

**A multilevel analysis of the determinants of high risk sexual behavior (multiple sexual partners)  
in sub-Saharan Africa**

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## **Abstract**

A number of authors have identified multiple sexual partnerships by both men and women, particularly overlapping or concurrent partnerships, to lie at the root of the HIV/AIDS epidemic in sub-Saharan Africa. In this paper we examine the influence of social and cultural context in men's and women's involvement in multiple sexual partnerships in sub-Saharan Africa, above and beyond the effects of individual characteristics. The data used in this study come from population-based sample surveys (Demographic and Health Surveys and AIDS Indicator Surveys) that were conducted in mid 2000s in 20 countries in sub-Saharan Africa. Our analytical approach features multilevel modeling, placing particular emphasis on country and community (ethnic group) characteristics that are likely to determine involvement in risky sexual behavior. The findings provide support to the ecological argument that health behaviors are shaped and determined by societal conditions, in addition to the effects of individual and household characteristics. Involvement with multiple sex partners is significantly most likely among men and women who live in societies in which early sexual debut or polygyny is most prevalent. The effects of individual characteristics suggest that increases in human and social capital skills are not necessarily associated with socially conservative and healthful sexual behaviors in sub-Saharan Africa. Men and women who are most likely to have multiple sex partners in the region are those who have the individual attributes that bring to them more rights and decision-making autonomy but not necessarily more financial and social resources: young age, urban residence, education, media exposure, and working for cash and away from home. Findings from this study suggest a number of opportunities for more effective policy and programmatic responses to curb the spread of the HIV epidemic in sub-Saharan Africa. In particular, the results argue strongly for behavior change and partner reduction efforts within communities in which higher-risk behaviors such as multiple concurrent partnerships are normalized and most prevalent.

## INTRODUCTION

HIV/AIDS is a devastating human tragedy and the greatest humanitarian challenge of our time. The pandemic is still a complex public health problem in sub-Saharan Africa which accounts for more than 65% of HIV infections worldwide (UNAIDS and WHO, 2009). This has been a painful reality, with noticeable impact on families, communities and the society at large. There has been an intense debate in the last two decades on the relative roles of unsafe sex and unsafe health care on HIV spread in Sub-Saharan Africa (Caldwell and Caldwell, 1996; Odebuyi and Vivekananda, 1991), but most public health experts believe that unsafe sexual behaviors (unprotected sex and multiple and concurrent sex partners) are the mechanism through which HIV is spreading in the region (Halperin and Epstein, 2004; Leclerc-Madlala, 2008, 2003). According to these authors, multiple sexual partnerships—particularly overlapping or concurrent partnerships—by both men and women lie at the root of the persistence or the severity of the HIV epidemic in sub-Saharan Africa.

Researchers have linked women's disproportionate burden of HIV/AIDS in sub-Saharan Africa to their economic dependence on men, often putting them in a position necessitating an exchange of sex for money or favors. In their 2007 study, Phaladze and Weiser found strong and consistent relationships between food insufficiency and multiple high risk sexual behaviors among women in Botswana and Swaziland (Phaladze and Weiser, 2007). They concluded that protecting and promoting right to food and basic economic security may decrease women's vulnerability to HIV in those countries. Women are more vulnerable to HIV/AIDS than men because they usually are less educated and do not have the societal position and financial resources that would allow them to meet their social and economic obligations and to negotiate safer sexual relationships with men. They may engage in informal sex transactions even when working in low-paid jobs in factories, offices, bars, restaurants, etc. in attempts to secure adequate food and nice clothes and to pay house rent. Until matters of poverty and vulnerability are properly addressed, it is difficult to achieve a significant decline in numbers of women who engage in unsafe sex.

Assuming that sexual behaviours are rooted in cultures, Caldwell and colleagues attribute the rapid spread of HIV infection in sub-Saharan Africa to the impact of lesser moral and instructional constraints on sexuality in a wide range of geocultural settings (Caldwell and Caldwell, 1996; Caldwell et al., 1989). Older ethnographic accounts of courtship and marriage indicate that sexual practices we refer to now as age-disparate and intergenerational relationships as well as transactional sex and multiple concurrent partnerships, all have antecedents in older practices that have long played a part in defining the nature of social life and the particular values and norms associated with sexuality in Southern Africa (Leclerc-Madlala, 2009, 2008). Many culturally inscribed assumptions and expectations that once legitimized multiple and concurrent partnerships still prevail at present, and continue to influence the meanings that people attach to contemporary sexual relations and the expectations that people have in relationships. There is no evidence from either historic or ethnographic records that strong social taboos against age-disparate and intergenerational relationships ever existed across Southern Africa. With the recognition that involvement with multiple partners is most likely in societies that are permissive towards cross-generational and transactional relationships, international donors and policy makers are beginning to

acknowledge the need for cultural approaches to the AIDS crisis (Leclerc-Madlala, 2009; Nkosana and Rosenthal, 2007).

According to Caldwell and colleagues (Caldwell and Caldwell, 1996; Caldwell et al., 1989), the lesser constraints on acceptable sexual activity that are found in many cultures and societies across sub-Saharan Africa have resulted in a high level of heterosexual networking, which provides both a considerable risk of HIV transmission and a strong resistance to the control of AIDS through the enforcement of monogamy or celibacy. Certain cultural norms and social institutions promote and even institutionalize multiple and concurrent sexual partnerships as socially acceptable forms of sexual conduct. Patriarchy, for example, is deeply entrenched in Africa's social institutions, affording husbands absolute decision-making power, and forcing wives to subordinate their interests to theirs (Caldwell and Caldwell, 1987; Frank and McNicoll, 1987). The sociocultural factors that increase the risk of HIV infection for married women are those that condone male promiscuity in patriarchal and lineage-dominated societies. Men's involvement in extramarital sex increases the risk of HIV infection for a married couple.

In this study, we use an analytical framework inspired by the ecological view of health and information from DHS and AIS surveys conducted in sub-Saharan Africa to identify the determinants of high-risk sexual behavior in the region. An analysis of the determinants of high-risk sexual behavior that is guided by the ecological model is set to be of benefit to public health practice because it provides the possibility of understanding the extent to which health behaviors are determined by as many factors as individual, family, and community characteristics (Sallis et al., 2002). Behavioral research's renewed commitment to clarifying the role of societal conditions in behavioral choices reflects the understanding that behaviors are determined by forces that operate at levels as diverse as the individual, the family, and the community.

## **THEORETICAL ARGUMENTS**

The goal of this study is to examine the influence of social context in men's and women's involvement in high-risk sexual behaviors in sub-Saharan Africa, above and beyond the effects of individual characteristics. An examination of the effects of social context characteristics is important because, in many settings across the sub-Saharan region, people's attitudes towards sexual conduct and the meanings and perceptions that characterize contemporary sexual relations are determined by cultural and/or religious values that are likely to change substantially from society to society. This ecological argument underscores the fact that human behavior is not understandable apart from the broader social context within which it occurs (Smith, 1989). Since behaviors are not determined by instincts, but by socially organized institutions and assumptions, we believe that people's attitudes towards high-risk sex in sub-Saharan Africa are determined by the sexual norms that regulate sexual behaviors before, during and after marriage and by the social conditions in which people live.

In order to identify the societal factors that are likely to determine involvement in high-risk sexual behavior, we concurrently focus on two separate components of social context whose characteristics are

expected to have independent effects on sexual behaviors. The first component involves the general influence of societal structures of authority (i.e., patriarchy and lineage dominance) and sexual norms on society and sexual behaviors: this aspect is referred to in this study as the “cultural norms component” of social context. The second component involves the influence of social change and cultural secularization on society and sexual behaviors: this aspect is referred to as the “social change component” of social context.

### ***Cultural norms component of social context***

The most powerful influences on human sexuality are the effects of collective moralities and cultural norms that can generate self-imposed constraints on some forms of sexual conduct. According to this viewpoint, sexual practices are a reflection of community-specific sexual norms and all normative discourses on sexuality (Dowsett, 1999; Ntseane and Julia Preece, 2005). The main claim of this argument is that involvement in high-risk sexual behaviors is most likely among men and women who are socialized and live in communities in which collective moralities and cultural norms are most permissive (liberal) towards sexual relationships with multiple partners and extra marital relationships. These are societies in which the normative elements that legitimate both multiple and concurrent partnerships and the association between sexual exchange and individual gains among women are clustered and where women have a great deal of decision-making autonomy (freedom of choice) in sexual matters. On the other hand, sexual behaviors should be more prudent in communities in which normative discourses on sexuality are more conservative and where women's autonomy is most suppressed.

