones, desirous to defend their masculinity, continue procuring extra-marital relationships to demonstrate their social status (Silberschmidt, 2001). Previously, men exercised *absolute control* over their wives, but now, this power has been weakened by the Laws on women's rights, which has 'frustrated' men (Silberschmidt, 2001; Hunter, 2004). Men have also reacted to the loss of control over women by engaging in extra-marital relationships with women who can be subservient (Parikh, 2007). Men used to adequately provide for the mainly *basic* needs of their families, but now, men cannot adequately meet the modern and *multiple* needs of their families. This is the new *reality* under which vulnerability to HIV infection risk is being constructed in Uganda and SSA widely (e.g. Siu et al., 2012; 2013; 2014).

6.1.1.2 Child Marriage and Early Sexual Initiation

Early or child marriage (≤18 years) is a big problem worldwide (Mensch et al. 2006; Nour, 2006; 2009). Nour reports that 48 percent women aged 15–24 years in Asia, 42 percent in Africa and 29 percent in Latin America were married before 18 years of age (Nour, 2006; 2009). Based on DHS data from Kenya and Zambia, Clark established that married adolescent girls aged 15–19 years had a higher prevalence of HIV than unmarried women of same age and that these were related to increased frequency of sexual activity, decreased use of condoms, and exclusion of abstinence (Clark, 2004). Similar findings had been reported earlier in a Ugandan study by Kelly et al. (2003) who showed that women aged 15–24 years who were married to men older than them by 10 or more years had higher odds of being infected with HIV. They also concluded that early marriages were encouraged by social and economic conditions in a society such as lack of opportunities for education, employment, and social support.

Relatedly, age of sexual initiation is also linked to vulnerability to HIV infection (Pettifor et al., 2004), This may be due to: (1) physiological and immunological immaturity of the genital tract; (2) extended duration of sexual activity; (3) risk of having many life time sexual partners; and (4) marrying older men with more sexual exposure and HIV risk; this early sexual activity was catalysed by structural factors (Stockl et al., 2013). Population evidence from Cameroon showed that premarital sex may also increase vulnerability if it is prolonged (Adair, 2008). A survey among urban women in northern Tanzania also showed prolonged premarital sex was associated with higher odds of being infected with HIV, HSV2 (Herpes Simplex Virus Type II) and other STIs (Ghebremichael et al., 2009; Ghebremichael & Finkelman, 2013).

6.1.1.3 Other Social Factors of Vulnerability

Other factors that have been associated with HIV vulnerability are community attitudes towards women's control of their sexuality and general (dis) empowerment of women, and polygamy. Positive community attitudes towards women's ability to negotiate safer sex with their spouses should be associated with less vulnerability. On the other hand, negative attitudes and patriarchal power have been reported to limit women's ability to negotiate safer sex and protect themselves from HIV infection (Gupta, 2002; Langen, 2007). Polygamy is an important aspect to study, given the debate around multiple sexual practice and sexual concurrency. As a

traditional practice, some people argue that polygamy constitutes an HIV vulnerability practice. However, cutting-edge micro and macro-level research has shown that polygamy is negatively associated with HIV vulnerability in SSA (Reniers & Watkins, 2010; Reniers & Tfaily, 2012). More evidence is thus needed to shed light on these social practices.

6.1.2 Structural Factors

6.1.2.1 Poverty, Economic Inequalities and Community Wealth Status

The relationship between poverty and HIV infection was discussed in Chapter 5, section 5.1.1. This part focuses more on economic inequality and community wealth status. The distribution of wealth within countries or within regions in a country differently shapes people's vulnerability to HIV infection. Using DHS data of 170 regions in 16 SSA countries, Fox showed that living in a wealthy country or region increased the vulnerability of poor people to HIV infection while living in a poor country or region increased the vulnerability of rich people to the likelihood of being infected with HIV (Fox, 2012). Relatedly, a population-level study among young women aged 15–24 years in Malawi found that economic inequalities at the district and community levels were associated with a higher likelihood of being infected with HIV, engaging in extra-marital, early sexual initiation, and a lower chance of sexual abstinence (Durevall & Lindskog, 2012). Researching 15–24-year-old urban women in Mbale, Uganda, Nicholas (2010: 491) concluded that "although young women were informed and motivated to prevent HIV, poverty and inequality were significant barriers limiting their power to protect themselves".

On community-level wealth status, Vescio et al. in a Cameroonian study found that variation of wealth in a region was associated with greater vulnerability to HIV infection among men and women (Vescio et al., 2013). A separate study in Zambia by Gabrysch et al. using composite measures of community wealth found that young women (15–24 years) living in low and medium SES communities had a higher prevalence of HIV infection than those in higher SES areas (Gabrysch et al., 2008) but Ishida and colleagues observe an opposite relationship – people in higher SES communities had higher HIV prevalence rates than those in lower SES areas (Ishida et al., 2012). A combination of a narrow evidence base and disagreement of existing evidence prompted my research to narrow this gap.

6.1.2.2 Education

A detailed discussion on the relationship between education and HIV infection was done in Chapter 5, section 5.1.2. This section summarizes the issues and introduces the community dimension of education. Education has influence on vulnerability to HIV infection risk. Jukes et al. have proposed that education affects the risk of HIV infection in two ways: (1) through the process of schooling such as being physically removed from a social environment of vulnerability, being in social networks with less vulnerability, and delays in initiating sexual activity, and (2), through knowledge such as having the ability to comprehend AIDS-related information (Jukes et al., 2008). These physical and cognitive benefits result in safer sexual practices, delayed marriage, and enhanced capacity to choose, mechanisms, whose absence would heighten the risk of HIV infection (Zuilkowski & Jukes, 2012). However, there is scant evidence on the relationship between community-level educational attainment and vulnerability to HIV infection. Evidence premised on the study of young women aged 15–24 years in Zambia revealed that increase in the proportion of people with more educational attainment in a community was associated with a reduction in the prevalence of HIV among women (Kayeyi et al., 2009). My study sought to build on this limited evidence.

In the next section, I elaborate on the message that societal factors do not just create vulnerability to disease, but they also curtail access, utilization, and effectiveness of proven HIV/AIDS interventions.

6.2 Socio-Structural Factors and HIV/AIDS Interventions

Several factors are implicated in thwarting the success of proven HIV/AIDS interventions. These range from HIV/AIDS stigma and discrimination, cultural practices, religious beliefs and values to weaknesses in the public health care system. Here, the role of poverty, one of the most important of circumstances in access to health services is considered.

Poverty is a socio-structural condition documented to be inhibiting access to proven HIV interventions by: restricting access to HIV services through failure to test for HIV; interfering with regular visits to the clinic to receive care or refill medicine due to lack of money for transport; and failure to perform required clinical investigations or to buy medicine due to lack of money, among some constraints (Tuller et al., 2010; Ghanotakis et al., 2012). In a study of

rural women receiving post-natal care including Highly Active Antiretroviral Therapy (HAART) in western Uganda, economic factors were identified by 93 percent of the participants as the main constraints. The effects of poverty were mainly related to lack of money for transport to the clinic, lack of money to buy lunch at the clinic and for buying nutritious food at home as recommended for better treatment outcomes (Duff et al., 2010). They concluded, "our data suggest that financial constraints may be so overwhelming that they prevent access to HAART, regardless of patients' knowledge and intention to take the drugs" (Duff et al., 2010: 7).

In view of the preceding discussions, we can see that it is important to address societal dimensions of HIV/AIDS. In section 6.3, I develop this message further.

6.3 Importance of Addressing Socio-structural Drivers of HIV

There are two reasons that have been advanced as to why it is important to address socio-structural drivers of HIV infection. That is, it provides the possibility of addressing clustered social vulnerability factors for HIV and the possibility of realizing multiple outcomes. Addressing clustering of HIV vulnerability is premised on the realization that there is a tendency for some of these factors to be correlated (Jewkes et al., 2010). For example, harmful consumption of alcohol may co-exist with violence and risky sexual practices and these may be compounded by the presence of STIs. By using a single component intervention such as preventing STIs or ensuring condom use, the intervention would have missed the underlying correlates of vulnerability such as poverty/wealth, gender issues or area of residence. This is because the presence of STIs or non-use of condoms is driven by a fundamental upstream condition. Therefore, by addressing the principle cause, the associated causes would have also been solved (e.g. Parkhurst, 2013).

Addressing socio-structural conditions of HIV vulnerability provides the prospects of achieving multiple outcomes. This is because social and structural factors tend to cause multiple problems downstream. For example, lack of education and employment opportunities can result in commercial sex or multiple sexual partnerships because of poverty. Bowa and Mah report of interventions in Zambia to stop early initiation of sex, child marriage and to prevent intergenerational sexual partnerships by working with traditional leaders to address cultural norms driving these practices (Bowa & Mah, 2013). In Malawi, Baird et al. report of

an intervention that provided cash transfers to households of school going girls that were aimed at keeping the girls at school. This intervention did not only achieve its primary aim but it also led to a decline in the prevalence of HIV and STIs in the intervention group (Baird et al., 2012). The decline in the prevalence of HIV and STIs was associated with change in sexual practices. Similar results have been reported in interventions among school going adolescents in Uganda (Ssewamala et al., 2008; 2010).

Socio-structural interventions do not just interfere with multiple sources of vulnerability to HIV infection. As already pointed out, socio-structural interventions also facilitate the utilization and effectiveness of HIV prevention, care, and support services. Across SSA, the common constraints to scale up of HIV services are a combination of challenges at micro and macro levels. For example, Musheke et al. observe that patient attrition from ART in Zambia was associated with "[an] interplay of personal, social, health systems, and structural-level factors" (Musheke et al., 2012: 1). Similarly, economic difficulties related to money for routinely attending antenatal/PMTCT clinics and buying nutritious food both at the clinic and at home were reported among HIV patients in Uganda (Tuller et al., 2010; Duff et al., 2010). Based on this evidence, we can see that socio-structural responses are also important in enabling access to HIV services.

Whereas the important role of socio-structural factors is evident, the evidence demonstrating the mechanisms through which they operate is weak (e.g. Gupta et al., 2008). Heisi and Watts for instance argue that despite of the acknowledgement of the role of societal factors, scholars and researchers only theorize the pathways through which they are linked to vulnerability to the risk of HIV infection (Heise & Watts, 2013). In addition, studies that have investigated socio-structural conditions of vulnerability to HIV infection in SSA remain limited (See for example Mshisha et al., 2008; Messina et al., 2010; Feldecker et al., 2010; Speizer et al., 2011). None of these studies were conducted in Uganda.

It is in view of this deficiency of evidence that this research sought to answer these questions:

1. What are the effects of community-level social factors proxied by formerly married, attitudes, polygamy, age of first sex and marriage, etc. (defined as the proportion of individuals with a characteristic in a community) on vulnerability to HIV infection?

2. What is the role of structural factors (represented by community-level wealth/poverty and education) in influencing vulnerability to HIV infection?
3. What factors moderate the association between community-level socio-structural factors and HIV infection?

6.4 Data and Methods of Analysis

6.4.1 Data, Variables and Methods of Analysis

Analysis in this chapter is based on pooled data whose details are reported in Chapter 4. The UAIS does not have many community-level variables. This analysis derived community-level from individual-level variables theoretically known to influence vulnerability. Community refers to a cluster within the same geographical area (of at least 50 and at most 500 households). This classification is based on the country's census sampling frame, which classifies these households into primary sampling units (i.e. clusters) or communities. This is the most standard definition of community in DHS data for measuring community effects (Uthman et al., 2009). Community-level variables were computed by dichotomising (0, 1) non-continuous variables to derive the proportion of individuals in the community with relevant attributes. For example, lowest, second, and middle wealth quintiles were categorised 0 and fourth and highest quintiles were coded 1. In the education variable, no education, incomplete primary, and complete primary were coded 0 and incomplete secondary plus complete secondary or higher were coded 1. Table 6.1 in Annex shows details of the transformations performed.

Modelling was based on the following equation:

$$y_{ij} = b_0 + b_1 x_{1ij} + b_2 z_{2j} + u_{oj} + e_{ij}$$

Where:

y_{ij} = HIV positivity for an individual i, in a cluster, j

b_0 = Regression constant

b_1 = Co-efficient of individual-level factors, including poverty/wealth status and education status

x_{1ij} = Characteristics for an individual e.g. age, sex, area of residence, i, in a cluster, j

b_2 = Coefficient of cluster-level explanatory factors

z_2 = Characteristics of clusters e.g. wealth, cluster education, etc.

u_{oj} = Variation at community (i.e. cluster) level

e_{ij} = Variation at individual level

As in the previous chapter, two-level logit models with individuals at level 1 and clusters at level 2 were fitted. At level 1, case identification was used to ensure uniqueness of individuals.

Findings reported here are restricted to social and structural factors operating at the community level. These are factors for which data was collected. Analysis is guided by Bourdieu's social theory where he argues that the social context has overwhelming influence on social reality and that social inquiry should integrate the micro and macro levels. For characteristics of the surveyed Ugandan population and the HIV prevalence rates, refer to Chapter 5, Section 5.3. In interpreting the graphs, the solid line is the estimated effect while the dotted lines are the 95% confidence interval.

6.5 Research Findings

6.5.1 Social Factors and HIV Vulnerability

6.5.1.1 Multiple Sexual Partners

Having many life time sexual partners is a recognized practice associated with greater vulnerability to HIV infection (e.g. Mah, 2010; Mah & Halperin, 2010). In UAIS, sexually active respondents were asked, "In total, with how many different people have you had sexual intercourse in your life time?" (MoH [Uganda] & ICF, 2012: 214). From this question, life time sexual partners were categorized into ≤1 = 0 and ≥2 = 1, in other words, having two or more life time sexual partners was considered many. In this research, life time sexual partners also encompass multiple and concurrent sexual partners.

Figure 6.1A shows that an increase in the proportion of people with more life time sexual partners in a community is associated with a significant exponential increase in the prevalence of HIV, χ^2 118.204 [1df] $p < 0.001$ (model not shown). These findings were consistent with those obtained at the individual level of analysis where the odds of being infected with HIV for

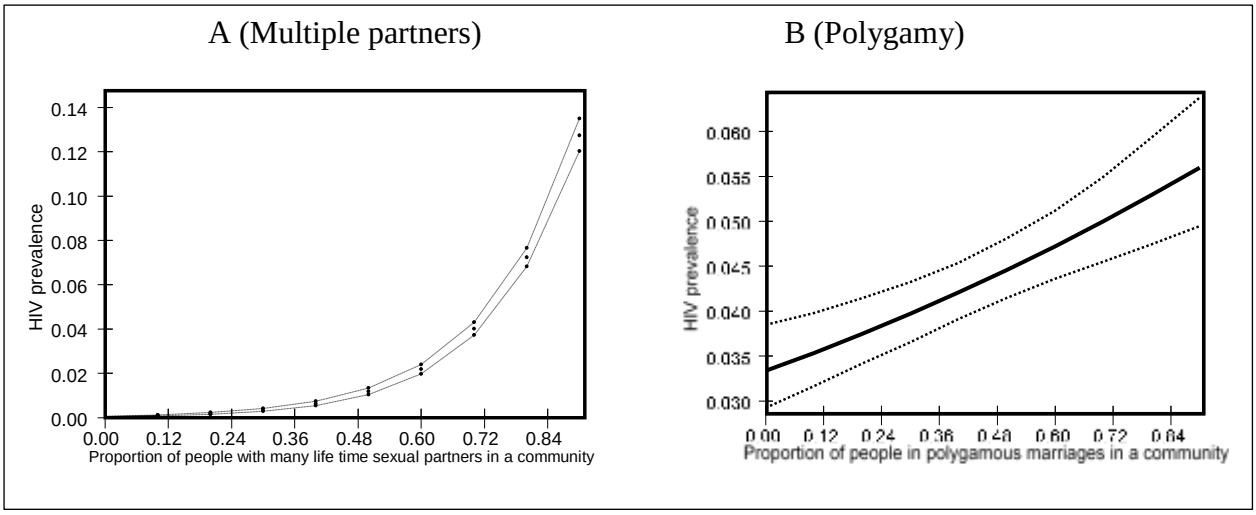
individuals with 2–4 life time partners were 2.13 [1.86–2.44] times and for individuals with more than five partners, the odds of being infected were 3.87 [3.29–4.54] times higher compared to individuals who had only one life time sex partner (Chapter 5: Table 5.4).

There are two points worth highlighting: (1) The graph of life time sexual partners is steep, which suggests that this practice has potential to explosively affect HIV infection rates compared to that of polygamy which is linear; (2) The graph of life time sexual partners starts from zero, which means that in the absence of sexual partners, HIV prevalence would be zero. Further, this evidence allows us to conclude that having multiple sexual partners does increase vulnerability both at the micro and macro levels.

6.5.1.2 Polygamy

Evidence from previous research in SSA has shown that polygamy is negatively associated with HIV infection (Reniers & Watkins, 2010; Reniers & Tfaily, 2012). In this analysis, I compare HIV prevalence in communities which have more polygamous men (denoted as those with 2 or more formal or recognized wives) and compare them with communities where polygamy is less common and men have no other wife (denoted by 0) (0 = 1 wife, 1 = >1 wife). I find a positive and significant association between living in a community with a higher proportion of men in polygamous marriages and being infected with HIV compared to living in communities with fewer men practicing polygamy. Figure 6.1B shows that an increase in the proportion of individuals in a community who are in polygamous relationships was associated with a significant increase in HIV prevalence, (χ^2 152.997 [1df] $p < 0.001$). Polygamy was not significant at individual level of analysis.

Figure 6. 1: HIV prevalence by proportion of people in the community who have multiple life time sexual partners (n=39,664 [Individuals], 887 [Clusters]) (A) and in polygamous marriages (Individuals= 38,390, Clusters=887) (B), UAIS, 2004-05 & 2011.



Full line is the graph | Dotted line is confidence interval

6.5.1.3 Early Marriage

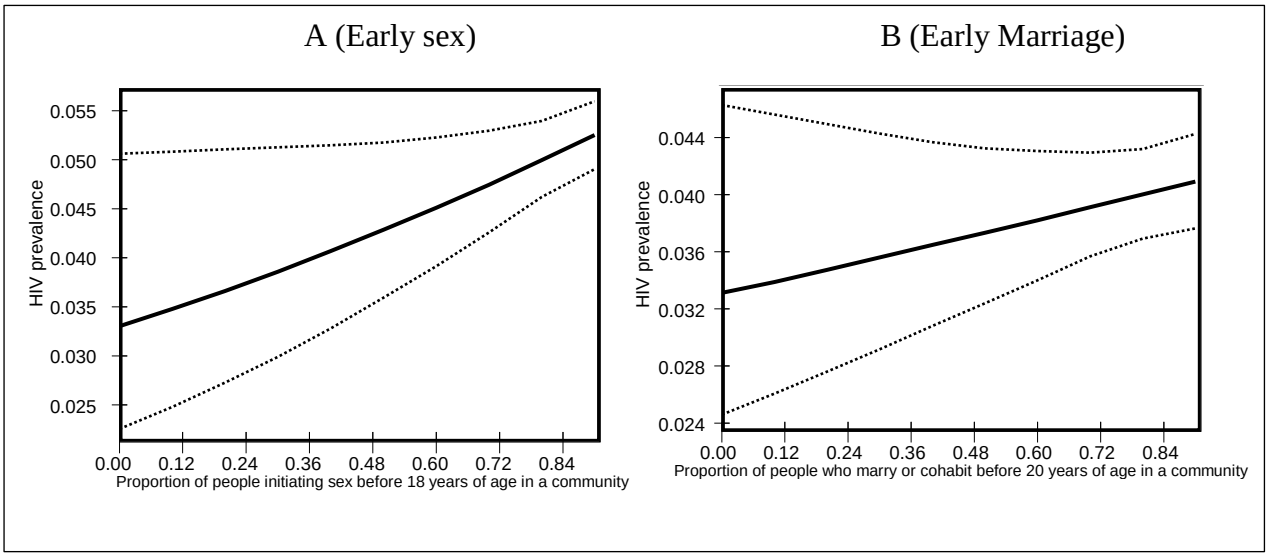
Early marriage has social and health implications including susceptibility to HIV infection (Clark, 2004). Nour shows that married girls were more likely to be infected in Kenya and Zambia. In Uganda, HIV prevalence among married girls was also higher compared to among unmarried girls (Nour, 2006). It is based on this important connection between marriage and HIV that UAIS collected data to monitor the implication of child marriage on their susceptibility to HIV infection.

These findings compare HIV prevalence rates in communities where more people initiate marriage before the age of 20 years (represented by 1) and rates in communities with more people initiating marriage at 20 or more years of age (represented by 0) (<20 years = 1, ≥20 years of age = 0). This research finds that there is a highly significant and positive association between living in a community with a higher proportion of people marrying or cohabiting before making 20 years of age and being infected with HIV compared to living in a community with fewer people marrying at 20 or more years of age. Figure 6.2B shows that when the proportion of people who marry or cohabit before reaching 20 years of age increases in a community, HIV prevalence significantly increases (χ^2 156.309 [1df] $p < 0.001$).

6.5.1.4 Early Sexual Initiation

Early sexual initiation is related to early marriage and is highly prevalent in SSA; a study of DHS data from 27 countries showed that early sexual initiation was prevalent and had increased in 19 countries (Mensch et al., 2006). Like early marriage, early sexual initiation is also associated with greater vulnerability to HIV infection (Magadi, 2011c). In this research, I compare HIV prevalence rates in communities where more people initiate sex before 18 years (represented by 1) and rates in communities with more people initiating sex at 18 years or after (represented by 0) (<18 years of age = 1, ≥18 years of age = 0). The evidence shows that there is a highly significant and positive relationship between living in a community with a higher proportion of people engaging in early or pre-marital sex and being infected with HIV compared to people in communities with more people initiating sex after 18 years. In Figure 6.2A, we see that when the proportion of people engaged in pre-marital sex increases in a community, HIV prevalence significantly increases (χ^2 151.015 [1df] $p < 0.001$). The findings on early sex and early marriage are very important because these practices were insignificant at the individual level of analysis.

Figure 6. 2: HIV prevalence by proportion of people in communities who engage in early sex (<18 years) (n=39,015 [Individuals], 887 [clusters] (A) and in early marriage or cohabitation (<20 years) (n=38,019 [individuals], 887 [clusters]) (B), UAIS, 2004-05 &2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.5.1.5 Community Attitudes towards Women's Negotiation of Condom Use

Powerlessness of women, especially in controlling their sexuality is a recognized aspect of women's vulnerability to HIV infection (e.g. Jewkes & Morrell, 2010). To measure women's level of empowerment, respondents (men and women) were asked, "If a wife knows her husband has a disease that she can get during sexual intercourse, is she justified in asking that they use a condom when they have sex?" MoH [Uganda] & ICF, 2012: 225). Analysis compared HIV prevalence rates in communities where more people said yes (represented by 1) and rates in communities with more people who said no (represented by 0) (No = 0, yes = 1). The evidence shows that there is a relationship between positive community attitudes on women asking their husbands to use condoms when necessary and being infected with HIV. Figure 6.3B shows that when the proportion of people (both women and men answered this question) having such attitudes increases in a community, HIV prevalence increases steadily (χ^2 154.216 [1df] $p < 0.001$). This is a counter intuitive finding. An increase in HIV prevalence when community attitudes favour women controlling their sexuality in a relationship indicates empowerment that would be expected to be protective, especially of women, an issue discussed further in Chapter 7.

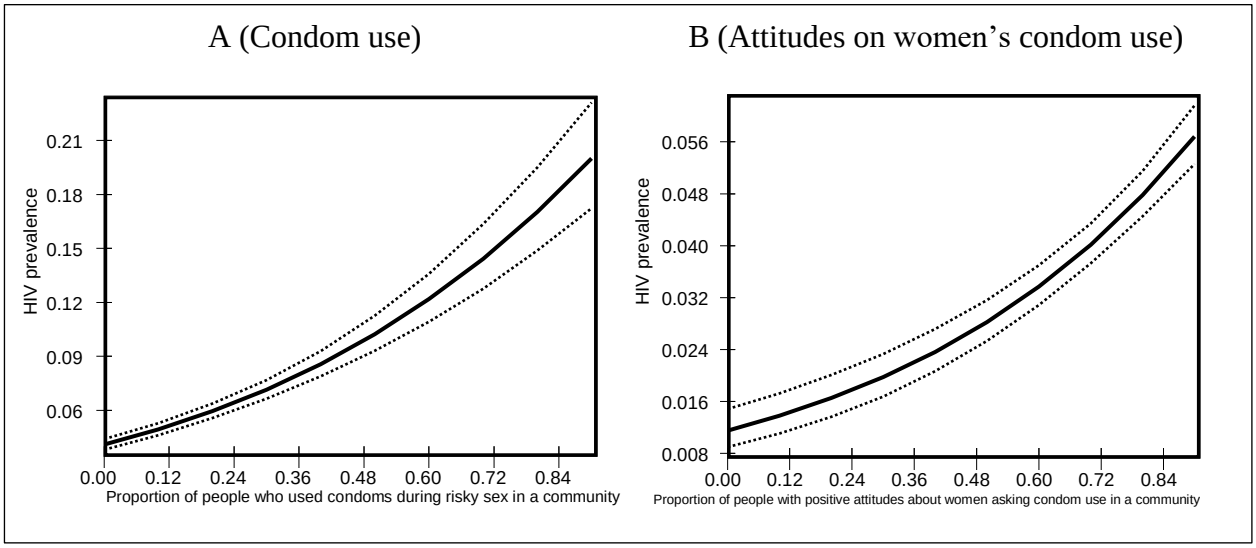
6.5.1.6 Condom Use during Unsafe Sex

Unsafe sex is a major risk factor for HIV infection but using condoms is a known HIV prevention method during such sex (Chersich & Rees, 2008). In line with this view, UAIS collected data to monitor the use of condoms in sexual encounters involving people of unknown HIV status. The survey asked people who were engaged in non-marital sex, "the last time you had sexual intercourse, was a condom used?" (MoH [Uganda] & ICF, 2012: 211). Based on the yes or no responses, this analysis predicted the likelihood of being infected with HIV for individuals who used condoms compared to those who did not. This research compared HIV prevalence rates in communities with a higher proportion of people who used condoms during unsafe l sex (defined as 1) and rates in communities which had higher proportions of people who did not use condoms during unsafe sex (defined as 0) (No = 0, yes = 1).

This research found a positive and highly significant relationship between having a higher proportion of people using condoms in a community during risky sex and being infected with HIV; in communities where more people used condoms, individuals were more likely to be

infected with HIV than in communities where fewer people used condoms. Figure 6.3A shows that an increase in the proportion of people in a community who used condoms at their last risky[8] sexual encounter was associated with an increase in the prevalence of HIV, (χ^2 136.865 [1df] $p < 0.001$). These findings were consistent with those observed at the individual level of analysis which showed that respondents who used condoms were 2.31 [2.00–2.67] times more likely to be HIV positive compared to those who had not (Chapter 5: Table 5.4). This is also a counter intuitive finding or reverse causality – where individuals infected with HIV use condoms during risky sexual encounters to prevent the spread of HIV infection to uninfected sexual partners, prevent their own risk of re infection from infected sexual partners, prevent other STIs, and to prevent unwanted pregnancy.

Figure 6. 3: HIV prevalence by proportion of people in communities who use condoms during risky sex (Individuals=39,102, Clusters=887) (A), and who have positive attitudes about women asking their husbands to use condoms during risky sex, (Individuals=38,498, Clusters=887) (B), UAIS, 2004-05 & 2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.5.1.7 HIV/AIDS Knowledge

Knowledge about ways through which HIV is transmitted as well as HIV prevention is important for individuals to avoid HIV infection. To measure the impact of HIV/AIDS

[8] Risky or unprotected sex refers to sex without using a condom. It is risky because it increases the risk of acquiring HIV infection from an infected partner/partner of unknown HIV status or transmitting HIV infection to an uninfected partner/partner unsure of their HIV status. Risky sex also increases the risk of HIV infected individuals getting super infection – getting another strain of HIV or one which is resistant to antiretroviral drugs. In addition, it is risky because other STIs can either be acquired from a partner with them or transmitted to one without.

knowledge on HIV vulnerability, UAIS collected data on comprehensive HIV/AIDS knowledge, defined as knowing three ways of preventing HIV infection. Among other questions, respondents were asked, "can people reduce their chance of getting the AIDS virus by not having sexual intercourse at all? Can people reduce the chance of getting the AIDS virus by having just one uninfected sex partner who has sexual intercourse with no other partners? And can people reduce their chance of getting the AIDS virus by using a condom every time they have sex?" (MoH & ICF, 2012: 217). These questions addressed abstinence, faithfulness and condom use, the three-known fundamental HIV prevention strategies. Analysis compared HIV prevalence rates in communities with a higher proportion of people who had comprehensive HIV/AIDS knowledge (denoted by 1) and rates in communities with more people having low or no knowledge (high or comprehensive HIV/AIDS knowledge, knowing 3 key ways[9] to prevent HIV infection = 1, low knowledge, knowing 2,1 or none of the 3 methods = 0).

This research found a positive and highly significant relationship between comprehensive HIV/AIDS related knowledge in a community and being infected with HIV. Compared to individuals in communities with more people having low knowledge, those in communities with a higher proportion of people with comprehensive knowledge had a higher likelihood of being infected with HIV. Figure 6.4A shows that an increase in the proportion of people with comprehensive knowledge in a community was associated with an increase in HIV prevalence (χ^2 150.537 [1df] $p < 0.001$). These results agreed with those at the individual level of analysis which showed that having comprehensive knowledge was associated with 39 percent (1.39 [1.03–1.89]) increase in vulnerability (Chapter 5: Table 5.4).

