Women, Culture and HIV/AIDS: Modeling the Impact of Cultural Norms in the Spread of HIV/AIDS in Three Regions in Sub-Sahara Africa

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(Draft)

Abstract:

HIV/AIDS prevalence in sub-Saharan Africa is now stagnant and heterosexual relationships are believed to be the most responsible means of transmission. Culture affects risky sexual behavior related to heterosexual partnerships. This study analyzes cultural influence on risky sexual behavior in 3 regions in sub-Saharan Africa (Southern, Western and Eastern Africa) using the data from Demographic Health Surveys. Results show that cultural norms affecting marriage, education and rural living influences the use of condom and risky sexual behavior in all regions. In Southern Africa, knowledge of HIV/AIDS and seeing an infected person decreased risky sexual behavior. Sexual violence, which is acceptable in most cultures, decreased use of condoms and increased sexual behavior among women in Southern and Western Africa. There is a need to use HIV/AIDS infected people as mentors to direct behavior changes in sub-Saharan Africa.

Introduction:

In Sub Saharan Africa the culture of sex forms an important aspect of the lives of the people. Sexual partnership is important for recreation, procreation, spiritual cleansing and identity (Akwara, 2003; Parker, 2001; Hunter, 1993). Some cultural norms such as widow rites, spouse exchange, polygamy and arranged marriages encourage multiple sexual partners and relations. Participation in the set cultural practices gives the individual a sense of belonging to the community as well as providing increased pleasure. Deviation from these practices attracts high levels of stigmatization and discrimination towards the individual and their family.

With the emergence of HIV/AIDS and other sexually transmitted infections (STIs), the cost of a sexual activity has become more expensive. Generally, the infected make decision on possible treatments while the uninfected decide on preventive and protective measures (Gersovitz, 2000). Uninfected individuals consider the possibility of getting infected while making decisions on sexual partnership. Likewise, infected individuals may worry about infecting others. Meanwhile, policy makers need to consider how the actions of individuals affect social welfare.

The culture of sex forms an important aspect of the lives of people in sub-Sahara Africa. Some cultural norms such as power difference between men and women, early marriage, polygamy and perceptions about pre-marital sex all contribute to risky sexual behavior which can lead to HIV/AIDS. In order to effect a behavioral change, an understanding of the influence of culture on risky sexual behavior is needed. The purpose of our study is to provide an empirical analysis on how culture contributes to risky sexual behavior in sub-Sahara Africa and how this relates to the difference in prevalence rates within the three regions, Southern, Western and Eastern Africa This study allows us to investigate the specific cultural factors that inadvertently further STIs in Sub Saharan Africa. Different policies on how to control the HIV/AIDS epidemic in Sub Saharan Africa have been developed. Some have been successful while others have not been very successful. Policy implications from this study will provide information on why some policy measures have not been very successful in some parts of sub-Sahara Africa.

The study is organized as follows; the next section is a review of literature of cultural norms and risky sexual behavior. We will then discuss the data used for the study and the empirical analysis. The results for the analysis is then presented and followed by a discussion of the results and policy recommendation, then conclusions.

Do cultural norms promote risky sexual behavior in Sub-Sahara Africa?

Cultural norms and beliefs are known to promote risky sexual behavior among individuals especially women and it has been identified as a major factor in the spread, transmission and treatment of infectious diseases globally (Doherty et al, 2005, Inhorn et al, 1998, Kloos 1995, Akwaara 2003, Parker 2001). Gender power differences, polygyny and use of gifts as exchange for sex, and societal perception of use of condoms are some areas through which culture can promote risky sexual behavior which can lead to the spread of HIV/AIDS.

In sub-Sahara Africa, cultural norms create power difference between men and women by defining their roles in marriage and sexual relationships. For example, women are regarded as sex suppliers, with little authority in sex, and are expected to remain monogamous in marriage. Men however are allowed to have multiple sexual partners, have younger sexual partners and have more authority in any sexual relationships (Aral, 2010; Mc Phail et al., 2003). Power difference between men and women lead to risky sexual behavior and practices which in turn leads to sexually transmitted infections (STIs) (Buvé 2002; Jewkes 2003*).* Polygyny and promiscuity promote risky sexual behavior through sexual violence, sexual networks and the huge age difference between sexual partners. Kalicham (2007) in an interview conducted in Botswana reported that individuals in steady partnerships with multiple partners were less likely to use condoms. Todd et al., (2009) considered sexual partnership data from four longitudinal population-based surveys (1998–2007) in Zimbabwe, Uganda and South Africa. Their study linked risky sexual behavior to polygyny in these countries. However, Ferry et al., (2001) in a study of four African cities did not find any link between multiple sexual partners and difference in HIV/AIDS prevalence rates in these cities.