In his 2004 paper on ethnic differences in sexual behaviors in Cameroon, Rwenge found that cultural norms specific to ethnic groups play an important part in sexual behavior (Rwenge, 2004). Involvement in high-risk sexual behavior seems to be higher in societies in which sexual permissiveness is commonly tolerated as a reality for both males and females, where the family institution is relatively weak and where women enjoy a great deal of autonomy. This is the case within the *Bëti* society characterized by permissive sexual norms and gender norms that give more autonomy to women, while the *Bamiléké* are characterized by strong family cohesion, seclusion of women in the domestic sphere, and rigid sexual norms. By many criteria, such as education of girls, women's freedom of movement outside the family setting, and use of modern contraception, the status of *Bëti* women is believed to be higher than that of their *Bamiléké* counterparts. Analyzing data collected from 1,239 married men who participated in the 2001–2002 Zambia Demographic and Health Survey, Kimuna and Djamba (2005) found that living in Southern and Western Provinces of Zambia was associated with significantly increased odds of extramarital sex, while living in Northern Province were associated with significantly decreased odds of sex outside of marriage.

Similar situations can be found in other parts of sub-Saharan Africa and they are being reflected in involvement in unsafe sex and high rates of HIV infection. Findings from medical studies and the analysis of the regional variations in infertility in the Congo and elsewhere in central Africa revealed that

the high rates of sterility that characterized the traditional infertility belt in central (Mongo) and Northeastern (Azande) regions of the Democratic Republic of the Congo had a pathological origin – venereal diseases, syphilis and gonorrhoea (Retel-Laurentin, 1974; Romaniuk, 1968a; Romaniuk, 1968b). It was established that the spread of these pathologies has a distinctly ethnic configuration. High sterility was confined to ethnic groups with liberal attitudes towards sexual conduct, while some others in the same vicinity were spared of it, much depending on the prevailing sexual mores (Romaniuk, 1968a; Romaniuk, 1968b).

### *Social change component of social context*

According to modernization theory, individual's ability to make autonomous decisions increases with economic development, social change, cultural secularization, and increasing orientation toward individual issues. Since this theory emphasizes the emergence of individual control over behavior, it is assumed that increases in levels of social change and cultural secularization can translate into more rights and decision-making autonomy for men and women and, subsequently, into more likelihood of involvement with multiple sex partners in communities that are more advanced towards economic development and social change. The main claim of this argument is that involvement in high-risk sexual behavior is the result of choices made by individuals who live in communities in which attitudes towards sexuality have become more liberal as a result of social change and where individual autonomy has significantly increased for large numbers of men and women.

The social change argument is based upon Kirk's (1996) and Caldwell's (1982, 1980) viewpoint that societal change is conducive to women's empowerment by providing them with resources that enable them to act autonomously in most contexts and to interact more equally with men within society and the marital unit. This claim suggests that societal modernization includes ideas of mass education, socioeconomic progress, cultural secularization, gender equity, women's empowerment, and individual autonomy. Each of these processes plays a major role in changing the perspectives of African men and women by gradually introducing new value orientations and role priorities in their lives, which means acquaintance with new ideas, involvement in new groups, and access to new opportunities for individual advancement. Overall, Caldwell's (1982) and Lesthaeghe's (1977) theory of societal change suggests that social change processes generate the transformative dynamics that introduce new perspectives and freedoms in men's and women's lives.

Sub-Saharan Africa today appears to be a continent both in serious economic difficulty but undergoing rapid social change. While traditional social institutions and cultural norms (i.e., patriarchal ideology and lineage norms) have remained strong in the region, gender roles and family structures that might be more empowering for men and women are taking root in the region as a result of socioeconomic modernization and secularization influences (Kritz and Gurak, 1989). In the post independence period, the effects of socioeconomic modernization and those of the new waves of individual freedoms brought about by political independence are expected to create new societal conditions across the sub-Saharan region by eroding the degree of compliance with traditional beliefs and moralities, by promoting rights and

opportunities for both genders so that women can become more conscious of their rights and more independent, and by making people aware of alternative worldviews and opportunities. All these processes are making it increasingly possible to women to exercise control over important dimensions of their lives, including involvement in transactional sex.

Many forms of socio cultural changes have occurred and are currently occurring at all levels in societies across sub-Saharan Africa. Traditional norms and values now co-exist and compete with more modern ways of living and thinking. A confluence of old and new is finding expression in many aspects of life, including the particularities of contemporary aspects of courtship and sexual relationships (Leclerc-Madlala, 2008, 2003; Nkosana and Rosenthal, 2007). As economic development and social change processes expand so too are people's aspirations and expectations expanding. Young women are developing new needs and new desires consistent with the ideals of a modern lifestyle created by social change and cultural globalization, and by the development of more modern forms of sexual relationships that simulate globalized images of glamour and romance (Leclerc-Madlala, 2003). For many young women relationships with older and more affluent men provide an easy and readily available way to meet a growing list of needs and wants that range from school fees and hair cut to more sophisticated modernity items such as designer handbags, nice dresses and shoes, cars and access into elite social circles. These growing aspirations in societies in which gaps between rich and poor continue to widen and where women have limited options for obtaining financial independence and achieving individual advancement, coupled with cultural allowances for age-disparate relationships and the intertwining of sex and material giving, make young women exceptionally vulnerable to HIV in Southern Africa and elsewhere across the sub-Saharan region (Leclerc-Madlala, 2009, 2008; Nkosana and Rosenthal, 2007).

### ***Individual Characteristics***

At the individual level, we argue that involvement in high-risk sexual behaviors is triggered by people's lack of the human capital skills and social status attributes that support healthful choices. According to Coleman (1988: S100), "human capital is created by changes in persons that bring about skills and capabilities that make them able to act in more responsible and efficient ways. " Hence, the human capital argument runs as follows: men and women who have advanced human capital skills are least likely to engage in high-risk sexual behavior. Furthermore, involvement in high-risk sexual behaviour is still least likely to occur among men and women who have the social status attributes (i.e., older age, more exposure to Western values and worldviews) that bring more rights and more decision-making autonomy to individuals.

The modernization literature holds the belief that formal education is the key to human capital development by transforming people's attitudes and values from traditional to more modern, and their behavior from constrained to more emancipated. Among other things, the typical interpretations of what education stands for include the following: intellectual development, a strong future orientation, access to resources or information, openness to external influences, modern thinking, and greater decision-making

autonomy. For example, education can provide protection against risky sexual behaviours by providing men and women with a sense of self-confidence and authority that can allow them to choose healthier behaviours, including safe sex. The human capital skills that individuals acquire in school, at the workplace or from media exposure are likely to translate into aspirations for a healthier and longer life.

## **DATA, VARIABLES AND METHODS**

### ***The Data***

The data used in this study<sup>1</sup> come from population-based sample surveys (DHS & AIS surveys) that were conducted in mid 2000s in 20 countries<sup>2</sup> in sub-Saharan Africa as part of the Demographic and Health Surveys (DHS) program. Demographic and Health Surveys (DHS) and AIDS Indicator Surveys (AIS) are nationally representative surveys that provide detailed information about basic socio-demographic characteristics, marital status, sexual behavior, fertility preferences and childbearing, knowledge about HIV/AIDS, perception of personal risk of HIV, and behavior modifications in response to concerns about HIV/AIDS. In particular, DHS and AIS surveys collect data on the number of sexual partners in the past twelve months prior to the survey, a useful indicator of concurrent multiple sexual partnerships which is the outcome variable of interest in this study.

DHS and AIS surveys include nationally representative samples of women and men of reproductive age (women aged 15-49 and males aged 15-54/59). Details of the sampling design and data collection procedures for each survey are available in the individual country DHS or AIS reports. Survey data from individual countries were pooled for the analysis. Data used in statistical analyses were collected from female and male respondents. Household's and individual's characteristics collected in the surveys are the sources of data for both the micro-level and macro-level variables. A summary of the analysis sample, disaggregated by gender and marital status, is presented in Table 1.

Ethnic groups and country settings are used in the analysis as approximations of the social contexts in which sexuality is socially organized and where cultural norms and social conditions are reflected into sexual behaviour. In sub-Saharan Africa, the ethnic setting is the socio cultural context in which the effects of shared cultural norms and societal conditions inter play in complex ways to determine value orientations and individual behaviours, including sexual practices. Ethnic identity is an important factor to consider in behavioural research because the societal forces that define people's roles and value orientations operate within the boundaries of cultural communities (Benefo, 1995; Ezeh, 1997; Caldwell et al, 1989). The idea of ethnicity relates to the fact that people perceive themselves as members of a certain cultural group rather than members of the society at large, and that such a group is the social

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<sup>1</sup> This research effort is a background analysis for a larger study on risk factors of HIV infection in sub-Saharan Africa.

<sup>2</sup> The countries covered by this study are those that have HIV test data collected during 2003-2008.

environment within which identities and value orientations are shaped. On the other hand, the country context is also a setting in which specific sets of societal conditions determined by cultural factors and social change factors can shape and determine people's sexual behaviors.

