



AN ABSTRACT OF THE DISSERTATION OF

Ellen W. MacLachlan for the degree of Doctor of Philosophy in Public Health  
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Title: Factors that Influence Risk Behavior in HIV Infected Women Receiving  
Antiretroviral Therapy in Kampala and Masaka, Uganda

Abstract approved:

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S. Marie Harvey

Women living in sub-Saharan Africa are more affected by HIV/AIDS than any other population in the world. Two-thirds of all new HIV infections worldwide occur in sub-Saharan Africa and over 60% of these infections are in women. Indeed, 70% of all women globally who are infected with HIV reside in this region (UNAIDS, 2006). If women are already infected with HIV, unprotected sex puts them at risk of transmitting the virus to a partner or to an unborn child. It also puts them at risk of becoming superinfected with different HIV strains, including HIV strains that are already resistant to HIV drugs (Little et al., 1999; Hecht et al., 1998; Flaks, Burman, Gourley, Rietmeijer, Cohn, 2003; Kozal et al., 2006). HIV infected women also need to be concerned with adherence to their antiretroviral therapy (ART) regimen. Lack of adherence to drug regimens puts women at risk of poor HIV treatment outcomes such as drug resistance (Chesney, 2003).

When used consistently and correctly, male condoms are the most effective method of protection against HIV for sexually active persons (Stone, Timyan, Thomas, 1999). Women, however, may be unable to negotiate the use of a male condom because strong gender-based power differentials and conservative social and cultural norms often make this decision completely up to a man (Gupta, 2002; Cohen, 2004). The constraints on a woman's ability to reduce her risk have led to concerns about the use of individual based models for HIV/AIDS behavior in women. These models often fail to acknowledge the relationship factors and the social, cultural and economic contexts that influence women's behavior.

These concerns with inadequate models of HIV risk reduction for women have resulted in the publication of numerous articles proposing social-structural, also referred to as structural and environmental, models of HIV/AIDS risk reduction for women (Parker et al., 2002; O'Leary & Martins, 2000; Parker et al., 2000; Sumartojo, 2000; Sweat & Denison, 1995; Decosas, 1996; Farmer, 2003; Turshen, 1998; Tawil et al., 1995; Lurie et al., 2004). This study, therefore, sought to use social-structural variables in exploring women's HIV-related risk behaviors in a sub-Saharan Africa setting, Uganda, in East Africa.

Although much is known about structural and environmental approaches to HIV prevention among HIV negative women, little is known about the potential application of this approach to studying sexual risk behaviors and adherence to ART among HIV infected women. The overall aim of the study was to examine associations between social-structural variables (e.g., poverty, gender power dynamics) and two outcome

variables: history of unprotected sex and self-reported adherence to ART among HIV infected women enrolled in drug therapy programs.

Data were collected using structured interviews with 377 HIV infected women in four different HIV/AIDS treatment programs in Kampala and Masaka, Uganda. A major finding of the study was that few women in the sample were sexually active (34%), partly due to the high proportion of non-sexually active widows (49%). The majority of sexually active women reported condom use at last sex act (75%) and disclosure of their HIV status to a main partner (78%).

In multivariate analysis condom use at last sex act was strongly predicted by the need to borrow food to survive (OR=5.440, 95% CI 1.237, 23.923,  $p<.05$ ), possibly indicating that women engaging in sexual exchange for food are more likely to use condoms. Forced, coercive or survival sex was significantly associated with the number of meals missed per week due to lack of food (OR=1.130, 95% CI 1.125, 1.526,  $p<.005$ ). In addition, married women compared to unmarried women were three times more likely to have experienced forced, coercive or survival sex (OR=2.911, 95% CI 1.234, 6.87,  $p<.05$ ).

Because married women are considered to be relatively more economically stable, the findings that missing meals due to lack of food and married marital status are both associated with forced, coercive or survival sex, when adjusted for other factors, support the conclusion that both impoverished women and women with access to more resources can be at risk. Alternately, married women may not have as ready access to resources as is usually assumed and could also be engaging in sexual exchange behavior and borrowing food to get by.

In either case, married women are probably more likely than their unmarried counterparts to experience large gender power differentials, despite their economic resources, that limit their ability to use condoms. Indeed, for all women in the study, the structural equation modeling (SEM) model fitting analyses indicated that gender-based power may be a more important predictor than economic security of women's sexual risk behaviors. Neither factor was, however, predictive of ART adherence in this study sample.

In summary, findings suggested that sexual exchange for food and other assistance is probably common and likely driven by economic deprivation. On the contrary, results indicated that sexual exchange is not necessarily linked with risky behaviors such as lack of condom use. There is evidence of increased risk for married women in the study, especially the risk of forced, coercive or survival sex. The complex interactions between poverty, hunger, marital status, gender-based power and different HIV/AIDS risk behaviors should be further examined in order to inform the implementation of HIV/AIDS programs designed for women.

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Factors that Influence Risk Behavior in HIV Infected Women Receiving Antiretroviral  
Therapy in Kampala and Masaka, Uganda

by

Ellen W. MacLachlan

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APPROVED:

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Ellen W. MacLachlan, Author

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## DEDICATION

The author dedicates this dissertation to

Maxwell Carter MacLachlan

His love, humor and companionship, at age 2 in Uganda,

were a constant source of inspiration



You are a treasure



Factors that Influence Risk Behavior in HIV Infected Women Receiving Antiretroviral  
Therapy in Kampala and Masaka, Uganda

Chapter 1: Introduction

**I. The Global HIV/AIDS Epidemic**

Globally, an estimated 40 million people are living with HIV/AIDS (UNAIDS, 2006). In 2006 over 4 million people became newly infected with HIV, with an estimated range from 3.4 million to 6.2 million. In the same year around 3 million people died of AIDS around the world. Sub-Saharan Africa accounted for the bulk of these deaths, with 2.1 million deaths in 2006 (UNAIDS, 2006). HIV/AIDS is now the leading cause of death among adults 18-45 years old in sub-Saharan Africa. Southern and eastern Africa has been the most affected by HIV/AIDS; over 32% of all people with HIV live in this sub-region and 34% of AIDS deaths occur there (Kalipeni, Craddock, Ghosh, 2004; UNAIDS, 2006).

Over three-fourths (77 %) of all HIV-positive women in the world live in sub-Saharan Africa (UNAIDS, 2004). Clearly, of all regions, women in sub-Saharan Africa are the most devastated by HIV/AIDS. No other region in the world approaches its HIV prevalence rates or displays such a disproportionate impact on women and girls. Out of the estimated 2.2 million people who died of AIDS in sub-Saharan Africa in 2003, an estimated 800,000 were women. Since 2001, women have accounted for close to 60% of those living with HIV/AIDS in the region and this proportion is expected to grow (UNAIDS, 2004).

In addition, HIV is spreading predominantly through heterosexual contact in sub-Saharan Africa, increasing the impact on women. In fact, heterosexual sex and

perinatal transmission account for almost all cases of HIV infection in sub-Saharan Africa (UNAIDS, 2006). The impact on women is seen most clearly in southern Africa, where in 2006 more than 20% of pregnant women tested were infected with HIV in most countries in the region (UNAIDS, 2006).

## **II. Women and HIV Risk**

In 2007 heterosexual contact accounted for 80% of new HIV/AIDS cases among US women and heterosexual contact remains the primary source of HIV infection among women worldwide (CDC, 2007). One reason women are at risk of STIs such as HIV is that women are biologically more susceptible to some STIs than men, and STIs are often more difficult to diagnose in women (Eng & Butler, 1997).

This biological risk is partly due to the large amount of vaginal mucosa that can potentially be exposed to the virus (Wingood & DiClemente, 2002). This increased risk has been estimated to be up to four times higher than the risk to men during vaginal intercourse that includes exposure to HIV (Padian, 1990). Women's increased risk is also due to the length of time infected semen remains in the vagina. For girls the biological risk of HIV/AIDS can be even greater because of the presence of an immature cervix. An immature cervix in adolescent girls means that the cells on the surface of the cervix are not yet fully hardened into smooth cells and so the cells there are exposed to invading pathogens (Wingood & DiClemente, 2002). In many countries STIs such as HSV-2 (herpes simplex virus type 2) are very common and greatly increase a woman's risk of HIV (Avert et al., 2001). Infections like HSV-2 result in open sores that provide a wider area of disrupted mucosa that can be exposed

to HIV or that can contain the virus. For example, a woman who has sex with an HIV-positive partner who has open sores on his penis due to HSV-2 infection is put at a much greater risk of acquiring HIV than if he was not co-infected with HSV-2 (Weiss et al., 2001).

The most important method men and women have to protect themselves from HIV/AIDS is the male condom (O'Leary & Jemmott, 1995). When used consistently and correctly, male condoms are the most effective method of protecting against HIV for sexually active persons (Stone, Timyan, Thomas, 1999). Unfortunately many men are unwilling to use male condoms and, due to strong gender-based power differentials and conservative social and cultural norms in many societies, women may be unable to negotiate the use of a male condom. This inability to negotiate condom use exposes women to HIV infection because a woman's ability to protect herself is decreased as she is forced to rely on her partner's behavior (Amaro & Raj, 2000; Fullilove et al., 1990; Pulerwitz, Amaro, De Jong, Gortmaker, Rudd, 2002; Schoepf, 2004; Gómez & Van Oss Martin, 1996; Blanc, 2001). Recent studies of gender power and HIV in developing countries indeed indicate an increased HIV risk among women reporting lower relationship power (Pettifor, Measham, Rees, Padian, 2004; Kershaw et al., 2006; Hebling & Guimarães, 2004; Dunkle et al., 2004). As UN Special Envoy Stephen Lewis notes, "It goes without saying that the virus has targeted women with a raging and twisted Darwinian ferocity. It goes equally without saying that gender inequality is what sustains and nurtures the virus, ultimately causing women to be infected in ever greater disproportionate numbers," (Lewis, 2004).

Studies have also indicated that HIV prevention methods, such as the use of the male condom, are as critical for women who are HIV-positive as it is for women who are not infected (Moon, Vermund, Tong, Holmberg, 2001; McGowan et al., 2004; Crepaz & Marks, 2002). One study found that 50% of HIV-positive women reported recent unprotected sex, in some cases while trading sex for money or drugs (McGowan et al., 2004). Attention to prevention of the transmission of HIV among HIV-positive women is especially important in light of the increased prevalence of HIV in this population due to the advent of HAART (highly active antiretroviral therapy) also called ART (antiretroviral therapy) therapies (CDC, 1998). Meaning, since effective therapies have been available in the late 1990s, individuals with HIV remain alive and able to transmit HIV instead of dieing of AIDS. In addition, many HIV-positive women and men are receiving antiretroviral therapy and unprotected sex may lead to the transmission of drug-resistant HIV (Little et al., 1999; Hecht et al., 1998; Flaks, Burman, Gourley, Rietmeijer, Cohn, 2003; Kozal et al., 2006; Chin-Hong et al., 2005). Infection with multiple HIV-1 variants has also been linked to faster disease progression (Sagar et al., 2003).

Although these studies were conducted in the US, there is concern that the recent emphasis on HIV/AIDS treatment in developing countries will similarly overshadow the need for continued prevention among HIV-positive persons (Gayle & Lange, 2004). The public health community needs to be vigilant that, with the growth of HIV treatment programs, a similar amount of emphasis is placed on prevention of further transmission among HIV positive individuals who are receiving treatment.

Although a few studies have been published regarding risky behaviors among HIV-positive women in international settings (Jones, Ross, Weiss, Bhat, Chitalu, 2005; Stringer et al., 2004; Bennetts et al., 1999; Lindan et al., 1991; Jewkes et al., 2006; McClelland et al., 2006), no research in international settings has focused specifically on HIV-positive women receiving ART in these settings (Stein, 2005; Petersen, Boily, Bastos, 2006; Eisele et al., 2007). This lack of research may be due to the fact that HAART has only recently been introduced in most places (UNAIDS, 2004). Findings from a recent study in Brazil indicated that treatment optimism associated with HAART was conceptualized as a rationale for unsafe sex among a minority of study participants. Behaviors such as disclosure and condom use for people on ART were more likely to be associated with an intense need for social validation within the context of their sexual relationships (Kerrigan et al., 2003).

### **III. Inadequacies in HIV/AIDS Prevention Research**

To date the largely biomedical and behavioral approaches of the medical and public health community toward HIV/AIDS prevention have achieved only limited success in poor countries, especially among women (Schoepf, 2004; Sweat & Denison, 1995; Heise & Elias, 1995). HIV/AIDS risk reduction programs for women have relied on interventions such as reduction of a woman's number of sexual partners, widespread promotion of male condom use and treatment of STIs in populations at risk (Schoepf, 2004; Sweat & Denison, 1995; Heise & Elias, 1995).

All three tactics often fail to recognize the unique concerns of women noted above, such as power dynamics with their sexual partners and the social, economic

and cultural barriers to condom use and the use of health services by women (Heise & Elias, 1995). There is now recognition in the U.S. and internationally that disease models that fail to consider the social, cultural, political and economic determinants of disease do not capture the entire picture of ill health (Parker, Easton, Klein, 2002; O'Leary & Martins, 2000; Parker, Easton, Klein, 2000; Sumartojo, 2000; Sweat & Denison, 1995; Decosas, 1996; Farmer, 2003; Turshen, 1998; Tawil, Verster, O'Reilly, 1995; Lurie, Hintzen, Lowe, 2004). These determinants are often called structural and environmental, socio-environmental or socio-structural determinants.

Some of the inadequacies in HIV/AIDS prevention for women have arisen from HIV/AIDS behavioral theories that rely on individual behavior change (Fee & Krieger, 1993). These theories tend to result in interventions that fail to recognize the extent to which women's HIV-related behavior is dependent on their partner's behavior (Gillespie, 1997; Amaro, 1995; Exner, Dworkin, Hoffman, Ehrhardt, 1997; Mize, Robinson, Bockting, Scheltema, 2002). The role of context in condom use behavior is especially relevant when applied to women because condoms are worn by men and are male-controlled and so condom use is not usually under a woman's control (Fishbein, 2000). Many argue that gender-specific models for HIV prevention and care, on the other hand, would recognize and act on women's inequality in social status and power (Amaro, 1995; Amaro & Raj, 2000; Wingood & DiClemente, 2000; Zierler & Krieger, 1997).

#### **IV. Structural and Environmental Models of Prevention**

The dire situation of HIV/AIDS in women has emboldened physicians, social scientists, activists, feminists and others to severely question current HIV/AIDS prevention and care approaches (Schoepf, Schoepf, and Millen, 2000). Many of the concerns with behavioral models of HIV risk reduction in women have resulted in the publication of numerous articles proposing new models of HIV/AIDS risk. Many of these new models call for expanded structural and environmental approaches to HIV/AIDS prevention (Parker et al., 2002; O'Leary & Martins, 2000; Parker et al., 2000; Sumartojo, 2000; Sweat & Denison, 1995; Decosas, 1996; Farmer, 2003; Turshen, 1998; Tawil et al., 1995; Lurie et al., 2004).

A large body of literature describes how these structural and environmental factors influence women's HIV risk (Amaro & Raj, 2000; Fullilove et al., 1990; Pulerwitz, Gortmaker, DeJong, 2000; Schoepf, 2004; Gómez & Van Oss Martin, 1996; Blanc, 2001; Gillespie, 1997; Zierler & Krieger, 1997; Wingood & DiClemente, 1996; Baylies, 2000; Bassett & Mhloyi, 1991; Schoepf, 1992a; Schoepf, 1992b; Farmer, Connors, Simmons, 1996). The most important facet of the body of research on structural and environmental factors in HIV/AIDS risk has been the reframing of the whole notion of behavioral risk within the more complex idea of social vulnerability to HIV/AIDS (Zieler & Krieger, 1997). This approach does not, however, discount the influence of individual behaviors on HIV risk. In calling for theoretical frameworks that integrate social-structural factors and cognitive-behavioral factors for HIV prevention for women, Amaro and Raj (2000) suggest the need to include important

individually based factors within the context of the larger social dynamics of gender, race/ethnicity and class oppression.

Although much is known about structural and environmental approaches to HIV prevention among HIV negative women, little is known about the potential application of this model to secondary prevention of HIV transmission among HIV positive women, as is put forth in this dissertation. For example, as more women already infected with HIV gain access to treatment for HIV/AIDS, will the socio-structural factors that are important for uninfected women, such as gender inequality, also influence the behaviors of HIV infected women on ART, such as adherence to ART and sexual risk behavior? (UNAIDS, 2004; Saul et al., 2000). Very few studies have applied the socio-structural framework described above to women already infected with HIV and the specific risks that they face.

In summary, despite the evidence for the influence of socio-structural factors on HIV infection, few studies have systematically examined which structural and environmental factors are most linked to HIV/AIDS risk in women in different parts of the world. These contextual factors can be combined with individual factors and relationship factors in order to better understand more globally women's HIV risk. The need for more socio-structural research is equally important for HIV-positive women as for HIV uninfected women around the world. The results of socio-structural research could play a critical role in the development and evaluation of programs that are specifically designed for HIV/AIDS risk reduction in women. This research is critical given the burden of HIV/AIDS in women globally.

## **V. Study Objectives**

The overall goal of the present study, therefore, is to increase understanding of the structural and environmental factors that may be associated with HIV/AIDS risk behaviors and ART adherence in HIV-positive women receiving ART in a sub-Saharan Africa setting. To reach this goal, the first objective of the study is to describe women's individual characteristics (e.g. age, marital status, education, etc.); economic hardships (e.g. cost of housing, food and school fees, etc.) and other responsibilities (e.g. number of orphans); and levels of sexual risk behavior in this population. The second objective is to examine the associations of these individual characteristics with sexual risk behaviors (e.g., condom use) in both bivariate and multivariate analyses. The final objective is to determine which socio-structural variables are the strongest predictors of women's reported sexual risk behavior and reported adherence to ARV medication using structural equation modeling (SEM) techniques.

## **VI. Significance of the Study**

The significance of the research conducted and described in this dissertation is that, first, despite the evidence of women's social vulnerability to HIV/AIDS, it is rare to find quantitative scientific studies that focus on socio-structural factors that effect HIV/AIDS risk in women. Two such factors are poverty and gender power differences. These two factors in particular underscore women's dependence on men in most settings and thus their partner's role in behaviors related to HIV transmission.

Traditional epidemiological studies of HIV/AIDS risk in women do not typically attempt to quantify such factors in any depth.

Second, this study also includes several individual factors related to HIV risk along with the socio-structural factors. This results in a more multidimensional approach to HIV risk in women, as supported by many leaders in the field. Because of the multidimensional approach, the results of the study can provide evidence for whether or not socio-structural factors constrain women's personal agencies to such an extent that behavior change can only be achieved if enabling social and economic conditions are created.

Another significance of this study is that the study was restricted to HIV positive women who have been in an ART program for six months or longer. The cutoff of six months was based on studies that indicate that sexual behavior will often start to normalize around six months after a person starts ART. The restriction to HIV infected women in this study provides critical information regarding the level of sexual risk behavior in this specific population, in addition to their levels of ART adherence (although the study cannot assess women who dropped out of the ART programs prior to the six month eligibility cutoff). In addition to scientific interest, the results could be of use to ART programs that have started in the last several years throughout sub-Saharan Africa. These programs can use the results of the study to tailor their programs to women and their needs.

Finally, this study data analysis includes in addition to more typical bivariate and multivariate regression techniques, two SEM (structural equation models) models

of condom use behavior and ART adherence. This statistical approach allows for an analysis of the relationships between regression equations, whether causal or not, and the level of inter-dependence. In addition, the SEM models of these relationships can be displayed pictorially to enable a clearer conceptualization of the theory under study. The hypothesized model can be tested statistically in a simultaneous analysis of the entire system of variables to determine the extent to which it is consistent with the data.

## Chapter 2: Literature Review

### **I. Chapter Outline**

This chapter includes a literature review with several sections. After the chapter outline in Section I, Section II provides an ‘Overview of HIV/AIDS in Women’. Following this section is Section III ‘Determinants and Theories of HIV Acquisition in Women’, Section IV ‘Structural and Environmental Risk Factors for HIV/AIDS in Women’, and Section V ‘Determinants of Risky Sexual Behavior and Adherence to HAART in HIV Positive Women’. The final section is Section VI ‘Summary, Research Objectives and Conceptual Model for Study’. The purpose of this literature review is to provide a rationale for the choice of structural and environmental variables that will be included as measures and predictor variables in this study (see Chapter 3, Section VI).

### **II. Overview of HIV/AIDS in Women**

Since HIV/AIDS became known to the world in 1981, research focused on HIV/AIDS in women has greatly evolved. Initial consideration of HIV/AIDS as a “gay disease” in the United States did much to sideline the vulnerability of women to HIV/AIDS (Fee & Krieger, 1993). In the United States this perception of HIV as an infection of men or gay men has historically been a barrier to raising awareness about the true risk that women face (O’Leary & Jemmott, 1995). More than twenty years later, it is now clear that women and minorities are the fastest growing segments of the population becoming infected with HIV in the United States (CDC, 2004; CDC 2005). Globally more adult women (15 years and older) than ever before are now living with

HIV. The 17.7 million [15.1 million – 20.9 million] women living with HIV in 2006 represented an increase of over one million compared with 2004 (UNAIDS, 2006).

Research in developing countries, such as countries in sub-Saharan Africa, has long focused on HIV/AIDS in women because of significant increase in the largely heterosexually-transmitted HIV/AIDS cases (Gibney, DiClemente, Vermund, 1999). Most of this research, however, has concentrated on HIV/AIDS risk in commercial sex workers (CSW) or in mother-to-child-transmission (MTCT). Even today it is difficult to identify research that studies the general population of women in developing countries (Caravano, 1992; Zoysa, Sweat, Denison, 1996; Hirsch et al., 2007; Bhattacharya, 2004). In both industrialized and developing countries, however, attention to HIV/AIDS in women has mounted steadily during the 1990s and into the 2000s as HIV incidence in women increased sharply and the extent of women's particular biological and social vulnerability to HIV/AIDS has become known.

In particular, in the last decade we have witnessed a growing concern about the limitations of HIV/AIDS programs for women and the need for research and programs that look beyond mother to child transmission and high risk groups of women (Gupta, 2000). For example, many researchers have implemented important trials of female condoms and microbicides in the hopes that these technologies could help women combat HIV/AIDS (e.g., Tabet et al., 2003; d'Cruz, Samuel, Waurzyniak, Uckun, 2003; Morrow et al., 2003; Stone, 2004).

Funding for HIV/AIDS in developing countries increased dramatically during this time period with contributions from the UN Global Fund for HIV/AIDS, TB and

Malaria, George W. Bush's PEPFAR initiative, the Bill and Melinda Gates Foundation and the Bill Clinton Foundation. As a result of these funds and others since 2004 we have seen a substantial increase in HIV/AIDS treatment around the world. Negotiations with drug companies to allow access to cheaper HIV/AIDS drugs have dominated news headlines during these years. In sub Saharan Africa thousands of people are now receiving life-saving drugs and the numbers on antiretroviral therapy are expected to grow exponentially in the coming years.