Premarital sex is highly discouraged in most African cultures. However, a majority of adolescents engage in sex before they turn 18, either through early marriage or pre-marital sex (Mc Phail 2003; Clark 2006; Mensch2006). Early age of coital debut is linked with risky sexual behavior such as increased number of lifetime sexual partners, higher number of sexual encounters and decreased use of condoms, all of which could increase the probability of STI infection (Pettifora et al., 2004; Hallet et al., 2007; O'Donnel et al., 2003; Clark et al.,2004; Clark et al., 2006). Clark et al., (2006) notes in South Africa, about 80 percent of adolescents under 18 years studied who reported unprotected sex were married. They also noted that married

adolescents were married to men much older, and in polygynous societies were junior wives. Similarly, Luke (2005), in a study of male non marital sexual behavior in Kisumu, Kenya, finds that about 14 percent of the studied partnerships were in a "sugar daddy" relationship with adolescents who were 10 or more years younger. Age difference inhibits sex negotiation between partners (Longfield 2006). West Africa has the highest reported cases of girls getting married before 18 years in sub-Sahara Africa (Jenson et al., 2003).

Another cultural norm that promotes risky sexual behavior is intimate partner violence. In a number of African cultures, sexual violence is acceptable and is to be treated as a private issue (UNAIDS, 2006; Burgonye 2008). Intimate partner violence is known to be significantly related to transmission of HIV/AIDS (Mayaud and Mabey (2004); Impet and Peplau (2003),) Physical and sexual violence against women have been reported in South Africa, Rwanda and Ethiopia (Kalichman et al., 2005, Ntaganira et al., 2008, Garcia-Moreno et al., 2006). Jewkes et al., (2006) associates intimate sexual violence with early marriage. Sexual violence increases risky sexual behavior and decreases use of condoms. Men in a study done in South Africa associated beating their partner to love. Questions such as is your partner justified to beat you has been used in measuring sexual violence in various studies.

Consistent and correct use of condoms has been widely accepted as important in reducing the spread of STIs (Winer et al., 2006). Condoms provide 90-95 percent protection from STIs if used consistently (Pinkerton et al., 1997). In Zaire and Ivory Coast, the use of condoms by commercial sex workers has contributed to reduction in HIV infection (Ghys et al., 2002; Bertrand et al., 1991; Hearst and Chen 2004). Similarly in Uganda, increased use of condom has contributed to a reduction in HIV prevalence rate (Stoneburner, 2004). Stephenson (2009), used the Demographic and Health Survey to analyze community influence on young people's (15-24 years) sexual behavior in 3 African countries (Ghana, Burkina Faso and Zambia), and reports that condom use is more prevalent among males than females. Prata et al., (2005) confirmed this in a study conducted in Angola on adolescent condom use. Trust in sexual relationships is the number one reason for not using condoms during sex (Agha 2002, Klein et al., 2010). Other factors such as discomfort, unavailability, inaccessibility and belief that condoms have pores in them, all contribute to the low use of condoms in most sexual relationships (Loosli, 2004). In a study in 8 countries in Africa respondents from Eritrea and Zimbabwe reported trust as number

one reason for non-use of condoms and respondents from Cameroun and Zambia identified dislike as the major reason for non-use. Availability and price were not reasons for non-use in the countries studied. Tavory and Swidler (2009) in a qualitative study in Malawi, reported terms such as "sex with condoms is like taking sweets with the wrapper on" or "weak" used to describe sex with condoms and men who use condoms. Education has been identified as a way of promoting use of condoms among adolescents and adults. Ukuwani et al., (2003) find women in Tanzania and Uganda with a higher level of education are able to negotiate safe sex and use condoms compared to women with no education.

Sex communication does not occur in most households in Africa. Girls who ask questions about sex are tagged as promiscuous. This cultural norm also prevents sexually active adolescents to access condoms. Furthermore, it limits the inclusion of sex education in the educational curricula and where it is included topics such as the use of condoms are excluded. Sometimes teachers perception about the use of condoms and ignorance about HIV/AIDS and contraceptives prevents them from teaching sex education even when it is included in the curriculum. Benefo (2010) finds that sex communication in households in Zambia is known to increase condom use. Apart from sex education in schools, the use of media such as television, radio and newspapers to promote safe sex practices has been successful in some regions.

The Model:

Consider an individual, who is not infected with a STI. This individual desires sexual relationship but does not want to get sick. We let n represent the number of sexual partners and $x,\ 0 \le x \le 1,$ represent the proportion of unprotected sex the individual has. For reasons that will be clear shortly we assume protection is represented by condom use, which helps to prevent sexually transmitted infections (STIs). For simplicity we assume the sexual frequency with each partner is constant. The representative individual's benefit increases with the number of sexual partners and the individual has more benefit from each sexual encounter when not using condoms.