**Table 1:** Sample size of DHS (and AIS ) surveys analysed for each country by gender and marital status (unweighted cases)

Country	Women		Men		All
	Married	Unmarried	Married	Unmarried	Total
Burkina Faso 2003	3196	415	1831	704	6146
Cameroon 2004	3534	1013	2532	1700	8779
Cote d'Ivoire 2005 <sup>1</sup>	2780	1364	1793	1594	7531
DR Congo 2007	3117	954	2535	1221	7827
Ethiopia 2005	3713	804	2873	614	8004
Ghana 2003	3439	1054	2310	917	7720
Guinea 2005	3053	403	1753	788	5997
Kenya 2003	1981	746	1501	949	5177
Liberia 2007	1609	928	942	887	4366
Lesotho 2004-05	4131	2016	2922	1700	10769
Malawi 2004	2092	513	1587	573	4765
Mali 2006	3977	237	2554	457	7225
Niger 2006	3557	249	1944	408	6158
Rwanda 2005	2709	1174	2428	958	7269
Senegal 2005	3407	315	1904	854	6480
Sierra Leone 2008	2554	682	1879	767	5882
Swaziland 2006	1882	1894	1056	1431	6263
Tanzania 2003-04 <sup>1</sup>	3869	1340	2575	1369	9153
Zambia 2007	3443	1542	2900	1586	9471
Zimbabwe 2005-06	4321	1621	2530	1529	10001
All (Sub-Saharan Africa)	62,364	19,264	42,349	21,006	144,983

<sup>1</sup>AIDS Indicator Survey (AIS)

Sample data from the 20 countries covered by this study were pooled for the analysis. The analysis sample is therefore referred to as “Sub-Saharan Africa.” Pooling the surveys is appropriate mainly because the DHS and AIS surveys were designed to collect cross-nationally comparable data on population and health issues. By pooling data from a large number of countries, we increase both the number of country contexts and the number of ethnic contexts in the analytic sample. The methodology for multivariate analyses involves multilevel modeling which takes into account the hierarchical structure of the data, resulting from pooling data across countries. As analysis of individual situations that

incorporates community factors, the multilevel methodology is appropriate for this study due to its ability to take into account not only individual characteristics but also the fact that these individuals belong to larger social units such as ethnic groups and/or countries.

By including random effects for ethnic group and country, we can control for unobserved characteristics of the ethnic group and the country that may influence the effects of variables included as micro-level and macro-level covariates. In the case of an ethnic group, such factors are for example, the effects of language, gender and sexual norms, and the associated collective moralities on people's sexual conduct. On the other hand, in the case of a country, unobserved factors include the effects of structural characteristics such as the investments that are being made to scale up education and socioeconomic development and those of the diffusion of more modern and liberal ideas about man-woman relations and about sexuality that are being spread by national and sub-national mass media materials. Other such factors include the effects of advancements in areas of road network and urban development, and in the involvement of women in income-generating activities outside the family setting.

### *Specification and measurement of the dependent variable*

Multiple sex partnerships among men and women are used as a proxy for risky sexual behavior and dependent variable in this study. The dependent variable is included in the analysis as a dichotomous variable coded "1" if a man or a woman reported involvement with multiple sexual partners in the past 12 months prior to the survey and "0" otherwise. A focus on the number of sexual partners among men and women is appropriate because multiple and concurrent partnerships constitute the key mechanism through which STIs and HIV infections are spreading across sub-Saharan Africa. Each additional sexual partner puts an individual at some incremental risk of exposure to a sexually transmitted pathogen and increases the dissemination of such pathogens. Having multiple recent partners is associated with disease risk for at least two reasons: first, it reflects the increased likelihood of encountering a sexually transmitted pathogen through having multiple potential exposures, and second, it may reflect an increased probability of choosing a partner with an infection through a riskier pattern of partner recruitment.

Multiple sex partnerships among young women are an important risk factor for HIV because “intergenerational relationships” have been noted to confer additional risk for HIV since older sexually active men are more likely to be HIV positive than men of young women’s own age group (LeClerc-Madlala, 2008). Moreover, women who are themselves monogamous are put at risk through their husbands or male partners who may have multiple partners. On the other hand, while the DHS data confirm previous studies showing that marriage is a risk factor for HIV in sub-Saharan Africa, analysis of sero-discordance from the couple’s dataset has revealed that HIV is brought into the relationship by both men and women in the region. (Mishra, 2007).

According to sexual ethnographic research (Leclerc-Madlala, 2009, 2008; Luke, 2005; Hallman., 2004; Nkosana and Rosenthal, 2007), the significant drivers of the HIV/AIDS epidemic in Eastern and Southern Africa are male attitudes and behaviors, intergenerational sex, gender and sexual violence, and multiple concurrent partnerships in which consistent condom use tends to be low. These drivers are worsened by underlying social and structural factors such as high population mobility, inequalities of wealth, lack of economic opportunities for girls and young women, the cultural and gender norms that render young women particularly at risk of HIV infection, in addition to their greater biological vulnerability. Throughout sub-Saharan Africa studies have revealed that young women's power to negotiate condom use is often compromised by age disparities and economic dependence. Young women have reported that they often cannot insist on safe sex practices, and doing so would jeopardize their economic goals in the relationship (Glynn et al., 2001; Luke, 2005; Hallman., 2004). As Shelton *et al.* (2005) and Gillespie and Greener (2006) have found, even when African women are relatively well off many still continue to be at risk. Concurrency in sexual relationships is more common in Southern Africa than elsewhere, fueled by migrant work that separates spouses, and by the often mutually advantageous practice of transactional sex (Mah and Halperin, 2008). Although African men and women do not have more sex partners than people do elsewhere, their partnerships are more likely to overlap for months or years, creating stable overlapping networks of sexual relationships through which HIV can spread rapidly (Halperin and Epstein, 2007). Condom use can be effective in casual relationships, but is very challenging in longer-term relationships, since people in those relationships tend not to see themselves as at risk (Halperin and Epstein, 2004).

### ***Specification and measurement of independent variables***

#### ***Macro-Level:***

Since social context is a societal infrastructure, it is important that we understand how societal conditions are structured and how selected community characteristics determine sexual behavior. The analysis for this study is carried out using macro-level factors of either cultural or transformative (social change) nature. The macro-level measures are developed by aggregating survey data for individual men or women within an ethnic group or a country. In the list of variables (Table A1 in the Appendix), there are two sets of macro-level measures: *cultural norms variables* and *social change variables*. To facilitate the description of the analytic model, community variables used as indicators of societal conditions are "CAPITALIZED."

#### ***Cultural norms variables***

The two community variables that are used to measure the impact of cultural norms and social institutions (i.e., patriarchy) are POLYGYNY and EARLY SEX. The variable POLYGYNY is the proportion of currently married women ages 15-49 in an ethnic group [and in a country for the country version of the variable] who are in a polygynous marriage. On the other hand, the variable EARLY SEX is measured as the proportion of women and men in an ethnic group [and in a country for the country version of the variable] whose age at first sex is 17 or younger.

POLYGyny is used as the measure of the prevalence of patriarchal ideology and male dominance in a society. This measure is intended to reflect Cain's (1993, 1984) viewpoint that the cultural forces that subordinate women's productive and reproductive rights to men's and kinship (lineage) obligations abound in societies that are highly patriarchal. Much less research has focused on the relationship between the level of gender stratification and sexual behavior in patriarchal societies: Does a gender context that gives women more autonomy facilitate involvement with multiple sex partners? Alternatively, does gender stratification constitute a sociocultural environment that might be conducive to involvement with multiple sex partners among men and women? If the answer is yes, what is the societal mechanism that sustains the process? We believe that women who are socialized and live in high-polygyny societies are least likely to have multiple sex partners because they live in geocultural settings that are highly patriarchal and where women's rights are most suppressed. On the other hand, men who live in those societies are more likely to have multiple sex partners because they have more rights and more decision-making autonomy.

The variable EARLY SEX is included in the analysis to assess the impact of community sexual norms on sexual behaviors. The goal here is to assess the relevance of the claim that sexual behaviors are rooted in cultures and that involvement with multiple sex partners is a common practice in cultures that are permissive, where both males and females tend to equally value the pleasure associated with sexual expression, and where children are not sufficiently sheltered from sexual knowledge (Martel et al., 2004). Permissive sexual norms that are associated with early sexual activity are a social reality for both men and women in societies that hold liberal and positive attitudes toward sexuality and view sexual development as essential to social adjustment (Martel et al., 2004). There are usually few social restrictions placed upon sexuality within permissive societies because healthy sexuality is considered necessary for marital happiness.