### **III. Determinants and Theories of HIV Acquisition in Women**

Most of the theories that have been developed around HIV/AIDS have concentrated on the specific attitudes, skills, beliefs and knowledge that result in HIV/AIDS behavior change (Kelly & Murphy, 1992). In general the traditional psychosocial theories of behavioral change were reworked and adapted to the particular problem of HIV/AIDS behavior (Fishbein, 2000; Kalichman, 1998). Because of the concern for protecting 'risk groups' against HIV/AIDS transmission, most research early in the epidemic, and indeed into the mid-nineties, in the United States focused on gay men (Caravano, 1992; Fee & Krieger, 1993).

The behavioral models that were adapted for HIV/AIDS and used in subsequent interventions were generally predictive of behavior change (Johnson, Hedges, Diaz, 2003). It became clear, however, that the same models needed to be adapted and expanded for use with women and minorities because contextual factors such as power differentials and gender roles play such important roles in the protective behaviors of these groups (Amaro & Raj, 2000; Gillespie, 1997; Zierler & Krieger,

1997; Wingood & DiClemente, 1996; Wingood & DiClemente, 1997; Gómez & Van Oss Martin, 1996; Pettifor et al., 2004; Kershaw et al., 2006; Hoffman, O'Sullivan, Harrison, Dolezal, Monroe-Wise, 2006; Stevens & Galvao, 2007).

Generalized psychological theories of individual behavior change that have been used for HIV/AIDS are the Health Belief Model (Janz & Becker, 1984; Rosenstock, Strecher, Becker, 1994; Brown, DiClemente, Reynolds, 1991; Kirscht & Joseph, 1989), the Theory of Reasoned Action (Ajzen & Fishbein, 1977; Fishbein & Middlestadt, 1989; VanLandingham, Suprasert, Grandjean, Sittitjai, 1995), Social Cognitive Theory (Bandura, 1989; 1994) and the Transtheoretical Model (Prochaska, DiClemente, Norcross, 1992; Galavotti, Cabral, Grimley, Riley, Prochaska, 1993; Rietmeijer et al., 1992). Newer models of HIV/AIDS behavior contained many of the same constructs that were used in earlier models but were tailored for use with HIV risk and preventive behaviors (Kalichman, 1998). Two models that were derived for HIV risk reduction were the AIDS risk reduction model (ARRM) (Catania, Kegeles, Coates, 1990; Boyer & Kegeles, 1991; Bertrand, Brown, Kinzonzi, Mansilu, Djunghu, 1992; Catania, Coates, Kegeles, 1994; Malow, Corrigan, Cunningham, West, Pena, 1993; Rotherram-Borus, Kiipman, Rosario, 1992) and the information, motivation, behavioral skills model (IMB) (Fisher & Fisher, 1992).

Despite the preponderance of theories, most HIV/AIDS interventions borrow constructs from all the theories and often the resulting frameworks for prevention are more similar than different (Kalichman, 1998). For example, HIV/AIDS interventions often emphasize perceptions of threat (Health Belief Model), intentions to act (Theory

of Reasoned Action), self-efficacy to perform behavior skills (Social Cognitive Theory) or motivations to change (Transtheoretical Model) (Gillespie, 1997; Kalichman, 1998).

For women, three theoretical models appear often in the published studies on women's HIV/AIDS risk reduction and include (1) the Theory of Gender and Power (TGP) (Connell, 1987), (2) Social Learning Theory (SLT) (Bandura, 1994), and (3) Cognitive Behavior Modification (CBM) based on Social Learning Theory (Bandura, 1994) (St. Lawrence et al., 2001). The TGP is the only one of these models that incorporates gender in its application to HIV/AIDS (Wingood & DiClemente, 2000). It considers the role of gender in HIV/AIDS risk and differentiates gender inequality into three primary structures: division of labor, division of power and cathexis. Division of labor can include child care, distinctions between paid and unpaid work and salary inequities (Connell, 1987). Division of power recognizes power imbalances in heterosexual relationships that result in men's authority and control and coercion over women. Cathexis refers to society's gender-approved norms and expectations for sexual behavior (Connell, 1987). By acknowledging the socio-economic context and the social and cultural norms that shape women's decisions, the TGP-adapted model represented a new model for women's HIV/AIDS risk that moved beyond individualistic explanations for women's behavior (Wingood & DiClemente, 2000).

Reviews have shown that the above three theories have successfully been used for HIV behavior change in women, to varying degrees (Exner et al., 1997; Mize et al., 2002; Wingood & DiClemente, 1996; O'Leary, 2000; Gillespie, 1997). It is noted in these reviews and elsewhere, however, that specific difficulties still exist for women

who are at risk because of 1) behavior of a primary partner that is beyond their control, 2) their social role or desire to have children, 3) their residence in impoverished countries or settings where they cannot obtain condoms, cannot negotiate condom use and must sell and barter sex to survive, and 4) the existence of severe gender inequalities and conservative social norms that greatly limit their ability to protect themselves (e.g., Amaro & Raj, 2000; Parker et al., 2000; Weiss & Gupta, 1998; Gupta, 2002; Schoepf, 2004; Heise & Elias, 1995; Farmer et al., 1996).

Although the TGP begins to address such issues by promoting a social structural theory of gender and power, other social models of HIV/AIDS risk in women are not forthcoming from the public health and psychological literature (Parker et al., 2002; Gillespie, 1997). As for the traditional models of behavior change, Gillespie notes “although these [behavior] models, when applied carefully, can help us understand which women may be more likely to engage in prevention because of the beliefs that they hold, they tell us very little about how women come to hold these beliefs and expectations and which conditions facilitate women’s actual control over risk reduction” (Gillespie, 1997, p. 18).

In summary, research focused on HIV/AIDS in women has found that for women in the United States and in developing countries the social structuring of gender creates enormous difficulties for HIV prevention (Exner et al., 1997; Mize et al., 2002; Wingood & DiClemente, 1996; O’Leary, 2000; Gillespie, 1997). Sexual stratification in the economy and politics and in everyday life means that women are less able to protect themselves by insisting on condom usage (Chavkin, 1990;

Friedman et al., 1992; Heise & Elias, 1995; Sweat & Denison, 1995; Weeks, Grier, Romero-Daza, Puglisi-Vasquez, Singer, 1998; Whelan, 1999).

To address this problem, many authors have begun to promote structural and environmental approaches to HIV/AIDS risk reduction (Sweat & Denison, 1995; Parker et al., 2000; Sumartojo, 2000; Tawil et al., 1995; Whelan, 1999). In a 2004 article on the social epidemiology of HIV/AIDS, Poundstone writes that this approach is based on the premise that changes to the structure of the social environment through legal, political or economic intervention are necessary to empower vulnerable groups to protect themselves against HIV/AIDS (Poundstone, Strathdee, Celentano, 2004; Krieger, 2001). The next section will review the structural and environmental factors that have been found to be most associated with HIV/AIDS risk, especially in international settings.

#### **IV. Structural and Environmental Risk Factors for HIV/AIDS in Women**

According to social sciences literature, two of the most important structural and environmental factors linked with HIV/AIDS risk in women are poverty and gender inequality. Numerous authors have linked poverty and gender inequality with HIV/AIDS risk in women (e.g., Stein, 1990; Farmer et al., 1996; Bassett & Mhloyi, 1991; Weiss & Gupta, 1998; de Bruyn, 1995; Tawil et al., 1995; Weiss, Whelan, Gupta, 2000). These writings have described how poverty and gender inequality combine in a process called the feminization of poverty, which leaves women in precarious, powerless positions (Scott, 1984). It is the lack of power associated with a low social and economic status and a weak gender role that has been most linked with

such outcomes as unprotected sex and the experience of partner violence (Gómez & Van Oss Martin, 1996; Amaro & Raj, 2000; Blanc, 2001). In addition, factors such as low socio-economic status and gender inequality that are associated with HIV/AIDS sexual risks may also be associated with lowered adherence to HIV/AIDS medications among HIV infected women who are receiving ART (Zorrilla, 2000).

Reviews of adherence-related factors, however, have not found socioeconomic status to be an important predictor of good adherence to HIV medications (Chesney, 2003; Catz, Kelly, Bogart, Benotsch, McAuliffe, 2000). However, at least one study found that men and women who had missed at least one dose of HAART medication were significantly more likely to report more sex partners, greater rates of unprotected vaginal intercourse and less protected sex with partners who were HIV-negative or of unknown status (Kalichman & Rompa, 2003). Because gender power is closely related to socioeconomic status and gender inequality, this construct will be reviewed as a structural factor below.

The social psychological literature defines power as having the capacity to influence the action of others and considers power in terms of power over others (Riley, 1997). In the context of sexual behavior the use of power is strongly influenced by socially and culturally defined gender roles. Gender roles are “important modifiers in how sexual encounters are negotiated and who determines which sexual practices will prevail” (Ehrhardt & Wasserheit, 1991). This means that for women in relationships of unequal power their specific gender roles have a significant influence over such behaviors as condom use (Blanc, 2001). This significance comes from the

fact that “for men, the behavior is wearing the condom; for women, the behavior is persuading the male partner to wear a condom” (Fullilove et al., 1990; Amaro, 1995; Amaro & Raj, 2000).

In addition to condom use, lack of power can result in drug and alcohol use, poor assertive communication skills, low self-efficacy to avoid HIV and limited perceived control in their relationships (Wingood & DiClemente, 2000; Morokoff et al., 1997; Wingood & DiClemente, 1998; Gómez & Van Oss Martin, 1996; Blanc, 2001; Winters, Stinchfield, Henly, 1993). In general, research worldwide “has identified the different ways in which the imbalance of power between women and men in gender relations curtails women’s sexual autonomy and expands male sexual freedom, thereby increasing women’s and men’s risk and vulnerability to HIV” (Gupta, 2000, p. 16).

Structural and environmental conditions that lead to inequalities in power are also intimately connected with violence toward women (Heise, Ellsberg, Gottemoeller, 1999; Blanc, 2001). Evidence from several cultural settings links violence and HIV. Results from 50 population-based surveys worldwide show that between 10-67 percent of women report being physically harmed by a male partner at some point in their lives (Zierler & Krieger, 1997; Heise et al., 1999). Besides the obvious risks of forced or coerced sex, violence can indirectly affect fertility preferences and the transmission of STIs through women’s fear of raising the issue of contraception or condom use with a partner (Heise & Elias, 1995; Heise et al., 1999; Bawah, Akweongo, Simmons, Phillips, 1999; Kaye, Mirembe, Bantebya, 2002; Koenig et al.,

2004). A study among African American women in the U.S. found that women with physically abusive partners were less likely to use condoms and more likely to experience abuse when they discussed condoms relative to women not in abusive relationships (Wingood & DiClemente, 1997).

In developing countries with high rates of HIV, violence may be associated with HIV serostatus or with HIV serostatus disclosure (Rothenberg, Paskey, Reuland, Zimmerman, North, 1995; Temmerman, Ndinya-Achola, Ambani, Piot, 1995; Gielen, O'Campo, Faden, Eke, 1997). In one study the odds of experiencing at least one violent event was 2.63 times higher among HIV-positive women than HIV-negative women in Tanzania (Maman et al., 2002). In a study in antenatal clinics in South Africa intimate partner violence (IPV) and high levels of male control were associated with higher HIV seropositivity (Dunkle et al., 2004). Fear of disclosure and partner violence is also a recent concern for women receiving HAART and their ability to adhere to their prescribed regimen (UNAIDS, 2004). Taken together, violence and a history of abuse may limit the effectiveness of HIV prevention programs that fail to take violence into account when promoting reduction in the number of sexual partners and the use of condoms for women at risk of HIV/AIDS (Maman, Campbell, Sweat, Gielen, 2000; Hamburger et al., 2004; Heise et al., 1999).

Closely related to socio-economic status and lack of power is the experience of HIV/AIDS related stigma and discrimination. Stigma and discrimination affect a variety of HIV/AIDS behaviors, such as condom use, voluntary counseling and testing and care seeking behaviors (Malcolm et al., 1998; Brown, McIntyre, Trujillo, 2003;

UNAIDS, 2002; UNAIDS, 2000). People living with HIV/AIDS can experience stigma and discrimination in health care settings or from partners, friends and family members (Bird, Bogart, Delahanty, 2004; UNAIDS, 2000). In circumstances of extreme stigma and discrimination, people experience a kind of social death in which individuals no longer feel a part of civil society and cannot access the resources and services that they need (Daniel & Parker, 1990; Ankrah, 1996).

HIV-positive women are much more likely to experience stigma and discrimination while men are more likely to be excused of the behavior that resulted in infection (UNAIDS, 2000). In India, for example, men are likely to abandon a woman if they discover she is HIV-positive (Warwick et al., 1998; Aggleton & Warwick, 1999; Bharat & Aggleton, 1999). In Africa women can be blamed for a husband's death or be ejected from the household if she has AIDS or if she is blamed for giving AIDS to her husband (UNAIDS, 2004).

These very real fears can decrease the likelihood that a woman will get an HIV test or pursue condom use (Francis-Chizororo & Natshalaga, 2003; Kalichman & Simbayi, 2003). Women who request condom use with their sexual partners are often stigmatized to be promiscuous, untrustworthy or acting as whores (Basset & Mhloyi, 1991). Stigma and discrimination are especially of concern for women who are HIV infected and may be a concern for women receiving therapy and trying to adhere to ART regimens (Sandelowski, Lambe, Barroso, 2004; UNAIDS, 2000; UNAIDS 2004).

Adherence to HAART and other health-seeking behaviors have been found to be strongly linked to a strong patient-provider relationship and other social support

(Ickovics & Meade, 2002; Abel & Painter, 2003; Murphy, Roberts, Martin, Marelich, Hoffman, 2000). Furthermore, it has been shown that ARV programs for women in resource-poor settings can be greatly influenced by the existence of social support, such as the *accompagneurs* used in Haiti by Zanmi Sante (Walton et al., 2004). Health care-related social support and social support in general has been linked with higher levels of HAART adherence (Chesney, 2003). Finally, the inclusion of mental health services, violence prevention and social services for women receiving health care has been linked to better HIV/AIDS outcomes (Cook et al., 2004; Dodds et al., 2004; Thompson et al., 1998; Melendez, Hoffman, Exner, Leu, Ehrhardt, 2003). These data indicate that strong social support from providers and others may help women in reducing sexual HIV risk.

Another important structural and environmental determinant of risk for women is social and cultural gender norms. This structure contains the expectations that society has about women and their sexuality (Wingood & DiClemente, 2000). Social biases produce cultural norms and adherence to strict gender roles and beliefs (e.g., women should have sex only to procreate or that girls should remain virgins until marriage) (Whelan, 1999).

In sub-Saharan Africa these kinds of social and cultural norms for women have had a profound effect on HIV/AIDS (UNAIDS, 2004). In Uganda, for example, traditional attitudes designate women as the physical property of their husbands after the payment of a “bride price” and, thus, his entitlement to dictate the terms of sex. In addition, traditional practices of widow inheritance (the “inheritance” by a man of his

brother's widow) expose women to unprotected and unwanted sex with HIV-positive partners (Human Rights Watch, 2003).

Changes in social norms have been associated with declines in HIV prevalence. For example, in Senegal and Uganda changes in norms regarding debut of sexual activity in young girls resulted in later debut of sexual activity and declines in HIV (UNAIDS, 1999; UNAIDS, 2001). A study in Bukoba, Tanzania found that recent declines in HIV prevalence could be linked to declines in traditional practices such as polygamy, widow inheritance, excessive alcohol consumption and sexual networking (Lugalla et al., 2004). Another important social or cultural norm that is pertinent to HIV rates is sexual relationships between older "sugar-daddy" men and young girls. Young girls engage in such relationship to receive material help but also acquire STIs such as HIV from their partners (Silberschmidt & Rasch, 2001). Such practices have been linked to the disproportionate number of girls with HIV as compared to boys their same age (UNAIDS, 2004).

## **V. Determinants of Risky Sexual Behavior and Adherence to HAART in HIV Positive Women**

Because the research proposed will involve HIV-positive women, it is pertinent to review the literature of HIV/AIDS risk in seropositive women. It should be noted that although some studies have been published regarding behaviors among HIV-positive women in international settings (Jones, Ross, Weiss, Bhat, Chitalu, 2005; Stringer et al., 2004; Bennetts et al., 1999; Lindan et al., 1991; Jewkes et al., 2006; McClelland et al., 2006), no research in international settings has focused specifically on HIV-positive women receiving ART in these settings (Stein, 2005; Petersen et al.,

2006; Eisele et al., 2007). This lack of research may be due to the fact that HAART has only recently been introduced in most places (UNAIDS, 2004). Some evidence suggests, however, that factors that influence risky sexual behavior may also influence lack of adherence to HAART (Remien & Smith, 2000; Kalichman & Rompa, 2003). Lack of adherence to HAART is most associated with poor treatment outcomes, drug resistance and increased HIV infectiousness.

Several articles published in the United States have documented high risk behaviors in HIV-positive individuals, especially young, gay men and minorities (e.g., McFarland, Chen, Weide, Kohn, Klausner, 2004; Hays et al., 1997; CDC, 1999; Valleroy, Gayle, Wilson, 2001). Because of the continued prevalence of high-risk behaviors in many groups, primary prevention of HIV infection among HIV-positives has been considered a key intervention for many years (Gayle & Lange, 2004; Janssen et al., 2001). This attention to prevention in positives is especially important in light of the increased prevalence of HIV in the population because of the advent of HAART therapies in the late nineties (CDC, 1998b). That is, since effective therapies have been available, individuals with HIV remain alive and able to transmit HIV instead of dying of AIDS.

In the United States researchers have examined the impact of ART on risk behaviors and how prevention efforts may need to be adjusted and integrated into the care of HIV/AIDS patients (Ferrando, 1998; Gagnon & Godin, 2000; Grulich, 2000; Van der Straten, Gómez, Saul, Quan, Padian, 2000). It is now recognized that “as people with HIV live longer, healthier lives they must continue to engage in consistent

risk reduction behaviors to prevent possible transmission to others and to prevent reinfection of themselves” (Mitchell & Linsk, 2001, p. 399).

Multiple risks exist for HIV positive persons who engage in unprotected sex, besides the risk of transmission to partners or perinatal transmission. A 2003 article on reinfection among HIV positive persons concluded that infection with multiple strains of HIV leads to faster disease progression and death (Sagar et al., 2003). In addition, for HIV-positive women and men who are receiving this antiretroviral therapy (ART), risk behavior may lead to the transmission or acquisition of drug-resistant HIV (Flaks et al., 2003; Kozal et al., 2006; Chin-Hong et al., 2005) and poor treatment outcomes.

Although researchers have discovered much about risk behaviors in HIV-positive gay men, less is known about HIV-positive women. In general women’s behavior has been examined in couple studies and these sexual behavior studies show that people aware of their HIV-positive status reduce or avoid engaging in activities that could transmit infection to others (Cleary et al., 1995; Higgins et al., 1991; Kilmarx, Hamers, Peterman, 1998). However, there is evidence among studies of heterosexuals that up to one third of couples where at least one partner is seropositive engage in unprotected intercourse (Kline & VanLandingham, 1994; Skurnick, Abrams, Kennedy, Valentine, Cordell, 1998; Wilson et al., 1999). Regardless of whether women engage in protective or high risk behavior, many of the determinants of these behaviors have been found to be similar for HIV-positive and HIV-negative people (Kok, 1999).

For example, one study among female partners of men with hemophilia and HIV infection found that safe sex behavior was related to communication about safe sex and positive attitudes towards condoms (Parsons, Butler, Kocik, Norman, Nuss, 1998). Kline & VanLandingham (1994) reported that perceived power to influence their partner's condom use was the strongest predictor of safe sex behavior for both HIV-positive and HIV-negative women. Protection of the partner was also a strong determinant for condom use in HIV-positive women.

A study of HIV-positive inner-city women found that unprotected sex was reported by 50% of the women. Moreover, in multivariate analysis, unprotected sex was most strongly associated with a history of trading sex for money or drugs (McGowan et al., 2004). One study of HAART and sexual behavior in 724 women found that, although sexual activity declined in the 6 months following HAART initiation, overall unprotected sex was higher after HAART initiation for women with one or more sexual partners than before HAART initiation (Wilson et al., 2004).

In conclusion, it is worthwhile to consider factors that prevent secondary transmission of HIV in women. First, prevention of unprotected sex may help slow disease progression and drug resistance by preventing superinfection with multiple HIV strains, drug-resistant strains and other STDs (Hecht et al., 1998; Sagar et al., 2003; Janssen et al., 2001; Flaks et al., 2003; Kozal et al., 2006; Chin-Hong et al., 2005). Infection with multiple HIV strains may also increase infectiousness (Baeten & Overbaugh, 2003). Second, prevention programs could improve the quality of life for women with HIV by creating opportunities for social support and stress reduction, two

important elements in the lives of HIV-positive women (Sandelowski et al., 2004). Finally, an effective program for HIV-positive women could reduce the likelihood that a woman will transmit the virus to her baby or a sexual partner (Wingood & DiClemente, 2002) and decrease stigmatization and partner violence (Cook et al., 2004; Dodds et al., 2004; Thompson et al., 1998; Melendez et al., 2003).

## **VI. Summary, Research Objectives and Conceptual Model for Study**

In summary, most of the behavioral models for HIV/AIDS in women have arisen in the last ten years due to the increases in new infections in women. The review of literature around determinants and theories for HIV/AIDS prevention in women found that these new models, such as the Theory of Gender and Power, incorporate socio-structural factors in their design. This design is based on numerous literature findings that women's HIV/AIDS risk behavior is often constrained by factors outside of her control; either in her sexual relationships, in the environment she lives in or in society at large.

In models of women's HIV/AIDS risk, therefore, socio-structural factors are combined with relationship factors and individual factors to provide the best model of what will predict sexual risk behavior. Some of the most important socio-structural factors for HIV risk in women are gender power differences, poverty and intimate partner violence. Although much less studied, there is interest in whether or not similar factors affect women's ability to adhere to ART regimens. HIV positive women have different risks, such as the risks of superinfection with multiple HIV

variant strains or further transmission of the virus to partners and children. They also face the risk of becoming infected with a drug resistant strain of HIV.

The goal of this study is to examine socio-structural, relationship and individual factors that shape the behaviors of women in Uganda who are receiving ART. The specific research objectives are:

- Describe the population of women receiving ART including socio-economic factors, demographic variables, level of sexual activity and magnitude of risky sexual behavior (e.g., condom use, number of sex partners who have other partners, and forced, coercive or survival sex)
- Determine which of these socio-economic factors and demographic variables are most closely associated with sexual activity and sexual risk behaviors (e.g., condom use, number of sex partners who have other partners, and forced, coercive or survival sex)
- Examine which socio-structural (e.g., economic security) and other factors (gender power) that most influence HIV/AIDS risk behavior (e.g., unprotected sex and experience of forced, coercive or survival sex) and ART adherence in this population

This final objective will be met using structural equation modeling (SEM) of factors determined through the above literature review to be most likely to influence sexual risk behavior and adherence. The conceptual model for this study is presented in Figures 2.1 and 2.2. Prior research supports a hypothesized relationship between these variables that is depicted in Figures 2.1 and 2.2 below. Figure 2.1 depicts the hypothesized pathway between the socio-environmental variables, relationship factors (gender based power domestic violence) and condom use behavior and experiences of forced, coercive or survival sex. As shown, relationship factors are hypothesized to moderate the relationship between economic security and condom use behavior and forced sex. Figure 2.2 depicts similar hypothesized pathways between socio-environmental variables, relationship factors such as gender based power and domestic violence and finally adherence to ART.