An increase in the prevalence of HIV when people have comprehensive HIV/AIDS knowledge suggests three issues: (1) it may be due to post infection effect, as already mentioned, this is a situation whereby infected individuals gain more awareness of HIV/AIDS because of attending care; (2) knowledge may not be adequate to prevent people from becoming infected with HIV; and (3), people may be having awareness but not knowledge – having consciousness and skills which enable a person to act. For example, a person may be aware that using condoms can prevent HIV infection but such a person may lack the knowledge to use them.

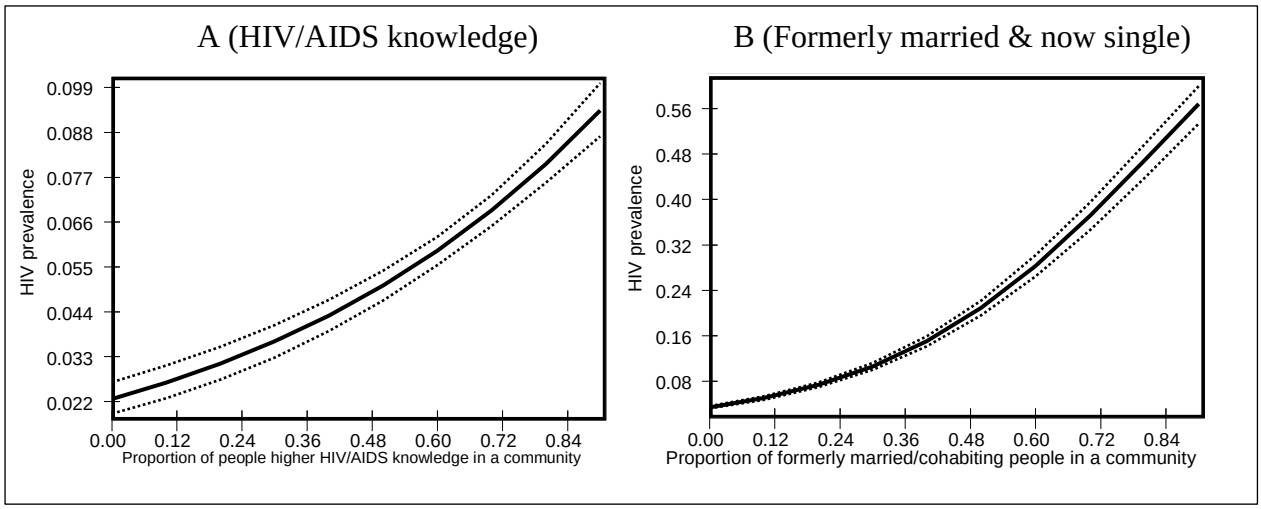
[9] 1. Abstinence till marriage to partner of known HIV status. 2. Being faithful to a sexual partner of known HIV status who has no other sexual partners, and 3. Consistent and correct condom use with non-regular sexual partners

6.5.1.8 Formerly Married

Marriage is perceived to be a protective measure against HIV infection in Africa (Tenkorang, 2012). It is because of the recognized importance of marriage in health that UAIS collects data to monitor its effect on HIV vulnerability. In UAIS, all respondents were asked, "Are you currently married or living with a woman/man as if married? Respondents had to say yes, married or yes, living together or no, not in union. Those who were not in union were asked, "have you ever been married or lived together as if married?" they had to say yes, formerly married, yes lived with a woman/man or no. Respondents who were formerly married were asked, "What is your marital status now? Are you widowed, divorced or separated?" (MoH [Uganda] & ICF, 2012: 208). From these questions, never been in any sexual union, married, and living with a sexual partner was categorized 0 while separated, divorced, and widowed were categorized 1 (formerly married/cohabited). The aim was to compare HIV prevalence among people in communities with a higher proportion of formerly married people who are considered more vulnerable to HIV infection and HIV prevalence among people living in areas dominated more by formally married people who are less vulnerable to HIV infection.

Figure 6.4B shows that an increase in the proportion of formerly married and formerly cohabiting people (currently single) in a community was significantly associated with an increase in the prevalence of HIV, χ^2 112.293 [1df] $p < 0.001$. These findings were backed by those at the individual-level of analysis, which showed that the odds of being infected with HIV for individuals who were either married or living with a partner were 2.22 [1.81–2.73] times higher, but individuals who had separated or divorced had odds of 3.60 [2.90–4.47] times higher, and those who were widowed had odds of 7.97 [6.24–10.11] times higher, when compared to individuals who had never been in any sexual union (Chapter 5: Table 5.4). An increase in HIV prevalence associated with being formerly married is likely due to marital infection or re-marriage (De Walque & Kline, 2012). See more discussion in Chapter 7, Section 7.2.3.

Figure 6. 4: HIV prevalence by proportion of people in communities who have comprehensive HIV/AIDS knowledge (Individuals=39,766, clusters=887) (A) and in formerly married or cohabiting unions (and currently single), (n=39,766 [individuals], 887 [clusters]) (B), UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.5.2 Structural Factors and HIV Vulnerability

6.5.2.1 Community Wealth Status and HIV Vulnerability

This section presents evidence initiated at the introduction about the influence of wealth on vulnerability to the risk of HIV infection. Based on the acknowledged influence of economic resources on HIV vulnerability, UAIS collected data on household wealth/poverty which was categorized into 5 quintiles: (1) lowest; (2) second; (3) middle; (4) fourth; and (5) highest household wealth quintiles. For this analysis, these categories were dichotomized into 0, for category 1–3 and 1, for category 4–5. These categories were based on the national poverty threshold which shows that using $2 a day threshold, 65% of Ugandans are regarded as poor (World Bank 2010). The findings reported here show the likelihood of being infected with HIV for people in wealthy communities compared to people in poor communities. This association was used as a proxy for community wealth.

The overall association between community wealth status and HIV infection in Uganda is positive; when the proportion of wealthy households increases in a community, HIV prevalence increases too. In Figure 6.5, I observe that an increase in the proportion of wealthy people/households in an area was associated with a significant increase in HIV prevalence, χ^2 147.400 [1df] $p < 0.001$, relative to areas with few wealthy households. These findings are

consistent with those obtained at the individual level of analysis which showed that living in a wealthy household was significantly associated with increased vulnerability to the risk of HIV infection in rural areas and among women (i.e. 23 percent higher odds in rural areas and 40 percent higher odds among women) compared to living in a poor household (Chapter 5, Table 5.4).

Figure 6. 5: HIV prevalence by community wealth status (n=39,766 [individuals], 887 [clusters]), UAIS, 2004-05 and 2011.

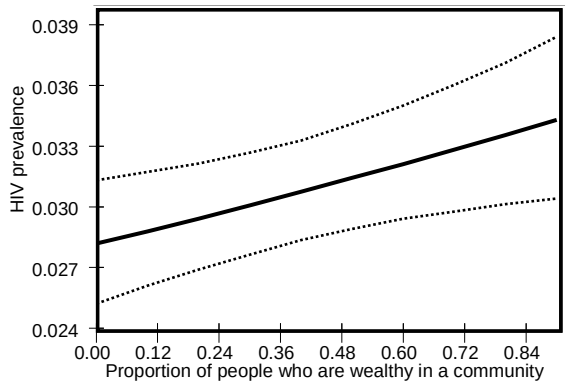


Figure 6.5 shows that an increase in the proportion of wealthy households in a community was associated with an increase in the prevalence of HIV.

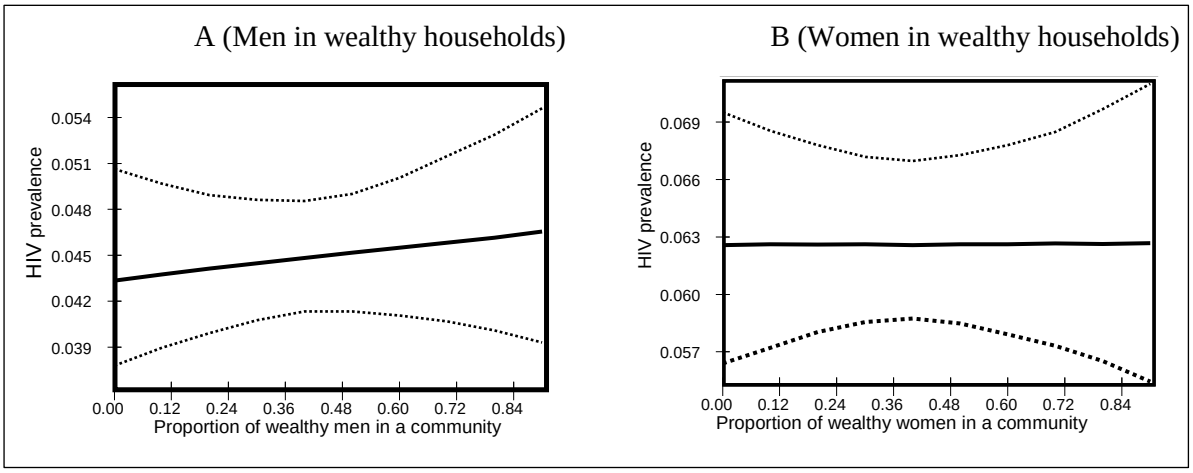
Solid line is the estimated effect | Dotted line is confidence interval

However, when analysis was disaggregated by gender, rural and urban place of residence, and time, the association between community wealth and HIV prevalence was positive for men, rural residents, and in 2004-05. On the other hand, the association was negative for urban residents and in 2011. For women, there was no association. These findings are presented in detail in the sections 6.5.2.2 to 6.5.2.4.

6.5.2.2 Community Wealth and Gender

There is a highly significant and positive association between community wealth and HIV prevalence among men. Figure 6.6A shows that an increase in the proportion of people in a community residing in households categorised as wealthy was associated with a modest increase in the prevalence of HIV among men, χ^2 35.502 [1df] $p < 0.001$. For women, community wealth was not associated with being infected with HIV (See Figure 6.6B). These findings differ from those at the individual level of analysis which showed that women in the highest ranked economic households had 1.40 [1.15–1.70] times higher odds of being infected with HIV compared to those in lower wealth ranked households (Chapter 5: Table 5.6).

Figure 6. 6: HIV prevalence by wealth and gender [Individuals=17,639, Clusters=887] (Men) (A) and [Individuals=22,127, Clusters=887] (Women) (B) UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

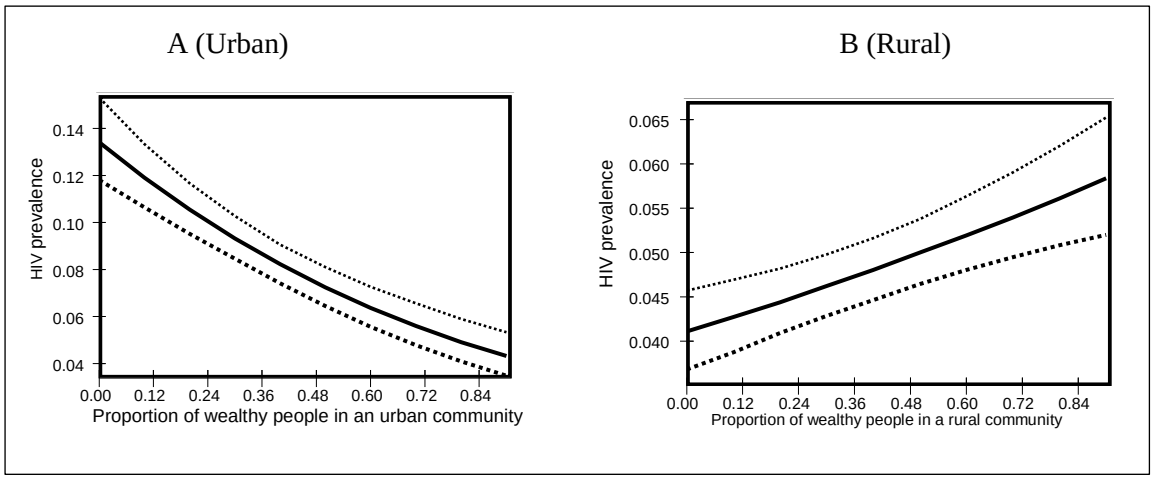
6.5.2.3 Community Wealth and Residence

There is a bi-directional association between community wealth and being infected with HIV. For urban areas, Figure 6.7A shows that an increase in the proportion of wealthy people in a community was associated with a decrease in the prevalence of HIV, χ^2 12.237 [1df] $p < 0.001$. These negative findings agreed with those observed at the individual level of analysis, much as they were insignificant (Chapter 5: Table 5.5).

The association between community wealth and the likelihood of being infected with HIV for rural residents was positive and highly significant. Figure 6.7B shows that an increase in the proportion of wealthy people in a rural community was associated with a significant increase in the prevalence of HIV, χ^2 95.632 [1df] $p < 0.001$. These findings were consistent with those obtained at the individual level of analysis which showed rural residents in the highest wealth category were 23 percent more likely to be infected with HIV than poor individuals also resident in rural areas (Chapter 5: Table 5.5).

From these findings, we note that: (1) it is community wealth that increases vulnerability to the risk of HIV infection for rural residents; and (2); wealth/poverty influences HIV vulnerability at both micro and macro social levels.

Figure 6. 7: HIV prevalence by wealth and residence [Individuals=7,260, Clusters=887] (Urban) (A) and [Individuals=32,506, Clusters=887] (Rural) (B) UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.5.2.4 Community Wealth and Time

There is an association between community wealth and HIV prevalence but this association changes over time. In 2004-05, the association between wealth and HIV was positive and highly significant. For example, Figure 6.8A illustrates that an increase in the proportion of people who were wealthy in 2004-05 was associated with a modest increase in the prevalence of HIV, χ^2 62.790 [1df] $p < 0.001$.

I then tried to find out if there was homogeneity in HIV infection, after controlling for community wealth/poverty by establishing the intra-cluster correlation coefficient (ICC) by applying random level estimates to the formula proposed by Tarling (2008: 112) and others.

$$p = u_{oj} \div (u_{oj} + e_{ij})$$

Where p is the intra-class correlation, e_{ij} is variation at level 1, which is represented by 3.29 and u_{oj} is variation at level 2. Estimates of community variance were used to calculate the intra-cluster correlation coefficient as shown below.

$$level\ 1 = 3.29 \text{ and } level\ 2 = 0.652\ (0.082)$$

$$p = \frac{0.652}{3.942} = 0.135$$

I found ICC of 0.135 in 2004-05, after controlling for community wealth status in 2004-05 as shown above.

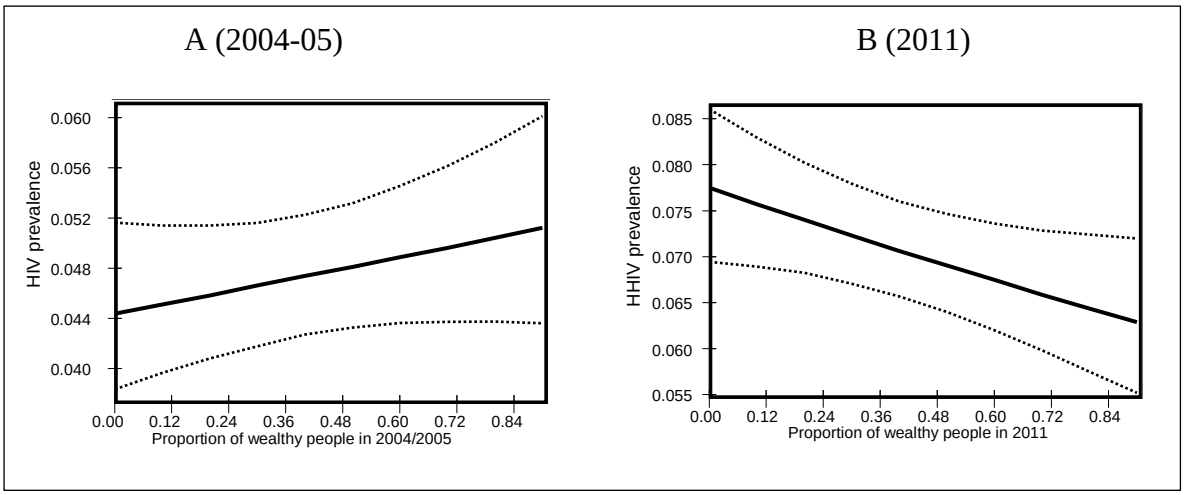
In 2011, the community wealth-HIV relationship became negative. Figure 6.8B shows that an increase in the proportion of wealthy people in a community was associated with a decrease in the prevalence of HIV, $\chi 2$ 68.746 [1df] $p < 0.001$. These findings were not supported by those at the individual level of analysis which were insignificant (Chapter 5, Table 5.7). The ICC after controlling for community wealth in 2011 was 0.107 as per the following calculation.

$$level\ 1 = 3.29 \text{ and } level\ 2 = 0.398\ (0.048)$$

$$p = \frac{0.398}{3.688} = 0.107$$

Taken together, the community wealth-HIV association can be said to be dynamic, being positive in 2004-05 and becoming negative in 2011. The ICC after controlling for community wealth in 2004-05 was 13.5 percent, and in 2011, it was 10.7 percent, which is like that also reported in Chapter 5, section 5.6.5. These results mean that 13 percent of unexplained HIV variance in 2004-05 could be attributable to unobserved community factors compared to 2011 where this was 11 percent of the total variance. The observed differences could be due to the shifting patterns of HIV/AIDS programmes and services. For example, access to HIV services may have improved. This positive trend is consistent with evidence in Table 5.7, which shows that the prevalence of HIV in 2011 reduced among women compared to men, among those with primary educational attainment compared to those with no education, reduced among those aged 34–44 years, and among those who drink alcohol before risky sexual encounters.

Figure 6. 8: HIV prevalence by wealth and time [Individuals=18,400, Clusters=887] (2004-05) (A) and [Individuals=21,366, Clusters=887] (2011) (B) UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.5.2.5 Community Higher Educational Attainment

As per the discussion in the introduction, educational attainment is supposed to reduce peoples' vulnerability to the risk of HIV infection. Figure 6.9 shows the overall relationship between community higher educational attainment and HIV prevalence. Community higher educational attainment has a negative and highly significant association with HIV prevalence when compared to lower educational attainment ($\chi 2$ 70.626 [1df] $p < 0.001$). These findings reflect those obtained at the individual-level of analysis where the odds of being infected with HIV associated with higher educational attainment were 0.63 [0.49–0.81] times the odds of HIV for complete secondary or higher educational attainment (Chapter 5, Table 5.4). These findings imply that higher educational attainment is associated with reduced vulnerability to the risk of HIV infection both at micro and macro-level.

Figure 6. 9: HIV prevalence by higher community educational attainment, (n=39,766 [individuals], 887 [clusters]), UAIS, 2004-05 and 2011.

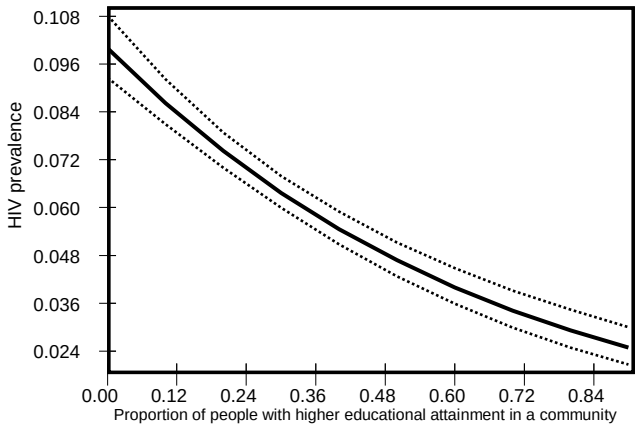


Figure 6.9 shows that an increase in the proportion of people with higher educational attainment in a community is associated with a decrease in the prevalence of HIV.

Solid line is the estimated effect | Dotted line is confidence interval

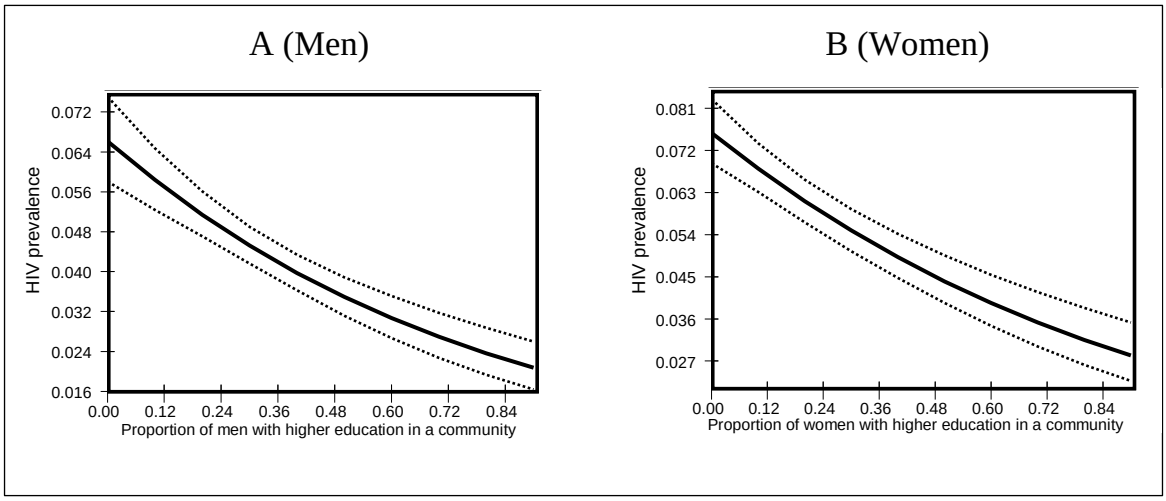
In the next sections, the influence of community higher educational attainment on vulnerability to the risk of HIV infection for women and men, rural and urban areas as well as influence in 2004-05 and 2011 is presented.

6.5.2.6 Community Higher Educational Attainment and Gender

There is a negative and highly significant association between educational attainment and being infected with HIV. Figure 6.10A shows that living in a community with a higher proportion of people with higher educational attainment was associated with a significant decrease in the prevalence of HIV among men, χ^2 39.119 [1df] $p < 0.001$. These findings were consistent with those obtained at the individual level of analysis which showed that men with higher educational attainment had lower odds (0.51 [0.34–0.75] times) of being infected with HIV compared to men with no educational attainment (Chapter 5: Table 5.6).

For women, Figure 6.10B shows that living in a community with a higher proportion of respondents with higher educational attainment was associated with a significant decrease in the prevalence of HIV among women, χ^2 97.540 [1df] $p < 0.001$. These findings too, were consistent with those reported at the individual level of analysis where for example, the odds of being infected with HIV among women with higher educational attainment were 0.55 [0.38–0.81] times the odds for women with complete secondary or higher education compared to women with no educational attainment (Chapter 5: Table 5.6).

Figure 6. 10: HIV prevalence by education and gender [Individuals=17,637, Clusters=887] (Men) and [Individuals=22,125, Clusters=887] (Women) UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

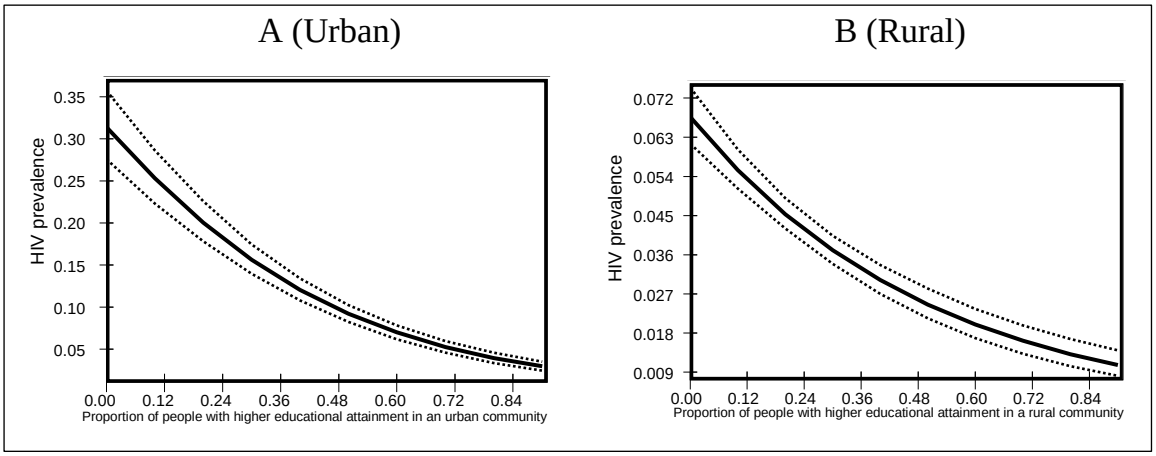
6.5.2.7 Community Higher Education and Residence

There is a negative and highly significant association between community higher educational attainment for residents of both urban and rural areas. People in communities with higher educational attainment were less likely to be infected with HIV than people in communities with lower educational attainment. Figure 6.11A shows that an increase in the proportion of people with higher educational attainment in an urban area was significantly associated with a decrease in the prevalence of HIV, χ^2 16.651 [1df] $p < 0.001$. These findings were supported by those at the individual level of analysis where the odds of being infected with HIV for urban residents with higher educational attainment were 0.64 [0.45–0.93] times for residents with incomplete secondary and 0.43 [0.28–0.67] times for those with complete secondary or higher education compared to individuals with no educational attainment (Chapter 5: Table 5.5).

In terms of rural areas, Figure 6.11B shows that an increase in the proportion of people with higher educational attainment living in a rural area was also associated with a decrease in the prevalence of HIV, χ^2 115.274 [1df] $p < 0.001$. However, these findings were not consistent with those reported at the individual level of analysis (See Chapter 5: Table 5.5). There are two issues which emerge from these findings: (1) community higher educational attainment is more protective for residents of urban areas than rural areas, an observation which was also

noticed at the individual level of analysis; and (2), the protective effect of higher education in urban areas may be because higher education was beneficial both at micro and macro levels.

Figure 6. 11: HIV prevalence by education and place of residence [Individuals =17,637, Clusters=887] Urban and [Individuals=22,125, Clusters=887] Rural UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

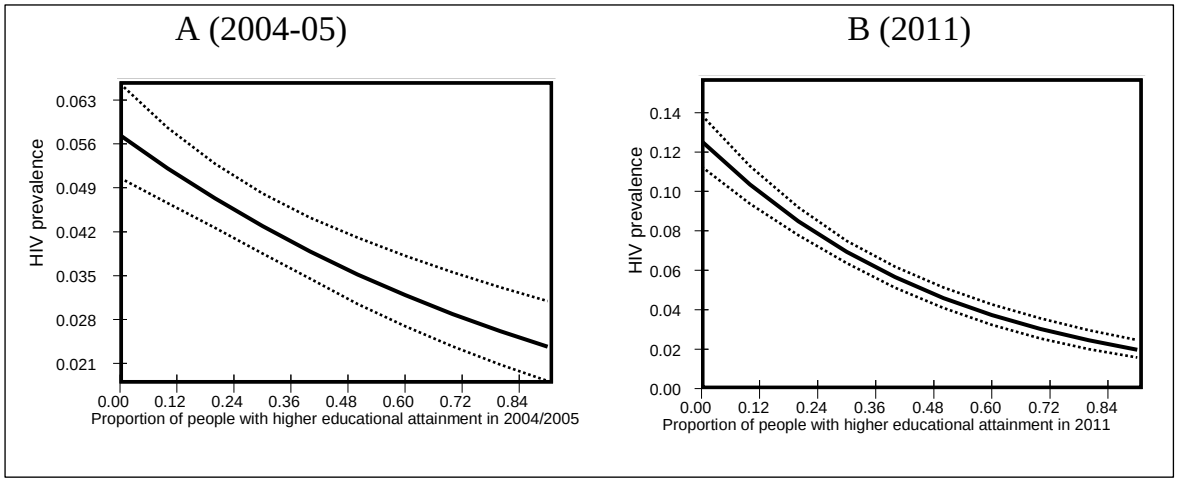
6.5.2.8 Community Higher Education and Time

There is a negative and highly significant relationship between education and being infected with HIV at different times. People in communities with higher educational attainment were less likely to be infected with HIV in both 2004-05 and 2011 compared to people in communities with lower educational attainment. Figure 6.12A shows that an increase in the proportion of people with higher educational attainment in 2004-05 was significantly associated with a decrease in the prevalence of HIV, χ^2 72.132 [1df] $p < 0.001$. These findings were in harmony with those reported at the individual level of analysis which showed that people with higher education were 0.63 [0.43–0.94] times less likely to be infected than people with no educational attainment but having similar other characteristics (Chapter 5: Table 5.7). Findings on higher community educational attainment in 2011 were like those in 2004-05; these findings were also in line with those obtained at individual level (Chapter 5: Table 5.7).

These findings raise three issues: (1) community higher educational attainment was more protective against vulnerability to the risk of HIV infection in 2011 than 2004-05, an observation which is backed by results from the individual level of analysis; (2), higher educational attainment (secondary or higher) is associated with reduced vulnerability to HIV

infection compared to lower educational attainment; and; (3) higher educational attainment reduces vulnerability to HIV at the individual and community level (Chapter 5, Table 5.7).