### *Social change variables*

The three variables that are used to measure the effects of distinct types of social change are EDUCATION, WORK, and CHRISTIAN. EDUCATION is the measure of current community education. It is measured as the average number of years of formal education among all men and women of reproductive age in an ethnic group [and in a country for the country version of the variable]. We hypothesize that that women who belong to communities that correspond to high values of the variable EDUCATION are least likely to engage in high-risk sexual behavior. When social change takes shape, it happens as a societal transformation, that is, the collapse of a larger value system that can be brought about by the spread of mass education. Societal changes that are likely to be set in motion by increases in levels of community education may include alterations of traditional institutional legacies (i.e., patriarchal ideology) that are usually unfavorable to women (Cain, 1993, 1984; Caldwell, 1982). A key mechanism through which current community education may influence sexual behaviors is social interaction and the effects of the waves of new ideas about commitment in a relationship and disease prevention that are diffused in a

society. For example, changes in women's role priorities, expectations, and opportunities can be viewed as the outcome of various levels of mass education and societal change. When these changes take place, there should be substantial reductions in the scope of male-female power differences, and the establishment of the normative foundations that can make it easier for women to have more social status and more decision-making autonomy. As pointed out by several scholars, community education is likely to operate through social learning (Bongaarts and Watkins, 1996; Montgomery and Casterline, 1996). For example, ideas and practices that women may learn from each other are as many as modern contraception, cost associated with childbearing, and the negative aspects of permissive sexual behaviors. How an educated woman interacts with other women with minimal or no education is not a straightforward process. The process starts when an educated woman interacts with a subgroup that in turn interacts with others, and this interaction will become part of a chain that includes the entire population in a large area (DeRose and Kravdal, 2007).

WORK is the proportion of women and men in an ethnic group [and in a country for the country version of the variable] who work for cash and away from home. Increases in levels of women's and men's participation in income-generating activities in non family settings can translate into new freedoms, new aspirations, and new role priorities for men's and women's lives, which is viewed by Cain (1993, 1984) as an important dimension of women's empowerment. Women gain some freedom and autonomy when they have access to non family enterprises and when they are exposed to new ideas and alternative worldviews outside the home (Riley, 1997; Caldwell, 1982). It is therefore reasonable to assume that involvement with multiple sex partners can be either discouraged or promoted in high WORK areas. On the one hand, the expansion of men's and women's participation in market economy may encourage the sharing of experiences and life perspectives that can help large numbers of men and women adopt sexual norms and beliefs that are compatible with healthy life. On the other hand, the expansion of market economy may constitute the channel through which types of sexual practice that are socially controversial but individually rewarding are shared and maintained.

Finally, the variable CHRISTIAN is used to assess the impact of exposure to Christian values and principles on the nature of sexual practices. It is measured as the proportion of women and men within an ethnic group [and in a country for the country version of the variable] who have Christian identity. The belief here is that sexual behaviors should be least permissive in communities in which Christian values are widely diffused and where they have gained wider social acceptance.

Christianization is of particular importance to this study because of the Christian church's opposition to traditional expressions of authority, socialization, sexuality, and exchange. The degree in which an African society is Christianized is viewed by Lesthaeghe (Lesthaeghe, 1989) as an indication of the degree of cultural secularization and people's empowerment. In Africa, the boundary between regions with high versus medium or low illiteracy (especially for women) corresponds largely to the historical demarcation zone between Islamic and Christian penetrations, despite schooling efforts in the least advanced areas during the post colonial period. Levels of female schooling are substantially higher in East and Southern

Africa because this portion of the sub-Saharan region is largely Christianized. This is an indication that gender conditions are likely to be more egalitarian in East and Southern Africa, as opposed to Central and West Africa where male-female power relations have remained unfavorable to women. This is happening despite the fact that West African women participate more in small trade and income-generation agriculture.

***Micro-Level:***

The human capital and social status attributes that are included in the analysis as individual and household characteristics are education, household wealth (DHS wealth index), media exposure, cash work, marital status (un married versus married), and age at first sex (early sex). The individual attributes that are included as statistical controls are Christian identity and urban residence.

The principal measure of individual advancement is formal education, which changes people's view of the world by increasing their ability to understand life from a more secular and progressive perspective. Education contributes to better health by exposing people to beliefs and values that promote aspirations for individual advancement and better health. The more secular people are, the greater the chance that they will believe that they have the ability to regulate important aspects of their lives, including their sexuality. Education is included in the analysis according to DHS categories: none, primary, secondary, and post secondary. People who lack formal education constitute the reference category: they are compared to people who have primary education, and also to people who have secondary or post secondary education. This format allows for non-linearity in the effects of education on high-risk sexual behavior.

There are several pathways through which household wealth could lead people to a healthier lifestyle and more conservative sexual behavior: greater wealth can mean financial resources that provide economic security, better living conditions, higher social status, stronger social and/or political connections, greater exposure to middle-class values, and thus greater ability to adopt values and worldviews that are oriented towards progress and prosperity, and develop sexual practices that are more prudent and orthodox. People with higher socioeconomic status are more exposed to non-traditional or middle-class health-related norms and behaviors through interactions with local professional and political elites and other affluent persons.

Exposure to mass media is investigated because media-based health promotion campaigns can substitute for formal education by increasing understanding of health issues and/or providing knowledge of good sexual practices (Brockerhoff, 1996). Accordingly, media exposure is expected to reduce the likelihood of involvement in high-risk sexual behavior. Informal channels such as the mass media can contribute to changes in sexual behavior in societies where large numbers of men and women are illiterate or have little formal education by explaining basic and useful human capital and HIV prevention ideas and by diffusing examples of more prudent and health-oriented sexual practices. Furthermore, viewing television and listening to radio can cause people to focus more effectively on their individual affairs and to avoid riskier

types of sexual behavior. The variable media exposure is included as a dichotomous variable coded "1" if a male and/or female respondent reported that he/she watches TV or listens to radio at least once a week, and "0" otherwise.

Cash or market employment is measured as a dichotomous variable coded "1" if a male respondent and/or a female respondent was working for cash and away from home at the time of the survey, and "0" otherwise. The impact of cash work is difficult to predict for two reasons. On the one hand, cash or market employment can increase propensity to engage in high-risk sex by increasing exposure to opportunities that can be used to address occasional emotional and/or economic needs. On the other hand, cash work can produce an opposite effect by making it possible to a man or a woman to develop life aspirations that make it difficult to engage in high-risk sexual behavior.

A person's views and preferences about sexual conduct are likely to change across time, depending on the stage in which he/she is in his/her sex life. This process can be reflected by age. Age is included in the analysis according to the following categories: 15-19, 20-29, 30-39, and 40+. People who are aged 40+ constitute the reference category: they are compared to people who are respectively aged 15-19, 20-29, and 30-39. This format allows for non-linearity in the effects of age on high-risk sexual behavior. Older age is expected to be associated with reduced experience of having multiple sex partners since as people grow older, the intensity of their sexual desires declines. Also, age is expected to predict negatively risky sexual behavior because older persons may have competing uses for their time, and multiple social obligations.

Age at first sexual activity is included as an indicator of the degree of exposure to liberal and permissive sexual values and practices. It is included in the analysis in the following format: <16, 16-17, 18-19, and 20+. The reference category is less than 16 years of age. Early sexual activity is expected to predict positively involvement with multiple sex partners due to the fact that research has consistently identified an association between early age at first sex and involvement in several kinds of socially unacceptable activities such as school absenteeism, having an increased number of friends, stealing, fighting and use of controlled substances (Mott et al., 1996). Early sexual activity leads to a long period of premarital sexual activity during which partner changes are relatively common, resulting in development of higher risk sexual orientations (Bongaarts and Watkins, 1996). This suggests that early age at first sex is likely to increase coital frequency and to virtually eliminate a man's and/or woman's ability to abstain from sex. People who begin having intercourse at younger ages are more likely to engage in sexual intercourse with casual partners and to have multiple and concurrent partnerships.

Individual characteristics included as statistical controls are urban residence and Christian identity. These variables are included in the analysis as dichotomous variables, with "1" representing the indicated attribute and "0" representing "otherwise." Residence in an urban area is likely to predict positively high-risk sexual behavior due to the fact that it can be associated with opportunities of addressing depressing living conditions by having multiple and concurrent sexual partners. The urban residence control is also

crucial here because both educational opportunities and most of the components of the wealth index are highly concentrated in urban agglomerations. On the other hand, women and men who have Christian identity are expected to avoid risky sexual behaviors because regular exposure to Christian values through church attendance is able to change sexual views and attitudes.

### *Statistical model and estimation*

Our outcome variable of interest is risky sexual behavior, a binary outcome reflecting whether or not an individual man or an individual woman had multiple sex partners in the 12 months preceding the survey. Explanatory factors include both individual /household level characteristics as well as social context characteristics measured at community (ethnic group) level and national level. The contextual factors are derived from the individual level data, based on mean indices or the proportion of the population in the community (ethnic group) or country with characteristics of interest.