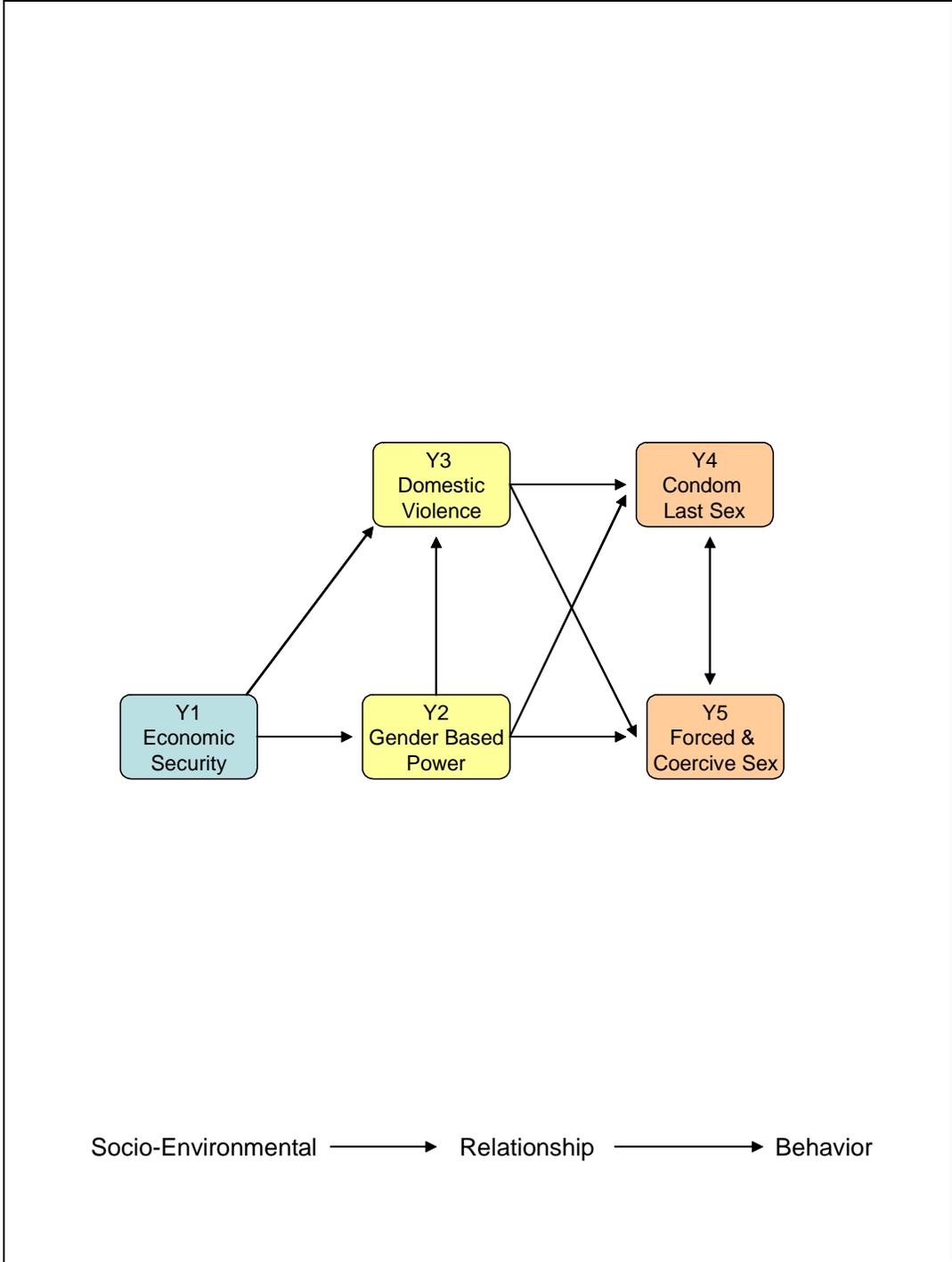


Figure 2.1: Hypothesized Condom Use at Last Sex Act SEM Model

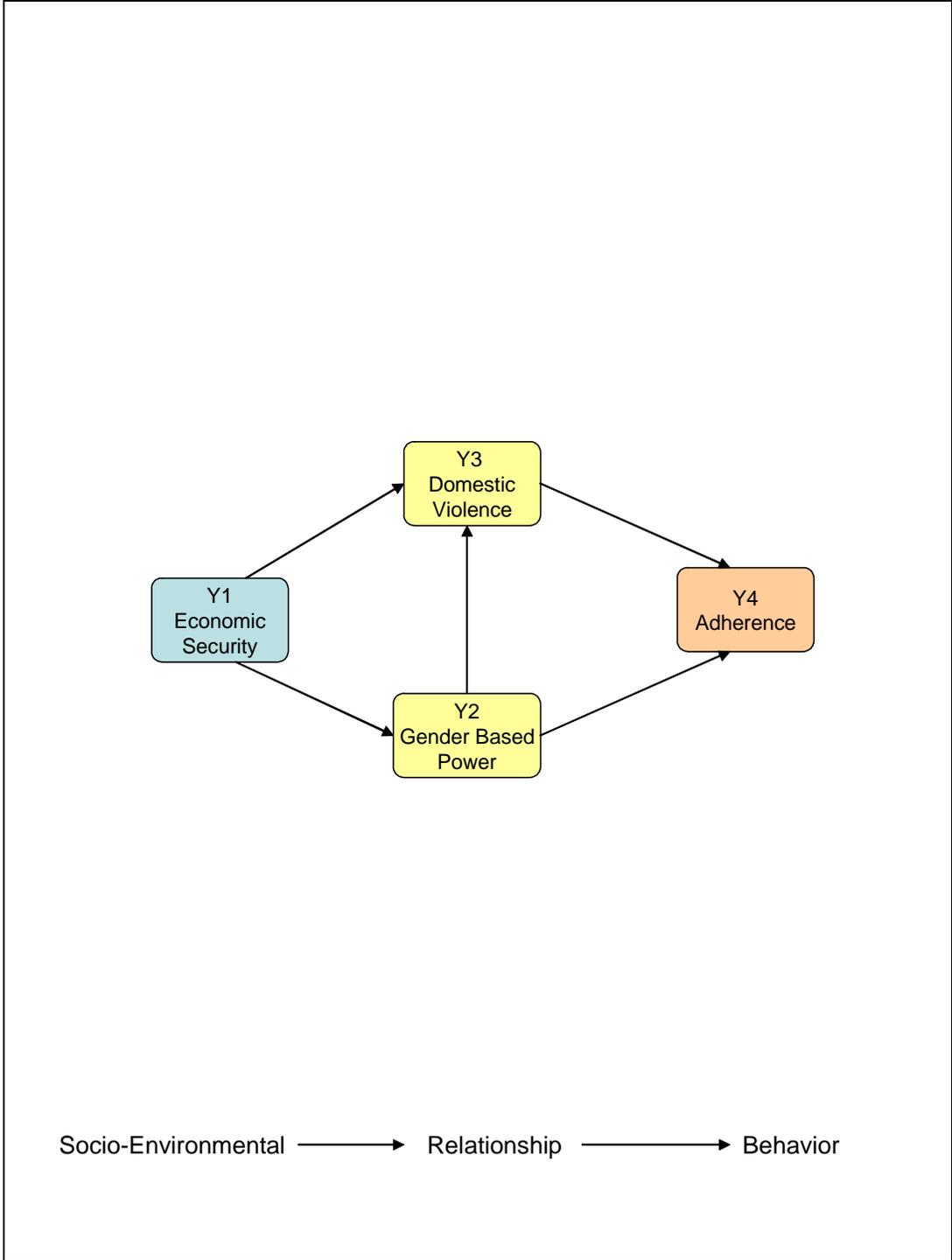


Figure 2.2: Hypothesized Adherence to ART SEM Model

## Chapter 3: Methods and Materials

### **I. Chapter Outline**

This chapter describes the methods and materials used in the study. More specifically, this chapter provides the rationale for the choice of study design, and describes the study instrument and measures, research setting and community context, target population, data collection procedures and data analysis. The structured interview guide is included in Appendix A.

### **II. Overview and Rationale**

This cross-sectional study collected data using a structured interview guide with women (n=398) receiving HIV/AIDS treatment in Kampala and Masaka, Uganda. The participants were recruited through four ART program sites that provide ART free of charge to women in Kampala and Masaka, Uganda. Each of the four programs provides HIV/AIDS treatment to approximately 1000-2000 women total. In order to inform the development of the structured interview guide, a formative qualitative study consisting of in-depth interviews and key informant interviews in three of the study communities was conducted. This formative research also informed the interview guide and confirmed that the measures used were culturally and linguistically appropriate to the target population. The study was conducted in collaboration with the Makerere Institute for Social Research (MISR) at Makerere University.

A cross-sectional study design was chosen because of time and resource constraints, the newness of the issue under study and the associative nature of the

study objectives. Very few studies have been conducted among women in ART programs in Africa and the primary objectives of the study were to describe the characteristics of the women in these ART programs and to conduct preliminary analyses of factors potentially associated with sexual risk behaviors. The rationale for using a structured interview guide was the literacy level among the women interviewed. Although literacy in English in Uganda is estimated to be 65%, it was considered prudent to administer the interview guide instead of using a self-administered survey.

### **III. Research Setting and Community Context**

Women were recruited from the ‘Reach Out’ NGO HIV/AIDS program that treats people in Mbuya Parish with ART and from 3 additional clinical sites. ‘Reach Out’ serves over 1,300 male and female clients who are residents of Mbuya Parish on the outskirts of Kampala. The total parish population is approximately 60,000 and it is one of the poorer parishes in Kampala. ‘Reach Out’ provides an array of services to its clients, including primary medical care and referral, laboratory testing, VCT (Voluntary Counseling and Testing), support for school fees, food distribution, micro-credit and emergency loan programs.

Women who were recruited from 3 other ART programs were residents of Kampala (ART programs at the Joint Clinical Research Centre-JCRC and the Mildmay International HIV/AIDS Centre) or Masaka (ART program ‘Uganda Cares’), about 200 miles north of Kampala and representing a more rural population. Women at these sites could be residents of parishes throughout either city. Kampala includes

inner-city parishes and parishes that are on the outskirts of town. In recent years the Government of Uganda has been very active in securing funds and training health care workers in order to begin ART in Uganda and some large research hospitals in Kampala have begun ART for patients. One hospital is Milago Hospital, where the Government of Uganda is working with the US Academic Alliance for HIV/AIDS and others to provide ART.

Other ART programs have also recently begun and more funds, such as the George W. Bush PEPFAR Fund and the WHO '3 by 5' initiative, have become available for HIV/AIDS treatment in Uganda. Uganda has been at the forefront of the fight against HIV/AIDS in Africa, with an impressive history of HIV/AIDS prevention efforts, evidence of decline in HIV infections in recent years and a productive history of collaborative HIV/AIDS research that have included some of the most important research findings in the history of HIV/AIDS (e.g., Guay et al., 1999; Gray et al., 2007; Wawer et al., 1998). Most of the ART programs in Uganda have been in place since 2004 with the exception of JCRC, which has been administering ART since 1998.

During the early 1990s, HIV prevalence peaked in Uganda at around 15% among all adults, and exceeded 30% among pregnant women in the cities. At the end of 2005, adult prevalence was estimated at 6.7%, and an estimated one million Ugandans were living with HIV/AIDS, according to UNAIDS/WHO (UNAIDS, 2006). The incredible decline in HIV prevalence and incidence in Uganda is considered one of the major success stories in Africa and it is believed that much of the success can be tied to strong community ties in Uganda and effective informal communication links.

According to multiple sources, it seems that the message about HIV and AIDS was effectively communicated to a diverse population by the government and by word of mouth. Much of the prevention work that has been done in Uganda has occurred at grass-roots level, with a multitude of tiny organizations educating their peers, mainly made up of people who are themselves HIV positive. This is equally true of the ART programs that are now flourishing in Uganda. The strong community groups helped considerably in breaking down the stigma associated with AIDS. Frank and honest discussion of sexual subjects that had previously been taboo was encouraged. There is a high level of AIDS awareness amongst people generally.

Even with the strong community ties in Uganda, in most communities there is a limit to what the social welfare structure can support. Stigma and discrimination still exists and people, men and women both, who are HIV positive or show outward signs of AIDS are often stigmatized, discriminated against, actively shunned and often abandoned. The existence of stigma and discrimination holds true for AIDS orphans as well, who must confront stigma and discrimination every day. These were some of my impressions of the communities during the qualitative work done in the communities and in interviews with women prior to conducting the survey.

The older, widowed women I met who have HIV were likely to be alone or living with orphans and their own children that are still alive. Often the widows are cut off from family members and have no long-term partners who can help them. This puts them in a precarious situation in terms of paying rent, paying for food or working to collect money to pay the school fees that are necessary in Uganda. Community ties

may help by linking them with someone who can loan them food to get by or even help them with school fees.

Besides stigma and discrimination, women in Ugandan communities are also influenced by gender inequality. Married women especially, partly because of the bride price a husband has provided before marriage, live with gender power imbalances in the form of gender violence. According to the latest Demographic and Health Survey released by the Uganda Bureau of Statistics, more than three-quarters of the women surveyed believe wife beating is justified when a woman burns the food, argues with her husband, goes out without informing her husband, neglects the children and refuses to have sex with her husband.

Against this backdrop in the communities, many people who have started ART are coming together to form social support groups that also may include HIV/AIDS education activities and gender violence reduction plans. Although HIV/AIDS prevention campaigns in Uganda depended on strong social ties in the communities, many people in the Uganda ART programs seem socially cut off from society and extremely lonely. Widowed women especially are likely to form support groups, including orphan support groups. Married and single women may not have as many chances to form groups, partly because they are less likely to disclose their HIV status to many other people as this would effect their social standing. Widowed women, on the other hand, do not need to seek permission from a husband nor do they usually plan to form new sexual partnerships, such as single women. In many ways then,

widowed women in these communities –despite the hardships they face—are some of the most liberated of the women in the HIV/AIDS treatment programs.

#### **IV. Target Population/Participants**

The inclusion criteria for participants included women 1) aged 18-49 years old, 2) who have been on free ART for 6 months or longer, and 3) stated that HIV/AIDS is their primary health concern. The same inclusion criteria were used for participants in the in-depth interviews and the structured interviews. For key informant interviews personnel with key roles in the project and those who work with clients were interviewed.

Women were recruited using a convenience sample of women registered at each program who came to the clinic to refill their ART medications on the day of the interview. Once it was established that the women had been on ART for 6 months or longer, they were screened for other eligibility criteria prior to receiving the informed consent form and participating in the interview.

#### **V. Data Collection Procedures**

Six women with field survey experience and baccalaureate degrees in social science disciplines were recruited as interviewers through MISR. Two teams of 3 interviewers were sent to each site according to a schedule. One of the 3 was a senior interviewer who served as a supervisor to the other two and was especially important in quality control of the completed interview guide. These interviewers were trained by the author on how to administer the interview guide and had also participated in the

pilot of the interview guide with 10 women. Once key personnel at each site had identified women at the clinic who had been on ART for 6 months or longer, they referred them to one of the trained female interviewers. All women were told that the interviews would last approximately 45 minutes to 1 hour.

The interviewer confirmed eligibility for the study and administered the informed consent was begun as soon as the interviewer. The informed consent form was written in Luganda and was read orally or directly translated if the interviewer was fluent in the language of the participant (several of the interviewers spoke 3-4 Ugandan languages fluently). If no interviewers were able to speak the woman's language fluently the woman was thanked for her interest and not included in the study. All women who agreed to participate signed the informed consent form and were given a copy at the end of the interview. If the woman agreed to participate, the trained interviewer orally administered questions to the woman. Interviews were conducted in empty exam rooms at the clinics or, in the case of Uganda Cares, outside the building under trees or on benches that were sufficiently far apart to maintain confidentiality. At the end of the interview the woman was thanked for her time and effort. Women at Mildmay were also reimbursed for travel.

## **VI. Study Instrument and Measures**

Because of the newness of the research field and research site, the questionnaire contained both new and previously published questions. Validation was assisted, however, by the pilot study of 10 women. Any misleading, unanswerable or

invalid questions or question sets were deleted or reworded during the pilot phase of the study and the interviewers were retrained on the revised interview guide.

Measures of variables that had been used in other research were adopted or adapted for use in the study whenever possible. In addition, for some questions wording needed to be changed based on the Luganda translation or understanding of the term. The interview instrument was designed so that the interviews could be completed in approximately 45 minutes. The final instrument (Appendix A) was translated into Luganda once the English version was complete. The next section describes the study measures.

*Personal Characteristics Measures.* The personal characteristics measures were adapted from the survey instrument used in the WHO Multi-Country Study on Women's Health and Domestic Violence (WHO, 2005). These included age, marital status and level of schooling. Personal characteristics added by the author included 1) length of time on HIV treatment: "When did you start HIV treatment?" 2) ethnic group "What ethnic group do you belong to?" and 3) religion "What is your religion? (Circle all that apply)".

*Socio-Economic Measures (Income).* Several questions were developed to assess sources of income and type of employment. Women were asked "What is your current source of income?" with the following possible responses: 1. salaried employment, 2. casual employment, 3. self-employment, 4. gifts/donations, 5. farming, none, or other. Later during recoding an "Employment Yes/No" variable was created.

This was defined as “Yes” for any women who chose one of the first 5 responses or had a response in “Other” that was deemed an income-generating activity.

Another income question asked “What is your monthly household income? (Probe for all members of the household combined).” The response categories were in Ugandan Schillings, from category 1 (0 UgSh) to category 6 (More than 200,000 UgSh). The categories were later collapsed to 1. 0-50,000 UgSh, 2. 50-100,000 UgSh, and 3. 100-200,000+ UgSh for the final analyses. Finally, women were asked “How much money do you yourself have to spend as you wish each month (whether it is your own or given to you by a spouse/partner)?”. This was an open ended question with the response to be given in Ugandan Schillings. Data from this question were used to create the variable “Woman’s Income.”

*Socio-Economic Measures (Food).* The food or hunger measures were adapted from a dissertation from data collected in Latin America that included measures on household food security (Lorenzana & Mercado, 2002). One item was “How often do you miss a meal due to lack of food?” with response categories 1. Every day, 2. 2-3 times per week, 3. Every week, 4. Every month and 5. Never. Responses were dichotomized into yes, misses meals vs no, does not miss meals with responses 1-4 equal to “Yes” and response 5 equal to “No.” Another measure adapted from Lorenzana asked “In the last week how many meals did you miss?” The author added other food measures of her own, partly based on conversations and advice from key personnel at the ‘Reach Out’ program, which has a long-standing food distribution program at the site. These items included “Do you ever borrow food from a neighbor

or obtain food on credit to get by? Yes/No,” “What are your weekly expenses on food? (Approximately, whether she pays or not, for household)” in Ugandan Schillings and the questions “What is the total number of people who depend on you for food?” and “Do you have enough food for yourself and your family right now?”

*Socio-Economic Measures (Education).* The education questions were developed by the author. These included items about the number of children in the household “How many children do you have living with you? (Either biological or other)” and orphans “How many of these children are orphans? (Orphans defined as at least one parent being dead and NOT being her own children). In addition there was an item about the amount of school fees, “What is the total amount of school fees that need to be paid each term (whether you pay it or someone else)? (For all children combined) with the response in Ugandan Schillings. A final item asked “How many times in this school term would you say you were unable to pay school fees” with the response categories 1. Only once, 2. 2-3 times, 3. Every month, 4. 2-3 times a month, 5. Never. Later during recoding the response categories “A year or more”, “A term or more”, “Not in school” were added. The final “Missed Fees” measure was dichotomized into responses that were yes, missed school fees vs no, did not miss school fees with “Yes” defined by responses to 1-4 or answering “A year or more” or “A term or more” and “No” if the response was category 5.

*Socio-Economic Measures (Housing).* The housing measures were adapted from the survey instrument used in the WHO Multi-Country Study on Women’s Health and Domestic Violence (WHO, 2005). This instrument contains several items

that were designed to measure a woman's living conditions and socio-economic status. These items included whether or not her house had a concrete floor, screened windows, an intact and secure roof, and the type of roofing material used. The instrument also assesses whether or not she lives in a house with electricity or with items such as a radio, a TV, a bicycle, a refrigerator or a motorcycle. Finally there are two items about level of crime and incidents of crime. One was "Are you concerned about the levels of crime in your neighborhood (like robberies or assaults)? Would you say that you are not at all concerned, a little concerned or very concerned?" and another was "In the past four weeks, has someone from this household been the victim of a crime in this neighborhood, such as a robbery or assault?"

Additional housing items were added by the author. One was "What are your total monthly housing costs (whether you pay it or someone else)? (Include electricity and water)" with the response in Ugandan Schillings. Another item was "In the last six months has your household always been able to pay housing costs? Yes/No". The word "household" was used in order to capture the reality that multiple family members may contribute to paying the housing costs. This dichotomous item was used in the final analyses as the variable "Able to Pay Rent."

*Economic Security Score.* In the structural equation model analyses the variable 'Economic Security' is based on a cumulative sum score of the following categorical measures: 1. low income (yes/no), 2. borrows food (yes/no), 3. misses meals (yes/no), 4. whether or not the woman misses paying school fees (yes/no), 5. whether or not the woman misses paying rent or housing costs (yes/no), 6. has a low

education (yes/no), 7. has no job (yes/no), 8. has orphans (yes/no), 9. has little to no money of her own (yes/no), 10. has poor flooring in her home (yes/no), 11. has no screens (yes/no), 12. has poor roofing on her home (yes/no), 13. has no electricity (yes/no), 14. has no refrigerator (yes/no), 15. has no car (yes/no), 16. has no bicycle (yes/no), 17. has no television (yes/no) and 18. has no radio (yes/no). The responses on the 18 dichotomous items (0=no, 1=yes) were summed so that higher scores corresponded to a lower socio-economic status or economic security score.