Figure 6. 12: HIV prevalence by education and time [Individuals=18,396, Clusters=887] 2004-05 and [Individuals=21,366, Clusters=887] 2011 UAIS, 2004-05 and 2011.



Solid line is the estimated effect | Dotted line is confidence interval

6.6 Adjusting for Individual and other Community Factors

6.6.1 Adjusting for Community-level Factors

In the next step of analysis, possible confounding factors were considered. Table 6.1 shows that seven community-level factors, (in order of the magnitude of the coefficient) remained positive and significant including living in a community with a higher proportion of people: who were formerly married; who use condoms during risky sex; who had comprehensive HIV/AIDS knowledge; who were drunk or whose spouse was drunk or who were both drunk with alcohol before risky sex; who initiate sex early; and, who had many people living in the highest ranked wealth households. When all eleven variables were included in the one model, educational attainment, polygamy, age at first marriage at the community level and attitudes towards women asking their men to use condoms, became non-significant.

Table 6. 1: Odds of HIV by community-level factors, (n=39,766), UAIS, 2004-05 and 2011

	Model 1		Model 2	
Parameter	**OR**	**CI**	**OR**	**CI**
Fixed effects				
Model 1: Null				
Constant	0.06	[0.05 - 0.06]*	0.01	[0.00 - 0.01]*
Model 2: Community factors				
Proportion of households categorised in wealthiest 40%			1.03	[1.00 - 1.05]*
Proportion of individuals having secondary or higher education			1.02	[0.98 - 1.07]
Proportion of people less than 18 years old at first sex			1.07	[1.00 - 1.15]*
Proportion of people more than ≥20 years old at first marriage			0.89	[0.76 - 1.05]
Proportion of men who had 2 or more wives			0.99	[0.93 - 1.06]
Proportion of people formerly married			1.41	[1.28 - 1.54]*
Proportion of people drunk with alcohol before last risky sex			1.08	[1.03 - 1.14]*
Proportion of people with more than 1 life time sexual partner			1.06	[1.01 - 1.12]*
Proportion of people with high HIV/AIDS knowledge			1.15	[1.08 - 1.23]*
Proportion of people who used condoms during last risky sex			1.18	[1.05 - 1.31]*
Proportion of people who believe women can ask condom use			0.98	[0.95 - 1.01]
Random effects				
Cluster constant	0.518	0.046*	0.356	0.035*
Clusters	887		887	
Individuals	39766		39766	

OR: odds ratio | CI: Confidence intervals | (*) Significant at 95% confidence intervals

6.6.2 Adjusting for Community- and Individual-Level Factors

Table 6.2 presents the final step of my analysis, where community-level factors are examined in a model that also controls for individual-level factors. Table 6.2 shows that many of the effects observed in Table 6.1 persisted, though some effects that were previously significant were lost and other factors that were not positive in model 2 became positive in model 3. There are only three community-level factors that remain robust to both specifications: they are communities with high proportions of formerly married respondents, communities with a high proportion of wealthy households, and communities with high proportions of respondents who claimed they or their spouses or both were drunk with alcohol before the last risky sex.

There are several points that can be gleaned from these findings: first, factors operating at the proximate level substantially influence vulnerability to HIV infection more than those that are distant when measured at the community level. For example, formerly married, condom use during non-marital sex, and community HIV/AIDS knowledge had significant effect sizes of

1.42 [1.30–1.56], 1.20 [1.07–1.34], 1.16 [1.08–1.24], respectively, though it should be noted that the statistical significance of the finding relating to non-marital condom use and HIV/AIDS knowledge is no longer significant in the model which controls for individual level factors (Table 6.2). Second, traditional practices such as polygamy which are normally assumed to be positively associated with HIV (as the unadjusted results in Figure 6.1B show), were negative at the community level, but were only statistically significant in Model 3. Thirdly, household wealth is important in influencing vulnerability at the community level; living in a community where more households belong to the highest 40% wealthy households increases vulnerability to HIV infection in Model 3.

Table 6. 2: Odds ratios of HIV by community factors, after controlling for individual-level factors (n=39,766), UAIS, 2004-05 and 2011.

	Model 1		Model 2		Model 3	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Model 1: Null						
Constant	0.06	[0.05 - 0.06]	0.00	[0.00 - 0.01]*	0.00	[0.00 - 0.00]*
Model 2: Community factors						
Proportion of households categorised in wealthiest 40%			1.03	[1.00 - 1.05]*	1.07	[1.03 - 1.11]*
Proportion of individuals having secondary or higher education			1.02	[0.98 - 1.07]	0.94	[0.88 - 1.00]
Proportion of people less than 18 years old at first sex			1.07	[1.00 - 1.15]*	1.07	[0.99 - 1.15]
Proportion of people more than 20 years old at first marriage			0.89	[0.75 - 1.05]	0.91	[0.76 - 1.08]
Proportion of men who had more 2 or more wives			0.99	[0.93 - 1.06]	0.91	[0.85 - 0.98]*
Proportion of proportion of people formerly married			1.42	[1.30 - 1.56]*	1.21	[1.09 - 1.33]*
Proportion of people drunk with alcohol before last risky sex			1.09	[1.03 - 1.14]*	1.11	[1.05 - 1.18]*
Proportion of people with more than 1 life time sexual partner			1.06	[1.00 - 1.12]*	0.97	[0.92 - 1.02]
Proportion of people with high HIV/AIDS knowledge			1.16	[1.08 - 1.24]*	1.06	[0.98 - 1.15]
Proportion of people who used condoms during last risky sex			1.20	[1.07 - 1.34]*	1.10	[0.98 - 1.23]
Proportion of people who believe women can ask condom use			0.98	[0.95 - 1.00]	1.08	[1.02 - 1.15]*
Model 3: Individual-level factors						
Wealth (Ref: Lowest quintile)						
Second					1.02	[0.88 - 1.18]
Middle					0.99	[0.85 - 1.15]
Fourth					0.98	[0.84 - 1.15]
Highest					1.04	[0.88 - 1.23]
Education (Ref: No education)						
Incomplete primary					1.08	[0.94 - 1.24]
Complete primary					1.13	[0.96 - 1.34]
Incomplete secondary					0.91	[0.77 - 1.08]
Complete secondary & higher					0.62	[0.49 - 0.80]*
Missing					1.45	[0.40 - 5.23]
Sex of respondent (Ref: Men)						
Women					1.58	[1.41 - 1.77]*
Age of respondent (Ref: 45–59 years)						
15-24 years					1.11	[0.93 - 1.32]
25-34 years					1.73	[1.51 - 2.00]*
35-44 years					1.79	[1.55 - 2.05]*
Area of residence (Ref: Urban)						
Rural					0.55	[0.42 - 0.73]*
Sex of household head (Ref: Male)						
Female					1.18	[1.05 - 1.32]*
Current marital status (Ref: Never)						
Married/living together					2.38	[1.93 - 1.93]*
Widowed					7.67	[6.01 - 9.78]*
Divorced/separated					3.49	[2.82 - 4.33]*

	Model 1		Model 2		Model 3	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Drunk with alcohol before unsafe sex (Ref: No)						
Drunk					1.24	[1.11 - 1.39]*
Not applicable					0.31	[0.02 - 4.72]
Condom use during unsafe sex (Ref: No)						
Used condom					2.21	[1.91 - 2.56]*
Not applicable					4.94	[0.33 - 74.56]
Number of life time sexual partners (Ref: 1 partner)						
2-4 partners					2.00	[1.74 - 2.30]*
>4 partners					3.51	[2.98 - 4.14]*
Not applicable					0.80	[0.58 - 1.13]
Comprehensive HIV/AIDS knowledge (Ref: No)						
Lowest knowledge					1.08	[0.76 – 1.52]
Medium knowledge					1.05	[0.76 – 1.44]
Highest knowledge					1.25	[0.92 – 1.71]
Year (Ref: UG5 (2004-5)						
UG6 (2011)					2.56	[1.72 - 3.82]*
Random effects						
Cluster constant	0.518	0.046*	0.335	0.036*	0.355	0.039*
Clusters	887		887		887	
Individuals	39766		39766		39766	

OR: odds ratio | CI: Confidence intervals | (*) Significant at 95% confidence intervals

Regarding community factors that confound the association between community SES and HIV infection, the evidence in Table 6.2 shows that other community-level (and individual-level) factors do not explain the association between community wealth and HIV infection.

6.7 Discussion of Findings

This chapter aimed to answer the questions on: (1) the effects of social and structural factors on vulnerability to the risk of HIV infection in Uganda; (2) the role of community-level socio-economic status in increasing or diminishing vulnerability to the risk of HIV infection in Uganda; and (3) the pathways through which socio-structural factors are linked to HIV vulnerability in Uganda. I first discuss social factors and then structural factors and conclude.

6.7.1 Social Determinants of Vulnerability

The negative polygamy-HIV association is an important finding in view of the debate about multiple sexual partnerships and partner concurrency. After controlling for other community- and individual-level variables, the study revealed that living in a community where higher

proportions of married men are in polygamous relationships significantly reduced vulnerability to HIV infection, 0.91 [0.85–0.98] (Table 6.2, Model 3). These findings agreed with previous research in SSA. Using data from 19 SSA countries, evidence showed that in countries as well as in regions within countries where polygamy was highly prevalent, HIV prevalence was low (Reniers & Watkins, 2010; see also Kuate et al., 2009 in Cameroon). This scenario is attributed to the exclusive nature of a polygamous sexual network and the lower rate of sexual intercourse in polygamous relationships (Reniers & Watkins, 2010), and restricted access to sexual partners for young men (Reniers & Tfaily, 2012). Living in a community with limited access to women by young men ultimately affects the level of sexual activity and consequently, of the level of vulnerability to the risk of HIV infection.

These findings support STOP's suggestion that social capital is associated with, among other benefits, social support (help from family, relatives, friends, and in-laws) and informal social control (ability of the community to maintain order) (Carpiano, 2006). For example, through social support, polygamous households can acquire resources that prevent destitution and through social control mechanisms, pre-marital and extra-marital sex is outlawed. Living in a community where more people are polygamous also results in social leverage (advantages that accrue due to polygamous status) in addition to social support and social control already mentioned. Polygamy thus affords its members such position, resources and status that they can reduce their vulnerability to the risk of HIV infection.

A positive association between the community-level belief that a woman is right to ask her husband/other sexual partner to use a condom when she knows that he has a sexually transmitted infection is an unusual finding. One would expect communities with high proportions of respondents who believe that women can ask for condom use to be associated with a lower rate of HIV prevalence. This counter intuition is most likely due to post infection effect, a situation where people become aware of the importance of a woman asking her husband to use a condom after infection. It may also signal inability of individuals to prevent HIV infection (especially women who answered this question), despite their knowledge that women should be free to ask their husbands to use condoms.

These findings depart from previous ones by Uthman et al (2009) and Antai (2011) that showed that women and men had attitudes that supported violence against women. As I have already suggested, this may be due to awareness/education, especially in HIV/AIDS care settings. In

HIV/AIDS clinics and organisations, HIV patients are sensitized and counselled on a range of issues including condoms use. Through these sessions, people become aware of the need for women to be sexually assertive. Beside AIDS care settings, favourable community attitudes supporting women to ask their husbands to use condoms could also be related to community AIDS awareness campaigns in Uganda over the last three decades. It is likely that these AIDS campaigns have had impact on people's knowledge about SGBV.

Theoretically, having evidence showing that community attitudes can be positive speaks to Bourdieu's arguments on the importance of social and cultural capital (education and collective community beliefs). However, positive attitudes which are associated with an increase in the prevalence of HIV in a community contradicts Bourdieu's theory that higher social status is associated with good health (HIV prevention in this case). Further, it illustrates STOP's arguments that multiple forms of capital are necessary for an individual to succeed. Favourable attitudes which are accompanied with an increase in HIV prevalence points to a lack of other forms of capital to support the individuals to avoid HIV infection.

6.7.2 Structural Factors

6.7.2.1 Community Wealth

Overall, after controlling for other contextual- and individual-level covariates in Table 6.2, living in a community where more households are in the wealthiest 40% category increases vulnerability to HIV infection. When other community-level and individual-level covariates were controlled for, this effect persisted. As much as the general trend is positive, there were differences as the findings of the unadjusted disaggregated analysis (by area of residence, gender, and time) which showed a positive relationship among men (Figure 6.6), rural residents (Figure 6.7), and in 2004-05 (Figure 6.8), an observation which is consistent with a diverse AIDS epidemic.

The higher vulnerability of men associated with community wealth as shown in Figure 6.6A was likely because wealth confers advantage to men more than women (Silberschmidt, 2001, 2004). She notes that, "wealthy businessmen can afford bride price for at least one wife and frequently use their wealth to keep 'girlfriends'". These men are highly admired and respected (2004: 46). Men are also more likely to be mobile (within the locality), migrate to urban areas,

and use their resources to engage in risky sexual activities (Mishra et al., 2007; Speizer et al., 2011). Mobility, migration and the associated dangerous sexual practices are made possible by better economic status (Wojcicki, 2005). In a study of 15 SSA countries, men who made many trips and lived away from home for longer periods or both, were more likely to have multiple sexual partners (Bingenheimer, 2010).

The higher vulnerability (to HIV infection) of rural residents living in areas with a higher proportion of wealthy households compared to rural residents living in areas with less wealthy households is likely related to inadequate AIDS awareness. Wealth alone is not sufficient to reduce vulnerability (Rodrigo & Rajapakse, 2010). It could also be due improved road transport networks and the development of trading centres. Proximity to a centre of development has been linked to increased vulnerability to the risk of HIV infection in SSA (Messina et al., 2010; Feldacker et al., 2010). In Uganda, rural residents with higher SES are more likely to frequent trading centres, often at the main roads, to drink alcohol, shop, and generally socialize. In addition, the positive wealth-HIV relationship was likely to be connected to the gender issues already discussed. In rural areas, economic resources are usually owned and controlled by men. Therefore, by being able to access, own, and control economic and other social resources, men become more vulnerable to the risk of HIV infection.

Theoretically, the higher vulnerability associated with having more socio-economically better off individuals in rural areas may be due to the less durable nature of the capital of rural dwellers. Bourdieu argues that it is institutionalized capital such as education and steady economic resources from a job that is more important (Moore, 2008). Importantly, given the cross-sectional nature of this data, and the known dynamic nature of rural poverty (Naude et al., 2009), people categorised as wealthy in one survey may not necessarily be wealthy in the next. The relative wealth observed in rural areas is thus superficial, wealthy people just have a lot of too little. We can conclude that by living in a relatively wealthy community, vulnerability to the risk of HIV infection inevitably increases.

Further, researchers have argued that poverty influences vulnerability to the risk of HIV in several ways. First, it deprives people opportunities for a good life and it limits choices available to people (Mbirimtengerenji, 2007). Given this depriving and constraining nature of poverty, affected people often lack knowledge and skills, themselves gateways to further opportunities. Second, poverty creates a culture of poverty or poverty trap – a situation where

people born into poverty pass the poverty to their children and grandchildren (Moore, 2008). Third, poverty also influences vulnerability to HIV through financial poverty – the lack of money to meet human needs (Mbirimtengerenji, 2007). It is these underlying conditions that create situations that produce practices and behaviours such as early marriage, various types of migration, especially rural-urban migration, widow inheritance, among other factors which create vulnerability to the risk of HIV infection. This is particularly the case in slums, areas in urban areas where deprived people are concentrated (e.g. Magadi, 2013; 2016).

6.7.2.2 Community Education Attainment

There are gender, rural-urban residential place, and time differences in the effects of community educational attainment on vulnerability to HIV infection.

For women, living in a community with men of similar educational status likely results in marriage to a person of similar educational status. This may not be the case with men. Gregson and colleagues argue that the protective effect of education among women is a result of educated women marrying men of similar educational status which is contrary to educated men who tend to engage in sexual relations with women of any educational category (Gregson et al., 2001); such assortative sexual relationships that women engage in carry less vulnerability to the risk of being infected with HIV (Gillespie et al., 2007, Reniers & Watkins, 2010). Furthermore, it is likely that even if a woman is married to a man with similar education, she is more likely to be faithful than the man who is more likely to engage in extra-marital sexual activities as has previously been reported. Overall, women have been found to benefit more from higher educational attainment (Rodrigo & Rajapakse, 2010).

For urban residents, a combination of education and other advantages in urban areas most likely explain the decreased HIV prevalence in urban compared to rural areas where 79 percent of people have primary or no educational attainment. This raises three fundamental issues: first, primary level educational attainment is cognitively inadequate—an individual may not comprehend complex HIV/AIDS information such as ARVs as much as a person with higher educational attainment (Bingenheimer, 2010); second, primary educational attainment may not attract other resources such as employment and subsequently, income (Bingenheimer, 2010); third, rural areas lack better economic opportunities compared to urban areas. Therefore, by

living in a [rural] community with such limiting characteristics, this triggers practices and behaviours which increase vulnerability to the risk of HIV infection.

Contrary to RAT that views individuals as context-less; STOP makes the argument that society comprises of fields. Fields have positions that actors occupy. However, the positions are associated with resources. The amount of resources one has determines their agility and versatility (Gatrell et al., 2004). We can therefore attribute the vulnerability of people to HIV whether in urban or rural areas to their social status. Secondly, Bourdieu argues that society is a network of fields. For example, religion and ethnicity network in the social fields; urban and rural areas network in the geographic field; and education, health, law, economics, etc. network in the national affairs. Because of this networking, i) fields influence each other, ii) individual actors are exposed to multiple influences and iii) fields compete. These influences impact on individual habitus and capital and their vulnerability to the risk of HIV infection.

Bourdieu also argues that capital has the effect of classifying society. In Uganda, as in most of SSA, the obvious class is between the poor and non-poor. In the case of HIV, such social classes include: rural dwellers versus urban dwellers, within rural areas, rural poor versus rural non-poor, and within urban areas, urban poor versus urban non-poor. In urban areas, this classification may further present in the form of slum and non-slum dwellers, etc. He argues that people who share similar conditions cluster, socialize, and evolve similar practices. Across this research, the evidence shows that social status influences vulnerability–groups with less capital as much as those with more capital being vulnerable. Bourdieu's thesis that disease can be transmitted through class fault lines is borne by the evidence in this research and the literature that shows that higher vulnerability is generally associated with lower social status.

Regarding time, like the observation in Chapter 5, the protective effect of community higher educational attainment improved in 2011 compared to 2004-05. These trends are consistent with what has been observed in previous studies (e.g. Fortson, 2008). In 2011, it is possible that highly educated people benefited more from the expansion of HIV awareness campaigns. In addition, improved economic conditions could have benefited the educated more than the less educated.

6.8 Conclusion from the Findings

To answer the first question on the influence of social and structural factors on HIV vulnerability, after controlling for individual- and other community-level factors, this research has established that positive attitudes about women asking condom use from their spouses in the event of a sexually transmitted infection was associated with greater vulnerability. People in communities where more people thought a woman was right to ask her husband to use a condom when he has an STI were more vulnerable to HIV infection than people in areas where more people had negative views. However, this was a counter intuitive finding.

To answer the second question about the influence of community-level SES on vulnerability, this study found that community wealth was positively associated with HIV infection. People who live in areas with more households categorized as being in the wealthiest 40% category (belonging to the fourth and fifth quintiles) were more vulnerable to HIV infection. An increase in the proportion of wealthy households in a community was associated with an increase in the prevalence of HIV in that community relative to a community with fewer wealthy households. The last question was about the pathways through which socio-structural factors may be linked to HIV vulnerability. I found that multiple sexual partnership was a confounding factor in the association between community wealth and HIV.

The community environment explains 10 percent of the unobserved variance associated with vulnerability to the risk of HIV infection in Uganda. This is much lower than the 28.5 percent (Magadi, 2013) and 30 percent (Magadi & Desta, 2011) found in other studies in SSA. In addition, this also shows that the social, economic, and political conditions in Uganda were similar during the survey period, which confirms the generalized nature of the AIDS epidemic in Uganda (UNAIDS, 2014).

This research concurrently demonstrates the influence of micro and macro conditions on HIV vulnerability, thereby supporting Bourdieu's quest to overcome a dichotomy in social science which is a modest advancement to the social sciences. Although this analysis has shown the link between social structures and HIV infection, the HIV causal mechanisms are rather complex and involve an interaction of multiple conditions acting at multiple levels of society. These findings have grave implications for a socially-oriented response to the AIDS epidemic in Uganda and beyond as expounded in Chapter 8.

In Chapter 7, I climax the application of the Bourdieu's theory by investigating the influence of both individual- and community-level factors on vulnerability to HIV infection using only data of the 2011 UAIS and I approach it in the context of Sexual and Gender Based Violence.

Chapter Seven

Sexual and Gender-Based Violence and HIV Infection in Uganda

Chapter 7

Sexual and Gender-Based Violence and HIV Infection in Uganda

7.0 Introduction to the Chapter

Women in sub Saharan Africa (SSA) have higher HIV prevalence than men. This thesis has produced evidence to support this fact in the Ugandan case. This chapter examines the role of Sexual and Gender Based Violence (SGBV) as an explanatory factor in vulnerability to the risk of HIV infection in Uganda. The chapter starts with an overview of the global and Ugandan literature on SGBV and considers the relationship between SGBV and HIV infection, presents the data and methods used in the chapter and the findings. The chapter concludes with a discussion of, and conclusions from the findings.

In 2002, the World Health Organization (WHO) provided global estimates which indicated that between 10–60 percent of women had suffered SGBV (Krug et al., 2002). In 2006, WHO indicated that the life time prevalence of physical or sexual violence or both among women was between 15–75 percent (Garcia-Moreno et al., 2006; see also WHO, 2013). Although both women and men are affected by SGBV, women are most affected (WHO, 2013; UBOS & Macro, 2007). Sexual and gender based violence is a social and health problem because of its social and health consequences (Krug et al., 2002; Chin, 2013) with women bearing the greatest consequences (e.g. Ellsberg et al., 2008).

7.1 Scale of Sexual and Gender-Based Violence

7.1.1 Global Scale of Sexual and Gender-Based Violence

Sexual and gender-based violence is pervasive, with all societies being affected (Garcia-Moreno et al., 2006). Empirical evidence from continental as well as cross cultural studies all show that SGBV against women is prevalent. The prevalence of intimate partner violence (IPV) is 45.6 percent in Africa, 40.2 in south-east Asia, 36.4 in eastern Mediterranean, 36.1 in the Americas, 27.9 in western Pacific, and 27.2 in Europe (WHO, 2013; Garcia-Moreno et al., 2006; Fulu et al., 2013; Cao et al., 2014). Global prevalence of life time SGBV against women shows that south-east Asia has the highest rates of 37.7 percent, followed by eastern Mediterranean, 37, Africa, 36.6, the Americas, 29.8, Europe, 25.4, and western Pacific at 24.6

(WHO, 2013; Garcia-Moreno et al., 2006). Sexual violence affects women of all ages. For example, prevalence of life time IPV globally is 29.9% among 15–19-year-olds, 31.6% among 20–24-year-olds, and 32.3 percent among 25–30-year-old women. It rises substantially to 36.6 and 37.8 among 35–39-year-olds and 40–44-year-olds, respectively (WHO, 2013).

Sexual and gender-based violence takes three forms: physical, sexual, and psychological. Physically, SGBV may include being slapped, punched, kicked, and assaulted with a weapon. Sexually, SGBV may include forced sex, coerced sex, verbal threats, unwanted touching, and coerced participation in sexually degrading acts; and psychologically, it may encompass acts such as being belittled, preventing a woman from seeing family and friends, intimidation, withholding resources, preventing a woman from working or confiscating her earnings (Rehn, 2013). Whereas sexual violence generally affects women, sexual violence by intimate partners affects women more (e.g. Campbell et al., 2008; Balogun et al., 2012; Cao et al., 2013).

There are various reasons why sexual violence occurs. In the Asia-Pacific region, SGBV was found to be associated with men's belief of entitlement to sex, SGBV as entertainment, as punishment to the victims, and due to drunkenness (Jewkes, et al., 2013). Underlying these practices are culturally rooted attitudes inculcated during socialization and the consequent imbalance in power between women and men, poverty, and general low social status for women. In SSA, gender identities of masculinity and femininity greatly underlie sexual violence (Smith, 2007; Jewkes & Morrell, 2010; Mugweni et al., 2012; Hatcher et al., 2013). Others argue that SGBV occurs because of men's institutionalized control over women. According to this view, SGBV results from men's control over women which is conferred primarily through marriage—payment of dowry or bride wealth, patrilocal residence and re-enforced through culture, religion, and law (Bingenheimer, 2011).

The outcomes of SGBV can be categorized as physical trauma, psychological trauma, and fear and control (WHO, 2013). Physical trauma may be in the form of musculoskeletal, soft tissue, and genital injury. Psychological trauma or stress may lead to a variety of mental disorders and substance abuse while fear and control are associated with consequences such as maternal and child health related problems, weight loss and loss of pregnancy, and sexual and reproductive health problems like unwanted pregnancy and STIs (WHO, 2013). All SGBV has potential to cause more serious consequences such as disability or death (WHO, 2013, see also Li et al., 2014). For example, 38 percent of all murders of women are committed by intimate partners

compared to six percent among men. Geographically, more homicide occurs in south-east Asia, followed by Africa and the Americas (WHO, 2013).

7.1.2 Sexual and Gender-Based Violence in Uganda

Evidence from Uganda indicates that physical violence is widespread. Based on UDHS for 2006, 60 percent of women report experiencing physical violence from 15 years of age and 34 percent of these experienced it in the 12 months preceding the survey. For men, 53 percent experienced physical violence from age 15 and 20 percent in the 12 months preceding the survey (UBOS & Macro, 2007). Prevalence of physical violence is higher in rural than urban areas and for women, most violence is from intimates while for men it is from unrelated individuals (UBOS & Macro, 2007).

Sexual violence, defined as "any behaviour within an intimate relationship that causes physical, sexual, or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviour" (e.g. Kouyoumdjian et al., 2013), is also common in Uganda and is perpetuated more against women than men. Among 15–49-year-old women, 39 percent suffer SGBV compared to 11 percent of all men. Marriage is the most important vulnerability factor for women's experience of SGBV; among women who have ever had sex, 55 percent previously married or cohabiting women and 43 percent of all women who were either married or cohabiting compared 18 percent among women who had never married suffered sexual violence. Like physical violence, more rural residents suffer sexual violence than urban residents and intimates are more likely to be perpetrator, accounting for 66 percent of all violence (UBOS & Macro, 2007).

Spousal violence is also widely documented in Uganda, again with women being victims more than men. Among ever married women aged 15–49 years, 68% experienced physical, emotional or sexual violence from a husband. Nearly half of these women experienced physical violence, mainly being slapped, punched, pushed or kicked (UBOS & Macro, 2007). Thirty-six percent of women experienced sexual violence, mainly being forced to have sex and 49% suffered emotional violence, in the form of being insulted, humiliated or threatened. Women whose husbands were drunk, and those who experienced their mother being beaten, were more likely to suffer SGBV. Women who were either separated or divorced were more likely to have experienced SGBV than married or never married women (UBOS & Macro, 2007).

7.1.3 Link between Sexual and Gender-Based Violence and HIV Infection

There is abundant evidence supporting the SGBV-HIV association. Evidence in the 1990s showed that sexual violence was linked to the likelihood of being infected with HIV. In a Rwandan study, physical violence was found to be associated with male spouses being HIV positive while sexual coercion among women showed that it was related with being infected with HIV (Van der Straten et al., 1998). Subsequently, more evidence supporting the link between SGBV and HIV infection has emerged. For instance, a study in Uganda has shown a link between duration of experiencing SGBV and HIV infection, with an increase in duration of SGBV being associated with an increase in HIV infection (Kouyoumdjian et al., 2013; see also Balogun et al., 2012). Studies in Ethiopia and Malawi show that SGBV was associated with increased likelihood of HIV infection among women (Bazargan-Hejazi et al., 2013; Hassen & Deyassa, 2014). See also Shamu et al., 2011; Li et al., 2014). None of these studies addresses the effects of community-level SGBV on vulnerability to the risk of HIV infection, which is the purpose of this research (See Chapter 1, Section 1.2 and Chapter 3 for additional information on individual and community vulnerability).

In a general sense, sexual violence interacts with HIV through certain mechanisms. The main ones include forced and coerced sex, and risky sexual and social practices (alcoholism, substance abuse, multiple sexual partners, non-condom use), among others. For example, if sex is forced, the risk of HIV being transmitted may be related to the virginal abrasions and lacerations that may occur (Campbell et al., 2008). Among young women, the risk of HIV transmission via forced sex may be associated with the fact that the virginal tracks may be immature and susceptible to trauma and tear (Li et al., 2014). Similarly, women who suffer sexual violence may be unable to negotiate condom use, increasing their exposure to sexually transmitted diseases including HIV. Sexually abused women are also more likely to initiate sex early and practice commercial sex (Kouyoumdjian et al., 2013).

Most evidence shows a positive association between SGBV and HIV positivity. However, some studies have shown a negative relationship. For example, a large-scale study using DHS data from 10 countries in SSA plus India, Dominican Republic and Haiti revealed a negative association between physical and sexual violence and HIV infection. According to these researchers, this could be explained by precedent and common risk factors (Harling et al., 2010). This contradictory evidence, as much as it is small, demonstrates the controversy

surrounding the relationship between SGBV and HIV and underscores the need for further evidence.

In the next section, the socio-structural mechanisms confounding the SGBV-HIV relationship from the perspective of victims and perpetrator are discussed in detail, starting with social (relationships) and later structural mechanisms.