The analysis features multilevel modeling, placing particular emphasis on country and community (ethnic group) variations in factors associated with risky sexual behavior, and the extent of clustering of such behavior within countries and communities (ethnic groups within country). The application of multilevel analysis is necessary not only to address potential correlation of individuals in the same community or country, but also to enable us examine the effects of social context factors and individual attributes.

The general form of the multilevel logistic regression model used may be expressed as follows:

$$\text{Logit } \pi_{ijk} = X'_{ijk}\beta + Y'_{ijk}u_{jk} + Z'_{ijk}v_k \quad (1)$$

where:  $\pi_{ijk}$  is the probability of having risky sexual behavior (i.e. multiple sex partners) for an individual  $i$ , in  $j^{\text{th}}$  community in  $k^{\text{th}}$  country;  $X'_{ijk}$  is the vector of covariates which may be defined at the individual, community or country level;  $\beta$  is the associated vector of usual regression parameter estimates;  $Y'_{ijk}$  is a vector of covariates (usually a subset of  $X'_{ijk}$ ) which vary randomly at community level;  $Z'_{ijk}$  is a vector of covariates (usually a subset of  $X'_{ijk}$ ) which vary randomly at country level; and the quantities  $v_k$  and  $u_{jk}$  are the residuals at the country and community level, respectively. These are assumed to have standard normal distributions with mean zero and variances  $\sigma_v^2$  and  $\sigma_u^2$  (Goldstein, 2003).

The estimates of country and community level variances are used to calculate intra-unit correlation coefficients to examine the extent to which risky sexual behavior is clustered within countries (or communities within countries) in sub-Saharan Africa. These are derived before and after taking into account the effects of significant covariates. Since individuals within the same community are within the same country, the intra-community correlation includes country variances. Thus, the intra-community ( $\rho_u$ ) and intra-country ( $\rho_v$ ) correlation coefficients are given by:

$$\rho_u = \frac{\sigma_u^2 + \sigma_v^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} \quad (2)$$

and

$$\rho_v = \frac{\sigma_v^2}{\sigma_v^2 + \sigma_u^2 + \sigma_e^2} \quad (3)$$

where:  $\sigma_v^2$  - is the total variance at country level;  
 $\sigma_u^2$  - is the total variance at community level; and  
 $\sigma_e^2$  - is the total variance at individual level.

For the multilevel logistic regression model, the level-1 residuals,  $e_{ijk}$ , are assumed to have a standard logistic distribution with mean zero and variance  $\pi^2/3$ , where  $\pi$  is the constant 3.1416( See , for example, Hedeker and Gibbons, 1996).

The analysis was undertaken using MLwiN multilevel software and estimations were based on second order PQL procedure (Rasbash et al, 2005).

We recognize a number of data limitations that should be borne in mind when interpreting the results. First, our ability to derive a reliable measure of high-risk sexual behavior is limited by the nature of information available. We have used multiple sexual partnerships as a proxy for risky sexual behavior, but have not taken into consideration key issues such as condom use or timing of partnerships (serial or concurrent), both of which are important in determining the extent of risk. Information on condom use in most of sub-Saharan Africa is often unreliable in establishing precise risk, since use is often inconsistent. Second, given the cross-sectional nature of the DHS, it is not possible to determine the time sequencing of events, Therefore, we are only able to establish the nature of associations, but we are unable to infer causal relationships.

## RESULTS

### *Descriptive analysis*

The bivariate results describing the zero-order level relationship between marital status and involvement with multiple sex partners are presented in Table 2. These are presented separately for married/unmarried women and men across all the 20 countries that are covered by the study.

**Table 2:** The proportion of women and men in each country who reported multiple sex partners within 12 months before the survey by marital status.

Country	Percent (weighted) reporting multiple partners								
	Women			Men			All		
	Marr ied	Unmar ried	Sig	Marri ed	Unmar ried	Sig	Marri ed	Unmar ried	Sig
Burkina Faso 2003	0.8	6.0	***	20.3	21.7	ns	8.2	16.0	***
Cameroon 2004	5.3	14.2	***	37.1	35.8	ns	18.7	27.8	***
Cote d'Ivoire 2005	1.7	9.8	***	27.7	28.4	ns	12.2	20.1	***
DR Congo 2007	2.6	7.3	***	19.3	21.0	ns	10.2	15.3	***
Ethiopia 2005	0.1	0.6	*	3.9	4.5	ns	1.8	2.1	ns
Ghana 2003	0.4	3.7	***	13.0	12.6	ns	5.8	7.9	***
Guinea 2005	2.3	6.7	***	30.1	28.6	ns	12.8	21.2	***
Kenya 2003	1.7	4.1	***	11.5	16.1	***	6.1	11.2	***
Lesotho 2004	10.1	7.3	*	23.9	29.8	**	15.2	18.4	**
Liberia 2007	7.2	12.8	***	21.6	22.3	ns	13.4	17.2	***
Malawi 2004	0.4	2.2	***	11.0	11.7	ns	5.3	7.7	**
Mali 2006	1.9	10.7	***	24.1	16.3	***	11.0	14.5	**
Niger 2006	0.9	1.6	ns	20.2	10.7	***	7.9	7.4	ns
Rwanda 2005	0.2	1.1	***	0.2	0.0	ns	0.2	0.6	**
Senegal 2005	1.3	3.4	**	24.7	11.9	***	9.9	9.6	ns
Sierra Leone 2008	5.8	8.9	**	26.1	20.3	**	14.4	15.2	ns
Swaziland 2006	1.0	3.1	***	18.0	21.7	*	7.3	11.5	***
Tanzania 2003	4.5	9.0	***	24.3	26.3	ns	12.8	18.2	***
Zambia 2007	0.7	3.7	***	19.6	14.2	***	9.6	9.3	ns
Zimbabwe 2005	0.5	3.2	***	12.3	13.7	ns	5.4	8.7	***

Significance (sig) by marital status: ns – not significant; \* - p<0.05; \*\* - p<0.01; \*\*\* - p<0.001

The descriptive statistics presented in Table 2 suggest a particularly consistent and strong association between marital status and multiple partnerships among females, the relationship being significant in all the countries except Niger. In all countries, with the exception of Lesotho, the results consistently show a higher risk among unmarried women than married counterparts. In some countries such as Burkina Faso, Cote d'Ivoire, Mali, Zambia and Zimbabwe, unmarried women are more than five times as likely as married women to report multiple sexual partners within the last 12 months preceding the survey.

The association between marital status and multiple sex partners is weaker for males and the patterns are less consistent. For the majority of the countries, the association is not significant, and where there is significance, the patterns are mixed, with more than half of the cases showing a higher risk of multiple sex partners among married than unmarried men. It is interesting to note that in some of the countries where unmarried women were strikingly more likely to report multiple sexual partners than married women (e.g. Mali and Zambia), the association is reversed for men, showing that married men are significantly more likely to report multiple partners. The higher incidence of reporting of multiple sexual partners among married men than unmarried counterparts could be partly attributed to polygamy being a common practice in a number of countries in sub-Saharan Africa.

It is worth asking if the profiles of relationships highlighted by the bivariate results still hold once the effects of other relevant macro-level and micro-level independent variables are controlled for. This is important because the observed bivariate associations could be partly attributable to the effect of confounding factors that are not taken into account in the current analyses. With a dichotomous outcome variable, multilevel multivariate logistic regression analysis provides a means to addressing this issue.

### ***Multilevel multivariate analysis***

As indicated earlier, we used multilevel logistic regression models to estimate the effects of community characteristics on involvement in high-risk sexual behavior, above and beyond the effects of individual characteristics. Analyses were run separately for men and women. For each gender, there were separate models for married and unmarried survey respondents. This is in recognition of the fact that the associations are likely to vary both by gender and by marital status within each gender. The results for males and females are presented in Tables 3a and 3b, respectively.

Overall, unmarried men are somewhat less likely (i.e.  $\exp[-0.07]$ ) to have multiple sexual partnerships than their married counterparts with similar individual and contextual characteristics (Table 3a). This might be suggesting that increases in social status that are associated with marriage make it easier for men to have multiple sexual partners. Whilst younger unmarried men (especially those in their twenties and thirties) are more likely to have multiple sexual partners than their older counterparts, older married men aged over 40 years are significantly more likely to have multiple sexual partners than younger married men aged below 30 years. The association between multiple sexual partnerships and individual/household socio-economic factors such as urban/rural residence, educational attainment, cash employment, media exposure and household wealth is generally weak among men, but there is a tendency for people who are individually more empowered (e.g., urban residents, the more educated, those in market employment, and those with greater media exposure) to report a higher risk of multiple sexual partnerships. A similar tendency is observed among men who live in communities in which large numbers of men and women have high educational attainment.