*Gender-based Power (Relationship Control).* The items used to measure relationship control were adapted from items validated to measure power and relationship control experienced by women in the US (Pulerwitz et al., 2000; Beeker, Guenther-Gray, Raj, 1998). These gender power measures were further adapted to women in South Africa by Jewkes, Nduna, Jama and Levin (2002). This South Africa adapted version was adopted by the author and validated through the formative research and instrument piloting processes. A total of 15 items were kept in the scale and used in the survey. These items were used in the structural equation modeling portion of the analyses using a sum score of women's responses from (1) Strongly Agree, (2) Agree, (3) Disagree to (4) Strongly Disagree in response to the following fifteen gender based power items: 1. If I asked my partner to use a condom he would beat or hit me, 2. If I asked my partner to use a condom he would get angry, 3. My partner won't let me wear certain things, 4. My partner has more to say than I do about important decisions that affect us, 5. My partner tells me who I can spend time with, 6. If I asked my partner to use a condom he would think I am having sex with other

people, 7. I feel trapped or stuck in our relationship, 8. My partner does what he wants even if I don't want him to, 9. When my partner and I disagree he gets his way most of the time, 10. My partner always wants to know where I am, 11. My partner tries to restrict me from seeing my family of birth, 12. My partner expects me to ask his permission before seeking health care for myself, 13. My partner gets angry if I speak with another man, 14. My partner is having sex with someone else, 15. Because my partner buys me things I want to please him. In the sum score a higher score meant a woman had high power and a lower score meant she had lower power.

*Domestic Violence.* The six items used to measure domestic violence were adapted from the revised conflict tactics scale (Straus, Hamby, Boney-McCoy, Sugarman, 1996). This scale was further adapted by WHO for the survey instrument used in the WHO Multi-Country Study on Women's Health and Domestic Violence (WHO, 2005). The six items ask women "Has your current husband/partner, or any other partner ever...slapped you or thrown something at you that could hurt you? Pushed you or shoved you or pulled your hair? Hit you with his fist or with something else that could hurt you? Kicked you, dragged you or beat you up? Choked or burnt you on purpose? Threatened to use or actually used a gun, knife or other weapon against you?" Women were then asked if this has happened in the last 12 months and whether it was one, few or many times. They were also asked if it had happened longer than 12 months ago, whether it was one, few or many times. This measure was used in the structural equation modeling portion of the analyses.

Exploratory factor analysis indicated that two factors were being measured. The first measured slapping, hitting, pushing and kicking and the second measured choking, burning or a knife or gun used. These represent gradations in the type of domestic violence the woman had experienced. In SEM analyses only the first factor (slapping, hitting, pushing and kicking) was used, because the second factor was not highly correlated to other SEM model factors. The factor analysis process for this measure and the final domestic violence items included are described in detail in Chapter 4.

*Forced, Coercive or Survival Sex.* The 5 items used to measure forced, coercive sex were adapted from items used by WHO for the survey instrument used in the WHO Multi-Country Study on Women's Health and Domestic Violence (WHO, 2005). For forced sex the question "Has your main partner forced you to have sex with him even when you didn't feel like it (by using physical force, threats, intimidation, withholding economic support, etc.) in the last six months?" was asked for main partner and for any man in the last six months. For coerced sex, the question "Has a man fondled you or touched your body when didn't want in the last six months (by using physical force, threats, intimidation, blackmail, deception, etc.)?" was asked. Finally, survival sex was measured using the question "Have you let a man fondle you or touch your body in the last six months in order to get some goods in return (e.g., food, clothing, money)?" and "Have you let a man have sex with you in the last six months in order to get some goods in return (e.g., food, clothing, money)?" A forced, coercive or survival sex score was created for each woman in the study. If a woman

answered 'Yes' to any of the above questions a 1 was added to her score, otherwise she scored a zero. The responses on the 5 dichotomous items (0=no, 1=yes) were summed so that higher scores corresponded to higher rates of forced, coercive or survival sex. The cumulative score was used in the final SEM analyses.

*Sexual Risk Behaviors and Sexually Active.* All sexual risk behavior items were based on the instrument used for 'The SISTA Project' that was developed by Ralph J. DiClemente and Gina M. Wingood, (DiClemente et al., 2004). These include items: condom used at last sexual act and sex with a partner with other partners. The first item was measured with the question "The last time that you had sex with your current/most recent partner did you use a condom?". The second item was measured with the question "During the past 6 months, have you had sexual intercourse with a man who you knew or suspected was having sex with other women?". Women's overall sexual activity was measured based on their response to whether or not they had a sexual partner at any time during the last 12 months. If no, they were considered to not be sexually active. If yes they were considered sexually active. In all SEM analyses only women sexually active were considered, a data set of 130 women.

*Adherence to ARVs.* All ARV adherence items were based on the Medication Adherence Self-Report Inventory (MASRI) which was developed by John C. Walsh and colleagues (Walsh, Mandalia, Gazzard, 2002) and validated for use in measuring ARV adherence. The self-report results were compared to objective measures and were strongly associated with findings using an electronic pill monitoring ( $r=0.63$ ;  $p<0.001$ ) and direct pill count ( $r=0.75$ ;  $p<0.001$ ). The ARV adherence measure was

used in the structural equation modeling portion of the analyses. ARV adherence was used in SEM analyses as a summed adherence score. The items were summed in the following manner: 1. number of doses missed yesterday, 2. the number of doses missed the day before yesterday, 3. the number of doses missed three days ago, 4. the number of doses missed in the two weeks before that, 5. the last time a dose was missed, 6. 95% adherence or better in the last month (on a visual analog scale – VAS), 7. the number of doses taken at the exact time supposed to in the last month, 8. the number of doses taken within half an hour of time supposed to in the last month, 9. the number of doses taken within one hour of the time supposed to in the last month, 10. the number of doses taken within two hours of time supposed to in the last month, 11. 95% or better of doses taken within two hours of correct time in the last month (on a visual analog scale – VAS) and 12. 5% or less of doses taken more than two hours late in the last month (on a visual analog scale – VAS). The sum score for adherence calculated each of these items so that a higher score (e.g., more doses missed, more doses taken not on time, less than 95% adherence) indicated worse adherence and a lower score (e.g., no doses missed, all doses taken on time, 95% or greater adherence) indicated better ART adherence.

## **VII. Data Analysis**

Data collected on the survey were entered in MS Excel and cleaned and re-coded where necessary. Descriptive statistics were used to scan the data, assess

normality, look for skewed variables and identify missing values and outliers. Any data transformations, replacements or deletions were performed at that time. Data were then imported into SPSS and frequency distributions were performed. The frequency distributions of demographic and socio-economic variables were used to provide a detailed profile of the population of women (Research Objective #1).

Bivariate analyses were performed between the demographic variables and the different socio-economic profiles (Income, Food, Education and Housing) and 2 sexual risk behavior outcomes (condom use at last sexual intercourse and sex with a man with other partners in the last 6 months). These analyses included independent *t* tests, Chi-square and ANOVA to determine whether differences were statistically probable at a .05 (two-tailed) alpha level and 95% confidence intervals. The same variables were entered into multinomial logistic regression to determine the contribution of the variables to the outcome dependent variables (condom use at last sex act, sex with a partner with other partners, experience of forced, coercive or survival sex, and whether a woman was sexually active or not) when controlling for key demographic variables. Stepwise variable entry method was used for the multinomial logistic regression, with the *p* to be included set at .05 and the *p* to be excluded set at 0.1. These bivariate and multivariate analyses provided results to address Research Objective #2.

Research Objective #3 was to develop structural equation models (SEM) to examine the relationships among constructs in the study. First, conceptual hypothetical models for condom use behavior and adherence to ART regimens were developed

based on theoretical relationships between the factors that were indicated in the literature review. Prior to testing the conceptual model exploratory factor analysis (EFA) was conducted on each construct with multiple items to assess whether each item represented the same thematic construct. The same items were also tested for reliability. The results of exploratory factor analysis and other construct building are presented in Chapter 4. Once construct building was complete, the hypothesized models were analyzed for fit with the observed data. A common approach to structural equation modeling has been to report some index of the goodness of fit of that model to the data. Therefore, the model fit of the hypothetical models was assessed with the 1) Chi-square goodness of fit and the accompanying p-value, 2) root-mean-square-error (RMSEA) and 3) the comparative fit indices (CFI). CFI values range from 0 to 1 and RMSEA with values less than .08 indicating close fit and values greater than .09 indicating adequate fit.

The chi-square measure can be interpreted as measuring whether or not the residual variances-covariances obtained by comparing the observed and predicted values differ from zero. Chi-square is considered a measure of goodness of fit because large chi-square values correspond to a poor fit and small chi-square values to an acceptable fit. A p-value greater than .05 for the chi-square goodness of fit test means a failure to reject the null hypothesis that the relationships among the variables specified were not significantly different from the observed relationships among the variables found in the data. Means, standard deviations, degrees of freedom and variance of all model indicators were reported. All parameter estimates and T-values

(the parameter estimate divided by the standard error) were reported. The T-values were used to test whether or not the true parameter is zero. Parameters with T-values larger than two in magnitude are considered to be statistically different from zero.

Following model fit testing for the hypothetical models it was determined whether respecification of the model indicators was feasible. To evaluate which alternative models might better fit the data, a comparison of path coefficients based on a regression relationship and path coefficients based on correlation relationship was made. A final determination of which coefficient to use was based on what was most consistent with the hypothesized model and whether there were sufficient degrees of freedom and thus ability to change pathways.

## Chapter 4: Results

### **I. Chapter Outline**

This chapter provides results to address the study objectives stated in Chapter 1. Section II presents the results that correspond with the first objective of the study: to describe women's personal characteristics (e.g. age, marital status, education, etc.), economic hardships (e.g. cost of housing, food and school fees, etc.) and other responsibilities (e.g. number of orphans), in addition to describing the levels of sexual risk behavior in this population. Section III presents the results of the second study objective: to examine the associations of a subset of the population characteristics described in section I (e.g., personal characteristics, socio-economic factors, hunger, etc.) with sexual risk behaviors (e.g., sexually active, condom use, forced, coercive or survival sex, sex with a man with other partners) using both bivariate and multivariate analyses. Finally, section IV presents the results of the third study objective: to determine which socio-structural variables (e.g., gender based power, domestic violence, etc.) are the strongest predictors of women's sexual risk behavior (e.g., condom use) and adherence to ARV medication using structural equation modeling (SEM) techniques.

### **II. Description of Study Sample**

The first study objective was to describe women's personal characteristics (e.g. age, marital status, education, etc.), economic hardships (e.g. cost of housing, food and school fees, etc.) and other responsibilities (e.g. number of orphans). In addition, the

objective was to describe the levels of sexual risk behavior in this population were examined.

### **Personal Characteristics**

The personal characteristics of the women interviewed are displayed in Table 4.1. Findings indicate that women in the study were generally older, with 84.6% of the women aged 30 years or older. The average age was 36.3 years old. Half, 49.3%, of the women in the study were widows, followed by married women, 20.4%, divorced or separated women, 15.6%, and single women, 14.6%. Most women in the study, 64.4%, had 0-9 years of formal education. However, a fairly large proportion of the women had received 10-12 or more years of education (34.2%). Many of the women interviewed were employed, either formally or informally (63.4%).

The ART lengths of the women interviewed reflected how long the different ART programs had been in place and when funding became available. The majority of the women interviewed at the four programs had only been receiving ART for 6-12 months (45.6%). The rest of the women interviewed were equally divided between women who had been receiving ART for 12-18 months (27.3%) and women who had been receiving ART for longer than 18 months (27.0%). The results for religion and ethnicity reflected the fact that the majority of the Uganda population is Catholic and that, in Kampala, most of the population consider themselves of Muganda ethnicity (47.2% were Catholic and 52.8% were Muganda). The other ethnicities reflect the study site characteristics. For example, the Banyankore live in the Masaka area and the

Acholi refugees from northern Uganda live in Mbuya Parish where the Reach Out HIV/AIDS initiative is located.

Table 4.1: Personal Characteristics of the Study Sample (N=377)

<b>Age</b>	
18-29 years	15.4%
30-39 years	46.1%
40-49 years	38.5%
Mean Age	36.3 Years
<b>Marital Status</b>	
Single	14.6%
Married	20.4%
Widowed	49.3%
Divorced or Separated	15.6%
<b>Employed</b>	63.4%
<b>Education Level</b>	
0-9 years	64.4%
10-12+ years	34.2%
<b>ART Length</b>	
6-12 months	45.6%
12-18 months	27.3%
>18 months	27.0%
<b>Religion</b>	
Catholic	47.2%
Protestant	26.8%
Other	26.0%
<b>Ethnicity</b>	
Muganda	52.8%
Banyankore	13.0%
Banyaruanda	4.2%
Basoga	4.0%
Acholi	3.7%
Iteso	2.9%
Mutooro	2.9%
Other	16.4%

### Income and Hunger Status

Findings regarding income and hunger among the women in the four ART programs are displayed in Table 4.2. Nearly half of women (45.3%) reported a total household income of 0-50,000 UgSh. The average monthly income reported by women reflects either her own income or what money is given to her on a monthly basis. The average amount of money a woman has to spend on her own per month is 55,304 UgSh, or approximately 33 US dollars.

Table 4.2: Socio-Economic Profile of the Study Sample (N=377)

<b>Household Income</b>	
0-50,000 UgSh	45.3%
50-100,000 UgSh	23.9%
1-200,000+ UgSh	24.7%
<b>Woman's Income in UgSh</b>	55,304 UgSh
<b># of Meals Missed per Week</b>	1.16
<b>Borrows Food</b>	61.3%
<b>Has Food Today</b>	67.6%
<b>Number of Food Dependents</b>	4.90
<b>Weekly Food Costs</b>	17,000 UgSh
<b>Number of Children at Home</b>	3.79
<b>Has Orphans to Care For</b>	56.5%
<b>Number of Orphans</b>	1.71
<b>School Fees Paid Per Term</b>	211,000 UgSh
<b>Misses School Fees</b>	43.8%

Women in the study reported an average of 1.16 meals missed in any given week, with a range from 1-8. Based on information collected during qualitative interviews, women were asked in the survey about whether they need to borrow food to get by. Specifically, women reported that they often asked a friend, neighbor, family member or grocer to assist her by giving her food on credit until she was able to repay somehow. Almost two-thirds of women (61.3%) of women reported needing to borrow food to obtain adequate food supplies. However, when women were asked if they had food available on the day of the interview, the majority of women (67.6%) reported that they had enough food on the day of the interview.

The average number of food dependents, meaning the number of people the woman has responsibility for feeding, indicates the burden women have to find food not only for themselves but an average 4.9 food dependents or more. Because women are expected to purchase food and cook for family members, it is useful to contrast the average weekly cost of food reported by the women (an average of 17,000 UgSh per week or 68,000 UgSh per month) with the average money women have per month to spend for all expenses (55,304 UgSh). In US dollars this is equivalent to 40 dollars per month in food costs compared to the 32 dollars she has each month for all expenses.

### **Children and Education**

The average number of children at home (3.79) and the average number of orphans the women care for (1.71) is most likely typical of many Ugandan women (see Table 4.2). The average school fees paid per term (211,000 UgSh or approximately 132 US dollars) should be contrasted with household income reported

and women's income to see the extreme disproportion between income and school fee expenses. This disproportion likely underlies the high number of families missing school fees for any one school term, with a total of 165 women (43.8%) reporting missing school fees. This finding includes missing only one payment, missing several times per term, missing payment for a whole term or for a year or more.

### **Housing and Other Costs**

Other costs for women and their families include housing costs (see Table 4.3). The monthly housing costs, whether for rent or other expenses, averaged 32,200 UgSh or approximately 20 US dollars per month. Over one quarter (27.3%) of women reported missing rent.

Other findings help describe poverty level and social status among the study population (Table 4.3). In general living conditions of the women in the study were generally good, with the majority of women reporting a house with a concrete floor (78.5%) and an intact roof (67.4%). However, less than half of the women lived in a house with screened windows (43.8%). Just over half (54.1%) of the women in the study reported that they were very concerned about the level of crime in their neighborhood and 9.0% reported that they or someone in their family had been a victim of a crime (such as robbery or assault) in the last month. Finally, living conditions are also described using the results of what household items women possessed, such as electricity (48.3%), radio (73.5%), television (30.8%), bicycle (14.9%), refrigerator (18.0%) and a motorcycle (2.7%).

Table 4.3: Standard of Living Indicators of the Study Sample (N=377)

<b>Monthly Housing Costs</b>	32,200 UgSh
<b>Misses Rent</b>	27.3%
<b>Concrete Floor</b>	78.5%
<b>Screened Windows</b>	43.8%
<b>Intact Roof</b>	67.4%
<b>Household Items:</b>	
Electricity	48.3%
Radio	73.5%
Television	30.8%
Bicycle	14.9%
Refrigerator	18.0%
Motorcycle	2.7%
<b>Crime Concern:</b>	
Not concerned	17.5%
A little concerned	26.0%
Very concerned	54.1%
<b>Crime Victim (in last month)</b>	9.0%

## **Sexual Behavior Profile**

The final table describing the women from the four ART programs (Table 4.4) displays the sexual behavior profile of the women interviewed. Only a third of the women interviewed (34.5%) reported that they were sexually active, defined by having had a sexual partner some time during the last 12 months. All women were asked whether or not they had experienced forced, coercive or survival sex (sex in exchange for food, clothing, etc.) in the 6 months prior to the interview. The number of women who reported this experience ranged from 14.0% to 18.0% with an average of 15.6% of women reporting any of these three experiences. The numbers of sex partners in the last three or six months were very low, with the majority of women reporting one sole sex partner (89% and 91% respectively). Only sexually active women (N=130) were asked questions regarding condom use. In general, condom use behavior was high, with 86.1% of women reporting ever using a condom and 73.8% using a condom during the last sex act (see Table 4.4).

Almost half of the women reported that a partner refused condom use at some point (46.9%). Over three-fourths of the women reported that they disclosed their HIV positive status to a sex partner. Over one half (56.9%) of women reported having a sex partner who is also HIV positive, although a considerable proportion of the women reported having a sex partner who either refuses to be tested or for whom she did not know his HIV serostatus (24.6% and 10.8%, respectively).

Table 4.4: Sexual Profile of the Study Sample (N=130)

<b>Sexually Active</b>	34.5% (130/377)
<b>Forced, Coercive or Survival Sex</b>	15.6% (59/377)
<b>% with one sex partner (3 months)</b>	89% (115/129)
<b>% with one sex partner (6 months)</b>	91% (117/128)
<b>Ever Used Condom</b>	86.1% (112/130)
<b>Condom Used at Last Sex Act</b>	73.8% (96/130)
<b>Ever asked Partner to use Condom</b>	87.7% (114/130)
<b>Partner Ever Refused Condom</b>	46.9% (61/130)
<b>Disclosed HIV status to Partner</b>	78.5% (102/130)
<b>Partner is HIV Positive</b>	
Yes	56.9% (74/130)
No	5.4% (7/130)
Don't Know	10.8% (14/130)
Won't Test	24.6% (32/130)
<b>Pregnant During the Last Year</b>	16.9% (22/130)
<b>Desire Children</b>	44.6% (58/130)
<b>In last 6 months:</b>	
Sex with partner with other partners	55.4% (72/130)
Sex with drunk partner	13.8% (18/130)
Sex with partner of unknown HIV serostatus	25.4% (33/130)
Sex with partner she won't see again	14.6% (19/130)
Sex with partner who doesn't know her HIV serostatus	13.8% (18/130)

A significant proportion of the women interviewed had been pregnant in the last year (16.9%) and many expressed a desire to have children (44.6%). Finally, a series of six questions related to sexual risk behavior in the last six months were asked of all sexually active women. Over half of the women (55.4%) reported that they had sex with a partner who has other partners. Sex with a drunk partner was less common with only 13.8% reporting this behavior. One-fourth of the women in the ART programs reported sexual activity with partners of unknown HIV serostatus (25.4%). Few women reported sexual activity with a partner they did not expect to see again (14.6%). Finally, only 13.8% of women reported sexual activity in the last 6 months in which she did not disclose her HIV positive serostatus to their partner.

### **Summary of Findings**

The study sample is made up of mostly middle-aged women, many of whom are widowed by AIDS. One-fifth of the sample is made up of married women. Most women are Catholic and most are of the Baganda ethnic group, both typical of Kampala. The women in the sample have substantial economic burdens and there is evidence that hunger is common. Over half of the women care for orphans. Only a third of the women interviewed (34.5%) reported that they were sexually active. The sexual risk behaviors of note are sex with a partner who has other partners, although most women reported only one partner. More than half of the women reported that they have had a partner who has refused to wear a condom and many women have partners who refuse to seek an HIV test. A substantial proportion of the women would like to become pregnant.

### **III. Factors Associated with Sexual Behaviors**

Study objective two was to examine the associations of a subset of the characteristics of the sample described in section II (e.g., personal characteristics, socio-economic factors, hunger, etc.) with sexual behaviors (e.g., sexually active; condom use; forced, coercive or survival sex; sex with a man with other partners).

#### **A. Bivariate Analysis by Outcome Variable**

##### **Sexually Active**

Several personal characteristics were associated with being sexually active, including age, marital status, ART length and number of orphans (see Table 4.5). The strongest of these bivariate associations were marital status and ART length. Overall, married women were much more likely to be sexually active (94.8%,  $p=.000$ ) and widowed women were much less likely to be sexually active (13.4%,  $p=.000$ ). ART length of >18 months was strongly associated with being less sexually active (17.6%,  $p=.000$ ) and ART length of 6-12 months was marginally associated with more sexual activity on average (39.8%,  $p=.011$ ). Other findings indicated that women aged 40 and older were less likely to be sexually active (26.2%,  $p=.007$ ) and women 18-29 years old more likely to report sexual activity (50.0%,  $p=.008$ ). Finally, the more orphans in the household the less likely women were sexually active (-.879 Difference in Mean, 95% CI -1.322, -.437;  $p=.000$ ).

Only three socio-economic factors were associated with sexual activity: employment, income and housing costs. Employed women were significantly more likely to be sexually active than unemployed women (38.1% vs 28.3%,  $p=.034$ ) (see

Table 4.6). Similarly, women reporting the lowest category of overall household income (0-50,000 UgSh per month) were less likely to be sexual active (28.7%,  $p=.029$ ).