7.2 Social Factors and Sexual and Gender-Based Violence

7.2.1 Child Abuse as a Determinant of Sexual Violence

Sexual violence may affect individuals across the age spectrum in different ways. For example, in a large 10 country study covering 60,646 11–16-year-old boys and girls in eastern and southern Africa, evidence showed SGBV rising with age, with children who had been victims of SGBV being more likely to perpetrate it (Andersson et al., 2012). In a similar large UN study in the Asia-Pacific region, men who raped non-partner women, reported doing so as teenagers and attributed their actions to their own experience of either being victims of violence or witnessing it (Jewkes et al., 2013). The issue of experiencing violence during childhood—emotional abuse and witnessing a mother being beaten was also reported to be associated with male perpetration of violence (Fulu et al., 2013). The evidence presented here illustrates that across societies, victimization or perpetration of sexual violence occurs across the age spectrum and that at different ages, people are exposed to various forms of SGBV abuse or perpetration.

7.2.2 Geographical Location and the Construction of Sexual Violence

The areas where people live have been linked to sexual violence. Uthman et al. submit that residential areas determine differential socio-economic status because "they shape individual opportunities and expose residents to multiple risks and resources over the life course" (Uthman et al., 2009a: 1802). In a population-based study in eastern India, evidence revealed that the prevalence of sexual violence among women was higher in rural than urban areas (Babu & Kar, 2009). In a qualitative study in the United States of America, rural women were reported to suffer more physical violence compared to urban women (Logan et al., 2003). In Africa, studies show that rural and urban areas have similarities in the determinants of SGBV (Balogun et al., 2012) but the predominant evidence shows that prevalence is higher in rural areas (e.g. UBOS, 2007). Although there are variations across space, area remains an important

determinant of vulnerability to SGBV, which is why community level analysis is examined in this study.

7.2.3 Marriage and other Intimate Relationships as Sites for Sexual Violence

Within marriage, sexual violence has been reported to be widespread. Early evidence in the 1990s by Khan et al. for instance shows 68% of married Indian women experienced SGBV (Khan et al., 1996; see also Silverman et al., 2008). This trend has continued, with nearly all SGBV continuing to occur in intimate relationships as the literature indicates (e.g. Jewkes, 2002; Shamu et al., 2013; Maman et al., 2010; Antai, 2011; Stockman, 2013; Babu & Kar, 2009; Van der Straten, 2009; Li et al, 2014; Bazargan-Hejazi et al., 2013; Kouyoumdjian et al., 2013; Ellsberg et al., 2008; Garcia-Moreno et al., 2006; Fulu et al., 2013; Balogum et al., 2012; Panchanadeswaran et al., 2008; Campbell et al., 2008; Shamu et al., 2012). In view of this evidence, it therefore means that marriage is an important source of vulnerability to sexual violence. However, none of these studies addresses this problem from a community perspective.

7.2.4 Sexual Violence as Normalised Attitudes

Community attitudes are another social determinant of SGBV. Attitudes tend to normalise violence (Uthman et al. 2009a; Cao et al. 2014). Because of the normalization tendency, what Bourdieu calls naturalization of domination, women in Africa have been reported to be supportive of wife beating, making them willing participants in their abuse. For example, in a study in Nigeria, women who lived in a community where a large proportion of people regarded a husband beating his wife as a normal practice were more likely to suffer violence (Antai, 2011). Similarly, in a 17-country study of attitudes to IPV, 70% of women and 60% of men in Uganda supported SGBV against women in Uganda (Uthman et al., 2009b; see also UBOS & Macro, 2007). Similar studies elsewhere in Africa show that community attitudes supporting SGBV were explanatory factors for SGBV in southern Africa (Andersson, et al., 2012). An international study among men showed that men who were not “gender sensitive”, were more likely to be either physically or sexually violent or both (Fulu et al., 2013). From this evidence, attitudes reinforce the practice of SGBV but community-level evidence is also lacking.

7.2.5 Culture and Sexual Violence

Sexual violence is associated with masculinity and men's power (e.g. Ghanotakis et al, 2012). According to this view, masculinity has expectations associated with it. For example, being a family provider. When these expectations are not met, men tend to resort to SGBV as a cover up for their inadequacy (Jewkes, 2002). Studies have shown that if the woman has more social, economic, and political power or otherwise, men tend to resort to sexual violence to exercise control, making controlling behaviour the most pre-dominant form of SGBV that women suffer (e.g. Balogun et al., 2012; Gruskin et al., 2013). Using Zimbabwean data, Shamu et al. observed that being unwilling to become pregnant, becoming pregnant independently, and being prevented from using a family planning method, was associated with SGBV among women (Shamu et al., 2013). This evidence demonstrates that SGBV is underpinned by gender inequality and inequity between women and men (Jewkes et al., 2010; Antai, 2011).

Perhaps because of the above issues, the SGBV-HIV relationship is also mediated by HIV risky sexual practices such as having multiple sexual partners and engaging in commercial sexual practices (e.g. Campbell et al., 2008; Rehn, 2013). In the UN global study of male perpetration of SGBV, men who had more than four sexual partners were more likely to perpetrate physical and SGBV in all the 11 countries studied (Fulu et al., 2013). In the same study, men in Bangladesh, Cambodia, and Indonesia who practiced transactional sex were more likely to perpetrate sexual violence. In a review of SGBV in Africa, having more than five sexual partners, and having a partner with multiple sexual partners, increased the likelihood of being infected with HIV (Shamu et al., 2011). Sexual and gender-based violence has also been associated with unfaithfulness in sexual relationships. In a qualitative Kenyan study, respondents attributed the practice of forced sex to a perception of unfaithfulness by the partner. When a wife refuses her husband sex, he views it as an indication of unfaithfulness while when his wife expresses concerns about her husband's extra-marital sexual relations; it equally attracts violence from him (Hatcher et al., 2013).

7.3 Structural Factors and Sexual and Gender-Based Violence

Sexual violence has multiple structural causes; in the sections that follow, the role of wealth status, educational attainment, and alcoholism are presented.

7.3.1 Household Wealth/Poverty

Wealth and poverty status have also been linked to SGBV. It is argued that poverty increases vulnerability to SGBV through several mechanisms. For example, scholars have averred that people in poverty often lack resources and because of this, poverty results in stress in relationships which leads to SGBV (Jewkes, 2002). Men with low socio-economic status are more likely to be perpetrators of SGBV while women with similar characteristics are also more likely to be victims. In their Chinese study, Cao et al. established that perpetrators of violence were more likely to be unemployed, and to contribute less to family income (Cao et al., 2013). Being unemployed (Hoque & Kader, 2009) and belonging to a low socio-economic group (Okenwa et al., 2009) have been observed to heighten the likelihood of experiencing SGBV. Food insecurity has equally been linked to physical and sexual violence in Papua New Guinea and in Cambodia (Fulu et al., 2013) and with other material needs in Kenya (Hatcher et al., 2013; Camlin et al., 2013). In view of this evidence, we see that multiple dimensions of poverty are associated with SGBV.

Higher economic status on the other hand is linked to SGBV through associated inequality. Evidence shows that inequality in economic status between spouses is more likely to result in SGBV. The case in point is highlighted by Antai using Nigerian DHS data in which he shows that women in wealthier households were more likely than those in less wealthy households to suffer IPV (Antai, 2011). Higher SGBV among economically better off women may be due to men who view this as a challenge to their masculinity and fits within the Theory of Resources which asserts that "individuals whose base is threatened by resource deficits in general or resource deficits relative to subordinate others in the family are more likely to perpetrate violence as a means of reclaiming their authority" (Cao et al., 2013). As much as better economic status is associated with being victimized, some studies have shown that people with higher economic status have also been linked to perpetration (Cao et al., 2013).

7.3.2 Educational Attainment

Educational attainment is one of the structural factors associated with sexual violence. The evidence linking education to violence indicates that people with better educational attainment are less likely to be either perpetrators or victims of sexual violence. This is because educated people tend to be empowered and confident to make choices. Further, education results in more

economic resources, which may allow potential victims to escape or ameliorate the consequences of SGBV (Jewkes, 2002). Along this line of argument, Cao et al. found that individuals with primary or less educational attainment were more likely to perpetrate or be victims of domestic violence (Cao, et al., 2014). Several studies have also reported a negative relationship between educational attainment and violence. The case in point is Fulu et al. who report that lack of higher educational attainment was associated with perpetration of physical violence in Bangladesh and Papua New Guinea, with sexual violence in Indonesia, and with physical and sexual violence in Cambodia (Fulu et al., 2013).

7.3.3 Alcoholism

The consumption of excessive alcohol is also associated with SGBV. Alcohol like other substances such as cocaine, cannabis, and marijuana, is thought to influence SGBV by blighting judgement and giving perpetrators (mainly men) 'courage' (Jewkes, 2002; Chersich & Rees, 2008; Zablotska et al., 2006; 2009). In a context of compromised judgement, men tend to perpetrate violence. Earlier studies in the late 1990s in Rwanda among hospital patients receiving maternal health care showed that alcohol use by male sexual partners was associated with women's experience of SGBV (Van der Straten et al., 1998). Shamu et al. in their qualitative Zimbabwean research found that men often perpetrated SGBV under the influence of alcohol or illegal drugs (Shamu et al., 2011, 2012; see also Campbell et al., 2008). Misuse of alcohol was shown to predict physical and sexual violence in China and Cambodia in a multi-country UN study (Fulu et al., 2013). This evidence shows that alcoholism creates a conducive environment for SGBV. It is because of these known relationships between wealth, poverty, education, and alcoholism and HIV infection that this research sought to investigate these associations in the context of Uganda.

Having discussed the social and structural drivers of SGBV, the following section discusses the influence of SGBV on access to HIV/AIDS services and service outcomes.

7.4 Sexual and Gender-Based Violence and HIV Services

Besides increasing vulnerability to the risk of HIV infection, SGBV also affects uptake of proven HIV interventions (e.g. Karamagi et al., 2006; Ghanotakis et al., 2013). For example, qualitative research in Kenya revealed that SGBV affected women's utilization of antenatal care services including HIV testing for fear of being beaten by their husbands because they did

not authorize it (Hatcher et al., 2013). Similarly, SGBV has also been blamed for women's poor access to maternal health services in Zimbabwe. A qualitative study revealed that women found it difficult to receive antenatal care services including PMTCT because they had to get permission from their husbands (Shamu et al., 2012). Other studies have found that SGBV is associated with poor adherence to ART (Mugavero et al., 2006), increase in (HIV) viral load (Trimble et al., 2013), and reduced CD4 cells and detectable viral load (Schafer et al., 2012). On this basis, we can conclude that SGBV has impact on access to HIV/AIDS services and outcomes of HIV/AIDS treatment and of other AIDS-related health services.

From the preceding sections, SGBV and its association with HIV vulnerability is well researched. There is evidence of the consequences of SGBV, its relationship with HIV infection, and the mechanisms underlying their relationship. However, available research is centred on understanding the role of individual agency. By so doing, previous research systematically ignores the important role of social conditions in the discussion about SGBV and HIV vulnerability. In view of these lapses, this research addresses these gaps by first examining the association between SGBV and HIV infection and simultaneously checking for the effects of SES on SGBV-HIV relationship, and secondly, by examining the role of social and structural factors associated with SGBV that operate at the community level, and demonstrates how they are related to HIV vulnerability.

To achieve the above, this chapter addresses the following specific research questions:

1. What is the association between sexual and gender-based violence and vulnerability to HIV infection in Uganda?
2. What individual- and community-level factors mediate the association between sexual and gender-based violence and HIV infection?
3. What individual- and community-level factors are associated with HIV infection for people who suffer sexual and gender-based violence?

In the following sections, I detail the data, methods, and analysis strategy employed. This is then followed by a presentation of findings which broadly address the micro and macro aspects of sexual violence and HIV infection. The first part of the findings addresses individual level correlates of sexual violence and HIV vulnerability. The second part addresses community level factors associated with sexual violence and vulnerability to HIV infection and

simultaneously compares these results with those at individual level of analysis. The chapter wraps up with sections that focus on the vulnerability of victims of SGBV to HIV infection and discussion.

7.5 Data and Methods of Analysis

7.5.1 Data

Analysis in this chapter is based on secondary data of Uganda AIDS Indicators Survey conducted in 2011. The data comprises 12,153 women and 9,588 men, from 11,340 households, of which 4,329 were urban residents and 17,412 rural residents. In this survey, the household response rate was 99 percent; that for women was 98 percent and men was 96 percent. The analysis is restricted to data from 2011 survey because some questions on SGBV were not asked in the 2004-05 survey. Analysis is further restricted to 7,909 ever/currently married women (15–49 years of age) and men (15–59 years of age) who responded to the questions on forced and coerced sex in this survey. Analysis was further restricted to 98 percent (7,784/7,909) cases that had blood test results for HIV. Of these, 15.5 percent (1,210/7,784) reported having ever experienced either forced or coerced sex.

7.5.2 Methods

This analysis aims to establish these associations as measured at individual and at community levels. The individual level analysis was done by running standard multilevel models. But for the analysis of community effects of sexual violence, individual level measures of sexual violence were used to derive relevant community-level variables. See Chapter 4, Section 4.3.2; Chapter 6, Section 6.4.1 and Annex 6.1 for details regarding community-level variables and their computation.

7.5.3 Measurement of Sexual Violence

In UAIS, all individuals who participated in the general survey and had ever been, or were currently in a sexual relationship were eligible to answer questions on SGBV. However, only one person (woman or man) was selected in a household to answer questions on SGBV. For example, if a wife was selected and interviewed on SGBV, her husband would not be interviewed. The rationale for selecting one person was to prevent other household members interviewed (in the general survey) from knowing that SGBV questions had been asked, which

could have consequences including the likelihood of further violence. Because of this approach, respondents gain confidence, become open and easily disclose their experience. In this analysis, I consider the six issues on SGBV reported in the final report of UAIS 2011.

The first question sought to know whether a respondent had ever been *forced* to have sex. The follow up question wanted to establish whether forced sex had happened in the 12 months preceding the survey. Respondents were also asked whether they had ever been *coerced* to have sex. This was also followed by a question on whether coercive sex had occurred in the 12 months before the survey. All these questions needed a yes, no, refused to answer or do not know response. Respondents were then asked to identify the perpetrator of the act, e.g. husband, stranger, and so on. The last questions were related to reporting sexual violence. In these questions, respondents were asked whether they reported SGBV to Police and for those who did not report, they were asked reasons why they did not report the abuse.

7.5.4 Analysis

Modelling started with single-level models as recommended by Rasbash et al. (2009). Rasbash et al. argue that "fitting single level models before proceeding to multilevel models is a good idea as the fixed effects estimates from single level models should generally be like those achieved by corresponding multilevel models" (Rasbash et al., 2009:115). Data was sorted in MLwiN by case identification, the hierarchy in this analysis. Sorting data by the hierarchy intended in the analysis allows all units in a cluster to be grouped together and all individual units to be grouped within their respective level 2 units (Rasbash et al., 2009; Khan & Shaw, 2011). Modelling was based on the random intercepts (Tarling, 2008: 114) expressed as:

$$y_{ij} = b_0 + b_1 x_{1ij} + b_2 z_{2j} + u_{oj} + e_{ij}$$

Where:

y_{ij} = HIV positivity for an individual i, in a cluster, j

b_0 = Regression constant

b_1 = Co-efficient of sexual violence and other individual-level covariates

x_{1ij} = Characteristics for an individual i, e.g. sexual violence, education, in a cluster, j

b_2 = Coefficient of cluster-level explanatory factors

z_2 = Characteristics of clusters e.g. wealth, cluster education, etc.

u_{oj} = Variation at community level

e_{ij} = Variation at individual level

Based on the above equation, two-level models were fitted sequentially. Analysis was done step by step and started by running a variance components model, in line with the recommendation by Rasbash et al. (2009) – one with only the intercept. The second step included a model with only sexual violence (See Table 7.5). In the third step, potential socio-economic confounders were introduced. In the final model, socio-demographic variables were modelled. To establish effects of community factors, derived community level variables were fitted. After obtaining initial results, analysis was refined further. In this progressive approach, effects of interaction with gender and rural-urban area of residence were obtained.

To answer the question about the influence of SGBV at the community level, two-level logit models with individuals at level 1 and clusters at level 2 were fitted. In the next section, I present the characteristics of the sample and the HIV prevalence rates. All descriptive analysis is weighted by HIV weight to cater for differential HIV-testing coverage by key characteristics such as urban/rural residence and gender.

This analysis focuses only on *ever* forced and *ever* coerced as indicators of SGBV. This research focuses on historical sexual violence because some of the consequences of SGBV discussed in the last part of section 7.1.1 last a life time (WHO, 2013). Further, there is evidence linking long exposure to SGBV and increased vulnerability to the risk of HIV infection (Kouyoumdjian et al. 2013). The two indicators of SGBV were merged to increase the size of the sample for victims. I added 866 cases of respondents who were coerced and 263 cases of those that were forced plus those who suffered both to get 1210 cases who suffered SGBV. Merging the two indicators also sought to capture the experience of both victims of forced and coerced sex. By merging data of these two indicators, I was able to have a reasonable number of victim cases to compare with 6,699 cases who were not victims.

7.6 Research Findings

7.6.1 Characteristics of the Sample

This analysis was based on 7,825 cases with HIV test results, who responded to questions on SGBV. The composition of the surveyed sample (48.7 percent men and 52.2 percent women) depicts the gender structure of the general population where men make up 48 and women 52 percent. Much of the sample was young, with 62.5 percent being below 35 years of age. The rural sample was 80.7 compared to 19.3 percent that was drawn from the urban areas. This also reflects the rural-urban proportions in the general population structure where about 80 percent of the people live in rural areas and the balance of 20 percent residing in urban areas. Most Ugandans surveyed were not educated; with 71.3 percent having primary or no education. In terms of religion, majority of the people are Christian, accounting for 87.5 percent with the rest being Moslem and others. Most respondents were married or cohabiting (69.6 percent) and those who have never been in a sexual union (also included in this analysis) make up 19.5 percent. All these characteristics reflect the structure of the Ugandan population. Scholars have argued that the close resemblance of the sample to the population speaks of its quality and provides a basis for generalizing findings to the population (e.g. Ellsberg et al., 2008).

7.6.2 Prevalence of HIV by key Characteristics of the Sample

Table 7.1 shows the prevalence of HIV in the sample by key population characteristics. The overall prevalence of HIV among 15–59-year-old men and 15–49-year-old women in UAIS 2011 was 8.2 percent but prevalence is 8.9 among women compared to 7.3 among men. HIV prevalence rises faster by age among women although it reaches 11.9 percent peak prevalence at age 35–44 years for both women and men. Generally, HIV prevalence is lower among women and men with more educational attainment but women with higher educational attainment have a much lower prevalence of 5.1 percent compared to men's 6.4 percent. There is no clear pattern of HIV prevalence by wealth status but women in the highest wealth categorised households have a higher prevalence of 11.0 percent than women in the lowest wealth categorised households. For marital status, prevalence is nearly similar among widowed respondents where it was 21.8 percent among widowed women compared to 20.0 percent for widowed men. Women who reside in female headed households have a prevalence of 12.4 percent, over five percentage points higher than among those in male headed households.

Overall, HIV prevalence is higher in urban areas where it is 10.9 percent compared to 7.5 percent among rural residents. Like gender, HIV prevalence also peaks at age 35–44 in both rural (11.0%) and urban areas (15.7%) although it rises faster among urban residents. HIV prevalence increases with wealth in rural areas but it decreases as wealth increases in urban areas. Residents in rural and urban areas with more educational attainment both have a lower prevalence of HIV but the rate is much lower for urban residents. However, as much as higher educational attainment considerably lowers prevalence among urban residents, prevalence is substantially as higher as 16.4% among those with no education and 17 percent among those with incomplete primary educational attainment. For residents of rural areas, peak prevalence is 9.6 percent among those with complete primary education. Widowed residents of urban areas have prevalence of 31.6 percent compared to 20.1 percent among rural residents. These were followed by those who were either separated or divorced. Respondents residing in female headed households in urban areas have a higher prevalence compared to those in female headed households in rural areas and in male headed households in both rural and urban areas.

When these statistics are contrasted with those of the entire sample, we see that HIV prevalence is higher among the 7,824 people who responded to the questions on forced and coerced sex. For example, HIV prevalence in this sub sample is 7.3 among men and 8.9 among women but in the main sample, it is 6.1 and 8.2 percent among men and women, respectively. Similarly, prevalence in this sample is 7.5 and 10.9 percent in the rural and urban areas, respectively compared to 6.9 and 8.9 percent in the rural and urban areas, respectively, in the main sample. The high prevalence in this sub sample is likely because the sample comprised people who had ever been, or were currently in a sexual relationship. HIV prevalence is bound to be higher in this group given the heterosexual nature of the AIDS epidemic in Uganda.

Table 7. 1: HIV prevalence by key population characteristics, UAIS, 2011 (n=7,824)

Characteristic	Women		Men		Rural		Urban	
	% HIV+	Cases	% HIV+	Cases	% HIV+	Cases	% HIV+	Cases
Age Group	*		*		*		*	
15-24	6.9	1356	2.5	1057	4.6	1881	6.6	534
25-34	9.5	1311	6.7	1167	7.0	1941	12.3	537
35-44	11.9	791	11.7	873	11.0	1377	15.7	286
45-59	8.2	624	10.5	645	9.1	1114	12.2	156
Total	8.9	4082	7.3	3742	7.5	6313	10.9	1513
Wealth/poverty Status	ns		ns		*		*	
Lowest	8.5	863	8.6	699	6.8	1211	14.5	351
Second	9.2	867	6.4	787	6.1	1310	14.5	345
Middle	8.2	807	7.1	741	7.2	1255	9.8	287
Fourth	7.7	778	7.9	718	8.1	1246	6.6	287
Highest	11.0	767	6.8	683	9.3	1290	6.6	242
Total	8.9	4082	7.3	3719	7.5	6312	10.8	1512
Educational Attainment	ns		ns		ns		*	
No education	7.7	714	7.4	244	7.0	891	16.4	67
Incomplete primary	8.9	1972	8.0	1626	7.3	3164	17.7	389
Complete primary	10.7	516	8.5	550	9.6	883	9.8	184
Incomplete secondary	10.0	710	5.8	917	7.1	1101	8.7	526
Complete sec & higher	5.1	215	6.4	405	6.2	274	5.8	346
Total	8.9	4082	7.3	3742	7.5	6313	10.8	1512
Current Marital Status	ns		ns		*		*	
Never been in union	4.8	587	2.6	938	3.0	1101	4.5	423
Married/living together	7.6	2896	8.1	2549	7.1	4544	11.4	902
Widowed	21.8	252	20.0	35	20.1	249	31.6	38
Divorced/separated	17.5	348	16.8	220	16.0	419	20.7	150
Total	8.9	4083	7.3	3742	7.5	6313	10.9	1513
Sex of Household Head	*		*		*		*	
Male headed household	6.8	2563	7.7	3200	7.0	4798	8.7	965
Female headed household	12.4	1518	5.0	541	8.9	1514	14.7	546
Total	8.9	4081	7.3	3741	7.5	6312	10.9	1511

*- Statistically significant, based on x^2statistic, $p < 0.05$ | ns- Not significant based on x^2statistic, $p > 0.05$

In the next section, I focus on sexual violence, first discussing its prevalence and then the prevalence of HIV by forms of sexual violence (forced sex and coerced sex). An exposition into SGBV aims to provide a background for understanding the findings in the advanced analysis.

7.6.3 Prevalence of Sexual Violence

7.6.3.1 Prevalence of SGBV by Background Characteristics

Table 7.2 shows life time prevalence of SGBV by key population characteristics. There are inequalities in the prevalence of SGBV with women being the most disadvantaged. Sexual violence is 30.7 percent among separated/divorced women compared to 10.9 among men. This is followed by women belonging to households in the fourth wealth category at 28.1 percent and those with complete primary educational attainment with a prevalence of 25.9 percent. Beyond this, women with complete secondary and higher education and women in households categorized in the highest wealth quintile as well as those aged 34–44 years have a prevalence of about 20 percent.

For men, prevalence of SGBV is highest among men in households belonging to the highest wealth category (11.0. percent) and followed by divorced/separated men at 10.9 percent but these rates are twice lower than among women. A high prevalence of SGBV among high status individuals suggests that conflict over resources could be an explanation as has been proposed (Cao et al., 2013) and may be an explanation for separation and subsequent high prevalence of SGBV in this group. High prevalence among high status women may also be a consequence of women's empowerment whereby empowered women assert their space against resistant men, a situation which results in violent behaviour by men.

Sexual violence is more prevalent among urban residents where prevalence is 17.7 compared to 15.5 percent among rural residents. Among urban residents, prevalence is highest among those separated or divorced, at 28.7 percent. This is followed by urban individuals who were widowed, had primary educational attainment, and those aged 45–59 years, all with a prevalence exceeding 20 percent. In rural areas, SGBV was more common among individuals who were divorced or separated (21.1 percent) and those living in households categorised in the fourth wealth/poverty quintile, whose prevalence was 19 percent. Prevalence of SGBV was reasonably higher at 16.3 and 16.6 percent among rural residents with incomplete primary educational attainment and those aged 35–44 years, respectively.

Overall, SGBV is more prevalent among divorced/separated women, those in wealthiest (fourth and highest) ranked households, in female headed households, women with higher education, and those aged 35–44 years. The high prevalence of SGBV in these groups is not surprising

because it is also in these groups with the highest prevalence of HIV. For example, (Table 7.1), prevalence of HIV is 21.8 percent among widowed women while among widowed urban women, it is 31.6 percent. HIV prevalence is 11.0 percent among people aged 35–44 and those of the same age but residents in urban areas have a prevalence of 15.7 percent. Also, mirroring SGBV prevalence, women residing in female headed households had an HIV prevalence of 12.4% and those residing in similar households but based in urban areas was 14.7 percent.

Table 7. 2: Life time prevalence of sexual violence by key population characteristics, UAIS, 2011 (n=7,784)

Characteristic	Women		Men		Rural		Urban	
	% SV	Cases	% SV	Cases	% SV	Cases	% SV	Cases
Age Group	*		ns		ns		ns	
15-24	20.1	1356	8.4	1058	14.8	1881	15.4	534
25-34	23.6	1312	8.1	1166	15.7	1940	18.2	537
35-44	26.3	791	8.4	873	16.6	1378	17.9	285
45-59	24.0	624	7.6	646	14.6	1113	23.7	156
Wealth/poverty Status	*		*		*		ns	
Lowest	16.2	682	6.4	699	10.7	1211	16.0	250
Second	24.2	868	6.0	787	14.6	1311	19.1	345
Middle	23.0	807	6.8	737	15.2	1256	15.6	288
Fourth	28.1	777	10.3	755	19.0	1245	20.3	286
Highest	24.1	768	11.0	764	17.5	1289	17.7	243
Educational Attainment	*		*		*		*	
No education	18.1	714	3.7	244	14.6	891	13.2	68
Incomplete primary	24.4	1927	8.3	1626	16.3	3163	23.1	389
Complete primary	25.9	517	8.4	550	16.1	882	20.7	184
Incomplete secondary	22.4	710	7.7	918	14.6	1101	12.9	526
Complete sec & higher	21.5	214	10.6	405	9.9	274	18.2	346
Current Marital Status	*		ns		*		*	
Never been in union	15.2	586	7.0	938	9.9	1101	10.8	424
Married/living together	23.7	2896	8.3	2548	16.0	4543	19.0	902
Widowed	23.4	252	2.9	35	2.4	250	23.7	38
Divorced/separated	30.7	348	10.9	220	21.1	418	28.7	150
Sex of Household Head	ns		ns		*		*	
Male headed household	22.5	2564	8.2	3201	14.4	4798	15.2	966
Female headed household	23.8	1519	7.9	542	18.8	1514	22.2	546
Total	23.0	4083	8.1	3743	15.5	6312	17.7	1512

*- Statistically significant, based on x^2statistic, $p < 0.05$
ns- Not significant, based on x^2statistic, $p > 0.05$

7.6.3.2 Prevalence of Sexual Violence by Forms of Violence

Table 7.3 shows prevalence of sexual violence in Uganda by forms. There are inequalities in the experience of SGBV which mainly disadvantage women. Life time prevalence of forced sex among women was 15 percent compared 3.2 among men. Among those who had experienced forced sex, 37.3 percent of women compared to 44.5 of men experienced it in the 12 months preceding the survey. For coerced sex, 16.1 percent of women experienced it in their life time compared to 6.5 of men. Among those who had experienced sexual coercion, 52.5 percent of women compared to 51.2 of men reported experiencing it, in the 12 months that preceded the survey. Compared to forced sex, coerced sex was more prevalent. When the two indicators were combined to form an aggregate indicator, still more women suffered SGBV than men. Women were three times more likely to experience SGBV than men.

Sexual violence is mainly perpetrated by intimate sexual partners. For women, 70.6 percent said they suffered SGBV from their spouse compared to 40.4 of men. For women, the other perpetrators were teacher, employer, stranger, and acquaintance that were identified by 29.4 percent of respondents. For men, most of their SGBV was incurred from non-intimates e.g. teachers, employer etc., whom 59.6 percent identified. These findings very much agree with those from previous research which show that women mainly suffer SGBV from intimates while men from non-intimates. In both urban and rural areas, 62 percent of SGBV was perpetrated by an intimate partner.