**Table 3a** Multilevel logistic regression parameter estimates of multiple sex partners among males (standard errors in brackets)

<b>Parameter</b>	<b>Unmarried</b>	<b>Married</b>	<b>All</b>
<b>Fixed Effects</b>			
<b>Constant</b>	-3.37(0.197)*	-2.47(0.135)*	-2.51(0.135)*
<b>Marital Status (Married)</b>			
Unmarried	N/A	N/A	-0.07(0.028)*
<b>Age group (40+)</b>			
15-19	0.02(0.100)	-0.36(0.124)*	0.01(0.030)
20-29	0.63(0.094)*	-0.09(0.035)*	0.01(0.028)
30-39	0.55(0.104)*	-0.00(0.030)	-0.48(0.049)*
<b>Residence (Urban)</b>			
Rural	-0.05(0.051)	0.13(0.039)*	0.07(0.030)*
<b>Education Level (None)</b>			
Primary	0.25(0.067)*	0.03(0.039)	0.06(0.033)
Secondary or higher	0.34(0.068)*	0.09(0.043)*	0.12(0.035)*
<b>Media Exposure (None)</b>			
Some	0.23(0.069)*	0.21(0.043)*	0.23(0.036)*
Not stated	0.24(0.238)	0.23(0.112)*	0.39(0.098)*
<b>Wealth Quintile (Lowest)</b>			
Second	-0.03(0.072)	0.06(0.041)	0.03(0.035)
Third	-0.09(0.071)	0.02(0.042)	-0.01(0.036)
Fourth	-0.15(0.073)*	0.08(0.047)	0.00(0.039)
Highest	-0.04(0.08)	0.07(0.057)	0.04(0.045)
<b>Religion (Catholic/Orthodox)</b>			
Protestant/Other Christ	-0.04(0.053)	-0.09(0.040)*	-0.06(0.032)*
Muslim	0.08(0.079)	0.18(0.055)*	0.14(0.044)*
Other/Trad	0.09(0.076)	0.27(0.057)*	0.20(0.045)*
Not stated	2.76(0.948)*	2.10(0.886)*	2.53(0.897)*
<b>Working (No)</b>			
Yes	0.32(0.041)*	0.04(0.032)	0.12(0.024)*
Not stated	-0.00(0.139)	-0.18(0.135)	-0.07(0.095)
<b>Age at first sex (20+)</b>			
<16 years	0.86(0.065)*	0.62(0.039)*	0.66(0.032)*
16-17 years	0.72(0.064)*	0.53(0.037)*	0.55(0.031)*
18-19 years	0.41(0.065)*	0.35(0.035)*	0.33(0.030)*
<b>Contextual Factors</b>			
Polygamy-2	-0.87(1.285)	4.68(1.09)*	3.50(0.947)*
Polygamy-3	6.72(2.64)*	1.90(2.315)	3.30(2.369)
Early sex-2	2.30(0.887)*	1.21(0.832)	1.63(0.716)*
Early sex-3	4.69(1.66)*	5.81(1.499)*	5.68(1.465)*
Education-2	0.17(0.098)	0.18(0.092)*	0.20(0.079)*
Education-3	-0.07(0.173)	-0.07(0.159)	-0.10(0.155)
Work-2	0.01(0.755)	0.81(0.633)	0.63(0.548)
Work-3	1.65(1.188)	0.60(1.022)	1.10(1.000)
Christian-2	-0.23(0.323)	0.34(0.288)	0.13(0.248)
Christian-3	0.55(0.686)	-0.39(0.627)	-0.04(0.626)
<b>Random Effects</b>			
Ethnicity-constant	0.09(0.031)*	0.13(0.029)*	0.09(0.021)*
Country-constant	0.21(0.090)*	0.16(0.072)*	0.19(0.079)*

\*Statistical significance at 5% level -  $p < 0.05$

§ Contextual factors ending with '-2' denote ethnic group level; while those ending with '-3' denote country level

Particularly striking is the substantially higher risk of multiple sex partners among married and unmarried men in the 'not stated' religious category compared to their counterparts of similar characteristics in other religious groups. Further analysis revealed that these cases are exclusively from Lesotho, one of the countries in Southern Africa with relatively high HIV prevalence and where concurrent multiple sex partnerships are most prevalent, fueled in part by migrant work that separates spouses (Motemekoane and Malope, 2008). It is also interesting to note that men of Muslim or traditional/other religious affiliations are more likely to report multiple partners than their Christian counterparts. As indicated earlier, Christian identity predicts negatively and significantly (among men) involvement with multiple sex partners.

As was expected, men who initiated sexual activity earlier, or from ethnic groups of countries in which earlier sexual debut is most prevalent, are more likely to report multiple sexual partners. Also, it is not surprising that men from countries or ethnic groups (married men) where polygyny is more widely practiced are considerably more likely to report multiple partners. This is an indication that men's involvement with multiple sexual partners is socially acceptable in communities that are culturally patriarchal and where male-female power relations are largely favorable to men. In many societies in sub-Saharan Africa, polygyny has long served as a way to demonstrate wealth and status publicly, and bridewealth transfers have long served as a way to distribute wealth to others. With falling marriage rates throughout the region at present, informal multiple concurrent partnering and age-disparate transactional relationships are now playing similar social roles.

There still remain significant variations in the risk of multiple sex partners among men across countries, and to a lesser extent across ethnic groups even after taking into account the effects of contextual factors relating to cultural norms and social change processes, in addition to those of individual socio-economic and demographic factors. The intra-unit correlation coefficients suggest that about 20 percent of the total variation in multiple partnerships are attributable to country level factors (results for variance components model not shown). When the individual and contextual factors relating to socio-economic, demographic and marriage patterns are controlled for (Table 3a), less than five percent of the total unexplained variation is attributable to unobserved factors at country levels. This suggests that most of the variation in multiple sex partnerships at country level is explained by the factors included in the model.

Corresponding risk factors for multiple sexual partnerships among married and unmarried women in sub-Saharan Africa are presented in Table 3b. Across countries in sub-Saharan Africa, unmarried women have on average more than double the odds (i.e.  $\exp[0.81]=2.25$ ) of reporting multiple sex partners during the 12 months preceding the survey than their married counterparts of similar background characteristics. Among unmarried women, the younger (especially those in their twenties) are significantly more likely to report multiple sex partners than older women aged over 40 years. There is, however, no significant difference in reporting of multiple sex partners by age among married women.

**Table 3b:** Multilevel logistic regression parameter estimates of multiple sex partners among females (standard errors in brackets)

<b>Parameter</b>	<b>Unmarried</b>	<b>Married</b>	<b>All</b>
<b>Fixed Effects</b>			
<b>Constant</b>	-4.74(0.256)*	-5.43(0.237)*	-5.34(0.188)*
<b>Marital Status (married)</b>			
Unmarried	N/A	N/A	0.81(0.047)*
<b>Age group (40+)</b>			
15-19	0.42(0.124)*	0.10(0.082)	0.20(0.079)*
20-29	0.71(0.117)*	0.14(0.084)	0.31(0.066)*
30-39	0.36(0.132)*	0.16(0.118)	0.21(0.071)*
<b>Residence (Urban)</b>			
Rural	-0.31(0.085)*	-0.24(0.080)*	-0.27(0.058)*
<b>Education Level (None)</b>			
Primary	0.27(0.100)*	0.10(0.080)	0.15(0.061)*
Secondary or higher	0.08(0.110)	0.21(0.100)*	0.12(0.072)
<b>Media Exposure (None)</b>			
Some	0.27(0.088)*	0.25(0.071)*	0.27(0.055)*
Not stated	-	-	-0.30(0.540)
<b>Wealth Quintile (Lowest)</b>			
Second	0.14(0.131)	0.11(0.091)	0.11(0.074)
Third	0.17(0.129)	0.02(0.094)	0.07(0.075)
Fourth	0.13(0.134)	-0.19(0.106)	-0.06(0.082)
Highest	0.08(0.143)	-0.20(0.124)	-0.05(0.091)
<b>Religion (Catholic/Orthodox)</b>			
Protestant/Other Christ	-0.11(0.087)	-0.01(0.085)	-0.04(0.060)
Muslim	-0.27(0.144)	-0.12(0.126)	-0.20(0.093)*
Trad/Other	0.05(0.168)	0.01(0.157)	-0.01(0.113)
Not stated	0.88(0.832)	3.52(1.113)*	2.21(0.913)*
<b>Working (No)</b>			
Yes	0.26(0.075)*	0.23(0.067)*	0.22(0.050)*
Not stated	0.29(0.257)	0.27(0.326)	0.23(0.203)
<b>Age at first sex (20+)</b>			
<16 years	1.09(0.147)*	0.90(0.127)*	0.96(0.096)*
16-17 years	0.92(0.145)*	0.66(0.128)*	0.76(0.096)*
18-19 years	0.61(0.151)*	0.51(0.134)*	0.55(0.101)*
<b>Contextual Factors</b>			
Polygamy-2	1.58(2.079)	-2.04(1.686)	-1.00(1.342)
Polygamy-3	1.35(2.784)	6.42(3.27)*	4.45(2.637)
Early sex-2	2.11(1.461)	1.71(1.247)	1.65(0.985)
Early sex-3	2.24(1.883)	5.61(2.063)*	3.88(1.628)*
Education-2	-0.03(0.156)	0.13(0.137)	0.08(0.107)
Education-3	0.28(0.204)	0.11(0.220)	0.15(0.177)
Work-2	2.45(1.248)*	0.12(1.022)	0.89(0.805)
Work-3	-3.34(1.504)*	0.08(1.483)	-1.07(1.191)
Christian-2	0.56(0.541)	0.39(0.492)	0.51(0.379)
Christian-3	-0.88(0.76)	-0.22(0.871)	-0.43(0.704)
<b>Random Effects</b>			
Ethnicity-constant	0.10(0.058)	0.11(0.055)*	0.07(0.034)*
Country-constant	0.12(0.076)	0.29(0.130)*	0.20(0.088)*