Table 4.5: Bivariate Associations between Women's Personal Characteristics and Sexual Activity

	<i>Sexually Active</i> 130 (34.5%)	<i>Not Sexually Active</i> 247 (65.5%)	Sig. P <sup>2</sup>
<b>Age (Years)</b>			
18-29 years	50.0	50.0	.008
30-39 years	36.2	63.8	---
40-49 years	26.2	73.8	.007
<b>Marital Status</b>			
Single	23.6	76.4	---
Married	94.8	5.2	.000
Widowed	13.4	86.6	.000
Divorced/Separated	32.2	67.8	---
<b>Education Level</b>			
0-9 years	33.7	66.3	---
10-12+ years	35.7	64.3	---
<b>ART Length</b>			
6-12 months	41.3	58.7	.011
12-18 months	39.8	60.2	---
>18 months	17.6	82.4	.000
<b>Religion</b>			
Catholic	30.9	69.1	---
Protestant	38.6	61.4	---
Other	36.7	63.3	---
<b>Children</b>			
Mean # of orphans	1.13	2.02	.000
Mean # of children total	3.64	3.86	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Table 4.6: Bivariate Associations between Women's Socio-economic Factors and Sexual Activity

	<i>Sexually Active</i> 130 (34.5%)	<i>Not Sexually Active</i> 247 (65.5%)	Sig. P <sup>2</sup>
<b>Employment</b>			
Yes	38.1	61.9	.034
No	28.3	71.7	---
<b>Household Income</b>			
0-50,000 UgSh	28.7	71.3	.029
50-100,000 UgSh	37.8	62.2	---
100-200,000+ UgSh	39.8	60.2	---
<b>Woman's Income in UgSh</b>	64,000 UgSh	51,000 UgSh	---
<b># of Meals Missed per Week</b>	.92	1.28	---
<b>Borrows Food</b>			
Yes	35.1	64.9	---
No	33.8	66.2	---
<b>Has Food Today</b>			
Yes	35.7	64.3	---
No	32.2	67.8	---
<b>Amount of School Fees (One term)</b>	213,000 UgSh	211,000 UgSh	---
<b>Able to Pay Fees</b>			
Yes	35.2	64.8	---
No	34.5	65.5	---
<b>Total Monthly Housing Cost</b>	36,400 UgSh	26,900 UgSh	.027
<b>Able to Pay Rent</b>			
Yes	36.5	63.5	---
No	42.3	57.7	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Table 4.7: Bivariate Associations between Women's Personal Characteristics and Any Forced, Coercive or Survival sex

	<i>Any Forced, Coercive or Survival Sex (6mo)</i>	<i>No Forced, Coercive or Survival Sex (6mo)</i>	Sig. P <sup>2</sup>
	59 (15.6%)	318 (84.4%)	
<b>Age (Years)</b>			
18-29 years	15.5	84.5	---
30-39 years	17.2	82.8	---
40-49 years	13.8	86.2	---
<b>Marital Status</b>			
Single	12.7	87.3	---
Married	35.1	64.9	.000
Widowed	8.6	91.4	.000
Divorced or Separated	15.3	84.7	---
<b>Education Level</b>			
0-9 years	16.0	84.0	---
10-12+ years	15.5	84.5	---
<b>ART Length</b>			
6-12 months	15.7	84.3	---
12-18 months	18.4	81.6	---
>18 months	12.7	87.3	---
<b>Religion</b>			
Catholic	10.1	89.9	.005
Protestant	21.8	78.2	---
Other	19.4	80.6	---
<b>Children</b>			
Mean # of orphans	1.56	1.74	---
Mean # of children total	3.85	3.77	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Finally, women who reported higher total monthly housing costs were more likely to be sexually active (9,469 UgSh Mean Difference, 95% CI 986, 17,952;  $p=.027$ ).

### **Any Forced, Coercive or Survival Sex**

Two personal characteristics were associated with any forced, coercive or survival sex (Table 4.7). Married women most likely to have experienced these sex acts (35.1%,  $p=.000$ ) and widowed women least likely to have experienced them (8.6%,  $p=.000$ ). Women who reported to be of Catholic religion were significantly less likely to report forced, coercive or survival sex (10.1%,  $p=.005$ ) versus 21.8% of Protestant women and 19.4% of all other religions.

Four socio-economic factors were associated with any forced, coercive or survival sex in the last six months. First, women's personal income level was positively associated with experience of forced, coercive or survival sex in the last six months; women who had experienced any of these sex acts reported more income than women who had not (95% CI 3,600, 45,981;  $p=.022$ ) (see Table 4.8). In addition, women who were able to pay school fees were more likely to have experienced forced, coercive or survival sex than those who could not pay (20.1% versus 10.3%,  $p=.009$ ). Number of meals missed per week was also associated with experience of forced, coercive or survival sex. Women who reported a higher mean number of missed meals were more likely to report forced, coercive or survival sex (.721 mean difference, 95% CI .177, 1.266;  $p=.010$ ). On the other hand, women able to pay house rent were less likely to have experienced forced, coercive or survival sex compared to women not able to pay rent (13.8% versus 28.2%,  $p=.009$ ).

Table 4.8: Bivariate Associations between Women's Socio-Economic Factors and Any Forced, Coercive or Survival sex

	<i>Any Forced, Coercive or Survival Sex (6mo)</i>	<i>No Forced, Coercive or Survival Sex (6mo)</i>	Sig. P <sup>2</sup>
	59 (15.6%)	318 (84.4%)	
<b>Employment</b>			
Yes	17.6	82.4	---
No	12.3	87.7	---
<b>Household Income</b>			
0-50,000 UgSh	12.9	87.1	---
50-100,000 UgSh	22.2	77.8	---
100-200,000+ UgSh	15.1	84.9	---
<b>Woman's Income in UgSh</b>	76,250 UgSh	51,450 UgSh	.022
<b># of Meals Missed per Week</b>	1.76	1.04	.010
<b>Borrows Food</b>			
Yes	17.3	82.7	---
No	13.1	86.9	---
<b>Has Food Today</b>			
Yes	14.5	85.5	---
No	18.2	81.8	---
<b>Amount of School Fees (One term)</b>	184,000 UgSh	217,000 UgSh	---
<b>Able to Pay Fees</b>			
Yes	20.1	79.9	.009
No	10.3	89.7	---
<b>Total Monthly Housing Cost</b>	35,500 UgSh	29,100 UgSh	---
<b>Able to Pay Rent</b>			
Yes	13.8	86.2	.009
No	28.2	71.8	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

### **Condom Use at Last Sex Act**

Only one of the personal characteristics of women was associated with condom use at last sex act (Table 4.9). Condom use at last sex act was significantly associated with Catholic or Protestant religion, with women who reported Catholic religion more likely to have used a condom (93.3%,  $p=.023$ ) and women who reported Protestant religion least likely to have used a condom at last sex act (72.2%,  $p=.021$ ). No income, hunger, school fee burden or housing variables were significantly associated with condom use at last sex act (Table 4.10).

### **Sex with Partner with Multiple Partners**

None of the personal characteristics of women were associated with engaging in sex with a partner who has multiple partners (Table 4.11). The only socioeconomic factors that were statistically significant in bivariate analysis were hunger status variables (Table 4.12). More specifically, women who reported a higher number of meals missed per week were significantly more likely to report having had sex in the last six months with a partner who has multiple partners (.759 Mean Difference, 95% CI .196, 1.321;  $p=.009$ ). Women who reported needing to borrow food to get by were also more likely to have reported sex with a partner who has multiple partners (67.1% versus 41.3%,  $p=.005$ ).

Table 4.9: Bivariate Associations between Women's Personal Characteristics and Condom Use at Last Sex Act

	<i>Condom Last Sex Act (N=130)</i>	<i>No Condom Last Sex Act (N=130)</i>	Sig. P <sup>2</sup>
	96 (73.8%)	18 (13.8%)	
<b>Age (Years)</b>			
18-29 years	92.0	8.0	---
30-39 years	81.4	18.6	---
40-49 years	83.3	16.7	---
<b>Marital Status</b>			
Single	72.7	27.3	---
Married	87.3	12.7	---
Widowed	79.2	20.8	---
Divorced/Separated	87.5	12.5	---
<b>Education Level</b>			
0-9 years	85.5	14.5	---
10-12+ years	86.0	14.0	---
<b>ART Length</b>			
6-12 months	78.3	21.7	---
12-18 months	91.9	8.1	---
>18 months	88.2	11.8	---
<b>Religion</b>			
Catholic	93.3	6.7	.023
Protestant	72.2	27.8	.021
Other	84.8	15.2	---
<b>Children</b>			
Mean # of orphans	1.13	1.83	---
Mean # of children total	3.75	3.89	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Table 4.10: Bivariate Associations between Women's Socio-economic Factors and Condom Use at Last Sex Act

	<i>Condom Last Sex Act (N=130)</i>	<i>No Condom Last Sex Act (N=130)</i>	Sig. P <sup>2</sup>
	96 (73.8%)	18 (13.8%)	
<b>Employment</b>			
Yes	85.2	14.8	---
No	81.8		
<b>Household Income</b>			
0-50,000 UgSh	92.5	7.5	---
50-100,000 UgSh	83.9	16.1	---
100-200,000+ UgSh	76.5	23.5	---
<b>Woman's Income</b>	68,400 UgSh	63,750 UgSh	---
<b># of Meals Missed per Week</b>	1.07	.76	---
<b>Borrows Food</b>			
Yes	89.0	11.0	---
No	75.6	24.4	---
<b>Has Food Today</b>			
Yes	85.2	14.8	---
No	81.8	18.2	---
<b>Amount of School Fees (One term)</b>	215,000 UgSh	288,000 UgSh	---
<b>Able to Pay Fees</b>			
Yes	88.7	11.3	---
No	79.6	20.4	---
<b>Total Monthly Housing Cost</b>	37,850 UgSh	30,500 UgSh	---
<b>Able to Pay Rent</b>			
Yes	80.3	19.7	---
No	81.5	18.5	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Table 4.11: Bivariate Associations between Women's Personal Characteristics and Sex with a Partner who has other Partners

	<i>Sex w/ Partner Who Has Other Partners (N=130)</i>	<i>No Sex w/Partner Who Has Other Partners (N=130)</i>	Sig. P <sup>2</sup>
	72 (55.4%)	53 (41.0%)	
<b>Age (Years)</b>			
18-29 years	48.1	51.9	---
30-39 years	66.1	33.9	---
40-49 years	50.0	50.0	---
<b>Marital Status</b>			
Single	75.0	25.0	---
Married	52.1	47.9	---
Widowed	56.5	43.5	---
Divorced/Separated	68.4	31.6	---
<b>Education Level</b>			
0-9 years	59.0	41.0	---
10-12+ years	57.8	42.2	---
<b>ART Length</b>			
6-12 months	58.8	41.2	---
12-18 months	57.5	42.5	---
>18 months	52.9	47.1	---
<b>Religion</b>			
Catholic	57.7	42.3	---
Protestant	61.5	38.5	---
Other	52.9	47.1	---
<b>Children</b>			
Mean # of orphans	1.21	.96	---
Mean # of children total	3.42	3.74	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

Table 4.12: Bivariate Associations between Women's Socio-economic Factors and Sex with a Partner who has Other Partners

	<i>Sex w/ Partner Who Has Other Partners (N=130)</i>	<i>No Sex w/Partner Who Has Other Partners (N=130)</i>	Sig. P <sup>2</sup>
	72 (55.4%)	53 (41.0%)	
<b>Employment</b>			
Yes	60.0	40.0	---
No	51.4	48.6	---
<b>Household Income</b>			
0-50,000 UgSh	55.3	44.7	---
50-100,000 UgSh	57.6	42.4	---
100-200,000+ UgSh	65.7	34.3	---
<b>Woman's Income</b>	73,000 UgSh	54,500 UgSh	---
<b># of Meals Missed per Week</b>	1.28	.52	.009
<b>Borrows Food</b>			
Yes	67.1	32.9	.005
No	41.3	58.7	---
<b>Has Food Today</b>			
Yes	56.3	43.7	---
No	60.5	39.5	---
<b>Amount of School Fees (One term)</b>	199,000 UgSh	239,000 UgSh	---
<b>Able to Pay Fees</b>			
Yes	63.2	36.8	---
No	51.9	48.1	---
<b>Total Monthly Housing Cost</b>	34,000 UgSh	40,300 UgSh	---
<b>Able to Pay Rent</b>			
Yes	51.5	48.5	---
No	69.0	31.0	---

<sup>2</sup>P values from chi-square test for categorical variables or oneway ANOVA for continuous variables

## **Summary of Findings**

The bivariate analyses indicated that sexual activity (having had a sexual partner in the last 12 months) was most strongly associated with marital status, with married women most likely to be sexually active and widowed women least likely to be sexually active. Women with lower housing costs and lower household incomes were also less likely to be sexually active.

Married women were twice as likely to report forced, coercive or survival sex and widowed women two times less likely. Forced, coercive or survival sex was also more likely among women with more income but also among women who missed meals due to food insecurity. Women who reported that they were able to pay rent were less likely to report forced, coercive or survival sex. However, women who reported that they were able to pay school fees were more likely to report forced, coercive or survival sex.

The only factor that was significantly associated with condom use was religion, with condom use much higher among Catholic women.

Among the factors examined for their association with women's report of having sex with a partner who has other partners, hunger factors were the most important. Women who report missing more meals due to food insecurity and those who report the need to borrow food to survive were more likely to report having sex with a partner who has other partners.

**B. Multivariate Analysis by Outcome Variable**

Four multivariate logistic regression models were estimated to examine the independent effects of personal characteristics, income, hunger status and school fees/housing variables. Adjusted odds ratios and 95% confidence intervals are reported for each covariate.

Variables that were statistically significant in bivariate analysis or were of particular interest were entered into multinomial logistic regression analyses. Wald statistic forward stepwise regression was used. The dependent variables in the models that were included used condoms at last sex act, had sex with a partner with other partners, experienced of forced, coercive or survival sex and was woman sexually active. Results for all outcome variables are presented in table 4.13.

Table 4.13: Results of Multinomial Logistic Regression for Sexual Risk Behaviors Controlling for Personal Characteristics

	Sexually Active		Forced, Coercive or Survival Sex		Condom Use at Last Sex Act		Sex w/ Partner w/ Multiple Partners	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
<i>Personal Characteristics</i>								
Age	.924†	.881, .970	.992	.948, 1.038	1.002	.911, 1.103	1.011	.950, 1.077
Marital Status								
Single	.591	.232, 1.507	.778	.258, 2.343	.523	.064, 4.284	1.070	.198, 5.793
Married	47.375††	14.38, 156.05	2.911*	1.234, 6.870	1.141	.206, 6.323	.545	.179, 1.657
Widowed	.412*	.192, .882	.473	.187, 1.195	.775	.116, 5.162	.682	.176, 2.636
Div/Sep	0 <sup>b</sup>		0 <sup>b</sup>		0 <sup>b</sup>		0 <sup>b</sup>	
Education	.989	.913, 1.071	.996	.923, 1.075	.993	.865, 1.141	.989	.899, 1.088
ART Length	.959	.919, 1.001	.993	.957, 1.030	1.024	.931, 1.127	1.001	.943, 1.064
# Children Total	1.057	.905, 1.234	1.007	.852, 1.190	1.146	.805, 1.631	.863	.679, 1.097
# Orphans Total	.880	.714, 1.083	1.066	.876, 1.297	.774	.511, 1.173	1.320	.947, 1.842
<i>Income**</i>								
Employment	1.851	.879, 3.898	1.273	.622, 2.604	2.902	.541, 15.553	.772	.237, 2.509
Household Income								
0-50,000UgSh	2.024	.601, 6.811	2.211	.658, 7.425	98.07†	5.984, 1607	1.813	.430, 7.646
50-100,000UgSh	2.280	.677, 7.676	3.409*	1.04, 11.12	8.619*	1.32, 56.51	1.853	.487, 7.108
100-200,000UgSh	3.047	.779, 11.910	2.280	.604, 8.608	13.44*	1.385, 130	8.108*	1.21, 54.28
+200,000UgSh	0 <sup>b</sup>		0 <sup>b</sup>		0 <sup>b</sup>		0 <sup>b</sup>	
Woman's Income	1.003	.998, 1.009	1.004	1.000, 1.008	1.000	.988, 1.011	1.002	.994, 1.010
<i>Hunger Status**</i>								
# of Missed Meals	.992	.836, 1.176	1.310†	1.125, 1.526	1.144	.690, 1.896	1.389	.984, 1.959
Borrows Food	1.217	.644, 2.301	1.139	.596, 2.175	5.440*	1.237, 23.923	2.687*	1.118, 6.460
Has Food Today	1.237	.640, 2.389	.705	.373, 1.335	2.649	.654, 10.731	1.231	.499, 3.036
<i>School Fees/Housing**</i>								
Total School Fees	.999	.997, 1.001	.999	.997, 1.001	1.002	.996, 1.007	1.000	.998, 1.002
Able to Pay Fees	.813	.374, 1.767	.392*	.173, .890	.719	.146, 3.548	.922	.314, 2.702
Total Housing Cost	.999	.989, 1.010	1.001	.991, 1.012	1.005	.979, 1.033	1.003	.986, 1.019
Able to Pay Rent	.896	.398, 2.016	.405*	.186, .882	.615	.114, 3.315	.534	.182, 1.571

\*p<.05, †p<.005, ††p<.0005

\*\*Controlling for all personal characteristics

b This parameter is set to zero because it is redundant

### **Sexually Active**

As with bivariate analysis, married women were very likely to be sexually active (OR=47.375, 95% CI 14.38, 156.05) and widowed women very unlikely (OR=.412, 95% CI .192, .882). Also older women in the sample were less likely to be sexually active (OR=.924, 95% CI .881, .970). No socio-economic variables (e.g, employment, household income or women's personal income) were predictive of whether a woman was sexually active in the multivariate analysis.

### **Any Forced, Coercive or Survival Sex**

For experience of forced, coercive or survival sex, married status accounted for the most variance, with married women almost three times more likely to experience these sex acts (OR=2.911, 95% CI 1.23, 6.87). Women who reported total household income in one of the higher income brackets (50-100,000 UgSh) were three times as likely to report forced, coercive or survival sex (OR=3.409, 95% CI 1.04,11.12). The continuous variable of number of meals missed per week was predictive of forced, coercive or survival sex (OR=1.310, 95% CI 1.125, 1.526), with women who reported missing more meals more likely to have experienced this kind of sexual activity.

Finally, variables concerning payment of house rent and school fees were shown to be predictive of experience of forced, coercive or survival sex. Women who reported that they were able to pay their children's school fees were less likely to have experienced this kind of sex (OR=.392, 95% CI .173, .890). Women who reported that they were able to pay their house rent (or costs) during the last six months were also

less likely to have experienced forced, coercive or survival sex (OR=.405, 95% CI .186, .882) when controlling for all her personal characteristics.

### **Sex with Partner with Multiple Partners**

Women who reported household income in the 100-200,000 UgSh bracket were eight times as likely to report sex with a partner who had several partners (OR=8.108, 95% CI 1.21, 54.28). Women who reported needing to borrow food to get by were also twice as likely to have had a partner who has other sexual partners (OR=2.687, 95% CI 1.118, 6.460).

### **Condom Use at Last Sex Act**

Women who reported household income in the 0-50,000 UgSh bracket were many times more likely to report condom use at last sex (OR=98.07, 95% CI 5.984,1607) although this confidence interval is very large. Two other household income categories, 50-100,000UgSh and 100,000-200,000UgSh, were also significantly associated with higher condom use at last sex rates (OR=8.619, 95% CI 1.32, 56.51 and OR=13.44, 95% CI 1.385, 130). However, these statistical cells had very low sample sizes. Report of needing to borrow food was strongly predictive of condom use at last sex act (OR=5.440, 95% CI 1.237, 23.923).

### **Summary of Findings**

Multivariate analysis using logistic regression indicated that the odds of being sexually active and having reported forced, coercive or survival sex was much higher for married women. Widowed women are least likely to be sexually active. The odds of reporting forced, coercive or survival sex was highest among women who reported to be in one of the middle income categories. Women who reported missing meals due to food insecurity were also at higher risk of forced, coercive or survival sex. In multivariate analysis women who reported that they were able to pay school fees and pay rent were much less likely to report forced, coercive or survival sex.

The odds of using a condom at last sex act were less likely as income levels increased, although these statistics were unstable due to small sample size in many of the cells. Women who reported needing to borrow food to survive were more likely statistically to use condoms at last sex act and to have sex with a partner who has other partners. The odds of reporting sex with a partner who has other sex partners was highest among women who reported to be in one of the highest income categories.

### **IV. Results of Structural Equation Modeling**

Study objective three was to determine which socio-structural variables and relationship factors (e.g., gender based power, economic security, domestic violence, etc.) are the strongest predictors of women's sexual risk behavior (e.g., condom use) and adherence to ARV medication using structural equation modeling (SEM)

techniques. These results are presented in three sections. In Section A the preliminary model building results are reported for both the i) condom use SEM model and ii) the adherence to ARV medications SEM model. In Section B the model testing results are summarized. In Section C a summary of the findings is provided and final SEM models with significance measure included are presented.

### **Preliminary Model Building**

Exploratory factor analysis using principal components analysis was performed only on the domestic violence factor. The cumulative scores used for Gender Based Power; Economic Security; Forced, Coercive and Survival Sex; and Adherence that are used in the SEMs, are described in Chapter 3. The categorical variable for condom use is also described in Chapter 3.

### **Domestic Violence**

The following eight items were included in the first exploratory factor analysis for domestic violence: 1. whether she was slapped ever (SLPEVER), 2. whether she was slapped in the last 12 months (SLP12MO), 3. whether she was pushed ever (PUSHEVER), 4. whether she was pushed in the last 12 months (PSH12MO), 5. whether she was hit ever (HITEVER), 6. whether she was hit in the last 12 months (HIT12MO), 7. whether she was kicked ever (KICKEVER) and 8. whether she was kicked in the last 12 months (KICK12MO). The principal components factor analysis for domestic violence resulted in three factors, shown in Table 4.14.

Table 4.14: 1<sup>st</sup> Factor Loadings – Domestic Violence

	Factor		
	1	2	3
Ever Pushed	.748	-.329	-.076
Ever Kicked	.699	.051	-.247
Pushed In Year	.685	.291	-.167
Ever Hit	.674	-.630	-.057
Hit In Year	.660	.005	-.361
Kicked In Year	.641	.551	-.190
Ever Slapped	.617	-.261	.670
Slapped In Year	.529	.454	.620

Extraction Method: Principal Component Analysis.

Two items were then removed, slapped in the last 12 months (SLP12MO) and kicked in the last 12 months (KICK12MO), because of multiple loadings on the three factors. Principal components factor analysis was performed again on the remaining six items for domestic violence. The analysis resulted in one factor for domestic violence. The factor loadings for the final six items are shown in Table 4.15.

Table 4.15: 2<sup>nd</sup> Factor Loadings – Domestic Violence

	Factor
	1
Ever Pushed	.823
Ever Hit	.782
Every Kicked	.675
Hit In Year	.659
Pushed in Year	.651
Ever Slapped	.608

Extraction Method: Principal Component Analysis.

The factor score for these items was saved for use in the SEM model. Internal consistency reliability testing (Cronbach's alpha) was conducted and a correlation

matrix of the six domestic violence items was examined to determine how well the items correlated with each other. The correlation matrix is shown in Table 4.16.

Table 4.16: Inter-Item Correlation Matrix - Domestic Violence Items

	Ever Slapped	Ever Pushed	Pushed in Year	Ever Hit	Hit in Year	Ever Kicked
Ever Slapped	1.000	.430	.224	.523	.140	.293
Ever Pushed	.430	1.000	.543	.559	.320	.531
Pushed in Yr	.224	.543	1.000	.210	.476	.331
Ever Hit	.523	.559	.210	1.000	.558	.383
Hit in Year	.140	.320	.476	.558	1.000	.305
Ever Kicked	.293	.531	.331	.383	.305	1.000

The correlations between the six domestic violence items ranged from the lowest correlation ( $r=.140$  between ‘slapped ever’ and ‘hit in the last 12 months’) to the highest correlation ( $r=.559$  between ‘hit ever’ and ‘pushed ever’). Cronbach’s alpha was calculated for the six domestic violence items and achieved an alpha of .785 (based on standardized items). This was deemed reliable because it met the minimum standard of reliability (Cronbach’s alpha  $> .60$ ) (Nunnally & Bernstein, 1994).