Nearly all SGBV is not reported to authorities. For women, 95.6% victims did not report their abuse to Police compared to 99.6 of men. The main reason cited by 47.1% of women was shame and fear such as being afraid of divorce or desertion, being afraid of further violence, being afraid of putting the perpetrator in trouble, sexual violence being an embarrassment to report, and fear of shaming the family. This was followed by lack of knowledge which was reported by 18.8% of women. For men, 36.8% cited lack of knowledge about the need to report SGBV. For both women and men, regarding sexual violence as normal and lack of confidence in the Police accounted for 15–17% of reasons for non-reporting. In terms of area, 96% of SGBV was not reported in both rural and urban areas with shame and fear being cited by over 40 percent and lack of knowledge by over 20% of respondents. These findings were like those reported in Uganda DHS for 2006; see Section 7.1.2 about SGBV in Uganda.

Table 7. 3: Prevalence of sexual violence by forms of violence, UAIS, 2011 (n=7,825)

Form/Characteristic	Women		Men		Rural		Urban	
	% SV	Cases	% SV	Cases	% SV	Cases	% SV	Cases
Sexual violence (forced and coerced)	*		*		*		*	
Yes	23.0	939	8.1	304	15.5	976	17.7	268
No	77.0	3143	91.9	3438	84.5	5337	82.3	1245
Ever been forced[10] into sex?	*		*		*		*	
Yes	15.0	611	3.2	119	8.9	561	12.2	169
No	85.0	3471	96.8	3624	91.1	5751	88.8	1344
Ever been forced into sex in the last 12 months?	*		*		*		*	
Yes	37.3	227	44.5	53	38.6	216	38.1	64
No	62.7	382	55.5	66	61.4	344	61.9	104
Ever been coerced[11] into sex?	*		*		*		*	
Yes	16.1	657	6.5	242	11.1	700	13.2	188
No	83.9	3426	93.5	3501	88.9	5612	86.8	1314
Ever been coerced into sex in the last 12 months?	ns		ns		*		*	
Yes	52.5	341	51.9	124	51.7	357	55.1	108
No	47.5	308	48.1	115	48.3	334	44.9	88
What was the relationship to perpetrator?	*		*		*		*	
Spouse /partner	70.6	520	40.4	103	62.9	491	62.3	132
Other abuser	29.4	217	59.6	152	37.2	290	37.7	80
Did you report SV to Police?	*		*		*		*	
Yes	4.4	32	0.4	01	3.2	25	3.8	08
No	95.6	700	99.6	258	96.8	755	96.2	203
Main reason not to report abuse	*		*		*		*	
No knowledge SV can be reported	18.8	126	36.8	91	24.3	174	21.5	43
No confidence in the Police	16.3	109	17.4	43	16.1	115	18.5	37
Sexual violence is normal	17.8	119	15.8	39	18.3	131	13.5	27
Fear of consequences or shame	47.1	315	30.0	74	41.3	715	46.5	93
Total	100	669	100	247	100	6312	100	200

(*) = Significance, based on x^2statistic $P < 0.05$

7.6.4 Prevalence of HIV by Sexual and Gender-Based Violence

Table 7.4 shows prevalence of HIV infection by forms of sexual violence. HIV prevalence was higher among victims of SGBV compared to non-victims. For example, 12.3 percent of women

[10] Causing an individual to have sex against their will by use of physical force
[11] Causing an individual to have sex against their will by use of non-forceful means such as pressure, intimidation, and manipulation

with a history of forced sex were infected with HIV compared 8.3 percent who were not. Also, 13.2% women with a history of sexual coercion were infected compared to 8.1% who were not. The trend was similar in terms of residence. For example, 18.3 percent urban residents who reported to have been forced to have sex were infected compared to 9.9 percent who had not and 21.9 percent urban residents who had recent (in the last 12 months) experience of sexual coercion were infected compared to 15.4 percent who had not. The situation in rural areas was likewise where 9 percent of respondents who had a history of forced sex were infected compared to 7.3 percent who had not. HIV prevalence was 11.3 percent among respondents who had experience of coerced sex in rural areas compared to 7.0 percent who had no such experience.

HIV prevalence was higher among females, and victims of sexual violence in urban areas compared to males and victims in rural areas. For example, HIV prevalence is 12.3 percent among female victims compared to 5.9 percent among male victims of forced sex. Similarly, HIV prevalence was 13.2 percent among female victims of sexual coercion compared to 7.0 percent among male victims. In terms of residence, HIV prevalence is 18.3 percent among victims of forced sex in urban areas compared to 9.1 percent among those in rural areas. And among victims of sexual coercion, prevalence is 12.6% among victims in urban areas compared to 11.3% among those in rural areas. These figures reflect the overall national HIV prevalence rates where HIV prevalence is higher among women and among residents of urban areas than among men and residents of rural areas. When the two indicators were combined, the trend observed was similar with higher prevalence being observed among women and urban residents.

HIV prevalence was slightly higher among women who were sexually assaulted by their spouses compared to those victimised by others (strangers, teachers, employers and acquaintances). For example, HIV prevalence was 12.3 percent among women victimized by their husband compared to 11.5 percent among women who were victimized by other perpetrator. The trend was similar for men and place of residence. For example, HIV prevalence was 9.7 percent among men who suffered violence in the hands of their spouses compared to 5.8 who were victimized by others and in terms of residence, HIV prevalence was 15.9 percent among residents of urban areas with experience of sexual violence compared to 12.7 percent among those victimized by all others. The same was among victims who were

resident in rural areas where the rate was 10.8% compared to 8.1 percent sexual violence by other categories of perpetrators. However, the differences based on perpetrator were small according to both place of residence and gender.

Table 7. 4: HIV prevalence by forms of sexual violence, UAIS, 2011 (n=7,784)

	Women		Men		Rural		Urban	
Characteristic	**% HIV +**	**Cases**	**% HIV +**	**Cases**	**% HIV +**	**Cases**	**% HIV +**	**Cases**
Sexual violence (forced & coerced)	*		ns		*		*	
Yes	12.6	939	6.6	305	10.1	976	14.6	268
No	7.8	3143	7.4	3437	7.0	5336	10.1	1245
Total	8.9	4082	7.3	3742	7.5	6312	10.9	1513
Ever forced to have sex.	*		ns		ns		*	
Yes	12.3	611	5.9	119	9.1	561	18.3	169
No	8.3	3472	7.4	3623	7.3	5750	9.9	1344
Total	8.9	4083	7.3	3742	7.5	6311	10.9	1513
Forced sex in last 12 months.	ns		ns		ns		ns	
Yes	11.9	227	9.4	53	7.9	215	21.9	64
No	12.3	382	3.0	66	9.6	344	15.4	104
Total	12.2	609	5.9	119	8.9	559	17.9	168
Ever coerced to have sex	*		ns		*		ns	
Yes	13.2	657	7.0	242	11.3	700	12.6	199
No	8.1	3425	7.3	3500	7.0	5612	10.6	1313
Total	8.9	4082	7.3	3740	7.5	6312	10.8	1513
Coerced in last 12 months.	ns		ns		ns		ns	
Yes	13.5	341	8.9	124	11.8	357	13.9	108
No	13.0	308	5.2	115	10.4	334	11.4	88
Total	13.3	649	7.1	239	11.1	691	12.8	196
Relationship with perpetrator.	ns		ns		ns		ns	
Spouse/partner	12.3	520	9.7	103	10.8	491	15.9	132
Other	11.5	217	5.8	152	8.1	289	12.7	80
Total	12.5	737	7.1	255	10.3	780	14.2	212
Did you report to Police?	ns		ns		ns		ns	
Yes	12.5	32	0.0	01	15.4	26	0.0	08
No	12.6	700	7.4	258	10.2	755	14.3	203
Total	12.6	732	7.4	259	10.3	781	13.7	211
Main reason not to report.	ns		ns		ns		ns	
No knowledge	18.4	125	6.7	90	13.9	173	11.9	42
No confidence	11.0	109	7.0	43	7.8	115	16.2	37
Normal	12.1	119	10	40	9.2	131	11.1	27
Fear/shame	11.6	315	6.8	74	9.4	295	14.9	94
Total	12.5	668	7.3	247	10.2	714	14	200

*- Statistically significant, based on x^2statistic $p < 0.05$ | ns- Not significant, based on x^2statistic $p > 0.05$

7.7 Multilevel Results of Sexual Violence and HIV Infection

7.7.1 Individual-level Findings

The first research question of this chapter was to answer the question on the association between SGBV and vulnerability to HIV infection and to identify the pathways linking the two. To achieve this, descriptive analysis reported in the previous section was extended. Table 7.5 shows results of the odds ratios of having HIV infection by SGBV. At these stages, potential confounding factors were controlled for. Three models were fitted—Model 1 for sexual violence only, Model 2 controlled for socio-economic factors, and Model 3 controlled for factors of socio-sexual practices. All results are presented with 95% confidence intervals.

In Model 1, I started by investigating the hypothesis that individuals with a history of SGBV are more likely to be infected with HIV than those without such a history. Without any controls, the findings showed that there was a significant association between sexual violence and HIV prevalence. The odds of having HIV were 1.61 [1.29–2.00] times higher for individuals with a history of SGBV in comparison with individuals without. I then introduced a range of socio-economic factors that are hypothesized to be operating in the background in Model 2 and compared victims and non-victims. Still I found that having a history of SGBV increased the odds of having HIV infection by 49 percent; individuals who suffered SGBV had 1.49 [1.18–1.87] times higher odds of having HIV than their counterparts of similar socio-economic characteristics who had not. In Model 3, I controlled for factors of socio-sexual practice but still I found that victims of sexual violence had 1.34 [1.06–1.70] times higher odds of being infected, compared to non-victims with similar characteristics.

To answer the first part of the second research question about individual level factors that partly explain HIV vulnerability, this research identified factors including: living in an urban area and engaging in multiple sexual partnerism. Based on these findings, I concluded that these are the factors that partly explain the individual level association between SGBV and HIV infection.

Table 7. 5: Odds ratios of HIV prevalence by sexual violence, UAIS, 2011 (n=7,692)

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Constant	0.07	[0.06 - 0.07]*	0.05	[0.04 - 0.08]*	0.01	[0.00 - 0.01]*
Model 1: Sexual violence						
Sexual violence (Ref: No)						
Yes	1.61	[1.29 – 2.00]*	1.49	[1.18 – 1.87]*	1.34	[1.06 – 1.70]*
Model 2: Socio-demographic factors						
Wealth status (Ref: Lowest quintile)						
Second			0.88	[0.66 - 1.16]	0.87	[0.65 - 1.15]
Middle			0.98	[0.73 - 1.30]	0.97	[0.73 - 1.31]
Fourth			0.91	[0.68 - 1.23]	0.91	[0.68 - 1.24]
Highest			1.12	[0.82 - 1.52]	1.16	[0.85 - 1.59]
Education (Ref: No education)						
Incomplete primary			1.30	[0.96 - 1.76]	1.18	[0.87 - 1.60]
Complete primary			1.42	[0.99 - 2.04]	1.20	[0.83 - 1.73]
Incomplete secondary			1.15	[0.80 - 1.66]	1.00	[0.69 - 1.45]
Complete sec & higher			0.62	[0.37 - 1.04]	0.47	[0.28 - 0.79]*
Sex of respondent (Ref: Men)						
Women			1.12	[0.92 - 1.36]	1.32	[1.03 - 1.68]*
Age of respondents (Ref: 45–59 years)						
15-24 years			0.39	[0.29 - 0.53]*	0.94	[0.66 - 1.34]
25-34 years			0.84	[0.64 - 1.10]	1.16	[0.87 - 1.55]
35-44 years			1.21	[0.93 - 1.57]	1.46	[1.11 - 1.92]*
Drunk with alcohol before risky sex (Ref: Not drunk)						
Drunk			1.22	[0.97 - 1.54]	1.25	[0.99 - 1.59]
Not applicable			1.34	[1.05 - 1.71]*	1.83	[1.31 - 2.55]*
Place of residence (Ref: Rural)						
Urban			1.91	[1.48 - 2.48]*	1.78	[1.37 - 2.32]*
Model 3: Socio-sexual factors						
Religious affiliation (Ref: catholic)						
Protestant					0.87	[0.70 - 1.08]
Moslem					0.63	[0.46 - 0.87]*
All others					1.02	[0.76 - 1.37]
Sex of household head (Ref: Male)						
Female					1.14	[0.90 - 1.45]
Marital status (Ref: Never been in sexual union)						
Married/living together					2.53	[1.61 - 3.99]*
Widowed					5.18	[2.95 - 9.08]*
Divorced/separated					3.42	[2.10 - 5.57]*
Total life time sex partners (Ref: 1 partner)						
2-4 partners					1.41	[1.08 - 1.85]*
≥5 partners					2.57	[1.86 - 3.54]*
Not applicable					0.84	[0.40 - 1.76]

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Condom use during risky sex (Ref: Not used)						
Used condoms					3.35	[2.51 - 4.46]*
HIV/AIDS stigma (Ref: Low)						
Medium stigma					1.36	[1.08 - 1.70]*
High stigma					1.78	[1.38 - 2.30]*
Random effects						
Cluster constant	0.329	0.084*	0.298	0.082*	0.236	0.078*
Clusters	470		470		470	
Individuals	7692		7692		7692	

OR: odds ratio | CI: Confidence intervals

Analysis investigated further the relationship between SGBV and HIV infection by examining possible interactions with area of residence. To achieve this, I checked whether any of the factors modeled combine with residence to increase vulnerability to the risk of HIV infection. I fitted four interaction models but SGBV and all covariates were not significant. In the next section, I turn attention to contextual drivers of HIV infection in this sample of people who answered questions on SGBV.

7.7.2 Community-level Findings

To answer the second part of the second research question on the effect of community-level factors on the association between SGBV and HIV infection, I performed three analyses: first, I applied the random level estimates to the formula proposed by Tarling (2009) and others (Section 7.7.2.1); second, I fitted a variance model of SGBV (Section 7.7.2.2); and thirdly, I fitted models that control for individual-level factors (Pickett & Pearl, 2001) (Section 7.7.2.3).

7.7.2.1 Random-level Estimates

The following equation is used to estimate community effect.

$$p = u_{oj} \div (u_{oj} + e_{ij})$$

Where p is the intra-cluster correlation, e_{ij} is variation at level 1, which is represented by 3.29 (for Logistic Regression) and u_{oj} is variation at level 2. Community random variance estimates in Table 7.5 were used to calculate the intra-cluster correlation coefficient as follows:

Model 1 random effect with only SGBV, without controls;

$level\ 1$ = 3.29 and $level\ 2$ = 0.329 (0.084)

$$p = \frac{0.329}{3.619} = 0.091$$

Model 2 random effect, controlling for socio-economic characteristics;

$level\ 1$ = 3.29 and $level\ 2$ = 0.298 (0.082)

$$p = \frac{0.298}{3.588} = 0.083$$

Model 3 random effect, controlling for socio-behaviour factors;

$level\ 1$ = 3.29 and $level\ 2$ = 0.236 (0.078)

$$p = \frac{0.236}{3.526} = 0.067$$

These results show that controlling for social-economic and socio-demographic characteristics reduced the coefficient from 0.091 in Model 1 to 0.083 in Model 2. When socio-behavioural factors were introduced in the model 3, the coefficient reduced further to 0.067, which means that 6.7 percent of the total unexplained variation in vulnerability to the risk of HIV infection can be attributed to unobserved community effects.

7.7.2.2 Community-level Sexual and Gender-based Violence

This section further adduces evidence demonstrating that there is an association between SGBV and HIV infection. Using a model with only community-level SGBV, Figure 7.1 shows that there exists a significant positive relationship between community level SGBV and HIV infection; an increase in the proportion of victims of SGBV in a community was associated with a significant increase in the prevalence of HIV infection, χ^2 11.437 [1df] $\mathrm{p} < 0.001$. These results were consistent with those observed at the individual level of analysis which showed

that people who experienced SGBV were 34 percent more likely to be infected with HIV than those who did not have similar experience but had similar characteristics (Table 7.5). From this evidence, we can conclude that there is an association between SGBV and HIV infection at both micro and macro levels.

Figure 7. 1: HIV prevalence in a community where more people have experience of sexual violence (n=7,784, cluster=470) Uganda AIS, 2011.

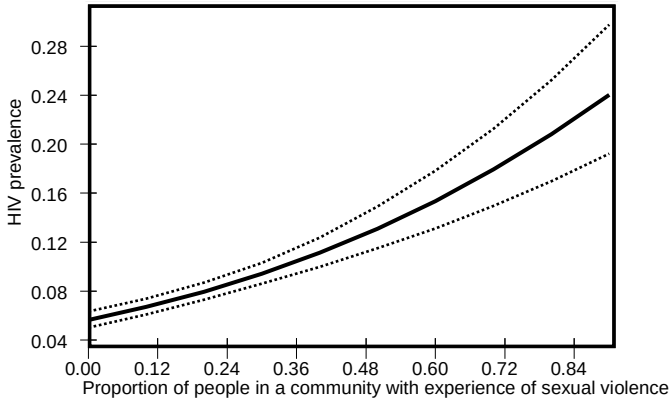


Figure 7.1 shows that an increase in the proportion of sexually abused people in a community was associated with a steady increase in the prevalence of HIV.

Solid line is the estimated effect | Dotted line is confidence interval

7.7.2.3 Controlling for Individual-level Factors

In the third and final step of investigating community-level effects, I fit a model of community-level factors and control for individual-level factors (Table 7.6); when individual-level factors are controlled for, findings show that the SGBV-HIV association reduced from OR 1.60 [1.29–1.99] to 1.47 [1.17–1.85] and remained positive in Model 3 at 1.28 [1.01–1.62]. However, when community-level factors were considered, the SGBV-HIV OR for SGBV reduced to 1.19 [0.93–1.52], making me to conclude that community level factors, especially community wealth and alcoholism have a significant effect on the association between SGBV and HIV infection; living in a community with more wealthy households increases vulnerability. Similarly, living in a community where more people engage in alcoholism prior to unsafe sex is associated with increased vulnerability to HIV compared to living in a community with fewer people who become drunk with alcohol before sex.

Table 7. 6: Odds Ratios of HIV prevalence by sexual violence after controlling for individual level effects, UAIS, 2011 (n=7,692)

	Model 1		Model 2		Model 3		Model 4	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects								
Constant	0.07	[0.05 – 0.07]*	0.05	[0.04 – 0.08]*	0.01	[0.00 – 0.02]*	0.01	[0.00 – 0.02]*
Model 1: Sexual violence								
Sexual violence (Ref: No)								
Yes	1.60	[1.29 - 1.99]*	1.47	[1.17 - 1.85]*	1.28	[1.01 - 1.62]*	1.19	[0.93 - 1.52]
Model 2: Socio-economic								
Wealth status (Ref: Lowest quintile)								
Second			0.87	[0.66 - 1.15]	0.87	[0.65 - 1.15]	0.84	[0.63 - 1.12]
Middle			0.97	[0.73 - 1.30]	0.97	[0.73 - 1.30]	0.90	[0.67 - 1.22]
Fourth			0.94	[0.70 - 1.27]	0.95	[0.70 - 1.28]	0.83	[0.60 - 1.15]
Highest			1.11	[0.81 - 1.51]	1.16	[0.85 - 1.58]	0.96	[0.68 - 1.38]
Education (Ref: No education)								
Incomplete primary			1.34	[0.99 - 1.81]	1.25	[0.92 - 1.69]	1.23	[0.91 - 1.67]
Complete primary			1.45	[1.01 - 2.07]*	1.29	[0.90 - 1.86]	1.28	[0.89 - 1.85]
Incomplete sec			1.17	[0.81 - 1.68]	1.10	[0.76 - 1.58]	1.10	[0.76 - 1.61]
Complete sec & higher			0.65	[0.39 - 1.09]	0.57	[0.34 - 0.95]*	0.58	[0.34 - 0.98]*
Sex of household head (Ref: Men)								
Women			1.14	[0.94 – 1.39]	1.32	[1.04 – 1.69]*	1.33	[1.05 – 1.70]*
Age of respondent (Ref: 45–59 years)								
15-24 years			0.40	[0.29 - 0.54]*	0.91	[0.64 - 1.31]	0.91	[0.63 - 1.30]
25-34 years			0.85	[0.65 - 1.11]	1.18	[0.89 - 1.57]	1.17	[0.88 - 1.55]
35-44 years			1.22	[0.93 - 1.59]	1.48	[1.12 - 1.95]*	1.48	[1.12 - 1.95]*
Drunk with alcohol (Ref: No)								
Drunk			1.21	[0.96 - 1.53]	1.25	[0.99 - 1.59]	1.20	[0.94 - 1.53]
Not applicable			1.36	[1.07 - 1.72]*	1.85	[1.33 - 2.57]*	1.85	[1.33 - 2.57]*
Place of residence (Ref: Rural)								
Urban			1.91	[1.47 - 2.48]*	1.82	[1.40 - 2.36]*	2.07	[1.38 - 3.08]*
Model 3: Socio-demographics factors								
Religion (Ref: Catholic)								
Protestant					0.89	[0.72 - 1.10]	0.90	[0.72 - 1.11]
Moslem					0.64	[0.47 - 0.89]*	0.65	[0.47 - 0.90]*
All others					1.02	[0.76 - 1.37]	1.03	[0.76 - 1.38]
Sex of household head (Ref: Male)								
Female					1.15	[0.91 - 1.45]	1.14	[0.90 - 1.45]
Current marital status (Ref: Never)								
Married/living together					2.56	[1.62 - 4.03]*	2.55	[1.62 - 4.03]*
Widowed					5.27	[3.01 - 9.23]*	5.17	[2.94 - 9.07]*
Divorced/separated					3.49	[2.15 - 5.68]*	3.41	[2.10 - 5.56]*
Life time sex partners (Ref: 1 partner)								
2-4 partners					1.41	[1.08 – 1.85]*	1.43	[1.07 – 1.89]*
≥5 partners					2.54	[1.85 – 3.50]*	2.55	[1.82 – 3.57]*

	Model 1		Model 2		Model 3		Model 4	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Not applicable					0.91	[0.45 – 1.85]	0.90	[0.44 – 1.84]
Condom use (Ref: No)								
Used condoms					3.36	[2.53 – 4.46]*	3.13	[2.34 – 4.20]*
Model 4: Community factors								
Proportion of households grouped in the wealthiest 40%							1.07	[1.01 - 1.13]*
Proportion of people with higher education							0.96	[0.88 - 1.05]
Proportion of people drunk with alcohol before risky sex							1.09	[1.00 - 1.18]*
Proportion of proportion of people formerly married							1.01	[0.90 - 1.12]
Proportion of people who experienced sexual violence							1.06	[0.97 - 1.16]
Proportion of men who had 2 or more wives							0.98	[0.90 - 1.05]
Proportion of people less than 18 years old at first sex							1.02	[0.94 - 1.11]
Proportion of people 20 or more years old at first marriage							0.97	[0.81 - 1.15]
Proportion of people who used condoms during last risky sex							1.14	[0.98 - 1.33]
Random effects								
Cluster constant	0.346	0.085*	0.316	0.083*	0.261	0.080*	0.242	0.078*
Clusters	470		470		470		470	
Individuals	7784		7784		7784		7784	

OR = Odds Ratio | CI = Confidence Interval | (*) = Statistical significance at 5% level, $p < 0.05$

7.7.3 Determinants of HIV Vulnerability among Victims of SGBV

7.7.3.1 Individual-level Factors of Victims of SGBV

This section answers the third research question on determinants of HIV infection among victims of SGBV. This was achieved by comparing victims and non-victims of SGBV. Three models were fitted separately for victims and non-victims. Table 7.7 presents results of Models 2 and 3.

Table 7.7 shows that two social factors are highly associated with vulnerability of victims of SGBV to HIV infection i.e. having multiple sexual partners and residing in an urban area. For example, where as victims of SGBV who had 2–4 life time sexual partners had 2.23 [1.18–4.20] times higher odds of being infected; non-victims had 1.26 [0.94–1.69] times higher odds when compared to individuals who had one life time sexual partner. Similarly, when victims with ≥5 life time sexual partners had 3.78 [1.92–7.44] times higher odds of being infected, non-victims had 2.06 [1.51–2.81] times higher odds, also in comparison with individuals who had only one partner. Victims of SGBV who resided in urban areas were also more likely to have

HIV compared to victims in rural areas. Victims residing in urban areas had 2.11 [1.31–3.41] times higher odds of being infected compared to victims in rural areas.

I also explored factors that reduce vulnerability for victims and found that educational attainment significantly and substantially reduces vulnerability among victims more than non-victims. For example, victims with complete primary, incomplete secondary, and complete secondary or higher educational attainment had 0.38 [0.18–0.83], 0.44 [0.21–0.91], and 0.13 [0.04–0.43] odds of being infected compared to individuals with no educational attainment. Most of the odds for non-victims were positive. For example, those with complete primary educational attainment had 70 percent higher odds of being infected and 46 percent for incomplete primary compared to individuals with no educational attainment.

Table 7. 7: Odds ratios of HIV prevalence between victims and non-victims of sexual violence, UAIS, 2011 (n=1,196, victims and n=6,588, non-victims)

Parameter	No sexual violence group				Sexual violence group			
	Model 2		Model 3		Model 2		Model 3	
	OR	CI	OR	CI	OR	CI	OR	CI
Fixed effects								
Constant	0.01	[0.01 - 0.02]*	0.01	[0.00 - 0.01]*	0.10	[0.04 - 0.24]*	0.05	[0.02 - 0.16]*
Model 1: Socio-economic status								
Wealth (Ref: Lowest quintile)								
Second	0.92	[0.67 - 1.25]	0.87	[0.64 - 1.19]	0.76	[0.40 - 1.43]	0.68	[0.36 - 1.29]
Middle	0.98	[0.71 - 1.36]	0.92	[0.66 - 1.27]	1.07	[0.57 - 2.01]	0.91	[0.48 - 1.73]
Fourth	1.00	[0.72 - 1.39]	0.93	[0.67 - 1.30]	1.07	[0.57 - 2.00]	0.86	[0.45 - 1.62]
Highest	1.13	[0.80 - 1.60]	1.03	[0.73 - 1.46]	1.65	[0.87 - 3.12]	1.44	[0.75 - 2.74]
Education (Ref: No education)								
Incomplete primary	1.52	[1.07 - 2.16]*	1.46	[1.02 - 2.07]*	0.79	[0.45 - 1.39]	0.65	[0.36 - 1.15]
Complete primary	1.80	[1.20 - 2.71]*	1.70	[1.12 - 2.56]*	0.48	[0.22 - 1.02]	0.38	[0.18 - 0.83]*
Incomplete secondary	1.40	[0.93 - 2.12]	1.29	[0.85 - 1.96]	0.54	[0.26 - 1.10]	0.44	[0.21 - 0.91]*
Complete sec & higher	0.96	[0.55 - 1.70]	0.79	[0.45 - 1.40]	0.21	[0.07 - 0.65]*	0.13	[0.04 - 0.43]*
Model 2: Socio-demographics								
Residence (Ref: Rural)								
Urban	1.80	[1.34 - 2.41]*	1.69	[1.26 - 2.25]*	2.32	[1.44 - 3.73]*	2.11	[1.31 – 3.41]*
Sex of household head (Ref: Male)								
Female	1.21	[0.95 - 1.56]	1.30	[1.01 - 1.68]*	0.97	[0.63 - 1.50]	1.07	[0.69 - 1.67]
Marital status (Re: Never married)								
Married/living together	3.23	[2.20 - 4.74]*	4.41	[2.65 - 7.32]*	1.20	[0.62 - 2.32]	1.24	[0.58 - 2.68]
Widowed	10.25	[6.11 - 17.19]*	7.87	[4.25 - 14.56]*	4.36	[1.77 - 10.76]*	3.85	[1.45 - 10.23]*
Divorced/separated	6.23	[3.94 - 9.85]*	5.12	[2.95 - 8.91]*	2.76	[1.29 - 5.93]*	2.50	[1.09 - 5.76]*
Model 3: Sexual practices								
Condom use at last sex (Ref: No)								
Used condoms			3.70	[2.70 - 5.08]*			2.08	[1.13 - 3.82]*
Not applicable			2.21	[1.53 - 3.17]*			0.91	[0.49 - 1.69]
Number of sexual partners (Ref: 1)								
2-4 partners			1.26	[0.94 - 1.69]			2.23	[1.18 - 4.20]*
=>5 partners			2.06	[1.51 - 2.81]*			3.78	[1.92 - 7.44]*
Not applicable			0.77	[0.35 - 1.69]			1.86	[0.33 - 10.54]
Random effects								
Cluster constant	0.364	0.103*	0.290	0.098*	0.316	0.237	0.172	0.226
Clusters	470		470		404		404	
Individuals	6588		6588		1196		1196	

OR = Odds Ratio; CI = Confidence Interval
(*): statistical significance at 5% level, $p < 0.05$

7.7.3.2 Community-level Factors of Victims of SGBV

After establishing individual-level vulnerability pathway factors for victims of SGBV, I explored community-level factors also associated with vulnerability for victims of SGBV. This was aimed at answering the third specific research question that sought to establish community-level factors determining vulnerability of victims of SGBV to HIV infection. To achieve this, three models were fitted: Model 1 was a Null Model; Model 2 contained individual level factors while Model 3 had community-level covariates.