\*Statistical significance at 5% level -  $p < 0.05$

\$ Contextual factors ending with '-2' denote ethnic group level; while those ending with '-3' denote country level

The patterns with respect to socio-economic factors are generally similar to the patterns observed for men. For instance, urban residence, primary or secondary education, greater media exposure, and being in cash employment are generally associated with a higher risk of multiple sex partnerships. However, it is interesting to note that, among unmarried women, those with primary education have the highest risk, while among those who are married it is those with secondary or higher education who have the highest risk of multiple partnerships. As in the case of men, there is little difference in the risk of multiple sex partnerships by household wealth index.

There is a particularly strong association between age at first sex and reporting of multiple sex partners among both married and unmarried women. For instance, unmarried women who initiated sexual activity at younger than 16 years are on average about three times as likely to report multiple sex partners as their counterparts of similar characteristics who initiated sexual activity after their teenage years. As in the case of men, there is a strong positive association between involvement with multiple sex partners and residence in geocultural settings in which early sexual debut and polygyny are most prevalent across sub-Saharan Africa. Those associations are mostly significant among men and married women. This is an indication that involvement in high-risk sexual behavior is most prevalent in societies in which sexual norms are widely permissive.

Also as in the case of men, there remain significant variations in the risk of multiple sex partnerships among married women (but not unmarried women) across countries in sub-Saharan Africa and to a lesser extent across ethnic groups within countries, after controlling for contextual factors relating to polygamy and timing of sexual initiation, in addition to individual and contextual socio-economic and demographic factors. About 20 percent of the variation in multiple partnerships among married women are attributable to country level factors (results of variance component model without covariates not shown). When the individual and contextual factors relating to socio-economic, demographic and marriage patterns are controlled for, less than 10 percent of the total unexplained variation is attributable to unobserved factors at country level.

## **DISCUSSION AND CONCLUSION**

In this paper we have used data from population-based sample surveys (DHS and AIS data) and multilevel and multivariate approach to identify the determinants of involvement with multiple sex partners in sub-Saharan Africa. The use of a context-sensitive and multilevel analytical approach is due to the fact that the countries covered by this research and the communities within them do have characteristics that are influencing sexual behaviors, above and beyond the effects of individual and family characteristics.

The multivariate results provide support to the ecological argument that health behaviors are shaped and determined by societal conditions, in addition to the effects of individual and household characteristics. The effects of societal conditions include on the one hand the effects of cultural factors and, on the other

hand, the effects of social change. Involvement with multiple sex partners is significantly most likely among men and women who live in societies in which early sexual debut is most prevalent, that is, in communities in which sexual norms are most permissive (liberal). This finding is consistent with Caldwell and colleagues' view (Caldwell et al., 1989; Caldwell and Caldwell, 1996) that the rapid spread of HIV infection in sub-Saharan Africa is socially facilitated by the existence of cultural standards that are permissive towards multiple sexual partnerships in a wide range of geocultural settings across the region.

The impact of the prevalence of polygyny (among married men, and also among married women) underscores the complexity of contemporary African societies with respect to the impact of cultural norms on men's and women's sexual behaviors. Since the social forces that control women's productive and reproductive rights in high-polygyny and lineage-dominated societies constitute a sociocultural environment that is more concerned with maximizing men's and women's reproductive performance than with policing sexual behaviors, we believe that situations of insecurity and frustration within which patriarchy and polygyny place women in those societies constitute a powerful motivation for a meticulously managed involvement with multiple sex partners among women. A key mechanism through which patriarchal norms and gender stratification systems determine women's social status is by depriving them of the power to control and guide their lives and by restricting their access to opportunities for individual advancement that are available in the community (Cain, 1993, 1984; Morgan and Niraula, 1995). There seems to exist a sexual culture that is meticulously permissive among men and women in a wide range of patriarchal and male-dominated geocultural communities across sub-Saharan Africa. In patriarchal societies in which chastity and marital fidelity are emphasized for women, men are usually allowed to enjoy some degree of sexual freedom before and during marriage (Caldwell et al., 1989; Caldwell and Caldwell, 1996). This double-standard can produce different motivations for involvement in types of sexual practices that can be socially controversial but rewarding at the individual level. While sexually permissive behaviors are triggered by the desire to exhibit wealth and/or a high social status for men, emotional and/or economic needs are the most common reason for women (Bagnol and Chamo, 2004; Jones, 2006).

Our findings indicate that unmarried women are likely to have multiple sex partners when they are living in communities in which cash work involving men and women is most prevalent. This impact is certainly an indication that, by significantly increasing the numbers of women and men with new role priorities and new aspirations in non family settings, the expansion of market employment is making it easier for unmarried women to be approached by men who need partners. The impact of current community education is more complex and difficult to explain because advances in overall educational attainment predict positively involvement with multiple sex partners among men. Once again, this finding might be indicating that potential partners are more visible in non family settings in communities in which most individuals have some formal education.

The effects of individual characteristics suggest that increases in human and social capital skills are not necessarily associated with socially conservative and healthful sexual behaviors in sub-Saharan Africa. Men and women who are most likely to have multiple sex partners in the region are those who have the individual attributes that bring to them more rights and decision-making autonomy but not necessarily more financial and social resources: young age, urban residence, education, media exposure, and working for cash and away from home. We believe that the micro-level attributes that are assumed to be empowering at the individual level are significantly associated with increases in aspirations for upward mobility and the pursuit of modernity (modern consumerism) and less with basic economic security across sub-Saharan Africa. Young women who engage in transactional sex, including women attending university, may not be considered poor by most standards, but constitute a class of “material girls” whose growing consumer impulses place them at risk for HIV through consumption sex. In Southern Africa, for example, transactional sexual exchange is used by women to gain the resources that can allow them to pursue images and ideals largely created by the media and cultural globalization, including increasing consumerism and exposure to the commodities of modernity (Leclerc-Madlala, 2004, 2003).

A prominent aspect of contemporary African societies that undoubtedly contributes to the expansion of involvement in transactional sex is that sexuality is frequently seen by women as a resource that can be used to gain emotional and socioeconomic benefits. There has been development of a relatively affluent middle class with a desire among men for material goods and multiple sexual partnerships, and a sexual culture that associates transactional sex with gifts among women and multiple sex partners with social prestige among men (Leclerc-Madlala, 2009, 2008). Across all socioeconomic strata young women are culturally conditioned to variable degrees to view their sexuality as a valuable resource and to view sex primarily as a male desire and need. A woman's dignity and sense of self-worth when 'giving' sex is tied to an implicit expectation that her giving will be reciprocated through a gift, money or service (Leclerc-Madlala, 2009, 2008). Young women, for example, are often persuaded to have sex with “sugar daddies” – older, wealthier men – in exchange for money or gifts. Some girls enter the sex industry for similar reasons, including securing basic needs for those who live in poverty. Taken together, these cultural prescriptions for sex are potent underlying factors that are contributing to the expansion of involvement in transactional and cross-generational sex and to the spread of HIV in sub-Saharan Africa. For a vast majority of women not coerced into prostitution, including those with advanced formal education and/or higher social status, engagement in transactional sex is triggered by consumerism and/or advancement objectives. Women may engage in informal sex transactions even when they are highly educated and/or work for cash in the modern economy because they do not have the financial resources that would allow them to meet the demands associated with rising consumerism and/or individual advancement needs.