### **Final Hypothesized SEM Models**

In figures 4.1 and 4.2 below the hypothetical SEM models for condom use at last sex act and ART adherence to medications are shown. These were also included in Ch. 2, Section VI and depict the hypothesized relationships between some of the key factors measured in the study. In these hypothetical SEM models the relationships are depicted as either causal or correlation relationships, with double-headed arrows depicting correlations and single-headed arrows depicting causal relationships. The hypothetical pathways between the factors displayed in Figures 4.1 and 4.2 are tested in Section B of this Chapter and the final models are depicted in Section C.

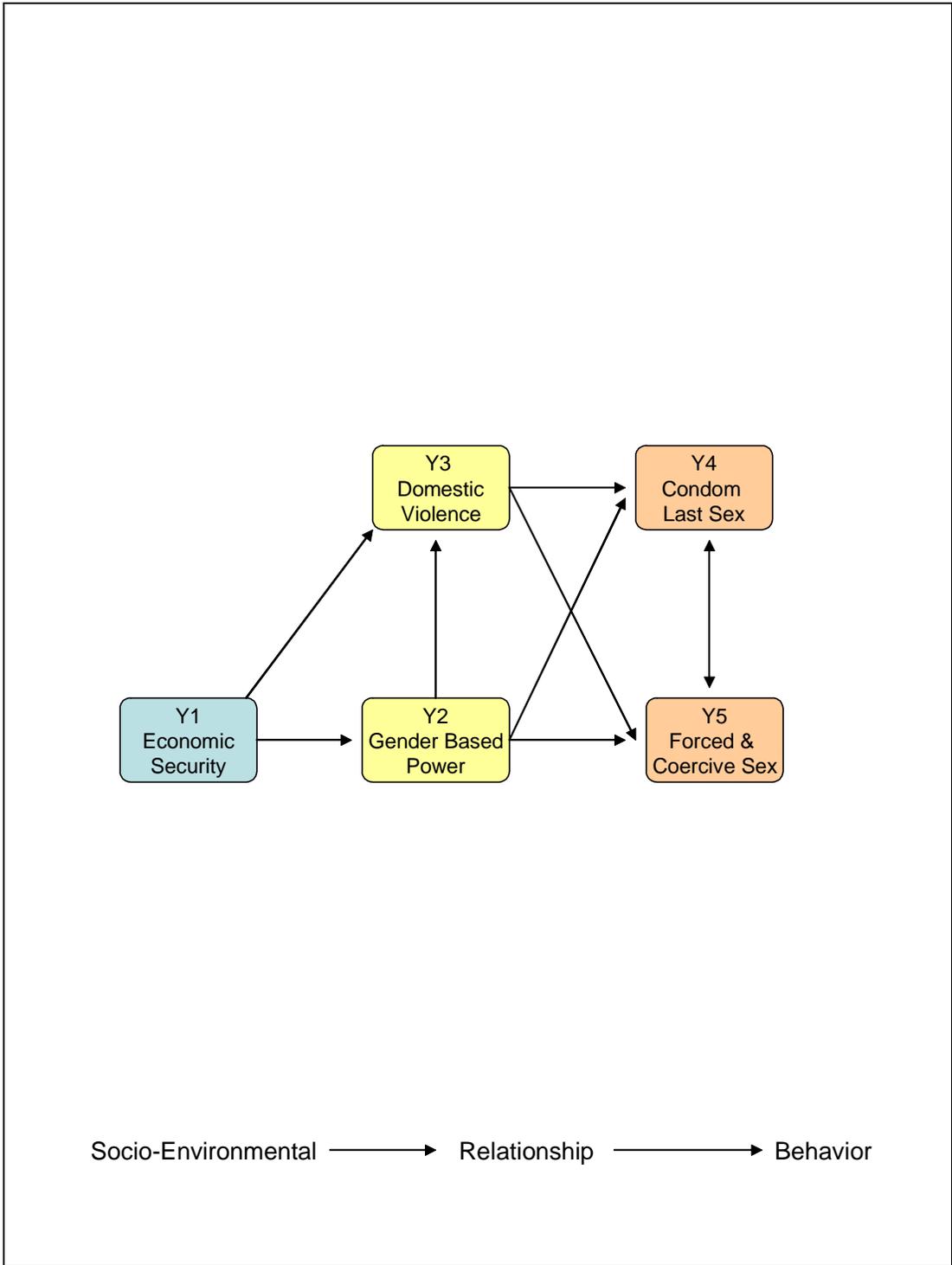


Figure 4.1: Hypothesized Condom Use at Last Sex Act SEM Model

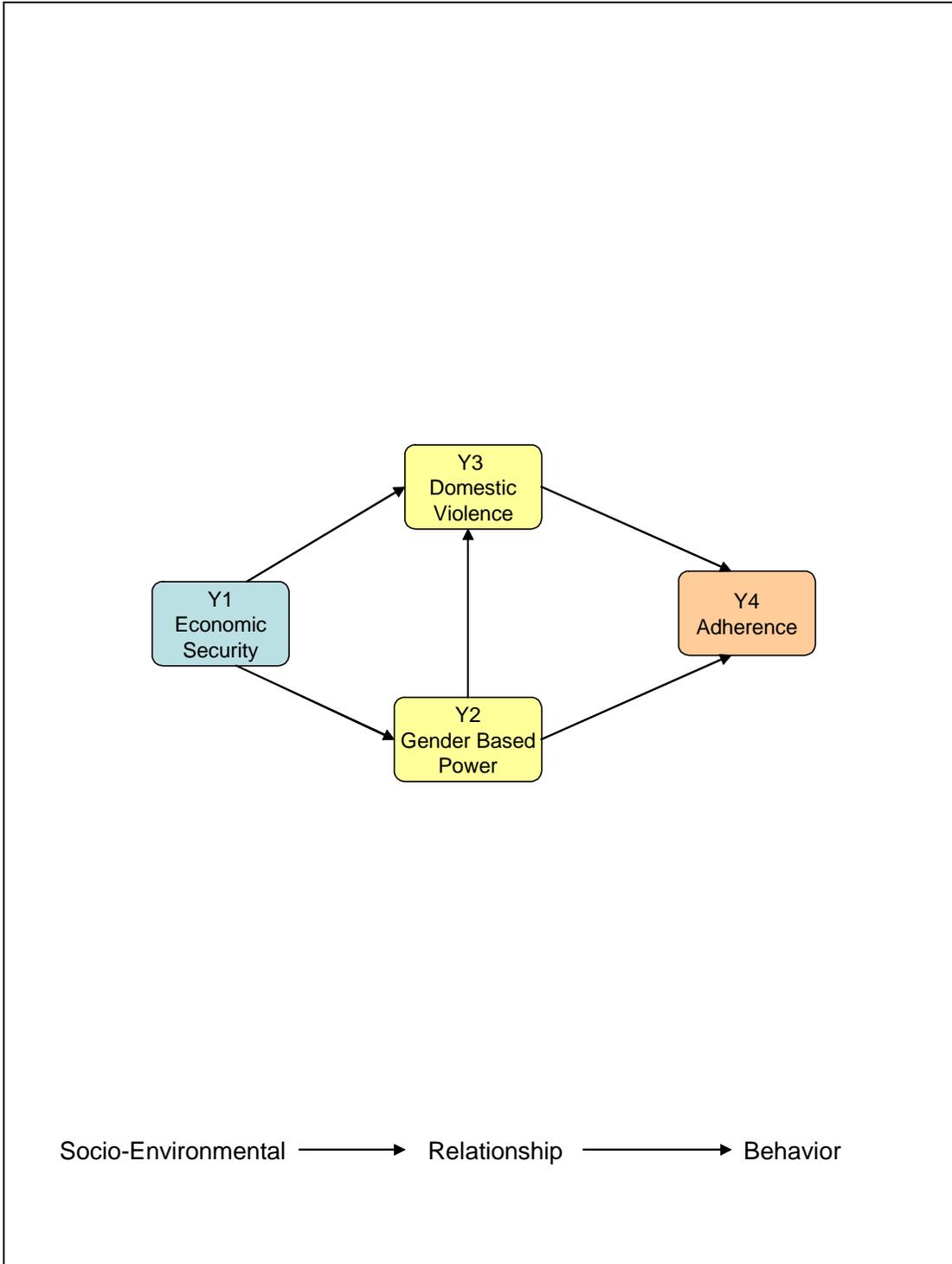


Figure 4.2: Hypothesized ART Adherence SEM Model

## B. Model Testing

### i. Condom Use SEM Model

The five factors in the condom use SEM model in Figure 4.1 were entered into Mplus Version 4.2, by Muthen & Muthen© for SEM analysis. Descriptive statistics for the sample are presented in Table 4.17.

Table 4.17: Descriptive Statistics for the Variables in the Hypothesized Condom Use Structural Equation Model

	Y1	Y2	Y3	Y4	Y5
Y1	1.000				
Y2	-0.155	1.000			
Y3	-0.142	0.155	1.000		
Y4	-0.089	-0.086	-0.091	1.000	
Y5	0.063	-0.342	-0.113	0.166	1.000
Means	8.092	0.309	26.208	8.092	2.300
Variances	12.376	62.127	0.992	0.166	1.409

Note: Correlations are in the diagonal, means and variances are in the lower rows of the matrix; Y1=Economic Security, Y2=Gender Power Sum Score, Y3=Domestic Violence Factor Score, Y4=Condom Use at Last Sex Act, Y5=Forced, Coerced or Survival Sex Sum Score

Model fitting procedures for the model presented in Figure 4.1 resulted in the following fit indices:  $\chi^2 (2, N=130) = 0.775, p=0.6787, CFI=1.000,$  and  $RMSEA=0.000,$  indicated an adequate fit of the model to the data. In SEM testing this means that model testing failed to reject the null hypothesis which states that the relationships among the variables specified in the SEM model are not significantly different from the observed relationships among the variables found in the data.

The parameter estimates for the Condom Use SEM are presented in Table 4.18 below. Parameter estimates divided by standard errors (Est./S.E.) greater than  $-/+ 1.96$

represent significant values. The ‘with’ function corresponds with correlation between factors and the ‘on’ function corresponds with causal relationships.

Table 4.18: Parameter Estimates for Condom Use Structural Equation Model

---

MODEL RESULTS

		Parameter Estimate	Standard Error	Estimate ÷ Standard Error
Y5	ON			
	Y3	-0.073	0.103	-0.712
	Y2	-0.050	0.013	-3.840
Y4	ON			
	Y2	-0.008	0.020	-0.387
	Y3	-0.067	0.153	-0.439
Y3	ON			
	Y2	0.017	0.011	1.553
	Y1	-0.034	0.027	-1.253
Y2	ON			
	Y1	-0.344	0.203	-1.697
Y4	WITH			
	Y5	0.164	0.137	1.203

---

Note: Boxed items represent significant relationships

It was not possible to specify this model any further because there were only 2 degrees of freedom for the model and a low  $\chi^2$ . With a  $\chi^2$  of only 0.775 for the hypothesized model, any model comparison with a single df difference (e.g., a model specifying an additional parameter to be estimated) would be non-significant since the  $\chi^2$  CV of 3.841 for a single df test could not be exceeded. Therefore, the hypothetical

model is the final model. The hypothetical model is depicted again in Figure 4.3 in Section C with the significance values included.

## ii. ART Adherence SEM Model

The four factors in the ART adherence SEM model in Figure 4.2 were entered into Mplus Version 4.2, by Muthen & Muthen© for SEM analysis. Descriptive statistics for the sample are presented in Table 4.19.

Table 4.19: Descriptive Statistics for the Variables in the Hypothesized Adherence Structural Equation Model

	Y1	Y2	Y3	Y4
Y1	1.000			
Y2	-4.321	1.000		
Y3	-0.498	1.224	1.000	
Y4	0.200	-0.360	-0.235	1.000
Means	8.092	44.385	0.001	2.622
Variances	12.376	62.042	0.992	5.101

Note: Correlations are in the diagonal, means and variances are in the lower rows of the matrix; Y1=Economic Security, Y2=Gender Power Sum Score, Y3=Domestic Violence Factor Score, Y4=ART Adherence Sum Score

Model fitting procedures for the model presented in Figure 4.2 resulted in the following fit indices:  $\chi^2 (1, N=130) = 0.013$ ,  $p=0.9086$ , CFI=1.000, and RMSEA=0.000, indicated an adequate fit of the model to the data. In SEM testing this means that model testing failed to reject the null hypothesis which states that the relationships among the variables specified in the SEM model are not significantly different from the observed relationships among the variables found in the data.

The parameter estimates for the ART adherence SEM are presented in Table 4.20 below. Parameter estimates divided by standard errors (Est./S.E.) greater than  $-/+1.96$  represent significant values. The ‘with’ function corresponds with correlation between factors and the ‘on’ function corresponds with causal relationships.

Table 4.20: Parameter Estimates for ART Adherence Structural Equation Model

---

MODEL RESULTS

		Parameter Estimate	Standard Error	Estimate ÷ Standard Error
Y4	ON			
	Y2	-0.001	0.026	-0.045
	Y3	-0.236	0.200	-1.176
Y3	ON			
	Y2	0.017	0.011	1.542
	Y1	-0.034	0.025	-1.386
Y2	ON			
	Y1	-0.349	0.198	-1.765

---

Note: Boxed items represent significant relationships

It was not possible to specify this model any further because there was only 1 degree of freedom for the model and a low  $\chi^2$ . With a  $\chi^2$  of only 0.013 for the hypothesized model, any model comparison with a single df difference (e.g., a model specifying an additional parameter to be estimated) would be impossible since the  $\chi^2$  test could not be executed with no degrees of freedom. Therefore, the hypothetical

model is the final model. The hypothetical model is depicted again in Figure 4.4 in Section C with the significance values included.

### **C. Final SEM Models**

#### **Summary of the findings**

Two hypothetical SEM models were developed, one for condom use at last sex act and one for adherence to ART. Since many of the factors in the SEM models were only available for sexually active women (e.g., gender power, condom use at last sex act) a dataset made up only of the sexually active subset of women in the study was used for the SEM analyses.

All the factors used in SEM were either categorical variables or cumulative sum scores, and thus observed variables, with the exception of the latent factor domestic violence. The items that make up the domestic violence factor were examined in factor analysis and had acceptable factor loadings and inter-item correlations. The items also had good reliability based on Cronbach's alpha.

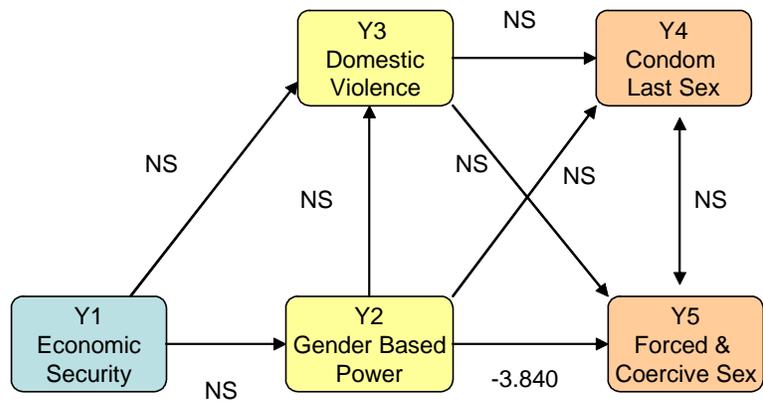
Once the preliminary model building steps were complete, the factors were analyzed for overall model fit. Both models showed adequate fit of the actual data to the hypothesized data relationships put forth in the SEM models.

After overall model fit was concluded the pathways in both models were estimated and analyzed for statistical significance. In the condom use at last sex act model the only significant pathway was gender power predicting forced, coercive or survival sex. In the adherence to ART model none of the estimated pathways were statistically significant in this study sample.

**Figures**

In Figure 4.3 one causal pathway was significant. A lower gender power factor score (meaning the woman had low power) predicted more instances (higher score) of forced, coercive or survival sex score by approximately 1.8 SD (standard deviations) with a t test value of -3.840. No other pathways were significant.

In the second ART adherence SEM model in Figure 4.4 no pathways were found to be statistically significant.



Socio-Environmental → Relationship → Behavior

Figure 4.3: Final Condom Use at Last Sex Act SEM Model

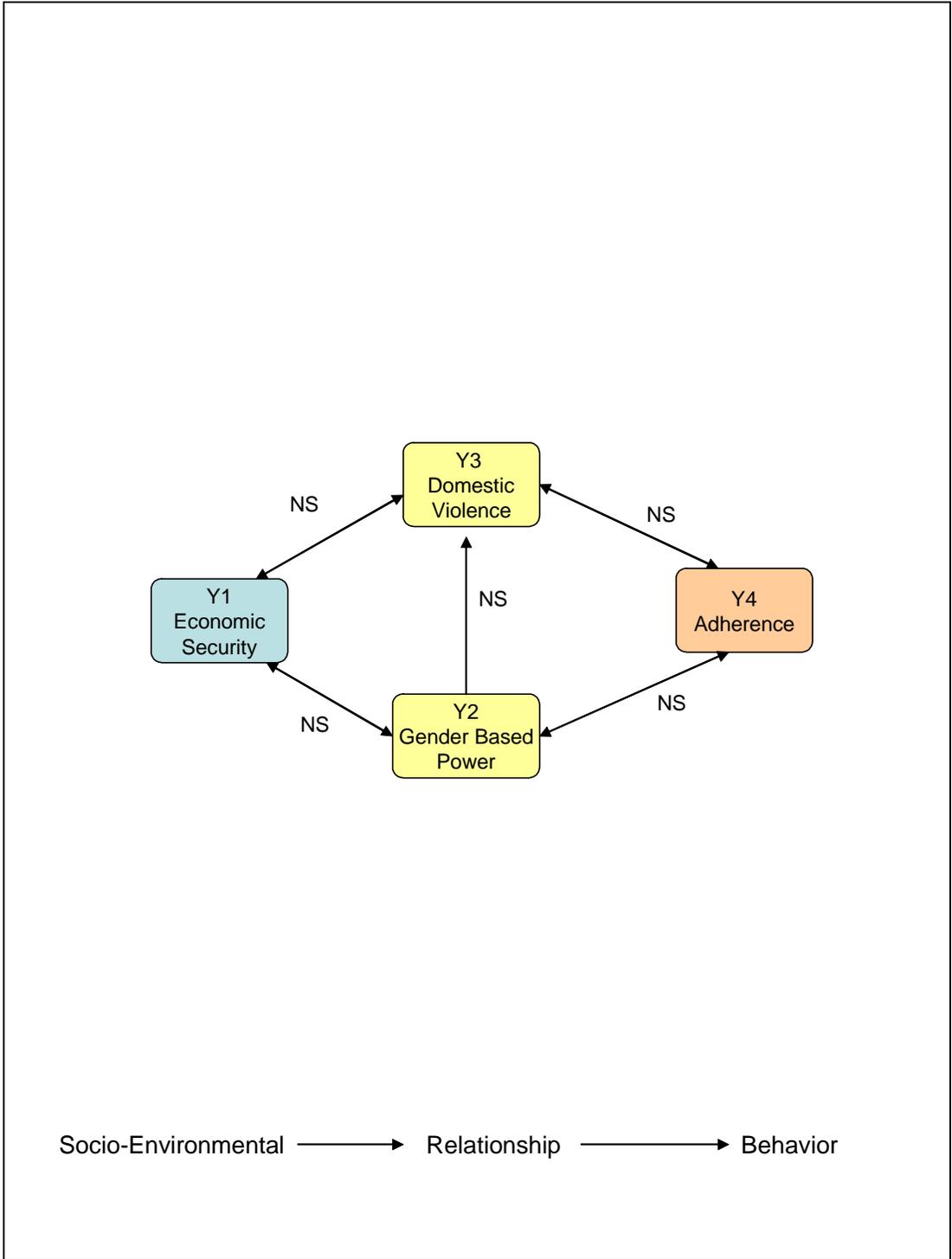


Figure 4.4: Final ART Adherence SEM Model

## Chapter 5: Discussion

### **I. Chapter Outline**

The purpose of this Chapter is to provide a summary and interpretation of the results of the study for each research objective. Section II is a discussion of the results of the descriptive analyses done to understand the characteristics of the sample population of women from the ART programs in Uganda. Section III is a discussion of the possible meanings of the results from the bivariate and multivariate analyses of sexual risk behaviors. Section IV is a discussion of the structural equation models for condom use at last sex act and ART adherence. Section V discusses the limitations and strengths of the study. Sections VI, VII and VIII respectively discuss recommendations for future research, implications for public health and conclusions.

### **II. Understanding the Study Sample**

The descriptive analyses undertaken to better understand the sample population of women provided important insights into the study sample. Even though the average length in HIV treatment for the women studied was 16 months, only one third of the women interviewed reported that they were sexually active. This finding likely reflects the high number of widows in the study, and divorced and separated women, who have not had sexual partners for many years. In fact, many women reported that their husbands had died of AIDS and that they themselves had been close to dying when they joined their ART program. In interviews with several women in the ART programs it was clear that they had little interest in starting new relationships. In fact,

these women harbored considerable anger toward men in general because of AIDS and domestic violence, which many women had experienced. One woman said that she cannot ride in a taxi or other public transportation with a man because she becomes so angry.

The finding that so few women were sexually active was unexpected. The limited numbers made it more difficult to determine factors associated with sexual risk behaviors because of insufficient sample size. A likely explanation for the low sexual activity is that the ART programs in Uganda began in the mid 2000s with an urgent demand for treatment of middle-aged women in the later stages of AIDS who had many dependents. The number of dependents likely motivated women to seek treatment and stay alive. In fact in many ART programs women comprise 60% or more of the recipients (Kiguba et al., 2007) which most likely reflects women's intense motivation to stay alive. The ART programs reported that even with less stigma and discrimination around HIV/AIDS, many sick men prefer to die at home instead of seeking care and treatment at an ART center.

Over time, however, the demand for treatment may come from younger, healthier men and women who test HIV positive and then are followed over time until they meet ART criteria, such as a low CD4 cell count or high viral load. This shift may mean that eventually more sexually active women will make up the local ART population and there will be fewer widows. In Cape Town, South Africa, where it appears this shift has already taken place, researchers have found that the waiting

period before beginning ART is a time of increased sexual risk behavior for men and women (Eisele et al., 2007).

In fact this trend is apparent in this study sample, with women who had been in the ART programs the longest least likely to be sexually active and those who had been in the ART programs the shortest most likely to be sexually active. It stands to reason that a life-saving intervention would first be used to save the very sick and then later on targeted to people much earlier in their progression to AIDS. Anecdotally many women in the study said that they would never be able to have a sexual partner because everyone had seen their outward signs of AIDS and knew that they had been very sick. As the ART population of women changes, attracting a sexual partner may become much less problematic because women will receive ART before showing any signs of AIDS. In interviews with younger women, perhaps 20 years old, it was clear that their realities were much different from their older counterparts. The older, widowed women who cared for orphans and were generally not sexually active had resigned themselves to their HIV status and disclosure seemed very common. In many ways they appeared more liberated and empowered than all the other women. Younger women, on the other hand, were very frightened of the prospect of disclosure to parents, school comrades or new boyfriends and often kept their serostatus to themselves even though they were enrolled in ART. Because of this, these young women were often very lonely, full of anxiety and unlikely to form support groups with other women. They were also more reluctant to discuss sensitive sexual issues.