In Table 7.8, I set out to establish the effect of community-level factors on the vulnerability of victims of SGBV to HIV infection. The analysis shows that the protective effect of complete secondary or higher educational attainment reduced from 84 to 77 percent. There were also slight reductions in the positive effect among individuals engaged in multiple sexual partnerships, and among female heads of households. However, there were increases in the effect among urban compared to rural residents and among widows. However, no community-level factor was significant, suggesting that the observed changes could be due chance.

Table 7. 8: Odds ratios of community-level prevalence of HIV among victims SGBV, UAIS, 2011 (n=1,196)

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Constant	0.12	[0.10 - 0.15]*	0.03	[0.01 - 0.08]*	0.03	[0.01 - 0.11]*
Model 1: Individual level factors						
Wealth status (Ref: Lowest quintile)						
Second			0.63	[0.33 - 1.20]	0.64	[0.33 - 1.23]
Middle			0.85	[0.45 - 1.63]	0.84	[0.43 - 1.64]
Fourth			0.79	[0.41 - 1.50]	0.61	[0.28 - 1.31]
Highest			1.37	[0.71 - 2.62]	1.07	[0.49 - 2.34]
Education (Ref: No education)						
Incomplete primary			0.68	[0.38 - 1.23]	0.70	[0.39 - 1.27]
Complete primary			0.40	[0.18 - 0.87]*	0.41	[0.19 - 0.91]*
Incomplete secondary			0.50	[0.24 - 1.04]	0.69	[0.30 - 1.59]
Complete sec & higher			0.16	[0.05 - 0.53]*	0.23	[0.07 - 0.78]*
Place of residence (Ref: Rural)						
Urban			1.96	[1.21 - 3.17]*	2.44	[1.43 - 4.18]*
Current marital status (Ref: Never)						
Married/living together			1.08	[0.50 - 2.36]	1.25	[0.52 - 3.02]
Widowed			2.86	[1.06 - 7.74]*	3.16	[1.07 - 9.35]*
Divorced/separated			2.09	[0.89 - 4.86]	2.37	[0.92 - 6.10]
Life time sexual partners (Ref: 1 partner)						
2-4 partners			2.36	[1.25 - 4.45]*	2.24	[1.05 - 4.77]*
≥5 partners			5.58	[2.74 - 11.34]*	5.15	[2.24 - 11.85]*
Not applicable			2.16	[0.38 - 12.32]	2.00	[0.35 - 11.53]
Sex of household head (Ref: Male)						
Women			2.57	[1.43 - 4.62]*	2.42	[1.32 - 4.43]*
Condom use at unsafe sex (Ref: No)						
Used condoms			2.16	[1.16 - 4.04]*	2.30	[1.22 - 4.33]*
Not applicable			0.90	[0.48 - 1.67]	0.96	[0.51 - 1.81]
Model 3: Community level factors						
Proportion of households categorised in the wealthiest 40%					1.07	[0.98 - 1.16]
Proportion of individuals having secondary or higher education					0.91	[0.82 - 1.01]
Proportion of people formerly married in a community					0.96	[0.84 - 1.09]
Proportion of people with more than 1 life time sexual partners					1.02	[0.91 - 1.13]
Proportion of individuals drunk with alcohol at last risky sex					1.04	[0.96 - 1.13]
Proportion of married men with more than 2 or more wives					0.99	[0.91 - 1.08]
Random effects						
Cluster constant	0.338	0.240	0.194	0.232	0.192	0.231
Clusters	404		404		404	
Individuals	1196		1196		1196	

(*): statistical significance at 5% level, $p < 0.05$

7.8 Discussion of Findings

This chapter set out to examine the association between SGBV and vulnerability to the risk of HIV infection. The second research question was to establish the individual- and community-level conditions that explain the relationship between SGBV and HIV infections and the third research question sought to establish individual- and community-level factors of vulnerability among victims of SGBV.

7.8.1 Sexual Violence, Moderators and HIV Vulnerability

To answer the first research question, this research has established the prevalence of HIV among victims of SGBV to be twice the national average. In the descriptive findings, HIV prevalence among victims is 14.9 percent compared to the national average of 7.3 percent.

As highlighted in the literature, there is no previous research linking SGBV at the community-level to vulnerability to the risk of HIV infection and because of this gap, it is difficult to compare these results. However, despite this gap, individual level evidence suggests that attitudes may be an explanation for pervasive sexual violence at the community level (e.g. Jewkes, 2002; Uthman et al. 2009b: Antai, 2011; Cao et al., 2014). For instance, in a representative community study in Uganda, 70 and 90 percent of men and women, respectively, were found to regard wife beating as justifiable (Koenig et al., 2003). Other studies already cited in this thesis have also reported a tendency by communities to normalize SGBV.

7.8.2 Community-level Factors of Vulnerability

The second question sought to establish community-level factors that mediate the association between sexual violence and HIV infection. Several socio-structural factors hypothesized to mediate the association between community-level SGBV and HIV infection were examined. I observed in section 7.7.2.3 that a range of community level socio-demographic and sexual practice factors weakened the association between SGBV and HIV infection. Particularly, the findings revealed that community wealth and alcoholism confound the association (Table 7.6). Based on these findings, I conclude that there is an association between SGBV and HIV positivity at the micro level.

7.8.3 Vulnerability Factors among Victims of SGBV

The third research question sought to establish micro and macro factors associated with HIV infection among victims of SGBV. I observed that living in urban areas increased the chances of having HIV infection by over 2 times among victims of sexual violence compared to people living in rural areas. On the other hand, having multiple sexual partners increased the odds of being infected with HIV by nearly 2 to 4 times compared to people who had only a single sexual partner (Table 7.7). These findings were consistent with previous research e.g. Durevall and Lindskog (2014) that show that socio-sexual risky practices especially that of men, explained the association between intimate partner violence and HIV infection. The micro determinants of vulnerability were exhaustively discussed in Chapter 5.

7.8.4 Factors that Reduce Vulnerability

The analysis also established factors that lower the likelihood of sexually abused people becoming infected with HIV. In Table 7.7, I found that having higher educational attainment lowers vulnerability to HIV infection by 56–87 percent. Individuals who had complete primary educational attainment were 62 percent, those with incomplete secondary educational attainment were 56 percent and those with higher educational achievement and reported experiencing sexual violence were 87 percent significantly less likely to be infected with HIV compared to equally sexually abused people but with no educational attainment. These findings were in tandem with international-level evidence which shows that lack of higher educational attainment was associated with twice a higher likelihood of perpetrating sexual violence (Fulu et al., 2013; Jewkes et al., 2013). After individual and community covariates were controlled for, the beneficial effect of higher educational attainment persisted (Table 7.8).

In terms of religious influence, being Moslem was associated with 37 percent reduced likelihood of having HIV infection compared to people of the Catholic faith with the same characteristics (Table 7.5). This trend was similar in the descriptive analysis which showed that HIV prevalence among victimized individuals was 8.7 among Moslems compared to 13.2 percent among Catholics (Annex 7.1). Existing research also shows that being Moslem is associated with a lower likelihood of experiencing SGBV. Using evidence from Indonesia, researchers attributed the low rate of SGBV on "strictly enforced bans on drinking [alcohol] and low rates of exposure to violence during childhood" (Fulu et al., 2013: e203). This

conclusion was informed by the fact that the association between violence and alcohol was negative in majority Moslem countries such as Indonesia and Bangladesh. From this, we can see that Moslem values appear to influence practices about violence.

These findings (e.g. in Table 7.3) also agree with previous research. First, previous research has shown that there is an overlap between types of SGBV; meaning individuals who experience forceful sex also experience coercive sex. In this research, 93.3 percent of victims of SGBV experienced both forced and coerced sex. Second, SGBV is mainly perpetrated by intimate partners. This study finds that 70.6 percent of SGBV among women was perpetrated by either the spouse or other sexual partner. Third, majority of victims do not report SGBV to Police, a primary action towards redress. A total of 95.6 percent female victims and 99.6 percent male victims in this survey did not report, of whom 30–47.1 percent cited fear of repercussions or shaming the family for not reporting. These issues have been identified in regional as well as international research. "The fear of being blamed, and a perceived lack of support from families, friends, and services leads to underreporting and affects help-seeking behaviour" (Abrahams et al., 2014: 5). See also Garcia-Moreno et al., 2006.

In these results, it is higher educational attainment that substantially reduces vulnerability to HIV infection among victims of SGBV; multiple sexual partners were found to confound the association between SGBV and HIV infection. Relating Bourdieu's theory to the association between SGBV and HIV infection, we see that multiple sexual partnerships were associated with HIV infection but this was discussed in Chapter 6, Section 6.6.1. The other factors that was also associated with SGBV and HIV infection was gender issues – female victims of SGBV being more vulnerable to HIV infection than male victims with similar other characteristics and place of residence with victims of sexual violence in urban areas being more vulnerable than their rural counterparts who share similar characteristics.

7.9 Conclusion from the Findings

This research has attested that the effect of SGBV on HIV vulnerability occurs at both individual and community levels. Through this evidence, this research communicates that it is no longer sufficient to conceptualize SGBV merely in individual terms (Jewkes & Morrell, 2010). The central argument here is that the micro and macro mutually constitute and are mutually constituted.

To conclude, sexual violence is associated with vulnerability to the risk of HIV infection in Uganda. The most important factors influencing the association between SGBV and HIV infection are socio-demographic (complete primary educational attainment) and socio-behavioural factors (married or living with a spouse and multiple sexual partners). These findings offer new insights into our understanding of sources of vulnerability to HIV infection. Contrary to current knowledge, these findings demonstrate that the social environment wields some influence in people's vulnerability to the risk of HIV infections. This new sociologically informed dimension has important implications for HIV/AIDS policies, programmes, and research as discussed in the eighth and final chapter of this thesis, which follows.

Chapter Eight

Summary, Conclusion and Policy Implication

Chapter 8

Summary, Conclusion and Policy Implication

8.0 Introduction to the Chapter

This chapter gives a summary of the findings and a discussion of cross-cutting issues. It also provides conclusions based on the findings and the unique contribution of this research. The chapter also suggests the policy implications of these findings. Importantly, this chapter makes the argument that individual level factors of HIV vulnerability and risk to HIV infection are important but community level factors are perhaps more important. The chapter sums the research by highlighting its possible limitations and proposing some areas of focus for future research.

8.1 Summary of Findings

8.1.1 Socio-Economic Status

Chapter 5 examined the association between socio-economic status and HIV infection; identified the factors that confound the association between SES and vulnerability to HIV infection; and addressed how the determinants of vulnerability have changed between 2004-05 and 2011. Compared to those in the lowest economically ranked households, individual-level results in the pooled 2004-05 and 2011 data indicate that belonging to the highest wealth categorised household is associated with an increased likelihood of being infected with HIV among women and in rural areas (Table 5.4; 5.5 and 5.6). Compared to no education, complete secondary and higher educational attainment is negatively associated with being HIV positive in the general analysis, and in urban areas, among women and men, and in 2004-05 and 2011 in the sub group analysis (Table 5.4; 5.5; 5.6; and 7.7). However, primary educational attainment is positively associated with being infected with HIV compared to no education; it increases vulnerability by 22-46 percent in 2004-05 and by 24-26 percent in 2011 (Table 5.7).

Sexual practices explain the relationship between socio-economic status and HIV positivity. In Table 5.4, I show that after controlling for socio-demographic factors in Model 3, the effect of highest wealth status on HIV infection relative to lowest household wealth status was still significant, 1.20 [1.02–1.40]. However, when sexual practices were controlled for in Model 4,

the wealth-HIV association weakened; when these factors are controlled for, the odds ratio of the association reduced to 1.15 [0.98–1.35]. The fact that the association between wealth status and being infected with HIV ceased being significant once factors for sexual practices are controlled for allowed me to conclude that the wealth-HIV relationship is explained by these factors.

Between 2004-05 and 2011, the prevalence of HIV increased in some populations while in others, it decreased. The most important change is in area of residence, where rural residents, although still having lower HIV prevalence (0.43 [0.33–0.56] in 2004-05 and 0.60 [0.49–0.74] in 2011) than urban residents, were more likely to be infected with HIV in 2011 than 2004-05. And, people who used condoms during their last unsafe sex in what may be a reverse finding surprisingly had higher odds of being infected with HIV and this worsened in 2011 compared to 2004-05. The increase in the vulnerability of rural residents is associated with multiple sexual partners which increased vulnerability by 2.14–3.93 times in rural areas compared to 1.92–3.38 times in urban areas; widowhood increased vulnerability by 8.75 times in rural areas compared to the never married individuals and complete primary educational attainment which increased vulnerability by 1.30 [1.08–1.57] times in rural areas compared to no educational attainment (refer to Table 5.5). The findings in this study support previous evidence which shows that risky sexual practices such as multiple sexual partners; adolescent sex; and cross generational, transactional and commercial sex are key drivers of the AIDS epidemic in Uganda (Uganda AIDS Commission (UAC), 2014).

In terms of improvement, three important changes occurred: (a) people who engaged in unsafe sex while they, their sexual partners or both were drunk with alcohol, were less likely to be infected in 2011 (1.33 [1.14–1.54]) than in 2004-05 (3.03 [2.58–3.60]); (b) the odds of women being infected with HIV were higher (1.40 [1.24–1.58]) than among men in 2011 compared to 1.54 times (1.54 [1.33–1.77] in 2004-05; and (c), the protective benefit of higher educational attainment in preventing HIV infection increased by 10 percentage points in 2011 (0.53 [0.38–0.73] compared to 2004-05 (0.63 [0.43–0.94] (Table 5.7).

8.1.2 Socio-Structural Factors

Chapter 6 addresses the effects of social and structural factors on vulnerability to the risk of HIV infection; specifically, the chapter examines the role of community-level[12] SES in influencing vulnerability; and identifies pathways through which socio-structural factors are linked to HIV vulnerability. Several community-level socio-structural factors were positively associated with being HIV positive. These include: the proportion of people in the community who are formerly married and the proportion of people in the community who drink alcohol and become drunk with it before engaging in unsafe sex (Table 6.2). People in areas with a higher proportion of people in the above categories are more likely to be infected with HIV compared to people living in areas with a lower proportion of people in the categories named above but sharing similar other social characteristics.

Community wealth was positively associated with being infected with HIV in the pooled data analysis (39,766 cases) when educational attainment is controlled for. In the sub group analysis, community wealth is positively associated with HIV positivity among men, in rural areas, and in 2004-05. Community higher educational attainment was negatively associated with HIV positivity in the overall analysis that controlled for community wealth. In the sub group analysis, community educational attainment was negative for men, women, in rural and urban areas as well as in both 2004-05 and in 2011 (Chapter 6, Section 6.5.2.5). Overall, the effects of community wealth on HIV positive status was positive. However, population level community higher education ceased being significant after controlling for other community- and individual-level factors (Table 6.1 and 6.2).

8.1.3 Sexual and Gender-Based Violence

Chapter 7 addressed the association between SGBV and vulnerability to HIV infection; established individual- and community-level factors that mediate the association between SGBV and HIV infection; and identified factors that increase the vulnerability of victims of SGBV to HIV infection. The evidence at individual and community levels shows that SGBV is positively associated with HIV infection. For instance, at the individual level, among ever married/cohabited individuals, victims of SGBV were 34 percent more likely to be HIV positive (Table 7.5).

[12] Refer to section 6.4.1 for definition of community-level variables

Two factors confound the relationship between SGBV and HIV infection i.e. multiple sexual partnership and living in an urban area. Among victims with 5 or more sexual partners, vulnerability to the risk of HIV infection increased compared to victims with one life time sexual partner. Victims residing in urban areas had more than twice the odds of HIV infection than victims residing in rural areas (Table 7.7). An interaction model confirmed the influence of multiple sexual partnerships in the association between SGBV and HIV infection (Annex 7.2).

Higher educational attainment was substantially associated with reduced vulnerability to HIV infection for victims of SGBV. For instance, individuals with complete primary education and those with complete secondary and higher education were 62 percent and 87 percent less likely to be HIV positive, respectively compared to individuals with no education. After individual and community covariates were controlled for, the beneficial effect of higher educational attainment persisted.

8.2 Discussion of Findings

This section briefly discusses the key issues emerging from the findings because a detailed discussion was done in the respective empirical chapters 5, 6, and 7.

8.2.1 Socio-Economic Status

This research has shown women and residents of rural areas who live in the wealthiest 20% households are more likely to be infected with HIV. For a detailed discussion about the mechanisms through which household wealth operates to increase vulnerability, see Chapter 5, Section 5.1.1. Women in economically better off households are the most vulnerable to HIV infection compared to women in less economically better off households. This is likely due to gender inequalities also noted in a global study by Richardson et al. (2014). In unequal households, resources are more likely to be owned by men, which they use to engage in practices that heighten men's, and women's vulnerability to HIV (Silberschmidt, 2001; Haram, 2004). The positive wealth and HIV association among women is likely driven by the rural environment where wealth status was generally associated with greater vulnerability to the risk of HIV infection. But it may also be that the higher HIV prevalence among women in wealthy households is the reason for the higher HIV prevalence in wealthy households in rural areas. Closely related to the above point is living in a female headed household which also increased

the probability of infection. Greater association between being a female head of a family and being HIV positive underscores the greater disadvantage for these women and their family members.

The factors that partially explain the association between wealth status and HIV infection are engaging in multiple sexual partnerships, and being drunk with alcohol prior to engaging in unsafe sex. A detailed discussion on the mechanisms through which social factors including the practice of multiple sexual partnerism increase vulnerability to HIV infection was done in Chapter 6: Section 6.1.1. Some of the ways that have been suggested are that people who are economically better off tend to engage in life styles that increase sexual partners. On other hand, the capacity of economically disadvantaged people to avoid HIV infection may be related to their inability to afford HIV services (Fortso & Kuate-defo, 2005). The other mechanisms are out right commercial sexual practice (Gillespie et al., 2007; Durevall & Lindskog, 2012) and the effects of poverty (Patel et al., 2012). This literature suggests that wealth and poverty seem to operate simultaneously to increase vulnerability to the risk of HIV infection.

The mechanism through which alcoholism partly explains the association between HIV infection and wealth status is also discussed in Chapter 7, Section 7.3.3. According to researchers, alcoholism is associated with domestic violence which sets off practices that increase the risk of HIV infection (Fisher et al., 2007; Mongi et al., 2013). Kalichman et al. identified several mechanisms through which alcoholism may increase vulnerability to HIV infection including having low educational attainment, being wealthy, peer influence, and having sexual partners who are older (Kalichman et al., 2007b; 2007c). Practicing commercial sex has been advanced as an important mechanism through which alcoholism can enhance vulnerability to the risk of HIV infection (Fisher et al., 2007).

HIV prevalence substantially increased from 6.4% in 2004-05 first survey to 7.3% in the second survey in 2011. After controlling for a range of socio-economic factors, socio-demographic, and socio-sexual factors, individuals were 23 percent more likely to be infected than in 2004-05 (Table 5.4). This increase was higher than 11.4 percent incidence between 2008 and 2010 reported in model estimates (UAC, 2011). The observed increase is likely driven by an increase in HIV prevalence in rural areas (Table 5.7) and increase in the odds of HIV infection among people who used condoms before engaging in unsafe sex (this is likely a post infection effect already discussed). Importantly, there were equally substantial *decreases*

in the odds of HIV infection among women. The reduction in HIV prevalence is likely due to delayed onset of sex and increase in condoms use by young people (under normal circumstances) and adoption of safer sexual and social practices by adults (Asiimwe-Okiror et al., 1997). Further, there was a change in the effect of education on reducing HIV prevalence. Higher educational attainment (complete secondary or higher) was associated with reduced prevalence in 2011 (odds ratio 0.53 [0.38–0.73]) than in 2004-05 (odds ratio 0.63 [0.43–0.94]), an aspect that could signal ability of educated people to benefit from AIDS prevention messages or improved economic conditions of the elite—conditions that are necessary for the adoption of safer practices.

8.2.2 Socio-Structural Factors

Findings in Table 6.1 show that living in an area with a high proportion of: previously married people; people with multiple sexual partners; wealthy households; people who are drunk with alcohol before risky sex; and people engaging in early sex was associated with an increase in HIV prevalence. The other factors are living in an area where a higher proportion of people have comprehensive HIV/AIDS knowledge, and where a higher proportion of people use condom during risky sex. Higher HIV prevalence in communities with some of these practices suggests: cultural practices may be influencing HIV trends; poverty may be limiting access to education hence early marriage and early sex; Uganda's National Planning Authority reports that 45 and 59 percent students drop out at primary and secondary school in Uganda, respectively (NPA, 2012) while marital instability may be manifestations of poverty and the lack of social security.

When controls of individual level factors were introduced in Table 6.2, the association with community wealth persisted, suggesting that people who live in communities with a higher proportion of wealthy households are more vulnerable to HIV infection than those who live in communities with more households that are less wealthy. These findings contradict those in Zambia which showed that living in a low and medium SES community was associated with an increased prevalence of HIV infection (Gabrysch et al., 2008) but agree with those of Ishida et al. (2012) showing that better community SES was positively associated with HIV infection. Similarly, having a higher proportion of people who drink alcohol and become drunk with it before engaging in unsafe sex in a community, and a having a higher proportion of formerly married people in a community was associated with increased odds of HIV infection. One of

the key socio-structural findings is that having a higher proportion of men in a community who are polygamous was associated with a reduced odds of HIV infection. See discussion in Section 6.7.1.

8.2.3 Sexual and Gender-Based Violence

This research established that SGBV is associated with HIV infection and that sexual practices (multiple sexual partners, and urban place of residence) confound their association (Chapter 7, Section 7.7.1). This is likely due to the reasons already discussed in the previous sections. The other pathways which were also found to mediate the SGBV-HIV association were the age of respondents, sex of respondent, current marital status and religion. The possible explanation of how these factors influence the SGBV-HIV relationship is like that discussed in the previous sections.

Among victims of SGBV, individuals living in urban areas have a higher likelihood of HIV infection than those living in rural areas but sharing similar background characteristics. Similarly, sexually abused individuals engaging in multiple sexual partnerships have an increased odds of HIV infection as opposed to those who practice serial monogamy. The operative mechanism of these factors among victims of SGBV is likely similar to that among non-victims, already discussed. Also, victims with secondary or higher education had a substantially reduced odd of having HIV infection of 56–87 percent, suggesting that educational attainment is key in escaping SGBV or ameliorating its consequences. Among non-victims, higher education reduced vulnerability by 21 percent but primary educational attainment increased vulnerability by 46–70 percent.

From the forgoing findings, several fundamental conclusions can be drawn regarding factors associated with vulnerability and risk to HIV infection in Uganda.

8.3 Conclusions from the Findings

8.3.1 Household Wealth Status

The results provide little evidence of a significant overall association between household wealth and HIV infection. However, there is some indication of increased risk among those in

wealthier households that is explained by sexual behavior factors. The increased risk among individuals in wealthier households is apparent for women and rural residents. At the community level, 7.0 percent of unexplained variance in HIV prevalence was attributed to unobserved community effects.

8.3.2 Educational Attainment

People with higher educational attainment (complete secondary or higher) are less vulnerable to the risk of HIV infection in Uganda compared to people with no educational attainment having similar other socio-demographic characteristics. Overall, people with higher educational attainment are 37 percent less likely to be infected with HIV compared to people with no educational attainment and having similar other social characteristics. In terms of place of residence, people with higher educational attainment in urban areas are 57 percent less likely to be infected with HIV than people with no educational attainment who share similar other characteristics. Individuals in rural areas are not significantly less vulnerable to the risk of HIV infection (0.83 [0.59–1.17) compared to those with no educational attainment who also had similar other social characteristics.

The effect of educational attainment in reducing vulnerability among women and men was nearly similar. Men with higher educational attainment were 49 percent less likely to be infected compared to men with no educational attainment who share similar other social characteristics. On the hand, women were 45 people less likely to be infected compared to women with no educational attainment who also have similar other social characteristics. Between 2004-05 and 2011, individuals with higher educational attainment in 2004-05 were 37 percent less likely to be infected with HIV compared to those with no educational attainment sharing similar other social characteristics. In 2011, individuals with higher educational attainment were 47 percent less likely to be infected with HIV than those with no educational attainment but possessing similar other social characteristics. The protective effects of educational attainment on the risk of HIV infection increased in 2011.

Whereas higher educational attainment reduces vulnerability to the risk of HIV infection, primary educational attainment in the time sub group analysis increases vulnerability relative to people with no education. In 2004-05, individuals with primary level educational attainment had 22–46 percent increased likelihood of being infected with HIV compared to individuals

with no educational attainment who had similar social characteristics. As much as this reduced 5 years later, the positive association persisted where individuals with primary educational attainment were 24–26 percent more likely to be infected with HIV than those with no education attainment.

8.3.3 Sexual and Gender-Based Violence

Sexual and gender based violence increases vulnerability to HIV infection in Uganda by 34 percent. Individuals who experience SGBV are 34 percent more likely to be infected with HIV than individuals with no experience of SGBV but having similar other social characteristics.

For sexual and gender based violence and educational attainment, individuals with higher education are 53 percent less likely to be infected with HIV compared to individuals with no educational attainment but sharing similar other social characteristics (Table 7.5). Further, educational attainment reduces the vulnerability of victims of SGBV to the risk of HIV infection compared to non-victims. Victims of SGBV with higher educational attainment were 87 percent less likely to be infected with HIV compared to victims with no educational attainment and sharing similar other social characteristics. For non-victims, the likelihood of being infected with HIV was lower by 21 percent (and insignificant) (Table 7.7).

8.3.4 Theoretical Conclusions

These findings are generally consistent with Bourdieu's ontological and epistemological arguments. First, the substantial reduction of vulnerability associated with higher educational attainment supports Bourdieu's thesis on the importance of cultural capital to individuals in a social system. Second, the enhanced vulnerability associated with SGBV also supports his theory of symbolic violence, in which he vehemently argues that powerful actors exploit weaker members of society. However, the increased vulnerability to the risk of HIV infection of individuals living in 'wealthy' households and of people with higher educational attainment (as seen in interactional analysis) in rural areas represents an exception to Bourdieu's theory of capital. According to his theory, access to, and control over resources should give individuals advantage in a social system but these findings suggest the opposite.

Further, by revealing that social relationships, notably, marital relations, multiple sexual partnerships and the associated issue of condom use during sexual relations confound the determinants of HIV risk, this research supports Bourdieu's theory of social capital, in which he argues that the nature and quality of relationships influences the wellbeing of individuals. However, it is important to note that Bourdieu warns against focusing on the manifestation of reality, preferring to focus on its underlying causes. He argues that distant social conditions such as economic resources and power (as discussed above and in detail in Chapter 3) should be the focus of research.

These findings also support Bourdieu's argument on the wider implications of capital. To him, capital has more than economic value. One of the implications of capital is social classification. For example, classifying individuals into rural and urban residents but within these spatial dichotomies, capital creates HIV vulnerability differently. In this research, the 23 percent higher odds of HIV infection among individuals in economically better off households in rural areas points to the role of unobserved factors. It is likely that having more economic capital, without corresponding other resources, including cultural capital or having poor cultural capital, heightens vulnerability. In urban areas, a normal trend exists where vulnerability among individuals with higher education is 36–57 percent lower and vulnerability due to increased wealth status is negative (e.g. Figure 5.2). This suggests that urban residents with higher education are also more likely to be economically better off. On the other hand, the urban poor, majority of whom have lower educational attainment (67.8% urban residents in the lowest wealth quintile had primary or no educational attainment) were 28% more vulnerable. Overall, as Bourdieu argues, this means that it is a mixture of resources that lead to better welfare.

Epistemologically, the evidence showing that vulnerability to the risk of HIV infection is associated with individual and community-level factors is also in agreement with Bourdieu's epistemological arguments that proper social analysis ought to consider the influence of both structure and agency in the construction of social reality, in this case vulnerability to the risk of HIV infection. HIV/AIDS research therefore ought to inquire beyond the individual/micro environmental factors that increase vulnerability and risk to HIV infection. By separating the effects of the different levels of social reality, we are able take appropriate action to prevent HIV infections.

On the basis on the above arguments, we can conclude that Bourdieu's theory is generally applicable to Africa's HIV/AIDS context although there are some exceptions.

8.4 Contribution of the Research

The AIDS literature is littered with controversies surrounding the association between various factors/conditions and HIV infection (e.g. Gillespie, 2007; Gillespie et al., 2007; Ishida et al., 2012). Using STOP and multilevel modelling, this research plunged into these debates by investigating the association between individual- and community-level SES and SGBV and HIV positivity, from which it makes nearly a dozen momentous contributions.

The first controversy reported in Chapter 5 pertains to the association between SES and HIV infection. Some studies such as Dinkelman et al. (2007); Lopman et al. (2007); Dodoo et al. (2007) and Magadi (2013) (in urban areas) show that the association between wealth and HIV positive status is negative while others such as Mishra et al. (2007) Johnson & Way (2006) and Fox (2010, 2012) show the opposite. At the population level, my research shows a positive but non-significant wealth-HIV association after controlling for other important socio-economic and socio-demographic characteristics in the individual-level analysis. In the analysis disaggregated by gender and rural/urban area of residence, the association was positive and significant among women and in rural areas.

The second controversy also reported in Chapter 5 is about the association between attainment of education and HIV positive status. Some evidence such that of Meekers & Ahmed (2000); Dinkelman et al. (2007); Marteleto et al. (2008) and Fortson, (2008) shows that the association between education and HIV infection was positive but others including Magnani et al. (2002); Gupta & Mahy (2003); and Glynn et al. (2004) shows that educational attainment and HIV infection are negatively associated. My research shows that individuals with complete secondary or higher educational had lower odds of HIV infection in the overall (population-level) individual-level analysis, among women, among men, in urban areas and in 2011. However, attainment of primary level education was associated with increased odds of HIV infection. Except for rural areas, and in 2004-05, this research supports existing evidence showing a negative association between higher educational attainment and HIV infection. The findings from this research further show that the effect of secondary or higher educational attainment on vulnerability to the risk of HIV infection is context specific.