A superficial view of concurrency in sexual relationships is that men are driven by uncontrollable sexual urges and the cultural legacy of patriarchy and male promiscuity, while women are trapped by economic necessity and male domination. Although this viewpoint undoubtedly reflects a portion of the reality, a better understanding of this phenomenon is emerging from recent sexual ethnographic research that indicates that involvement in multiple and concurrent sexual partnerships in contemporary sub-Saharan

Africa is substantially driven by increases in levels of individual autonomy (Leclerc-Madlala, 2008, 2004). Whereas early studies emphasized economic concerns in the context of poverty and/or rising levels of income inequality as driving young women and girls into intergenerational relationships, evidence from qualitative studies suggests that young women are prompted into transactional sex with older and wealthier men by a complex interplay of factors, including the meanings and the transactional expectations that women attach to contemporary sexual relations. Recent ethnographic data (Leclerc-Madlala 2009, 2008, 2004; Nkosana and Rosenthal, 2007; Poulin, 2007) indicate that, in the context of growing social change and consumerism pressures and cultural expectations for men to give and women to receive a compensation for sex, involvement in transactional and concurrent relationships is widely viewed as a common and readily available way through which young women gain materially, affirm self-worth, achieve social goals, increase longer-term life chances, or otherwise add value and enjoyment to life. Other motivations for involvement with multiple sex partners that are commonly cited by most women and men include dissatisfaction with the primary partner, sexually and otherwise (Leclerc-Madlala, 2004, 2008; Swidler and Watkins, 2007; Tawfil and Watkins, 2007; Watkins, 2004). Such relationship dissatisfaction is likely to be caused by lack of communication and romance, partner's lack of skills in lovemaking, monotony, domestic discord, and desire for variety in partners and sexual practices.

The multivariate results highlighted in this study provide international efforts aimed at promoting HIV prevention within the sub-Saharan region as well as national governments with important insights into the micro-level and macro-level determinants of high-risk sexual behavior across the region, including the role of social context characteristics. The effects of community characteristics suggest that behavior interventions that attempt to decrease the odds of risky sexual behavior by focusing on individuals are unlikely to succeed over an extended period of time because the social forces that facilitate involvement with multiple sex partners are embedded within the sexual norms that are present in the societal conditions in which people live. Changes in sexual behavior that are meaningful and sustainable are unlikely to come from individual-centered partner reduction and behavior change communication programs.

Findings from this study suggest a number of opportunities for more effective policy and programmatic responses. Above all, the results argue strongly for multi-year behavior change and partner reduction efforts to be conducted in the communities in which higher-risk behaviors such as intergenerational sex, transactional sex and multiple concurrent partnerships are normalized and most prevalent. As pointed out by Leclerc-Madlala (2009), the success of partner reduction programs will be largely determined by the extent to which they are informed and guided by anthropological knowledge, that is, the understanding of the cultural milieu in which sexual partnering practices are occurring and being reproduced. This points to the necessity of identifying and addressing the cultural scripts (i.e., meanings and the transactional expectations that women attach to both casual and/or main sexual relations, and both the social and cultural norms and attitudes that are governing sexual relations and the context within which money or resources are exchanged between sexual partners) that tend to affirm and lend legitimacy to behavioral choices (i.e., involvement in transactional and cross-generational relationships) that lead to HIV infection. On the other hand, there is necessity of creation of labor-intensive socioeconomic projects that can

empower girls and young women to resist cross-generational relationships by scaling up economic opportunities for them.

Behavior change efforts that are based on the necessity of understanding and addressing the factors that sustain the culture of transactional sex underscores the necessity of a community-driven decentralized approach to behavior change efforts guided by a cohesive message that can be a powerful means through which values, norms and meanings associated with permissive and liberal sexual practices can be disrupted and dismantled. A stronger grounding of responses in communities with the support of effective and committed leadership at all levels would help to promote the development of social sanctions against the practice of concurrency in sexual relationships and changes to how people perceive transactional and multiple sexual partnerships. Without a vision of a disease-free future that is achievable through guided behavior change efforts and a developmental approach that can break both the association between wealth and involvement with multiple sex partners among men and the association between sexual exchange and material gains (money and/or gifts) among women, it is not realistic to expect young women to forgo in a near future the many potential benefits that come from relationships with older and more affluent men (Leclerc-Madlala, 2008).

The findings also suggest the necessity of a coordinated year after year two-pronged approach that focuses not only on empowering women through access to educational and economic opportunities while working to change men's behaviors and attitudes towards gender relations and sexuality but also on scaling up and strengthening the conventional programmatic areas (awareness raising; HIV education and information dissemination; service provision; life skills development; reduction of women's economic vulnerability; delay of sexual debut; partner reduction; knowing of partner status; and consistent use of condoms during unsafe sex) that can significantly reduce vulnerability to HIV infection among men and women who engage in cross-generational and transactional relationships. With financial dependence on men remaining a key factor in women's vulnerability to HIV generally and young women's susceptibility to involvement in intergenerational sex in particular, ensuring access to education and income-generating opportunities remains a major route out of women's ongoing poverty and dependency. Programmes aimed at educating girls and empowering them for present and future financial independence should be linked and expanded (Leclerc-Madlala, 2009, 2008). HIV prevention education should be more directly aimed at enabling young women to understand the scope of risks associated with transactional and multiple sexual partnerships and to make healthier choices in their sex life.

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## APPENDIX

**Table A1:** Description of Study Variables

NAME OF VARIABLE	MEASURE
<b>DEPENDENT VARIABLE</b>	
Multiple partners (Unmarried)	1= an unmarried respondent had multiple sexual partners in the past 12 months prior to the survey; 0=otherwise
Multiple partners (Married)	1= a married respondent had multiple sexual partners in the past 12 months prior to the survey; 0=otherwise
<b>MACRO-LEVEL INDEPENDENT VARIABLES</b>	
<b>CULTURAL NORMS VARIABLES</b>	
<b>POLYGyny (2)</b>	The proportion of currently married women ages 15-49 in an ethnic group who are in a polygynous marriage
<b>POLYGyny (3)</b>	The proportion of currently married women ages 15-49 in a country who are in a polygynous marriage
<b>EARLY SEX (2)</b>	The proportion of women and men in an ethnic group whose age at first sex is 17 years or younger
<b>EARLY SEX (3)</b>	The proportion of women and men in a country whose age at first sex is 17 years or younger
<b>SOCIAL CHANGE VARIABLES</b>	
<b>EDUCATION (2)</b>	Average number of years of education among all women and men of reproductive age (15-49) in an ethnic group
<b>EDUCATION (3)</b>	Average number of years of education among all women and men of reproductive age (15-49) in a country
<b>WORK (2)</b>	The proportion of women and men of reproductive age (15-49) in an ethnic group who work for cash and away from home
<b>WORK (3)</b>	The proportion of women and men of reproductive age (15-49) in a country who work for cash and away from home
<b>CHRISTIAN (2)</b>	The proportion of women and men of reproductive age (15-49) in an ethnic group who have Christian identity
<b>CHRISTIAN (3)</b>	The proportion of women and men of reproductive age (15-49) in a country who have Christian identity
<b>MICRO-LEVEL INDEPENDENT VARIABLES</b>	
<b>Education (Ref=none)</b> Primary Secondary or more	1=If respondent's educational attainment is some or full primary 1=if respondent's educational attainment is secondary or higher
<b>Household wealth/DHS Wealth Quintile (Ref: Lowest)</b> Second quintile Third quintile Fourth quintile Highest quintile	1=If household wealth status is second quintile 1= If household wealth status is third quintile 1= If household wealth status is fourth quintile 1= If household wealth status is highest quintile
<b>Media exposure (Ref=no exposure)</b> Some	1=If a respondent reported watching TV or listening to radio at least once a week at the time of the survey

Not Stated	1=If media exposure was not reported
<b>Working (Ref=No)</b> Yes Not Stated	1=If a respondent reported working for cash and away from home at the time of the survey 1=If employment status was not reported
<b>Age group (Ref=40+)</b> 15-19 20-29 30-39	1=if age is 15 to 19 1=if age is 20 to 29 1=if age is 30 to 39
<b>Age at first Sex(Ref=&lt;20)</b> <16 16-17 18-19	1=if age at first sex is less than 16 1=if age at first sex is 16 to 17 1=if age at first sex is 18 to 19
<b>Residence (Ref=Urban)</b> Rural	1=if respondent was living in a rural area at the time of the survey
<b>Religion (Ref=Catholic/Orthodox)</b> Protestant/Other Christian Muslim Other /Traditional Religion Not Stated	1= If religion is Protestant or other Christian 1= If religion is Muslim 1= If religion is Other/Trad 1= If religion is not stated
<b>Marital Status (Ref= currently married)</b> Unmarried	1=If a woman or man was unmarried at the time of the survey