Although most women were not sexually active, half of the sexually active women in this sample were married women. Thus, many of the analyses done in this study around sexual behavior often reflect the behaviors of married women. For example, among all sexually active women condom use was fairly high, as were rates of disclosure of her HIV serostatus to her main partner. However, on the negative side, forced, coercive or survival sex was fairly common and partner refusal to use a condom was widely reported by women who said that they were sexually active at the time of the interview. These findings reflect other reports from Uganda that describe how Ugandan men's gender power is derived from marriage, specifically from the male family's payment of a bride price, and how violence toward women increases women's powerlessness to influence condom use (Kaye et al., 2002; Koenig et al., 2004; Bunnell et al., 2005; Human Rights Watch, 2003; McGrath et al., 1993).

The descriptive analyses also indicate that most of the women in the study live in impoverished circumstances. Most women reported 0-31 US dollars per month total income for the entire household even though total average costs of school fees, food and housing costs per month were reported to be 168,000 UgSh or 105 US dollars. These costs are more than three times higher than what most families or households earn each month. Although each family may have myriad ways to make ends meet, it is clear that the women and the households they live in are struggling each month to pay necessary bills and expenses. Many women are forced to withdraw children from school, for example, and then reinstate them when they have sufficient funds. In contrast to school fees and food, housing costs seem to be fairly low and fewer women

struggle to pay rent. These kinds of economic struggles in Uganda, or the possible contribution to sexual risk behaviors, have not been widely published in the literature from Uganda or elsewhere.

Women's poverty is partly borne out by the extraordinary number of women who reported that they have to borrow food to get by, although most women reported that they had enough food on the day of the interview. A high proportion of women reported missing at least one meal per week and many reported missing as many as eight meals. Anecdotally, the ART programs noted that this food may be saved for orphans and other dependents the woman has. Throughout sub-Saharan Africa and in Uganda widowed women have become caregivers for those sick with AIDS and for orphans (Ssengonzi, 2007; Heymann, Earle, Rajaraman, Miller, Bogen, 2007). As expected, then, most women had one or more orphans to care for and many had several. Indeed, women were responsible for a substantial number of food dependents, nearly five people on average. Bivariate analyses confirmed that women who were not sexually active, presumably widows, had twice the number of orphans to care for than sexually active women.

### **III. Factors in Women's Sexual Behavior**

The bivariate and multivariate analyses done for the second research objective, to examine women's individual characteristics for associations with sexual risk behavior, revealed several important factors that may contribute to women's sexual risk level in this population. However, some analyses were hampered by small sample

size. All 377 women in the sample were asked if they were sexually active or not and whether or not they had experienced forced, coercive or survival sex in the last six months. This sample size was substantially larger than the sub-set sample of only 130 sexually active women who were asked whether or not they had used a condom at last sex act and whether or not they had a sex partner who has multiple partners.

### **Sexual Exchange Partnerships**

Overall the results suggest that at least some of the women in the sample were engaging in short-term sexual exchange partnerships, or survival sex, in order to support themselves and their dependents. Alternatively, women may simply have been in situations where their economic dependence on a man (among other reasons) put them at risk of coerced sex or forced sex. For example, women who reported more missed meals had a higher prevalence of forced, coercive or survival sex (in bivariate and multivariate analyses) and sex with a partner with multiple partners (in bivariate and multivariate analyses), even though they were less sexually active overall; women able to pay school fees (in multivariate analysis) and women able to pay housing costs (in bivariate and multivariate analyses) reported fewer instances of forced, coercive or survival sex; and women who reported needing to borrow food to get by reported more partners who had multiple partners than those that did not need to borrow food (in bivariate and multivariate analyses). Needing to borrow food was also associated with high condom use rates in multivariate analysis, possibly indicating that women who seek out casual relationships in order to support herself and her children usually use condoms or are able to convince their short or long-term partner to use a condom.

It is interesting to note that in bivariate analysis the results indicated that women who were able to pay school fees were more likely to report forced, coercive or survival sex whereas in multivariate analyses being able to pay school fees had a protective effect. That is, those who were able to pay school fees were much less likely to report forced, coercive or survival sex. It may be that the bivariate association reflected the woman's marital status, with married women much more likely to be able to pay school fees but also much more likely to experience forced, coercive or survival sex. With marital status controlled for in multivariate analysis, however, this association disappeared.

There are several reasons why women may need to seek out sexual exchange relationships. The majority of women had an enormous economic burden: an average of 211,000 UgSh (132 US dollars) in school fees per term, an average of 17,000 UgSh per week for food (11 US dollars), and an average 30,000 UgSh per month (19 US dollars) in rent to pay, even though in many cases these costs are most likely shared with a partner or family member. In either case, the average total monthly costs that were reported by the women in the sample were 170 US dollars, in a country where average monthly income is 30 US dollars. Previous qualitative research has shown that women may engage in sex exchange or get involved with intergenerational relationships in order to procure food for themselves and their children (Zulu, Nii-Amoo Doodoo, Chika Ezeh, 2004; Gillespie & Kadiyala, 2005; WFP, 2003; Fields-Gardner & Fergusson, 2004; Mill & Anarfi, 2002; Dunkle et al., 2004). Indeed, a recent publication has linked risks among women in Botswana and Swaziland (e.g.,

inconsistent condom use with a nonprimary partner, sex exchange, intergenerational sex) to food insufficiency (Weiser et al., 2007). This study, however, concentrated on uninfected women's risks related to food insufficiency, whereas no studies have considered HIV infected women and the effects of food insufficiency.

It may be that the impacts of food insufficiency are even higher and more complex among HIV infected women compared to uninfected women because of the increased stigma and discrimination they face; the high likelihood of abandonment by partners and family members; the dilemma of HIV disclosure in forming sexual unions; the greater numbers of widowed women and their social isolation; and the greater nutritional needs of HIV infected women due to an impaired immune system and an ART regimen that includes taking medications on a full stomach.

### **The Risks of Married Women**

Additional findings seem to conflict with the conclusion that a woman's economic needs drive her sexual risk behavior. Ultimately the findings from this study present a more complicated picture of the relative role of economic burden in women's sexual risk behaviors in this population. For example, some conflicting findings are that employed women are more sexually active than unemployed women (in bivariate analysis); women with low household income are less sexually active (in bivariate analysis); and the higher a woman's personal income (in bivariate analysis) the more she reported forced, coercive or survival sex.

However, although superficially these results seem to conflict with the discussion of impoverished women, many of these results probably reflect the risks of

married women, especially since they are found in bivariate analyses and not in multivariate analyses (where personal characteristics are controlled for). It seems highly likely that the finding that a high women's income is associated with women's reports of forced, coercive or survival sex is due, in part, to the economic contribution of a spouse and, thus, reflects the risks of marriage. Similarly, the result that women with lower incomes had lower levels of sexual activity most likely reflects the high number of non-sexually active widows in the sample and their low income due to not having spousal support. Employed women's higher sexual activity may reflect that the highest proportion of employment was found among married women. Other evidence of the risks of marriage, as mentioned under the sample description, is that the bivariate association that indicates that the ability to pay school fees is associated with increased forced, coercive or survival sex most likely reflects a woman's married marital status and thus her increased risk of forced, coercive or survival sex. In multivariate analysis the ability to pay school fees shows a protective effect against this outcome. The risk of married women were confirmed in multivariate analysis; married women in the sample were three times more likely than unmarried women to experience forced coercive or survival sex in multivariate analysis.

Thus, the bivariate findings showing a relationship between higher income and risk behavior most likely reflect the higher income in a married woman's household and her difficulties in negotiating safer sex with her husband. This shows that socioeconomic status is a difficult marker for women's HIV/AIDS risk behavior. This study reveals a paradox that both economic hardship and economic prosperity can

result in increased risk for women. The important difference may be that economic prosperity, because it is most likely the result of a union with a man, is accompanied by strong gender power differentials that may ultimately put women at high risk due to an inability to negotiate condom use. On the other hand, poor women who engage in survival sex because they do not have a spouse may be more able to negotiate condom use; however, this possibility is only scantily supported by the data and would need further study. Certainly research exists that supports marriage as being the most likely union to have strong gender power differences (Rwabukwali et al., 1994).

The sexual risks of married women in Uganda have been noted elsewhere in the literature (Bunnell et al., 2005; Were et al., 2006; Malamba et al., 2005) and are certainly indicated in this study of women in HIV treatment programs. Married women in the study were most likely to be sexually active and three times more likely to be forced or coerced into sex. These findings are consistent with recent publications that indicate that marriage is a risk factor for acquiring HIV (Hirsch et al., 2007; Smith, 2007; Parikh, 2007; Liu et al., 2005; Glynn, Caraël, Buvé, Musonda, Kahindo, 2003). Research in Uganda from as early as 1993 shows that social and cultural norms put women at risk of HIV (McGrath et al., 1993). Not surprisingly, the anthropologists in this early study found that the predominant culture in Kampala, derived from the Baganda ethnic group, is generally very permissive in terms of a man's control over his wife and his ability to have multiple partners outside of marriage.

More surprising is that these authors also found that, despite sexual norms prohibiting sex for women outside marriage, many of the women in their study

reported that there are certain circumstances when a woman may take other partners, including economic need, desire for greater sexual satisfaction, or revenge on a husband with other partners (McGrath et al., 1993). For the current study this finding may mean that married women also may constitute part of the group of women who seek out casual unions, or even longer term boyfriends, in order to meet their economic needs. This result further complicates the picture of economic level and women's risk; it may be that certain indicators that seem to categorize married women as having more resource (such as total household income) are misleading if women do not have access to those resources. In such a scenario married women are similar to other impoverished women who may seek out relationships that will support her as she seeks to pay housing costs, food costs and children's school fees. An important factor for married women, which is supported by the literature, is that many married women do not co-habitate with their spouses and/or are separated from him for long periods of time (Bledsoe, 1997). Women living under this arrangement are probably even more likely to form external unions if she is not receiving financial support from her spouse. This kind of living arrangement, and mobility in general, was not assessed in the study but is likely to occur in Uganda partly due to strong social stigma against divorce and high rates of marital separation and serial marriages (Adeokun and Nalwadda, 1997; McGrath et al., 1993).

#### **IV. Economic Security and Gender Based Power**

The last research objective was to determine predictors of condom use and adherence to ARV using structural equation modeling (SEM) techniques. The model

for condom use at last sex act theorized that economic security predicts both women's level of domestic violence and women's level of gender based power. Domestic violence and gender based power, in turn, predict both condom use and experiences of forced, coercive or survival sex. Gender based power was theorized to predict levels of domestic violence. Condom use and forced, coercive and survival sex were theorized to have a correlational relationship.

Model fitting procedures for the condom use at last sex act model resulted in a good fit of the model to the data. However, only one of the eight pathways were statistically significant, indicating that the hypothesized model needs to be refined in order to be a good model of condom use at last sex act and/or forced and coercive sex. The one causal pathway that was a significant predictor was gender based power on forced, coercive and survival sex. It was not possible to specify the model any further because of the low degrees of freedom and the low chi square amount.

Unexpected findings were that in both SEM models, economic status did not show significant causal pathways to condom use at last sex, domestic violence or gender based power factors. These findings may reflect what was found in the other analyses; that economic security is a misleading indicator because women are economically dependent on men and that women in all different economic strata live in a society with such strong social and cultural norms around gender based power and violence toward women that they are put at risk despite their economic circumstances. It may also indicate that the measurement was incorrect, with several factors accumulated into one score (education, hunger, housing status, income, etc.) some of

which may reflect the economic status of a partner and not the economic status of the woman. Another possibility is that certain items that define economic security, such as a woman's hunger status, are so conceptually different from other items that they need to be distinct factors in a model.

The findings that economic security was not predictive of the outcomes is somewhat supported by other findings in the literature (Hargreaves, 2002; Wojcicki, 2005; Weiser et al., 2007). Other researchers have argued that socioeconomic status is not easy to define in a sub-Saharan African setting and that it perhaps plays a more mediating role than a direct role in many of women's risk behaviors (Weiser et al., 2007). Some of these same studies have, however, found that socioeconomic status is important and does influence such outcomes as a man's control over a woman or domestic violence (e.g., Hargreaves, 2002; Dunkle et al., 2004). These findings do suggest that socioeconomic status is an important factor to continue to study and define.

As discussed above, it is difficult to develop and validate a measure that is essentially purporting to measure poverty. Much more work needs to be done to define and measure poverty, especially for HIV/AIDS and other public health studies interested in structural and environmental factors. For many years much of what has been theorized about poverty and women's HIV/AIDS risk has been qualitative research (Stein, 1990; Farmer et al., 1996; Bassett & Mhloyi, 1991; Weiss & Gupta, 1998; de Bruyn, 1995; Tawil et al., 1995; Weiss et al., 2000). Thus, the development

of better and more widely validated measures of poverty for sub-Saharan Africa that can be used for quantitative studies will be critical.

Even though economic status did not show a significant causal pathway, in the condom use SEM the gender based power factor did predict more experiences of forced, coercive and survival sex. These results are consistent with other findings related to gender based power indicating that women with lower power are more likely to experience coercive or even violent situations (Heise et al., 1999; Blanc, 2001; Kaye et al., 2002; Koenig et al., 2004). In Uganda a large study of women and violence found similar findings and that one of the main power differentials in play is one of access to economic resources (Human Rights Watch, 2003). Unfortunately gender based power did not predict condom use in this model, as has been supported elsewhere (Gómez & Van Oss Martin, 1996; Amaro & Raj, 2000; Blanc, 2001).

Another unexpected finding was that gender based power did not predict domestic violence in either SEM. Prior evidence supports the notion that inequalities in power are intimately connected with violence toward women (Heise et al., 1999; Blanc, 2001) in cultures all over the world. It is possible, even, that women with more power could be at higher risk of domestic violence. One study in Haiti, for example, found that “female dominance in decision making about purchases for daily household needs was positively associated with intimate partner sexual violence but its effects were mediated by relationship quality” (Gage & Hutchinson, 2006). A qualitative study in Uganda involved discussions with men and women about the causes of

domestic violence in Wakiso District, Uganda. The respondents cited urban migration, changing cultural values and men's unemployment as factors that shift the balance of power in gender relations. Often the resultant male uncertainty and 'gender antagonism' is associated with domestic violence (Kaye, Mirembe, Mia Ekstrom, Bantebya, Johansson, 2005). It is difficult to say whether this result would translate to findings in the current study.

Also nonsignificant in the condom use model were the pathways 1) between domestic violence and condom use, 2) condom use and forced sex, and 3) domestic violence and forced sex. These results were unexpected, especially due to the many qualitative reports of how intimately related these three items are (Maman et al., 2000; Hamburger et al., 2004; Heise et al., 1999). The first nonsignificant pathway, and indeed perhaps the reason why condom use is so poorly predicted in other parts of this study, may be because different factors are more important predictors of condom use in HIV infected women. Most of what has been written about women receiving ART and their risk behaviors are from the United States and too culturally specific to be adapted to Uganda. For example, a recent study conducted in Atlanta among HIV positive women indicated that intimate partner violence was associated with inconsistent condom use (Lang, Salazar, Wingood, DiClemente, Mikhail, 2007) but this is difficult to generalize to a Ugandan setting. Nevertheless, even though the women in this study were HIV infected, much evidence in Uganda supports the role of domestic violence in predicting both condom use and forced, coercive and survival sex

(Human Rights Watch, 2003). The insignificant pathways may also reflect the small sample size available for the SEM analysis or, as in the case of condom use and forced sex for example, the factors themselves fit together differently than was hypothesized for this model.

The theorized model for ART adherence was similar to the theorized model for condom use, based on a few previous studies that women's sexual risk behaviors and adherence to ART may possibly be influenced by similar social-structural factors (Zorrilla, 2002; Kalichman & Rompa, 2003). The model for ART adherence in this study theorized that economic security predicts both women's level of domestic violence and women's level of gender based power. Domestic violence and gender based power, in turn, predict ART adherence. Gender based power was again theorized to predict levels of domestic violence in the ART adherence model.

Model fitting procedures for the ART adherence model resulted in a good fit of the model to the data. However, none of the five pathways was statistically significant, indicating that the hypothesized model needs to be refined in order to be a good model of ART adherence. It was not possible to specify the model any further because of the low degrees of freedom and the low chi square amount.

An important unexpected finding was that no causal pathways with ART adherence were significant. A possible explanation for this finding is that factors that are typically associated with sexual risk behavior for HIV are not associated with adherence, as has been posited by some in the field (Zorrilla, 2002; Kalichman & Rompa, 2003; Remien & Smith, 2000). For an ART adherence model to be successful,

perhaps other factors need to be included in the model. It may also be that, as with the condom use SEM model, the factors themselves fit together differently than was hypothesized for this model but they are all still critical factors for ART adherence. However, it was not possible to further respecify pathways in either model and/or consider different pathways. In the ART adherence model the economic security indicator had the same limitations as in the condom use at last sex SEM model discussed above.

## **V. Limitations**

There are several limitations to this study. This was a cross-sectional survey of women at HIV treatment centers in Uganda and thus was not able to examine women's behavior prospectively. In addition, a non-probability sample of women was used which greatly limits the generalizability of the findings (Portney & Watkins, 2000). All of the women in the HIV/AIDS treatment programs in the survey received intense, multiple counseling sessions regarding the dangers of unprotected sex when receiving ART and the need to strictly adhere to her ART regimen. This experience could have resulted in considerable underreporting of sexual risk behaviors or ART non-adherence due to social desirability. Very sensitive questions such as domestic violence and forced, coerced or survival sex may have been underreported due to embarrassment or misunderstandings of the terms. There is also the chance of cross-cultural misinterpretation of the questions.

A further limitation of this survey is it was particularly limited by the power to predict sexual risk behaviors in the group of sexually active women (N=130). This low

power greatly influenced the ability to find significant associations with the condom use outcome measure and other measures in bivariate, multivariate and SEM analyses. Many sexually active women did not respond to the condom use at last sex question, so in fact the number of valid responses for condom use was only 114 out of 130 women. In several analyses, such as the odds ratios calculated in the four different categories of income in multivariate analysis, the number of cases was very small and led to some unstable estimates. In many of the bivariate analyses for condom use and sex with a partner with multiple partners very few bivariate associations were significant due to a very small sample size. In some cases they approached  $p < .05$ , at levels of .06 to .08.

The SEM analysis findings indicate that perhaps SEM analysis is not the most appropriate tool for measuring multi-layered HIV risk models (structural-environmental risk, personal relationship risk and individual behaviors), as was attempted here. Different statistical methods, such as hierarchical multilevel modeling, may be more appropriate for models containing structural-environmental factors mixed with relationship and individual factors. Hierarchical modeling is based on the premise that units are grouped into different hierarchies based on social structure, such as a relationship, family, school or community (Goldstein & Leyland, 2003). This kind of modeling allows and contrasts regression techniques within and between the group levels and not just at the individual level, mirroring more of what happens naturally in society.

More importantly for this study, however, the hypothetical SEM models that were possible to conceive and construct were greatly limited by the small sample size of sexually active women and thus the number of factors that could be included and the number of pathways that could be estimated. Also, even though the model fitting results for both models indicated adequate fit, it is likely that a different hypothetical configuration of the factors may have resulted in a more successful model. All of the factors included in the SEM models have substantial theoretical evidence supporting them and so should be considered in future hypothetical models.

Many of the measures used in the study have not been validated in an international setting or among different sub-Saharan African cultures. This was a significant limitation for this study. For example, some of the food and hunger items were adapted from work done in Latin America that had never been used in sub-Saharan Africa (Lorenzana & Mercado, 2002). The gender based power measure was adapted from gender based power research done in South Africa, but even so several items were changed that did not seem relevant to work in Uganda (Jewkes et al., 2002). Because so many items and scales in this study have not been widely validated, this weakens some of the conclusions of the study and may have been closely tied to the disappointing SEM results as well (e.g., measurement of gender based power, economic security, ART adherence). However, there are several measures that have been widely used, such as the indicator of condom use at last sex act, sex with a partner with multiple partners and experiences of forced, coercive or survival sex (DiClemente et al., 2004; WHO, 2005). The domestic violence measure as well was

taken from a WHO domestic violence survey that was conducted in several countries around the world (WHO, 2005). An important consideration in the choice of measures was that they were widely reported by scholarly sources to be important factors (e.g., gender inequality, poverty) in increasing women's HIV risk. However, many of these sources were from social science disciplines and quantitative measurements of the contribution of these factors to women's risk (especially HIV infected women) are uncommon. The one exception is important new work in measuring gender based power in sub-Saharan Africa (Jewkes, 2002; Jewkes, 2006; Dunkle, 2004). Thus, many of the quantitative measures used in this study have not been objectively validated and so the justification of their use is derived from mostly qualitative sources. It remains to be seen, therefore, if such measures can be fully quantified and to what extent it is appropriate to use factors justified by qualitative sources in quantitative studies such as this one.

There are some limitations to the measure of ART adherence in the study. Many studies of adherence will cross-validate self-reported medication adherence with more objective measures, such as pill counts or electronic bottle cap devices, which was not done in this study. Especially given the very strong ART adherence counseling given in these settings, there could have been significant under-reporting of missed doses and other adherence behavior and this could not be cross-validated with more objective measures. Also, the ART adherence scale that was used had been validated in the United Kingdom but had not been used in any developing countries.

Another limitation of the adherence measure was that the sampling method was unable to take into account women who had not started ART for some reason (e.g. no access to ART programs in Uganda) or those who had started ART and then dropped out of the program for some reason. There is a real possibility that the women sampled, who had all successfully completed at least six months of ART, comprise a highly select group of women who are quite different from women with no access to ART or who dropped out of an ART program for some reason. The discontinuation rates for ART that have been published, however, indicate that it is uncommon. In a 2006 study in Kampala of 686 people in ART programs only 13.7% had discontinued their ART (Kiguba et al., 2007). Nevertheless, this may somewhat limit the generalizability of the findings from the study.

Finally, the SEM analyses for the ART adherence model were restricted to sexually active women since data from some of the factors in the ART adherence model (e.g., gender based power, domestic violence) were only available for sexually active women. Therefore, the ART adherence SEM results may be different if a dataset containing both sexually active and non-sexually active women were used instead.

Some significant strengths of the research are that the sample was limited to women, whose HIV/AIDS prevalence rates are clearly of great concern in sub-Saharan Africa and around the world. This study was also limited to women with HIV infection who are receiving ART. This is a much understudied group that is, nevertheless, very important in public health terms as HIV treatment programs

become more widespread. Specifically, women in ART programs that are located in regions with widespread gender imbalance may face considerable difficulty in being able to enact the behavioral changes that ART programs recommend. These difficulties may remain even when a woman is fully aware of the risks of transmitting HIV to a sexual partner or baby and the risk of acquiring drug resistant HIV strains through unprotected sex. This study provides several clues to understanding how women's behavior is constrained by contextual influences and why women may sometimes be unable to protect themselves from these dangers. In particular, an important study strength is that the study includes measures for gender based power, economic security, food security, domestic violence and forced, coerced or survival sex. These are important social-structural factors that need continued research and description in order to more fully understand how they influence women's behaviors.