The third area of contribution is on the effect of community-level factors (meso environment) on vulnerability to the risk of HIV infection reported in Chapter 6. Few studies report findings of the association between community-level effects and HIV positivity (Ishida et al., 2012). Using a composite measure of SES, Gabrysch et al. found that young women (15–24 years) living in low and medium SES communities had a higher prevalence of HIV infection than those in higher SES areas (Gabrysch et al., 2008) but Ishida and colleagues observe an opposite relationship – people in higher SES communities had higher HIV prevalence rates than those in lower SES areas (Ishida et al., 2012). Using a composite wealth quintile in the current research, there was a positive community wealth-HIV association in the overall analysis, among men, residents of rural areas, and in 2004-05. However, among urban residents, and in 2011, the association was negative. The effects of community wealth vary across groups, are context specific and it is important to disaggregate analysis.

Still on community-level effects and as the fourth contribution, few studies have measured the magnitude of random effect. In a research of over 20 sub Saharan African countries, Magadi (2011a) found 30%; Magadi (2013) found 28.5%; Magadi, 2011b) 10–15%; Magadi & Desta (2011) found 15–30% of unexplained variance was accounted for by factors at the community level. Similarly, basing on community acceptance of people living with HIV, Chiao et al. showed that community factors accounted for 23% among women and 32% overall unexplained variance (Chaio et al., 2009). The present research joins this small body of compelling evidence to show in Chapter 5 that 5–15% (5% in urban and 13% in rural, 10% in women and in 2011 and 11% in men, 15% in 2004-05 and 9%, overall) of unexplained variation in HIV vulnerability is due to community-level factors.

Further to point four above, there is raging debate in multilevel modelling regarding the optimum number of upper level cases. The studies quoted above used less than 30 upper level cases. This research used 887 upper level cases in the multilevel model. Therefore, by producing random effects like those of previous studies, my research enlightens this debate by showing that a small or large number of higher level cases in a multilevel model all give the analysis adequate statistical power (See Table 5.4, 5.5, 5.6 and 5.7). Statistical power, which is largely dependent on sample size, is important in enabling the detection of effect, whenever it exists.

The fifth area of contribution which is detailed in Chapter 7 is in SGBV. Many researchers have reported findings on the prevalence of SGBV (WHO, 2013, Garcia-Moreno et al., 2006; Fulu et al., 2013; Cao et al., 2014) and on the positive association between SGBV and HIV positivity: see for example, Van der Straten et al. (1998); Shamu et al. (2011); Balogun et al. (2012); Kouyoumdjian et al. (2013); Bazargan-Hejazi et al (2013); Hassen & Deyassa (2014); and Li et al (2014). However, there is an important dissenting international study which reported a negative association between physical and sexual violence and HIV infection (Harling et al., 2010). Amid such dissent, the present research agrees with majority studies and shows that SGBV is positively associated with HIV infection in individual level analysis.

The sixth contribution this research makes is in country-specific evidence. Predominant regional AIDS literature recommends country-specific research (e.g. Asiedu et al., 2012). This necessity arises from the knowledge that HIV/AIDS is context driven. In addition, and related, the need for AIDS-context evidence is consistent with UNAIDS "know your epidemic, know your response agenda – meaning, if countries understand the uniqueness of their HIV/AIDS situations, they would be able to respond effectively (Case et al., 2012; Shubber et al., 2014). And for Uganda, a country which experienced a dramatic decline in HIV/AIDS prevalence from 18% in the early 1990s, stabilizing at about 6% in the 2000s and rising to 7.3% in 2011-12 necessitated this research and particularly, given that SES is a neglected area of AIDS research in Uganda. This new evidence sheds for more light on the Ugandan epidemic.

The seventh contribution is on the nature of observed relationships. There are conventional relationships in the literature; for example, increased income and higher attainment of education being associated with better welfare. However, in the AIDS literature, there is evidence showing that these conventional relationships are reversed. I have already cited the bi-directional relationship between wealth and HIV and education and HIV. My research confirms the unconventional nature of some relationships in the HIV/AIDS context and the fact that some may be a *post infection effect* (PIE). These examples include: using condoms; having higher HIV/AIDS knowledge; and being in favour of women negotiating the use of condoms with their husbands, all being associated with increased vulnerability to the risk of HIV infection. The PIE phenomenon has implications for the interpretation of HIV/AIDS statistics, for policies and programmes.

The eighth contribution is on cultural stereotyping. Using polygamy as a case, the widely reported positive association between multiple sexual partnerism and HIV infection (e.g. Mah, 2010; Mah & Halperin, 2010) has led people to conclude that polygamy, a traditional form of multiple sexual partnership is associated with increased HIV vulnerability. However, empirical evidence shows that polygamy is not associated with HIV infection (Reniers & Watkins, 2010; Reniers & Tfaily, 2012). From a community perspective, my research shows that people in communities where more married men practice polygamy were *less* vulnerable to HIV infection than people in communities where less than 50 percent of married men practiced polygamy. These findings caution against cultural stereotyping, meaning, polygamy, a formally recognised traditional form of 'multiple sexual partnership' does not necessarily increase vulnerability to HIV infection like conventional multiple sexual partnerships which are based on informal and fluid sexual networks (See Table 6.2).

The ninth contribution is on symbolic violence of weaker social groups and the role of marriage in HIV prevention. Previous research such as Magadi, 2011a; 2011b; and Magadi and Desta, 2011, shows that being formerly married was associated with being HIV positive. Consequently, based on such evidence, weaker individuals such as those divorced and separated have become stigmatized groups. My own findings replicate these findings.

Lastly, the importance of time in measuring the change in people's social circumstances and the impact of public policies aimed at addressing social problems is well known (e.g. Obalenskaya, 2012). However, few studies address the association between time and HIV infection. Results of a review study show that the association between HIV infection and education changes over time. For example, studies conducted before 1996 report a positive association more than those done after (Gregson et al., 2001). In a study in Tanzania, Parkhurst showed that HIV prevalence increased among poor women but simultaneously reduced among wealthy people over time (Parkhurst, 2010). In my study, many changes occurred in a 5-year period. However, the most outstanding was the relative increase in the odds of HIV infection in rural areas where 80% of Uganda's population live compared to urban areas, which most probably also accounts for 23% overall increase in HIV prevalence in 2011 (Table 5.4). I conclude that the increase in HIV prevalence observed between 2004-05 and 2011 in Uganda is probably due to *a deterioration of sexual practices in rural areas, the positive effect of higher wealth status and complete primary educational attainment on vulnerability to the risk of HIV infection that have made the epidemic to shift to, and become entrenched in rural areas.*

8.5 Policy Implications of the Findings

These findings portend several implications for an effective response to HIV/AIDS including:

The substantial effect of socio-structural factors on vulnerability calls for a paradigm shift in the national response to HIV/AIDS – from a heavy concentration on bio-medically informed individually oriented interventions to the recognition of the influence of socio-structural conditions and moving to address them meaningfully. According to 2011–15 Uganda National Strategic Plan for HIV/AIDS, "the national response [to HIV/AIDS], which has since the 1990s and 2000s been multi-sectoral is increasingly changing its character – indeed becoming more or less biomedical" (UAC, 2011: 12). In the same plan, it is noted that, "structural, contextual and social factors, such as poverty, gender inequality, inequity and poor access to health care, as well as stigma and discrimination plus other human rights violations" are drivers of HIV infections in Uganda (UAC, 2011: 8). These factors need to be addressed.

To overcome the detrimental influence of socio-structural conditions on vulnerability, the following need to be done: first, removing the vicious ability of socio-structural conditions to increase vulnerability to the risk of HIV infection. This will need going beyond the current approach of merely recognizing the influence of these conditions in driving infections, sensitizing communities about them, relegating their implementation to civil society organizations as well as underfunding[13] social responses, to making social programmes core, allocating sufficient funds and outlining measurable outcomes. Second, economic barriers to access to established HIV prevention, care and treatment services need to be removed. For example, the 7–10 percent of the national budget out of the recommended 15 percent funding of the health sector, and the associated consequences of 44% under staffing, 57% stock out of basic medicines, etc. (MoH, 2013) and the weak health systems undermine the prospect of preventing HIV through health services (Chersich & Rees, 2008; NPA, 2012; OPM, 2012).

The strong association between HIV vulnerability and higher educational attainment calls for serious improvements in Uganda's education. The current high dropout rates of 35 percent in primary and 61 percent in secondary schools undermine efforts to prevent HIV infection using the educational avenue (Ministry of Education and Sports [Uganda] (MoES), 2014). Having

[13] In 2011–2015 National Strategic Plan for HIV/AIDS, social programmes were allocated 10%

only 10 percent of the population with higher educational attainment also undermines the potential contribution of education in preventing HIV infection. To take advantage of all benefits associated with better cognitive ability, Uganda's education needs fundamental improvements – improvements that will keep children at school longer, especially girls, who are also thrice more vulnerable to HIV infection than their male counterparts.

In all analysis, gender issues emerged prominently to be a disadvantaging condition for women's vulnerability to HIV infection. For example, HIV prevalence is high among women. It also emerged that residents in female headed families were more vulnerable than those in male headed ones. In terms of marital status, separated, divorced and widowed women were more vulnerable than men of similar characteristics. This situation points to women's weak social position (e.g. Ofosu-Amaah et al. in Lule et al. (Eds), 2009). In view of this reality, these findings suggest the need to empower women further. It is apparent that laws that undermine women's status need to be revised and those which protect women's rights need to be enforced. Equally, the various policies on women's empowerment such as the gender policy need to be implemented effectively. Other associated policies meriting serious and immediate action include the OVC Policy (2004), the Population Policy (1995), Health Policy (1999), and Culture Policy, among others.

These findings have several implications for social protection. It was observed that socially vulnerable groups were more vulnerable to HIV. It has been argued that vulnerability to HIV results from multiple vulnerabilities (Bird et al., 2010). For example, people who are vulnerable to hunger are also likely to be vulnerable to HIV infection. Uganda's social protection mechanisms are awfully inadequate and they leave majority of vulnerable people unprotected. For effective HIV prevention, these findings suggest that wider vulnerabilities need to be addressed. Individuals/households that are generally resilient are more likely to prevent HIV infection or ameliorate its consequences. Expanding the current formal social protection mechanisms such as National Social Security Fund (NSSF), Public Service Pension Service (PSPS), and Social Assistance Grants for Empowerment[14] (OPM, 2012) and expediting the enactment of the Law and policy on health insurance, constitute examples of actions in this regard.

[14] The government is piloting a social protection programme for older persons, 65 years or over in 14 out of 111 districts. In this programme, beneficiaries are given a monthly grant of Uganda shillings 23, 000 (£4/$6).

This research has revealed counter-intuitive (unexpected) findings. For example, increased HIV/AIDS knowledge, condom use at last unsafe sexual intercourse, and positive attitudes on women asking their sexual partners to use condoms when they have a sexually transmitted infection was associated with greater vulnerability to HIV, instead of lessening it. These situations present two implications: first, people become knowledgeable about AIDS issues after infection, a situation that underscores the importance of public HIV/AIDS awareness. Second, AIDS policies need to be cognisant of this situation and continue to accord PLHIV due space in HIV prevention programmes as provided in the National Strategic Plan for HIV/AIDS (NSP) and other policy and HIV/AIDS programming frameworks. Existence of unexpected results also calls for caution and expertise in interpreting HIV/AIDS statistics.

These findings showed that poor urban residents were more vulnerable to HIV infection than poor rural ones. For instance, HIV prevalence was higher among urban poor than the rural poor. This points to social disadvantage and suggests a need for proper urban development as envisaged for example by Uganda's National Development Plan and addressing the livelihoods needs of the urban poor, an aspiration also documented in NSP. To prevent HIV infection among the five million or 15 percent of the total population residing in Uganda's urban areas, concrete developments in physical planning, improving opportunities, livelihoods, and social services aimed at Uganda's 63 percent slum dwellers need to be undertaken (NPA, 2012; OPM, 2012). Otherwise, without bold steps in managing an urban population growing at 5.7 percent, nearly twice the national population growth rate of 3.2 percent, urban areas currently taking 0.35 percent of the total national budget of the Government of Uganda (OPM, 2012) will likely continue to be the nucleus of Uganda's AIDS epidemic.

However, improving conditions in urban areas without paying attention to rural development is unlikely to be effective. This is because Uganda's urban population growth, like most of SSA is driven by rural to urban migration (Bird et al., 2010). Interventions to prevent HIV infection ought to constitute a double pronged development approach, one tackling simultaneously rural and urban development. Investments such as better infrastructure, opportunities, and social services will most likely remove the motivation to migrate to urban areas. In this regard, the current 4.7 percent (OPM, 2012) annual investment in (rural) agriculture is unlikely to stimulate the rural economy to meet the growing aspirations of the 80 percent of Ugandans habiting it. Therefore, greater investment in the rural economy, especially

improvement in education is likely to substantially contribute to stemming HIV in rural as well as urban areas.

8.6 Possible Limitations of the Research

Most occupational status categories in the data used in this research have an HIV prevalence higher than the average of 6.9 percent in the pooled data and when compared with people with no occupation. However, because of the issues of categorisation and reliability raised in Chapter 5, occupational status was excluded in this his research. This exclusion may have introduced omitted variable bias in the analysis (Scheffler, et al., 2007).

Data of UAIS contains results of HIV tests results for respondents who consented to test. Compared to reported HIV test results, using HIV results obtained by clinically testing respondents as part of the UAIS is regarded as an objective biomarker (De Walque, 2009). Nevertheless, despite the advantage of HIV prevalence estimates from AIS, they have been criticized for being inaccurate measures of HIV incidence. Critics rightly argue that among the people tested in the AIS, some may have already been infected with HIV. However, since the focus of this research was on the associations between the study variables, and not on measuring incidence, this problem did not affect findings.

Another possible problem associated with AIS data is selectivity – sampled individuals not participating in the survey, especially not testing for HIV. With a 92.6%, 96.3% and 97.9% response rate among men, women and households, this problem did not affect this study. Mishra et al. argue that unsystematic non-response does not significantly affect results of analysis (Mishra et al., 2006). Another problem of AIS data is its cross-sectional nature. Because it is a one-point time data, it is difficult to track changes in the trend of the AIDS epidemic. In this study, this problem was overcome by comparing data of two successive surveys. UAIS also relies on reported occurrence of conditions such as presence of STI or behaviour such as number of sexual partners. This information is susceptible to recall bias (Seeley et al., 1994) and because of its sensitive nature, it makes it prone to social desirability bias, too (Mishra et al., 2006; 2007). In this research, this problem was overcome by using sexual behaviour variables as controls and not as predictors.

Like any other practices defined as socially undesirable, SGBV is also prone to bias (e.g. Garcia-Moreno et al., 2006). Watts and Zimmerman have suggested that SGBV against women may be universally under reported (Watts & Zimmerman, 2002), due to stigma associated with it (Kouyoumdjian et al., 2013) and social desirability (Li et al., 2014). However, other evidence shows that bias is not a problem in SGBV research. Stockman et al. concluded that self-reporting of SGBV was not a significant limitation (Stockman et al., 2013). The second problem is causality. Because most studies on SGBV are cross sectional, it is difficult to infer causality—whether SGBV led to HIV infection or vice versa (van der Straten et al., 2009; Antai, 2011; Li et al., 2014), although the expected direction of association is SGBV causing HIV infection (van de Straten et al., 2009; Li et al., 2014). This problem did not affect this research because none of the objectives was about establishing causality. A third problem is vague wording of questions; vague questions cause subjective interpretation due differences in meanings attached to SGBV concepts across cultures (Stockman et al., 2013).

Several measures are usually instituted to mitigate the biases associated with SGBV research, for example, on wording; UAIS uses the latest terminology which is precise, thus avoiding underreporting (Garcia-Moreno et al., 2006; Stockman et al., 2013). Studies have found that the use of precise terminology facilitates increased response rates of SGBV (Stockman et al., 2013). The use of administrative techniques such as training, piloting, and use of qualified and experienced interviewers as well as supervisors, as was done in Uganda, increases disclosure (Garcia-Moreno et al., 2006) and objectivity (Kouyoumdjian et al., 2013). More fundamentally, confidentiality in the interview greatly mitigates the likelihood of under reporting (Garcia-Moreno et al., 2006); this is the reason why only one person was interviewed on SGBV per household in Uganda.

This study had hoped to compare SGBV violence across time, however, questions on SGBV were not consistently asked in 2004-05 and 2011 surveys. I could not therefore determine the consistence of these findings after a five-year period. Even within the 2011 data used, there was no data on women's empowerment and data on physical and psychological violence. Consequently, only questions on forced and coerced sex were analyzed. The opportunity to establish the effect of women's level of empowerment on their experience of SGBV as well as the association between other forms of SGBV e.g. physical and psychological violence and HIV were missed.

Because of the quality measures taken in UAIS, out of 578 who responded to the question on forced sex, "ever been physically forced to have unwanted sex by your husband/spouse", 51 percent said it never happened, 31.5 said it was often, 17.2 said it happened sometimes, and 0.3 did not know. For sexual coercion, out of 7,866 who responded to the question, "ever coerced to have sex without the use of physical force", 88.2 percent said no, 11.4 yes, 0.3 refused to answer, and 0.1 did not know. Given the administrative measures taken to ensure quality data is collected, a good response rate of 99.7 percent strongly suggests that the environment did not negatively affect the survey.

8.7 Suggestions for Future Research

This research has demonstrated the effect of time on vulnerability to HIV infection. However, the analysis was limited to a survey of two waves. To observe these patterns over a long time, there is need for longitudinal research. The research also showed variations in HIV prevalence/vulnerability across places. For example, HIV prevalence rates were higher in urban than rural areas but urban areas are not homogenous. Similarly, as much as prevalence is lower in rural areas, these areas are equally not homogenous. It would be important to definitively identify the most affected clusters. Because of this, analysis that incorporates spatial techniques is required in future research (e.g. Messina et al., 2010). Further, the predominant evidence claims that HIV infections are fueled by gender roles that subordinate women to men (e.g. Silberschmidt, 2001). However, traditional gender roles have changed. There is need to examine socio-economic change and how it is influencing the construction and enactment of new gender roles and identities that are shaping vulnerability to the risk of HIV infection.

The role of higher educational attainment also requires further research. Previous research has shown that higher educational attainment is associated with reduced vulnerability to the risk of HIV infection (e.g. Gupta & Mahy, 2003; Glynn et al., 2004). This research has also demonstrated that higher educational attainment is associated with reduced vulnerability to HIV infection at the population level. However, in rural areas, individual-level higher education does not help to reduce vulnerability to the risk of HIV infection. This needs further research attention to understand why individual level higher education does not contribute to reducing HIV vulnerability in rural areas. Related to this, this research has supported previous findings (e.g. Fortson, 2008) showing that primary education in rural areas, in 2004-05, and in

2011 is associated with increased vulnerability to HIV infection. It would also be crucial to discern further the mechanisms informing this observation.

There is need for a better understanding of the relationship between gender issues and vulnerability to the risk of HIV infection. Whereas women generally have a higher prevalence of HIV than men, urban women are twice more likely to be infected than rural women. Previous research has identified urban poverty (e.g. Magadi, 2013) and inequality (e.g. Nicholas, 2010) as possible explanations. However, for rural women, (who also suffer more gender inequalities and are also more poor), their vulnerability is lower than for urban women. There is need to understand why poor women in urban areas are more vulnerable to HIV infection while poor women in rural areas are less vulnerable. In addition, individual level evidence in the literature shows that wealthy women or women in wealthy households are more vulnerable than poor women or those in poor households. This research has supported this evidence. However, community wealth status is not associated with HIV infection among women. Future research needs to explore why women in wealthy households are more vulnerable to HIV infection and yet women in wealthy communities are not.

For SGBV, the predominant literature reported in Chapter 7 shows more women suffer SGBV than men. This research is generally consistent with previous cited research and has shown that women are three times more likely to suffer SGBV than men (e.g. Table 7.2). Unlike women, more men suffered SGBV from non-intimates. Research seeking to understand why more men experience violence outside intimate relationships is necessary.

Further, the dominant literature shows that SGBV is more prevalent in rural areas (Babu & Kar, 2009). It also shows that recent SGBV is more prevalent than historical SGBV and forced sex is more prevalent than coerced sex (UBOS, 2007) (See Section 7.1.2 and 7.1). However, in this research, findings show the reverse – SGBV is more prevalent in urban than rural areas and coerced sex is more prevalent than forced sex. Future research needs to find out why higher prevalence of SGBV is now higher in urban than rural areas and why coerced sex is more prevalent than forced sex. In terms of SGBV and HIV infection, vulnerability to the risk of HIV infection associated with SGBV is also higher in urban than in rural areas, with urban victims of SGBV being twice more likely to be infected than rural victims. This increased prevalence of HIV among victims of SGBV in urban areas merits further understanding.

Lastly, the HIV/AIDS literature contains a lot of evidence of reversed relationships (e.g. Mshisha et al., 2008a). My research confirms the unconventional nature of some relationships in the HIV/AIDS context and the fact that this may be a *post infection effect*. For example, using condoms during risky sexual encounters; having higher HIV/AIDS knowledge; and being in favour of women negotiating the use of condoms with their husbands or other sexual partners are associated with increased vulnerability to the risk of HIV infection. Research based on longitudinal data would help understand better the nature of these relationships. Without such an understanding, such findings have the potential to distort HIV/AIDS knowledge, policies and programmes.

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Annex 5.1: Recoding of individual-level variables, Uganda AIS, 2004-05 and 2011.

Variable	Original coding	New coding
Blood test result	0=HIV negative 1=HIV positive 2=HIV1&HIV2 positive 3=ERROR : V-, W+, M+[15] 4=ERROR: V-, W+, M- 5=ERROR: V-, W-, M+ 6=Indeterminant	0=Negative 1=Positive
Educational attainment	0=No education 1=Incomplete primary 2=Complete primary 3=Incomplete secondary 4=Complete secondary 5=Higher	1=No education 2=Incomplete primary 3=Complete primary 4=Incomplete secondary 5=Complete sec & higher
Wealth index	1=Poorest 2=Poorer 3=Middle 4=Richer 5=Richest	1=Lowest 2=Second 3=Middle 4=Fourth 5=Highest
Religion	1=Catholic 2=Anglican/Protestant 3=Seventh Day Adventist 4=Orthodox 5=Pentecostal 6=Other Christian 7=Moslem 8=Bahai 9=Other non-Christian 10=Traditional 11=None 96=Other	1=Catholic 2=Protestant 3=Moslem 4=All others
Age	1=15-19 2=20-24 3=25-29 4=30-34 5=35-39 6=40-44 7=45-59 8=50-54 9=55-59	1=15-19 2=20-29 3=30-39 4==>40
Current marital status	0=Never been in union 1=Married 2=Living with partner 3=Widowed 4=Divorced 5=Separated/no longer living together	0= Never been in union 1=Married/living with some one 2=Widowed 3=Divorced/separated
Age at first cohabitation or marriage	Absolute number of age in years	0=<15 1=16-17 2=18-19 3=>20
Age at first sex	Absolute number of age in years	0=<15 1=16-17

[15] Categories 3–6 are coded as missing

Variable	Original coding	New coding
		2=18-19 3=>20
Comprehensive HIV/AIDS knowledge	Reduce risk of getting HIV by not having sex at all: 0=No, 1=Yes Reduce chances of getting HIV by always using a condom during sex: 0=No, 1=Yes Reduce chance of AIDS: by having 1 sexual and other partner: 0=No, 1=Yes	0=No knowledge 1=Lowest 2=Medium 3=Highest
Total number of life time sexual partners	Absolute number	0=1 partner 1=2-4 partners 2==>5 partners
Number of sexual partners, including spouse in the last 12 months	Absolute number	0=None 1=1 partner 2==>2 partners
Number of sexual partners, excluding spouse in the last 12 months	Absolute number	0=no partner 1=>1 partner
Alcohol consumption at last sex with most recent sexual partner	0=No 1=Respondent only 2=Partner only 3=Respondent & partner 4=Neither drunk but consumed alcohol	0=Not drunk 1=Drunk
Condom use during the last sex with the most recent sexual partner	0=No 1=Yes 8=Don't know	0=No 1=Yes
Ever coerced to have sex without the use of physical force?	0=No 1=Yes 2=Refused to answer 8=Don't know	0=No 1=Yes
Ever been physically forced into unwanted sex by husband/partner?	0=No 1=Yes 2=Refused to answer 8=Don't know	0=No 1=Yes
Had sexually transmitted infection in the last 12 months	0=No 1=Yes 8=Don't know	0=No 1=Yes
Had genital ulcer in the last 12 months	0=No 1=Yes 8=Don't know	0=No 1=Yes
Had genital discharge in the last 12 months	0=No 1=Yes 8=Don't know	0=No 1=Yes

Annex 5.2: Odds Ratios of HIV prevalence showing significant interactions with place of residence, UAIS, 2004-05 & 2011

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Constant	0.09	[0.08 - 0.10]*	0.20	[0.13 - 0.29]*	0.01	[0.00 - 0.03]*
Model 1: Place of residence						
Place of residence (Ref: Urban)						
Rural	0.58	[0.50 - 0.68]*	0.45	[0.28 - 0.71]*	0.30	[0.10 - 0.90]*
Model 2: Socio-economic factors						
Wealth status (Ref: Lowest)						
Second			1.14	[0.88 - 1.47]	1.20	[0.91 - 1.57]
Middle			1.12	[0.85 - 1.46]	1.27	[0.95 - 1.69]
Fourth			0.86	[0.64 - 1.16]	0.98	[0.71 - 1.34]
Highest			0.85	[0.62 - 1.17]	1.05	[0.75 - 1.47]
Second.Rural			0.88	[0.65 - 1.18]	0.84	[0.61 - 1.16]
Middle.Rural			0.85	[0.62 - 1.17]	0.77	[0.55 - 1.07]
Fourth.Rural			1.22	[0.87 - 1.70]	1.10	[0.77 - 1.58]
Highest.Rural			1.28	[0.89 - 1.83]	1.08	[0.73 - 1.59]
Education (Ref: No education)						
Incomplete primary			0.68	[0.49 - 0.93]*	0.95	[0.67 - 1.35]
Complete primary			0.54	[0.38 - 0.78]*	0.75	[0.50 - 1.11]
Incomplete secondary			0.36	[0.26 - 0.50]*	0.66	[0.45 - 0.95]*
Complete secondary & higher			0.26	[0.17 - 0.38]*	0.42	[0.27 - 0.65]*
Missing			1.11	[0.10 - 12.23]	3.04	[0.27 - 34.38]
Incomplete primary.Rural			1.30	0.92 - 1.84]	1.15	[0.79 - 1.70]
Complete primary.Rural			1.83	[1.22 - 2.73]*	1.64	[1.06 - 2.55]
Incomplete secondary.Rural			1.85	[1.27 - 2.69]*	1.55	[1.02 - 2.37]*
Complete secondary & higher.Rural			2.41	[1.46 - 3.99]*	1.91	[1.10 - 3.33]*
Missing.Rural			1.00	[0.06 - 16.57]	0.43	[0.02 - 7.63]
Ethnicity (Ref: Baganda)						
Banyankole/Bakiga			1.43	[1.07 - 1.91]*	1.64	[1.21 - 2.24]*
Iteso/Karimojong			1.41	[0.94 - 2.12]	1.74	[1.14 - 2.67]*
Lubgbara/Madi			1.17	[0.75 - 1.82]	1.53	[0.94 - 2.48]
Basoga			1.11	[0.79 - 1.57]	1.14	[0.79 - 1.64]
Langi/Acholi			1.52	[1.02 - 2.27]*	2.03	[1.33 - 3.08]*
Bagisu/Sabiny			1.19	[0.71 - 1.98]	1.02	[0.59 - 1.77]
Alur/Japadhola			0.79	[0.46 - 1.35]	1.00	[0.57 - 1.74]
Banyoro/Batoro			1.60	[1.12 - 2.27]*	1.62	[1.11 - 2.37]*
All others			0.94	[0.68 - 1.29]	1.16	[0.83 - 1.62]
Banyankole/Bakiga.Rural			0.62	[0.44 - 0.89]*	0.71	[0.49 - 1.04]
Iteso/Karimojong.Rural			0.35	[0.22 - 0.56]*	0.36	[0.22 - 0.59]*
Lubgbara/Madi.Rural			0.26	[0.15 - 0.44]*	0.26	[0.14 - 0.46]
Basoga.Rural			0.51	[0.33 - 0.79]*	0.50	[0.32 - 0.78]*
Langi/Acholi.Rural			0.60	[0.38 - 0.96]*	0.55	[0.34 - 0.90]*