Another strength of this study is that the ART population of women sampled is similar to the overall population of women who are enrolled in ART programs in Uganda. The average age of the women in the sample, age 36, is similar to samples of 1044 adults in home-based ART programs in Uganda funded by CDC (Moore et al., 2007) who had a median age of 36. It is also similar to the median age (36) and education (60% had completed secondary school) of women in ART programs in Kampala in a recent report published by the Makerere University Medical School (Kiguba et al., 2007) which sampled 452 women. Another study of 1,092 men and women in ART programs in Uganda published in 2007 had very similar demographic findings to this study (King et al., 2007). For example, in the King study many ART

members were widowed, separated or divorced (55%) although 43% were married, women in the study had a median age of 37, 42% were sexually active and, of those, 69% had disclosed their HIV status to a close partner.

## **VI. Future Research**

Much of the research done here can be further refined and improved upon in order to understand better the risks of women in ART programs in sub-Saharan Africa. For example, it was not clear in these findings whether women who engage in sexual exchange experience gender power differences in the same way married women do and whether condom use negotiation is similar. It will be important to better compare and contrast women's sexual partners, women's economic motivation in those partnerships and how and when gender power differences play a role in her behavior with different partners.

Measures for poverty and gender based power in these settings need to be further validated and refined given their important role in women's lives. This study gives some evidence that food insecurity may play an important independent role in women's lives that is not necessarily tied with her reported economic status. Qualitative research could be used to uncover more about when and how women have access to resources to pay expenses (e.g., school fees, food, housing costs) and what factors are important predictors of food insecurity. It will be important to learn how a woman's marital status and general station in life influence food insecurity. In quantitative measures of food insecurity better measures need to be developed and validated in countries most likely to be affected by food shortfalls.

Future research should also include more validation studies of scales such as gender based power in settings like Uganda. A gender power scale from South Africa that was used in this study was not very successful in measuring gender power, with low correlation between items and low reliability overall. Given the role of gender power in Uganda and the need for interventions among both HIV infected and uninfected women there, a better a more comprehensive gender power scale that reflects Uganda realities needs to be developed. Gender based power and other factors studied here should be studied in longitudinal studies that can allow study of these dynamic factors in women's lives over time.

This study was not able to analyze several factors that may influence women's ART adherence. It may be that over time, as with sexual risk behaviors, adherence to ART may be more difficult for women and more research will be needed to understand what factors are most important in predicting good adherence. This study does not support the role of economic security or gender inequality in ART adherence, but other factors such as mobility, length of time on treatment, social support, type of regimen and experiences of stigma and discrimination should be examined for their influence on ART adherence. It may be that one of these factors plays a more direct role in ART adherence whereas economic security and gender inequality play a moderating role. This kind of research will be critical as ART programs expand in coming years and continue to enroll more clients.

The ability of ART programs to assist women in reducing their risk behavior despite high gender imbalances will be an enormous challenge. However, another

recommendation for future research would be to use the results found here to help to carry out program evaluation studies in ART programs in sub-Saharan Africa and elsewhere. These evaluation studies can be carried out with scientific rigor and specificity but can also be put to immediate use by ART programs as different interventions are tested over time. The results of this study indicate that interventions involving food distribution or interventions involving men in violence prevention programs may be most appropriate to be tested. Improved counseling for married women may also show substantial benefit to women in ART programs.

As described by Daniel Whelan, program evaluations of this sort are scarce, or unpublished, even though they are essential to understanding and confronting gender inequality and the HIV/AIDS risk of women (Whelan, 1999). Program evaluations also need to reach across disciplines and consider the impact of a wide variety of social programs on HIV/AIDS in women. This is especially pertinent to sub-Saharan Africa, where social development programs are widespread.

In Whelan's words:

“Many other interventions and programmes have sought to improve women's access to economic resources but have fallen outside the purview of HIV/AIDS prevention due in part to the fact that such programmes do not seek to reduce the spread of HIV or alleviate the impact of AIDS as established goals and objectives. In this category are various micro-finance projects for women (i.e. credit schemes and economic cooperatives), initiatives to provide women with training to improve their skills and access to other economic resources, and legal reform efforts to improve women's access to the legal and justice systems or to promote their economic and social rights. It also includes empowerment and leadership projects that seek to improve women's self-esteem, confidence and political participation; projects to address the incidence and causes of domestic violence; and programmes to improve women's literacy and promote women's access to formal and nonformal education. Even though the objectives of these programmes and initiatives neither include HIV risk reduction nor seek necessarily to improve women's sexual and reproductive

health and rights, it is possible that they may actually do so. The lack of evaluation indicators designed to measure HIV-related outcomes makes such a determination difficult.” (Whelan, 1999, p. 59)

## **VII. Implications for Public Health**

The findings here could be very useful to HIV treatment centers in Uganda and elsewhere in Africa that seek to 1) develop ancillary services for men and women in HIV treatment programs or 2) more fully integrate HIV prevention into existing services. One possibility is to integrate a ‘life phase’ approach to counseling and ancillary services targeted toward women (Elder, 1998a; Elder & Pellerin, 1998b).

For example, the needs and risks of younger, unmarried women versus older married women or widowed women are vastly different. Older, widowed women will often be on their own to care for several biological children and orphaned children and need to find money for everything from school fees to food and to rent. This group of women may need less HIV prevention counseling, as indicated by their low risk, and more assistance with food supplements, school fee grants or emergency housing.

Young single women or women who wish to marry may need more in-depth psychological counseling and active assistance with the disclosure situations that she is facing. This is partly because the younger women are less likely to show signs and symptoms of AIDS. She will still need to discuss safe sex methods and condom use. It is noteworthy that this study found that younger women have higher condom use rates. Her main worries may be around HIV status disclosure, forming new relationships and her desire for children. Young women may not have the motivation

to seek HIV testing and treatment in order to stay alive to care for children and orphans, and so ART treatment programs will need to find new ways to motivate and attract young women to services. Understanding the sexual behaviors of adolescent women receiving ART will be important.

Married women who begin ART need to understand the need for disclosure and the reasons to continue to use condoms with their main sex partner. However, disclosure for married women is often very difficult. Disclosure counseling is offered at all of the ART programs studied, but married women may need additional assistance with what to do in situations where non-condom use is forced or becomes violent. Methods to assist women may be assisted disclosure, couples counseling or home based VCT and ART delivery (Were et al., 2006). The risks for HIV infected individuals, such as secondary transmission, transmission of a resistant strain or HIV superinfection, may be most likely in this very sexually active group of women.

Other important public health implications of this study are that, although the shift has only slowly begun in Uganda, women in ART programs in Uganda may begin to change to a more sexually active population than is currently being treated. As described above, this may mean tailoring HIV prevention messages to a younger audience and certainly requires that HIV prevention be more integrated into HIV treatment than is currently the case. Another public health implication is that many women, especially widows caring for orphans, may have significant economic needs such as paying rent or finding food. ART programs in Uganda and elsewhere may want to consider co-housing treatment programs within other social assistance

programs or organization or implementing more comprehensive referral services. As more data is accumulated about what and which kinds of poverty are most important in women's sexual risk behaviors, ART programs need to consider intervening directly to try and counteract those influences in women's lives.

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Appendices

Appendix A. Interview Guide

**1. Age**

Question: How old are you? \_\_\_\_\_ Years Old

**2. Number of Months of ART Treatment**

Question: When did you start HIV treatment? \_\_\_\_/\_\_\_\_ (Month/Year)

**3. Marital Status and Sexual Activity**

Question: Are you now: SINGLE 01 (if so, a. Are you in a relationship?

Yes\_\_\_No\_\_\_ b. If yes how long have you been in this relationship?

\_\_\_\_MONTHS). MARRIED 02 (if so, How long have you been married?

\_\_\_\_ MONTHS). SEPARATED 03 or WIDOWED 04 (if so, a. Are you in

another relationship at this time? Yes\_\_\_No\_\_\_ b. If yes how long have you

been in this relationship? \_\_\_\_MONTHS). DIVORCED 05 (if so, a. Are you

in another relationship at this time? Yes\_\_\_No\_\_\_ b. If yes how long have you

been in this relationship? \_\_\_\_MONTHS).

**4. Level of Education**

Question: What was the highest level of school you completed? \_\_\_\_\_

**5. Religion**

Question: What is your religion? (Circle all that apply): Catholic 01, Protestant

02, Saved/Born Again 03, Seventh Day Adventist 04, Muslim 05, Pentecostal

06

## 6. Children

Question: How many living children do you have? (Either biological or other) \_\_\_\_\_ Children. How many of these children are orphans? (Orphans defined as at least one parent being dead and NOT being her own children) \_\_\_\_\_ Children

### Socio-Economic Measures (Income):

#### 1. Employment

Question: What is your current source of income? (If you are not sure, write in other): Salaried Employment 01, Casual Employment 02, Self-Employment 03, Gifts/Donations 04, Farming 05, None 06, Student 07

#### 2. Monthly Household Income

Question: What is your monthly household income? (Probe for all members of household combined): 0 UgSh 01, 0-20,000 UgSh 02, 20,000-50,000 UgSh 03, 50,000-100,000 UgSh 04, 100,000-200,000 UgSh 05, More than 200,000 UgSh 06

#### 3. Her Monthly Income

Question: How much money do you yourself have to spend as you wish each month (whether it is your own or given to you by a spouse/partner)? \_\_\_\_\_ UgSh

### Socio-Economic Measures (Food):

#### 1. Misses Meals

Question: How often do you miss a meal due to lack of food? Every day 01, 2-3 times per week 02, Every week 03, Every month 04, Never 05

**2. Meals Missed per Week**

Question: In the last week how many meals did you miss? \_\_\_\_\_ Meals

**3. Borrow Food**

Question: Do you ever borrow food from a neighbor or obtain food on credit to get by? \_\_\_\_\_ Yes (01) \_\_\_\_\_ No (02)

**4. Enough Food to Eat Today**

Question: Do you have enough food for yourself and your family right now (Today)? \_\_\_\_\_ Yes (01) \_\_\_\_\_ No (02)

Socio-Economic Measures (Education):

**1. Total Amount of School Fees per Term**

Question: What is the total amount of school fees that need to be paid each term (whether you pay it or someone else; for all children combined):  
\_\_\_\_\_ UgSh

**2. Able to Pay School Fees**

Question: How many times in this school term would you say you were unable to pay school fees? Only once 01, 2-3 times 02, Every month 03, 2-3 times a month 04, Never 05, Not in school or no cost 06, A term or more 07, A year or more 08

Socio-Economic Measures (Housing):

**1. Total Monthly Housing Costs**

Question: What are your TOTAL monthly housing costs (whether you pay it or someone else)? (Include electricity and water): \_\_\_\_\_ UgSh

## 2. **Able to Pay Rent**

Question: In the last six months has your household always been able to pay housing costs? Yes 01, No 02, Not Applicable 03

### Sexual Risk Behaviors Measures:

#### 1. **Condom Use during Last Sex**

Question: The last time that you had sex with your current/most recent partner did you use a condom? Yes 01, No 02, Don't Know/Don't Remember 98

#### 2. **Sex with Man Who You Knew/Suspected was Having Sex with Other Women**

Question: During the past 6 months, have you had sexual intercourse with a man who you knew or suspected was having sex with other women? Yes 01, No 02

#### 3. **Forced, Coercive or Survival Sex**

Five Questions:

1. Has your main partner forced you to have sex with him even when you didn't feel like it (by using physical force, threats, intimidation, withholding economic support, etc.) in the last six months? Yes 01, No 02
2. Has a man fondled you or touched your body when you didn't want in the last six months (by using physical force, threats, intimidation, blackmail, deception, etc.)? Yes 01, No 02
3. Has a man forced you to have sex with him even when you didn't feel like it (by using physical force, threats, intimidation, withholding economic support, etc.) in the last six months? Yes 01, No 02

4. Have you let a man fondle you or touch your body in the last six months in order to get some goods in return (e.g., food, clothing, money)? Yes 01, No 02
5. Have you let a man have sex with you in the last six months in order to get some goods in return (e.g., food, clothing, money)? Yes 01, No 02

Gender Based Power (Financial Autonomy):

Please tell me if you own any of the following, either by yourself or with someone else  
(Possible answers 1. Yes, own by self 2. Yes, own with others 3. No, don't own)

1. LAND	7. LARGE HOUSEHOLD ITEMS (TV, COOKER, ETC.)
2. YOUR HOUSE	8. JEWELLERY, GOLD OR OTHER VALUABLES
3. A COMPANY OR BUSINESS	9. MOTOR CAR
4. LARGE ANIMALS (COWS, ETC.)	10. SAVINGS IN THE BANK
5. SMALL ANIMALS (CHICKENS, PIGS, GOATS, ETC.)	11. OTHER PROPERTY
6. PRODUCE OR CROPS FROM CERTAIN FIELDS OR TREES	

Gender Based Power (Household Decision Making):

Six Questions:

1. Are you able to spend the money you earn how you want yourself, or do you have to give all or part of the money to your husband/partner? (Not her choice):  
Self/Own Choice 01, Give Part to Husband/Partner 02, Give All to Husband/Partner 03, No Partner in last 12 months 04, Refused/No answer 99

2. Would you say that the money that you bring into the family is more than what your husband /partner contributes, less than what he contributes or about the same as he contributes?: More than husband/partner 01, Less than husband/partner 02, About the same 03, No Partner in last 12 months 04, Refused/No Answer 99
3. Have you ever given up/refused a job for money because your husband/partner did not want you to work?: Yes 01, No 02, Don't Know/Don't Remember 98, Refused/No Answer 99
4. Has your husband /partner ever taken your earnings or savings from you against your will? (If no, mark category 01; if she has never had her own money mark category 05. If yes, has he done this once or twice, several times or many times?) Never 01, Once or Twice 02, Several Times 03, Many Times/All of the time 04, N/A (Does not have savings/earnings) 05, Don't Know/Don't Remember 98, Refused/No Answer 99
5. Does (or did) your husband/partner ever refuse to give you money for household expenses, even when he has (or had) money? (If no, mark category 01; if partner doesn't have (or did not have) money mark category 05. If yes, has he done this once or twice, several times or many times? Never 01, Once or Twice 02, Several Times 03, Many Times/All of the time 04, N/A (Partner does not earn money) 05, Don't Know/Don't Remember 98, Refused/No Answer 99



- b. Love and affection.....?
- c. Chances to talk to someone about problems at work or with your housework.....?
- d. Chances to talk to someone you trust about your personal and family problems.....?
- e. Chances to talk about money matters.....?
- f. Opportunities to meet other PLWHA.....?
- g. Opportunities to tell people your story.....?
- h. Useful advice about important things in your life.....?
- i. Help when you're sick.....?
- j. Help with housework.....?
- k. Help in case of an emergency.....?
- l. Help with transportation.....?

Social Support (General Sources):

1. Do you live in a single parent household? Meaning, are you the head of the household? 01 Yes 02 No 99 Refused/No answer

2. Does any of your extended family live near you? 01 Yes 02 No 99 Refused/No answer

3. Think about the family member or relative (not including spouse or anyone in the home) with whom you have the most contact. How often do you see or hear from that person? (If not listed, write in other)

- Less than monthly.....00
- Monthly.....01
- 2-3 times per month.....02
- Weekly.....03
- 2-3 times per week.....04
- Daily.....05
- Other: \_\_\_\_\_ 96
- Refused/No answer..... 99

4. How many relatives (include spouse) do you feel close to? That is, how many of them do you feel at ease with, can talk to about private matters, or can call on for help?

[If 10 or more than 10, code=10] \_\_\_\_\_ Relatives

Refused/No answer..... 99

5. How many of these are also in the ART/HIV program that you are in (include spouse)? \_\_\_\_\_ Relatives

Refused/No answer..... 99

6. Now think about your close friends and neighbors? Do you have any friends or neighbors with whom you feel at ease and can talk to about private matters? If so, how many? [If 10 or more than 10, code=10]

\_\_\_\_\_ Friends

Refused/No answer..... 99

7. How many of these are also in the ART/HIV program that you are in?

\_\_\_\_\_ Friends

Refused/No answer..... 99

8. Now think about the friend or neighbor with whom you have the most contact and feel closest to. How often do you see or hear from that person? (If not listed, write in other)

Less than monthly.....00

Monthly.....01

2-3 times per month.....02

Weekly.....03

2-3 times per week.....04

Daily.....05  
 Other: \_\_\_\_\_ 96  
 Refused/No answer..... 99

9. Is this person from the ART/HIV program that you are in? (Either as a client or as staff) 01 Yes 02 No Refused/No answer.....99

10. Think about the counselor or outreach worker with whom you have the most contact at your ART/HIV program. How often do you see or hear from that person? (If not listed, write in other)

Less than monthly.....00  
 Monthly.....01  
 2-3 times per month.....02  
 Weekly.....03  
 2-3 times per week.....04  
 Daily.....05  
 Other: \_\_\_\_\_ 96  
 Refused/No answer..... 99

12. a. Do you volunteer or work in any capacity with the ART/HIV program you are in? 01 Yes 02 No Refused/No answer.....99

b. If YES, what do you do in the program? \_\_\_\_\_  
 Refused/No answer.....99

13. Are you involved in any PLWHA clubs or groups? [Circle all that apply]

Youth Club.....00  
 Mamas Club.....01

Drama Group.....02

Advocacy Group.....03

Post-test Club.....04

None.....05

Other: \_\_\_\_\_ 96

Refused/No answer..... 99

Stigma and Discrimination:

I would now like to ask you about things you have felt, done or experienced as a PLWHA and for each I would like you to tell me if it has never happened (N.1) sometimes happened (S.2) often happened (O.3) or many times happened (M.4)

- 1a. Not disclosed your HIV status to someone to avoid stigmatization
- 1b. Been beaten or physically abused in some way because of your HIV status
- 1c. Had a health care worker or doctor not want to touch you
- 1d. Were abandoned by a spouse or partner because of HIV status
- 1e. Were abandoned by a family member because of HIV status
- 1f. Had a family member not want to touch you or share soap, cups, etc.
- 1g. Have kept HIV status a secret from one's own children
- 1h. Had a child experience stigma because of the mother's HIV status
- 1i. Was denied food, clothing or other amenities in the household
- 1j. Had someone tell you that you deserved to have HIV
- 1k. Had someone ask inappropriate questions about how you got HIV
- 1l. Had someone pressure you not to have children because of HIV
- 1m. Had someone reveal your HIV status without asking you first
- 1n. Hide your HIV drugs so that people don't know you have HIV
- 1o. Had someone tell you that you don't deserve to have anti-HIV drugs
- 1p. Have been homeless at some point because of HIV status
- 1q. Lost a job or was not able to get a job because of HIV status

Well Being:

1. How have you been feeling in general? (During the past month)

- In very good spirits.....01
- In good spirits mostly.....02

I have been up and down.....03  
 In low spirits mostly.....04  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

2. Have you been in firm control of your behavior, thoughts, emotions OR feelings?  
 (During the last month)

Yes, for the most part.....01  
 Generally so.....02  
 Not too well.....03  
 No, and I am somewhat disturbed.....04  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

3. Have you felt so sad, discouraged, hopeless or had so many problems that you  
 wondered if anything was worthwhile? (During the past month)

Very much so.....01  
 Quite a bit.....02  
 Some, enough to bother me.....03  
 A little.....04  
 Not at all.....05  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

4. Have you been under or felt you were under any strain, stress or pressure? (During  
 the past month)

Yes, quite a bit of pressure.....01  
 Yes, some, more than usual.....02  
 Yes, some, but about usual.....03  
 Yes, a little.....04  
 Not at all.....05  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

5. How happy, satisfied, or pleased have you been with your personal life? (During the  
 past month)

Very happy.....01  
 Fairly happy.....02  
 Satisfied-pleased.....03  
 Somewhat dissatisfied.....04

Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

6. Have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, think, feel or of your memory? (During the past month)

Not at all.....01  
 Some, but not enough to be concerned about.....02  
 Some, and I am quite concerned.....03  
 Yes, very much so and I am very concerned.....04  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

7. Have you been anxious, worried or upset? (During the past month)

Very much so.....01  
 Quite a bit.....02  
 Some, enough to bother me.....03  
 A little bit.....04  
 Not at all.....05  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

8. Have you been waking up fresh and rested? (During the past month)

Every day.....01  
 Fairly often.....02  
 Rarely.....03  
 None of the time.....04  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

9. Have you been bothered by any illness, bodily disorder, pains or fears about your health? (During the past month)

All the time.....01  
 A good bit of the time.....02  
 A little bit of the time.....03  
 None of the time.....04  
 Other: \_\_\_\_\_ 96  
 Refused/No Answer..... 99

10. Have you felt tired, worn out, used-up or exhausted? (During the past month)

All the time.....	01
A good bit of the time.....	02
A little bit of the time.....	03
None of the time.....	04
Other:_____	96
Refused/No Answer.....	99

Domestic Violence:

The next questions are about things that happen to many women, and that your current partner, or any other partner may have done to you. Has your current husband/partner or any other partner ever...

A. Slapped you or thrown something at you that could hurt you? (Yes 01 No 02).

B. Pushed you or shoved you or pulled your hair? (Yes 01 No 02)

C. Hit you with his fist or with something else that could hurt you? (Yes 01 No 02)

D. Kicked you, dragged you or beat you up? (Yes 01 No 02)

E. Choked or burnt you on purpose? (Yes 01 No 02)

F. Threatened to use or actually used a gun, knife or other weapon against you? (Yes 01 No 02)

- If Yes, has this happened in the past 12 months? (Yes 01 No 02)

- If yes, in the past 12 months would you say that this has happened once, a few times or many times? (One 01 Few 02 Many 03)

- If no, before the past 12 months would you say that this has happened once, a few times or many times? (One 01 Few 02 Many 03)

ART Adherence:

We understand that some people on anti-HIV medication find it difficult to take it regularly and sometimes miss doses. We won't be surprised if you have missed some doses as well. We need to know how many doses you have missed.

1. How many doses of medication did you miss.....yesterday?

Zero.....00  
 One.....01  
 Two.....02  
 Three.....03  
 Don't know.....98

2. How many doses of medication did you miss.....the day before yesterday?

Zero.....00  
 One.....01  
 Two.....02  
 Three.....03  
 Don't know.....98

3. How many doses of medication did you miss.....the day before that (3 days ago)?

Zero.....00  
 One.....01  
 Two.....02  
 Three.....03  
 Don't know.....98

4. a. How many doses of medication have you missed in the two weeks before that?

Zero (go to Q.5).....00  
 One (go to Q.5).....01  
 Two or more.....02  
 All of them.....03  
 Don't know.....98





12. Put a cross on the line below at the point showing your best guess about how many doses in the last month you have taken more than 2 hours late.