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Bagisu/Sabiny.Rural			0.48	[0.27 - 0.87]*	0.56	[0.30 - 1.05]
Alur/Japadhola.Rural			0.80	[0.44 - 1.48]	0.68	[0.36 - 1.29]
Banyoro/Batoro.Rural			0.64	[0.42 - 1.00]	0.66	[0.42 - 1.04]
All others.Rural			0.74	[0.51 - 1.09]	0.67	[0.45 - 1.00]
Time in years (Ref: 2004-05)						
UG6 (2011)			0.96	[0.75 - 1.23]	1.00	[0.78 - 1.29]
UG6.Rural			1.29	[0.98 - 1.71]	1.26	[0.95 - 1.67]
Model 3: Socio-demographic factors						
Age of respondent (45-59 years)						
15-24 years					0.89	[0.62 - 1.28]
25-34 years					1.42	[1.05 - 1.92]*
35-44 years					1.50	[1.10 - 2.04]*
15-24 years.Rural					1.27	[0.84 - 1.91]
25-34 years.Rural					1.27	[0.90 - 1.78]
35-44 years.Rural					1.24	[0.88 - 1.76]
Sex of respondent (Ref: Men)						
Women					2.18	[1.75 - 2.71]*
Women.Rural					0.74	[0.57 - 0.95]*
Marital status (Ref: Never been married)						
Married/living together					2.02	[1.44 - 2.84]*
Widowed					6.22	[3.99 - 9.68]*
Divorced/separated					2.99	[2.09 - 4.27]*
Married/living together.Rural					1.14	[0.75 - 1.75]
Widowed.Rural					1.36	[0.80 - 2.32]
Divorced/separated.Rural					1.29	[0.82 - 2.02]
Drunk with alcohol before risky sex (Ref: No)						
Drunk					1.54	[1.22 - 1.95]*
Not applicable					0.69	[0.03 - 14.80]
Drunk.Rural					0.78	[0.60 - 1.02]
Not applicable.Rural					0.32	[0.00 - 24.69]
Condom use during risky sex (Ref: No)						
Used condom					1.91	[1.48 - 2.47]*
Not applicable					1.99	[0.09 - 42.92]
Used condom.Rural					1.34	[0.98 - 1.83]
Not applicable.Rural					3.78	[0.05 - 291.30]
Multiple sexual partners (Ref: 1 sex partner)						
2-4 partners					1.97	[1.47 - 2.64]*
>4 partners					3.55	[254 - 4.95]*
Not applicable					0.50	[0.25 - 1.02]
2-4 partners.Rural					1.09	[0.78 - 1.51]
>4 partners.Rural					1.10	[0.75 - 1.61]
Not applicable.Rural					1.89	[0.84 - 4.25]
AIDS knowledge (Ref: No knowledge)						

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Lowest knowledge					0.66	[0.29 - 1.52]
Medium knowledge					0.77	[0.37 - 1.61]
Highest knowledge					0.89	[0.43 - 1.83]
Lowest knowledge.Rural					1.82	[0.73 - 4.54]
Medium knowledge.Rural					1.47	[0.65 - 3.31]
Highest knowledge.Rural					1.61	[0.73 - 3.57]
Random effects						
Constant	0.478	0.044*	0.363	0.035*	0.293	0.035*
Cluster	887		887		887	
Individual	39766		39766		39766	

OR: Odds Ratio
C.I.: Confidence intervals
*: statistical significance at 5% level, $P < 0.05$

Annex 5.3: Odds Ratios of HIV prevalence showing significant interactions with gender, UAIS, 2004-05 & 2011

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	
Fixed effects						
Constant	0.05	[0.04 - 0.05]*	0.08	[0.05 - 0.12]*	0.00	0.00 - 0.01]*
Model 1: Gender						
Women	1.42	[1.30 - 1.55]*	2.00	[1.31 - 3.05]*	3.02	[1.20 - 7.62]*
Model 2: Socio-economic factors						
Wealth status (Ref: Lowest)						
Second			0.94	[0.75 - 1.18]	0.96	[0.77 - 1.20]
Middle			0.98	[0.77 - 1.23]	1.03	[0.82 - 1.30]
Fourth			1.03	[0.82 - 1.30]	1.10	[0.87 - 1.39]
Highest			0.94	[0.74 - 1.21]	1.08	[0.84 - 1.39]
Second.Women			1.15	[0.87 - 1.53]	1.13	[0.86 - 1.50]
Middle.Women			1.00	[0.74 - 1.33]	1.00	[0.75 - 1.33]
Fourth.Women			0.93	[0.70 - 1.25]	0.95	[0.71 - 1.28]
Highest.Women			1.18	[0.87 - 1.60]	1.14	[0.84 - 1.56]
Education (Ref: No education)						
Incomplete primary			0.75	[0.58 - 0.97]*	0.93	[0.72 - 1.20]
Complete primary			0.85	[0.63 - 1.14]	0.96	[0.72 - 1.28]
Incomplete secondary			0.60	[0.45 - 0.80]*	0.86	[0.65 - 1.15]
Complete secondary & higher			0.47	[0.32 - 0.69]*	0.56	[0.38 - 0.81]*
Missing			2.01	[0.41 - 9.87]	3.18	[0.59 - 17.14]
Incomplete primary.Women			1.30	[0.96 - 174]	1.18	[0.88 - 1.58]
Complete primary.Women			1.17	[0.82 - 1.66]	1.18	[0.83 - 1.67]
Incomplete secondary.Women			0.98	[0.69 - 1.38]	0.97	[0.68 - 1.39]
Complete secondary & higher.Women			0.99	[0.60 - 1.63]	1.06	[0.64 - 1.74]
Missing.Women			0.38	[0.03 - 5.46]	0.22	[0.02 - 2.98]
Place of residence (Ref: Urban)						
Rural			0.65	[0.52 - 0.81]*	0.68	[0.55 - 0.85]*
Rural.Women			0.71	[0.56 - 0.90]*	0.85	[0.67 - 1.08]
Ethnicity (Ref: Baganda)						
Banyankole/Bakiga			1.32	[1.01 - 1.73]*	1.55	[1.18 - 2.03]*
Iteso/Karimojong			0.93	[0.67 - 1.29]	1.10	[0.80 - 1.51]
Lubgbara/Madi			0.59	[0.39 - 0.88]*	0.69	[0.47 - 1.02]
Basoga			1.10	[0.80 - 1.51]	1.19	[0.87 - 1.62]
Langi/Acholi			1.37	[1.01 - 1.85]*	1.53	[1.13 - 2.07]*
Bagisu/Sabiny			0.78	[0.52 - 1.17]	0.77	[0.52 - 1.13]
Alur/Japadhola			1.04	[0.71 - 1.52]	1.12	[0.78 - 1.62]
Banyoro/Batoro			1.51	[1.11 - 2.06]*	1.64	[1.19 - 2.24]*
All others			1.11	[0.84 - 1.47]	1.20	[0.90 - 1.59]
Banyankole/Bakiga.Women			0.79	[0.58 - 1.08]	0.86	[0.63 - 1.18]
Iteso/Karimojong.Women			0.60	[0.41 - 0.87]*	0.67	[0.45 - 0.98]*
Lubgbara/Madi.Women			0.67	[0.42 - 1.07]	0.84	[0.53 - 1.33]
Basoga.Women			0.57	[0.39 - 0.83]*	0.50	[0.34 - 0.73]*

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	
Langi/Acholi.Women			0.75	[0.54 - 1.04]	0.91	[0.64 - 1.29]
Bagisu/Sabiny.Women			0.97	[0.61 - 1.55]	0.95	[0.60 - 1.50]
Alur/Japadhola.Women			0.56	[0.36 - 0.88]*	0.65	[0.41 - 1.01]
Banyoro/Batoro.Women			0.79	[0.55 - 1.13]	0.73	[0.50 - 1.06]
All others.Women			0.62	[0.44 - 0.88]*	0.70	[0.50 - 0.99]*
Time (Ref: 2004-05)						
2011			1.26	[1.07 - 1.49]*	1.26	[1.08 - 1.49]*
2011.Women			0.93	[0.78 - 1.12]	0.95	[0.79 - 1.14]
Mode 3: Socio-demographic factors						
Age of respondent (Ref: 45-59 years)						
15-24 years					0.54	[0.39 - 0.75]*
25-34 years					1.10	[0.90 - 1.34]
35-44 years					1.47	[1.21 - 1.78]*
15-24 years.Women					3.08	[2.08 - 4.56]*
25-34 years.Women					2.24	[1.71 - 2.95]*
35-44 years.Women					1.41	[1.08 - 1.84]*
Marital status (Ref: Never married)						
Married/living together					3.19	[2.22 - 4.58]*
Widowed					9.22	[5.66 - 15.01]*
Divorced/separated					4.46	[3.06 - 6.50]*
Married/living together.Women					0.47	[0.30 - 0.72]*
Widowed.Women					0.66	[0.37 - 1.15]
Divorced/separated.Women					0.56	[0.36 - 0.88]*
Drunk with alcohol before sex (Ref: No)						
Drunk					1.24	[1.05 - 1.46]*
Not applicable					0.09	[0.00 - 2.77]
Drunk.Women					1.01	[0.81 - 1.25]
Not applicable.Women					3.15	[0.00 - 3.88]
Condom use during risky sex (Ref: No)						
Used condom					2.58	[[2.07 - 3.22]*
Not applicable					22.69	[0.03 - 1.57]
Used condom.Women					0.85	[0.63 - 1.13]
Not applicable.Women					0.24	[0.00 - 3.21]
Multiple sexual partners: Ref: 1 partner)						
2-4 partners					2.31	[1.56 - 3.42]*
>4 partners					3.55	[2.40 - 5.25]*
Not applicable					1.43	[0.79 - 2.60]
2-4 partners.Women					0.90	[0.59 - 1.36]
>4 partners.Women					1.14	[0.73 - 1.75]
Not applicable.Women					0.35	[0.17 - 0.72]
AIDS knowledge (Ref: No knowledge)						
Lowest knowledge					1.60	[0.93 - 2.76]
Medium knowledge					1.32	[0.80 - 2.17]
Highest knowledge					1.59	[0.98 - 2.58]

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	
Lowest knowledge.Women					0.57	[0.29 - 1.13]
Medium knowledge.Women					0.79	[0.42 - 1.46]
Highest knowledge.Women					0.83	[0.46 - 1.52]
Random effects						
Cluster constant	0.519	0.046*	0.389	0.039*	0.325	0.035*
Clusters	887		887		887	
Individuals	39766		39766		39766	

O.R.: Odds ratios
C.I.: Confidence intervals
*: statistical significance at 5% level, $P < 0.05$

Annex 5.4: Odds Ratios of HIV prevalence showing significant interactions time, UAIS, 2004-05 & 2011

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Constant	0.05	[0.05 - 0.06]*	0.13	[0.09 - 0.17]*	0.00	[0.00 - 0.01]*
Model 1: Time in years						
Time (Ref: 2004-05)						
UG6 (2011)	1.22	[1.07 - 1.39]*	1.27	[0.82 - 1.95]	3.07	[1.21 - 7.80]*
Model 2: Socio-economic factors						
Wealth status (Ref: Lowest)						
Second			1.10	[0.88 - 1.38]	1.12	[0.89 - 1.42]
Middle			1.04	[0.83 - 1.31]	1.09	[0.86 - 1.38]
Fourth			1.13	[0.89 - 1.42]	1.15	[0.91 - 1.46]
Highest			1.12	[0.88 - 1.42]	1.24	[0.97 - 1.59]
Second.UG6			0.89	[0.66 - 1.18]	0.88	[0.65 - 1.18]
Middle.UG6			0.89	[0.66 - 1.20]	0.89	[0.65 - 1.20]
Fourth.UG6			0.80	[0.59 - 1.09]	0.83	[0.61 - 1.13]
Highest.UG6			0.91	[0.66 - 1.24]	0.87	[0.62 - 1.20]
Education (Ref: No education)						
Incomplete primary			0.87	[0.72 - 1.04]	1.09	[0.89 - 1.33]
Complete primary			1.00	[0.79 - 1.26]	1.26	[0.98 - 1.62]
Incomplete secondary			0.66	[0.52 - 0.83]*	1.12	[0.86 - 1.44]
Complete secondary & higher			0.53	[0.36 - 0.77]*	0.78	[0.52 - 1.15]
Missing			1.26	[0.36 - 4.48]	1.66	[0.46 - 6.01]
Incomplete primary.UG6			1.00	[0.77 - 1.29]	1.05	[0.80 - 1.37]
Complete primary.UG6			0.86	[0.62 - 1.18]	0.88	[0.63 - 1.24]
Incomplete secondary.UG6			0.80	[0.58 - 1.10]	0.79	[0.56 - 1.11]
Complete secondary & higher.UG6			0.73	[0.45 - 1.18]	0.73	[0.44 - 1.22]
Missing.UG6			1.00	[0.00 – 0.00]	1.00	[0.00 – 0.00]
Place of residence (Ref: Urban)						
Rural			0.45	[0.35 - 0.57]*	0.54	[0.43 - 0.69]*
Rural.UG6			1.25	[0.91 - 1.72]	1.21	[0.88 - 1.65]
Ethnicity (Ref: Baganda)						
Banyankole/Bakiga			1.06	[0.81 - 1.38]	1.42	[1.09 - 1.87]
Iteso/Karimojong			0.59	[0.42 - 0.83]*	0.85	[0.60 - 1.20]
Lubgbara/Madi			0.44	[0.29 - 0.65]*	0.64	[0.43 - 0.95]*
Basoga			0.85	[0.61 - 1.18]	0.80	[0.57 - 1.11]
Langi/Acholi			1.28	[0.94 - 1.74]	1.54	[1.13 - 2.09]
Bagisu/Sabiny			0.78	[0.51 - 1.18]	0.68	[0.45 - 1.03]
Alur/Japadhola			0.85	[0.58 - 1.24]	0.91	[0.62 - 1.34]
Banyoro/Batoro			1.60	[1.17 - 2.18]	1.64	[1.19 - 2.26]
All others			0.72	[0.53 - 0.97]*	0.81	[0.59 - 1.09]
Banyankole/Bakiga.UG6			1.13	[0.80 - 1.60]	1.03	[0.73 - 1.46]
Iteso/Karimojong.UG6			1.27	[0.81 - 2.00]	1.06	[0.68 - 1.66]
Lubgbara/Madi.UG6			1.09	[0.64 - 1.87]	0.92	[0.54 - 1.57]

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Basoga.UG6			0.83	[0.54 - 1.28]	0.94	[0.61 - 1.45]
Langi/Acholi.UG6			0.77	[0.51 - 1.17]	0.85	[0.56 - 1.29]
Bagisu/Sabiny.UG6			0.93	[0.54 - 1.61]	1.13	[0.66 - 1.93]
Alur/Japadhola.UG6			0.74	[0.44 - 1.26]	0.82	[0.49 - 1.39]
Banyoro/Batoro.UG6			0.69	[0.45 - 1.04]	0.71	[0.47 - 1.09]
All others.UG6			1.22	[0.84 - 1.77]	1.31	[0.89 - 1.91]
Model 3: Socio-demographics factors						
Age of respondents (Ref: 45-59)						
15-24 years					1.35	[1.03 - 1.78]*
25-34 years					2.04	[1.63 - 2.54]*
35-44 years					1.81	[1.45 - 2.26]*
15-24 years.UG6					0.68	[0.48 - 0.97]*
25-34 years.UG6					0.73	[0.55 - 0.97]*
35-44 years.UG6					0.95	[0.72 - 1.27]
Sex of respondent (Ref: Men)						
Women					1.80	[1.52 - 2.14]*
Women.UG6					0.92	[0.74 - 1.15]
Marital status (Ref: Never been married)						
Married/living together					2.57	[1.83 - 3.59]*
Widowed					11.18	[7.70 - 16.22]*
Divorced/separated					4.25	[3.01 - 6.02]*
Married/living together.UG6					0.78	[0.51 - 1.18]
Widowed.UG6					0.53	[0.33 - 0.87]*
Divorced/separated.UG6					0.75	[0.48 - 1.17]
Drunk with alcohol during risky sex (Ref: No)						
Drunk					1.15	[0.97 - 1.36]
Not applicable					0.23	[0.01 - 4.34]
Drunk.UG6					1.16	[0.92 - 1.45]
Not applicable.UG6					1.31	[0.96 - 1.79]
Used condoms during risky sex (Ref: No)						
Used condom					1.53	[1.20 - 1.94]*
Not applicable					5.88	[0.31 - 111.27]
Used condom.UG6					1.96	[1.45 - 2.65]*
Not applicable.UG6					1.00	[0.00 – 0.00]
Multiple sexual partners (Ref: 1 sex partner)						
2-4 partners					2.30	[1.86 - 2.83]*
>4 partners					4.30	[3.35 - 5.51]*
Not applicable					0.44	[0.23 - 0.87]*
2-4 partners.UG6					0.87	[0.66 - 1.14]
>4 partners.UG6					0.83	[0.60 - 1.15]
Not applicable.UG6					2.25	[1.03 - 4.88]*
AIDS knowledge (Ref: No knowledge)						
Lowest knowledge					1.27	[0.74 - 2.19]
Medium knowledge					1.35	[0.82 - 2.22]

	Model 1		Model 2		Model 3	
Parameter	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Highest knowledge					1.82	[1.11 - 2.97]*
Lowest knowledge.UG6					0.82	[0.40 - 1.65]
Medium knowledge.UG6					0.71	[0.38 - 1.34]
Highest knowledge.UG6					0.63	[0.34 - 1.17]
Random effects						
Cluster constant	0.511	0.046*	0.374	0.039*	0.307	0.036*
Clusters	887		887		887	
Individuals	39766		39766		39766	

C.I.: Confidence intervals
*: statistical significance at 5% level, $P < 0.05$

Annex 6.1: Recoding of derived community-level variables for data of UAIS, 2004-05 and 2011.

Variable	Individual-level coding	Community-level coding
Wealth status	1=Lowest 2=Second 3=Middle 4=Fourth 5=Highest	1 – 3 = 0 4 – 5 = 1
Education	1=No education 2=Incomplete primary 3=Complete primary 4=Incomplete secondary 5=Complete sec & higher	1 – 3 = 0 4 – 5 = 1
Age at first sex	0=<15 1=16-17 2=18-19 3=>20	3 = 0 0 – 2 = 1
Age at first marriage	0=<15 1=16-17 2=18-19 3=>20	3 = 0 0 – 2 = 1
Marital status	0= Never been in union 1=Married/living with some one 2=Widowed 3=Divorced/separated	0 – 1 = 0 2 – 3 = 1
Drunk with alcohol	0=Not drunk 1=Drunk	0 = 0 1 = 1
Life time partners	0=1 partner 1=2-4 partners 2==>5 partners	0 = 0 1 – 2 = 1
Comprehensive HIV/AIDS knowledge	0=No knowledge 1=Lowest 2=Medium 3=Highest	0 – 2 = 0 3 = 1
Condom use at last risky sex	0=No 1=Yes	0 = 0 1 = 1
Prevalence of sexually transmitted infections – genital ulcer	0=No genital 1=Reported genital ulcer	0=0 1=1
Can a woman ask her husband to use a condom if he has STI	0=No 1=Yes	0=0 1=1

Annex 7.1: HIV Prevalence among sexually abused people by socio-behavioural characteristics, UAIS, 2011 (n=1,243)

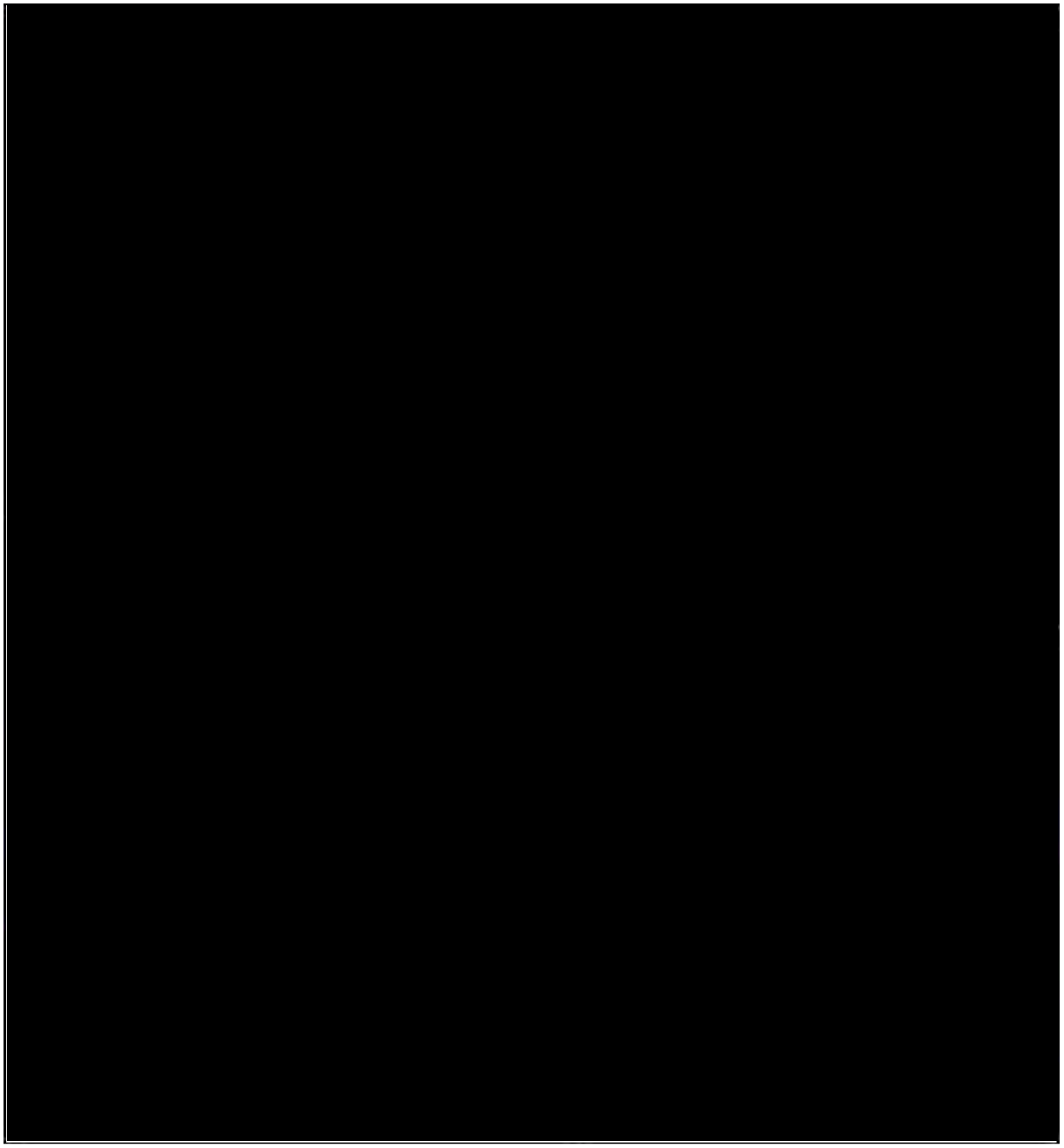
Form/Characteristic	% positive	Cases
Presence of genital ulcer	*	
Yes	16.2	370
No	9.0	871
Total	11.1	1241
Condom use at last risky sex	*	
Yes	18.6	113
No	9.9	910
Total	10.9	1023
Age at first sex	*	
≤15	16.8	232
16–17	12.4	323
18–19	8.4	227
≥20	8.7	69
Total	12.2	851
Religion	ns	
Catholic	13.2	471
Protestant	10.6	442
Moslem	8.7	161
Other	8.9	169
Total	11.1	1243
Age at first marriage or cohabitation	ns	
≤15	17.3	81
16–17	11.4	263
18–19	11.0	210
≥20	9.5	105
Total	11.7	659
Drunk with alcohol before unsafe sex	ns	
Yes	12.5	305
No	10.2	718
Total	10.9	1023
Can a woman ask her husband to use a condom?	ns	
Yes	10.4	460
No	10.2	166
Total	10.4	626
Can a woman refuse her husband sex?	ns	
Yes	9.8	552
No	14.1	99
Total	10.4	651

Annex 7.2: Parameter estimates for HIV infection for significant interactions with sexual violence

	Model 1		Model 2		Model 3	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Fixed effects						
Constant	0.07	[0.06 - 0.07]*	0.05	[0.03 - 0.08]*	0.01	[0.00 - 0.01]*
Model 1: Sexual violence						
Yes	1.61	[1.29 - 2.00]*	3.43	[1.19 - 9.89]*	5.52	[1.25 - 24.43]*
Model 2: Socio-economic factors						
Wealth status (Ref: Lowest)						
Second			0.90	[0.66 - 1.23]	0.90	[0.66 - 1.23]
Middle			0.95	[0.68 - 1.31]	0.98	[0.70 - 1.35]
Fourth			0.91	[0.65 - 1.26]	0.95	[0.67 - 1.33]
Highest			1.05	[0.74 - 1.48]	1.09	[0.77 - 1.56]
Second.Yes			0.84	[0.41 - 1.74]	0.72	[0.34 - 1.51]
Middle.Yes			1.15	[0.56 - 2.38]	0.86	[0.41 - 1.82]
Fourth.Yes			1.07	[0.52 - 2.23]	0.77	[0.36 - 1.65]
Highest.Yes			1.33	[0.64 - 2.80]	1.14	[0.53 - 2.46]
Education (Ref: No education)						
Incomplete primary			1.47	[1.04 - 2.09]	1.40	[0.98 - 2.00]
Complete primary			1.91	[1.27 - 2.87]*	1.64	[1.08 - 2.49]*
Incomplete secondary			1.39	[0.91 - 2.12]	1.22	[0.80 - 1.87]
Complete sec & higher			0.80	[0.45 - 1.42]	0.64	[0.36 - 1.16]
Incomplete primary.Yes			0.59	[0.29 - 1.17]	0.46	[0.23 - 0.95]*
Complete primary.Yes			0.25	[0.10 - 0.61]*	0.22	[0.09 - 0.56]*
Incomplete secondary.Yes			0.44	[0.18 - 1.05]	0.42	[0.17 - 1.03]
Complete sec & higher.Yes			0.31	[0.08 - 1.16]	0.23	[0.06 - 0.91]*
Sex of respondent (Ref: Men)						
Women			1.08	[0.87 - 1.33]	1.13	[0.86 - 1.48]
Women.Yes			1.50	[0.84 - 2.68]	2.75	[1.38 - 5.49]*
Age of respondent (Ref: 45-59)						
15-24 years			0.32	[0.23 - 0.46]	0.84	[0.56 - 1.28]
25-34 years			0.87	[0.64 - 1.17]	1.14	[0.83 - 1.57]
35-44 years			1.17	[0.87 - 1.57]	1.34	[0.99 - 1.82]
25-34 years.Yes			0.42	[0.22 - 0.80]*	0.66	[0.33 - 1.32]
35-44 years.Yes			0.57	[0.30 - 1.08]	1.03	[0.50 - 2.14]
45-59 years.Yes			0.45	[0.22 - 0.96]*	0.63	[0.26 - 1.53]
Drunk with alcohol (Ref: No)						
Drunk			1.21	[0.93 - 1.58]	1.26	[0.96 - 1.66]
Not applicable			1.46	[1.11 - 1.92]*	2.34	[1.59 - 3.43]*
Drunk.Yes			1.03	[0.60 - 1.77]	0.93	[0.52 - 1.64]
Not applicable.Yes			0.80	[0.44 - 1.46]	0.40	[0.18 - 0.89]*
Place of residence (Ref: Rural)						
Urban			1.81	[1.35 - 2.42]*	1.73	[1.30 - 2.32]*
Urban.Yes			1.32	[0.77 - 2.28]	1.19	[0.67 - 2.11]
Model 3: Socio-demographic factors						

	Model 1		Model 2		Model 3	
Parameters	**OR**	**CI**	**OR**	**CI**	**OR**	**CI**
Religious affiliation (Ref: Catholic)						
Protestant					0.89	[0.70 - 1.13]
Molsem					0.60	[0.41 - 0.87]*
All others					1.17	[0.84 - 1.62]
Protestant.Yes					0.84	[0.49 - 1.42]
Molsem.Yes					1.19	[0.56 - 2.51]
All others.Yes					0.50	[0.23 - 1.10]
Sex of household head (Ref: Male)						
Female					1.25	[0.95 - 1.65]
Female.Yes					0.68	[0.39 - 1.20]
Marital status (Ref: Never been married)						
Married/living together					3.44	[2.00 - 5.92]*
Widowed					5.89	[3.03 - 11.46]*
Divorced/separated					3.96	[2.21 - 7.11]*
Married/living together.Yes					0.27	[0.10 - 0.76]*
Widowed.Yes					0.54	[0.15 - 1.94]
Divorced/separated.Yes					0.51	[0.17 – 1.49]
Multiple sexual partners (Ref: 1 sex partners)						
2-4 partners					1.23	[0.91 - 1.66]
=>5 partners					2.08	[1.46 - 2.98]*
Not applicable					0.75	[0.33 - 1.70]
2-4 partners.Yes					1.99	[0.96 - 4.12]
=>5 partners.Yes					3.19	[1.38 - 7.37]*
Not applicable.Yes					3.16	[0.42 - 23.52]
Condom use during risky sex (Ref: No)						
Used condoms					3.81	[2.76 - 5.25]*
Used condoms.Yes					0.60	[0.29 - 1.24]
HIV/AIDS stigma (Ref: Low stigma)						
Medium stigma					1.47	[1.13 - 1.91]*
High stigma					1.99	[1.49 - 2.66]*
Medium stigma.Yes					0.74	[0.44 - 1.24]
High stigma.Yes					0.60	[0.31 - 1.18]
Random effects						
Cluster constant	0.329	0.084*	0.310	0.083*	0.246	0.080*
Clusters	470		470		470	
Individuals	7692		7692		7692	

Annex 8.0: Map of Uganda



The End