The benefit function can be represented as $b(n,x)$ with $\frac{\partial b}{\partial n} = b_n(n,x) > 0,\ \frac{\partial^2 b}{\partial n^2} = b_{nn}(n,x) < 0,\ .$

$\frac{\partial b}{\partial x} = b_x(n,x) > 0,\ \frac{\partial^2 b}{\partial x^2} = b_{xx}(n,x) < 0$ and $\frac{\partial^2 b}{\partial xn} = b_{nx}(n,x) > 0.$ Condom use help protect from a sexually transmitted infection by lowering the transmission rate of the disease.

The probability of getting sick is represented by a binomial function based on the prevalence rate in the society, α, and the transmission rate, $\beta(x)$ with $\beta'(x) > 0$ so the more unprotected sex the individual has the greater the transmission rate. The probability of an uninfected person getting infected with an STI is given by $(1-(1-\alpha\beta(x))^n)$ (Oster 2008) where we assume $0 < \alpha\beta(x) < 1$ for all values of x. The expected cost of illness from sexual activity is, therefore, $c*(1-(1-\alpha\beta(x))^n)$ where c is the costs incurred if an individual gets infected, including any medical care associated costs, costs associated with the value of life if the STI can be fatal, and psychic or social costs associated with being infected. Let $c(x,n) = c*(1-(1-\alpha\beta(x))^n).$ Then $\frac{\partial c(x,n)}{\partial n} = -c\ (1-\alpha\beta(x))^n \log(1-\alpha\beta(x)) > 0$ because $(1-\alpha\beta(x)) < 1.$ In addition $\frac{\partial c(x,n)}{\partial x} = nc(1-\alpha\beta(x))^{n-1}\alpha\beta'(x) > 0.$

The focus of this paper is how cultural factors may also affect an individual's sexual choices. We focus on social and cultural norms related to the number of partners and the use of condoms Individuals who deviate from these accepted cultural norms receive some form of punishment. Let $\theta*(n-\bar{n}, x-\bar{x})$ represent the punishment function for deviating from the cultural norm where $\bar{n}$ represents the cultural norm for the number of sexual partners and $\bar{x}$ is the cultural norm with regard to condom use. Then $\frac{\partial\theta*(n-\bar{n},x-\bar{x})}{\partial(|\,n-\bar{n}\,|)} = \theta*_{|n-\bar{n}|}(n-\bar{n},x-\bar{x}) \geq 0$ and $\frac{\partial\theta*(n-\bar{n},x-\bar{x})}{\partial(|\,x-\bar{x}\,|)} = \theta*_{|x-\bar{x}|}(n-\bar{n},x-\bar{x}) \geq 0$. The cross-partial derivative $\left(\frac{\partial^2\theta*(n-\bar{n},x-\bar{x})}{\partial(|\,n-\bar{n}\,|)\partial(|\,x-\bar{x})\,|}\right)$ indicates any complementarity or substitutability in the cultural norm penalty. We note that $\frac{\partial\theta*(n-\bar{n},x-\bar{x})}{\partial n} = \frac{\partial(|\,n-\bar{n}\,|)}{\partial n}\frac{\partial\theta*(n-\bar{n},x-\bar{x})}{\partial(|\,n-\bar{n}\,|)}$ so the sign of

$\frac{\partial\theta^*(n-\bar{n},x-\bar{x})}{\partial n}$ depends on the sign of $\frac{\partial(|n-\bar{n}|)}{\partial n}$ and similarly $\frac{\partial\theta^*(n-\bar{n},x-\bar{x})}{\partial x}=\frac{\partial(|x-\bar{x}|)}{\partial x}\frac{\partial\theta^*(n-\bar{n},x-\bar{x})}{\partial(|x-\bar{x}|)}$ depends on the sign of $\frac{\partial(|x-\bar{x}|)}{\partial x}$. As a result an increase of n or x when below their respective cultural norms lowers the deviation penalty, while increases of n or x when above their respective cultural norms will increase the penalty. More generally, we can write $\theta^*(n-\bar{n},x-\bar{x})=\theta(n,x)$ where $\frac{\partial\theta(n,x)}{\partial n}=\theta_n(n,x)$ switches sign at $n=\bar{n}$ and $\frac{\partial\theta(n,x)}{\partial x}=\theta_x(n,x)$ switches sign at $x=\bar{x}$.

The individual's net utility function is

$$U(n,x)=b(n,x)-\theta(n,x)-c^*(1-(1-\alpha\beta(x))^n) \quad (1)$$

The first order necessary condition for the individual with respect to the number of sexual partners is given as

$$\frac{\partial U}{\partial n}=b_n(n,x)-\theta_n(n,x)+c^*(1-\alpha\beta(x))^n\log(1-\alpha\beta(x))=0 \quad (2)$$

or

$$b_n(n,x)-\theta_n(n,x)=c^*(1-\alpha\beta(x))^n\log(1-\alpha\beta(x)) \quad (3)$$

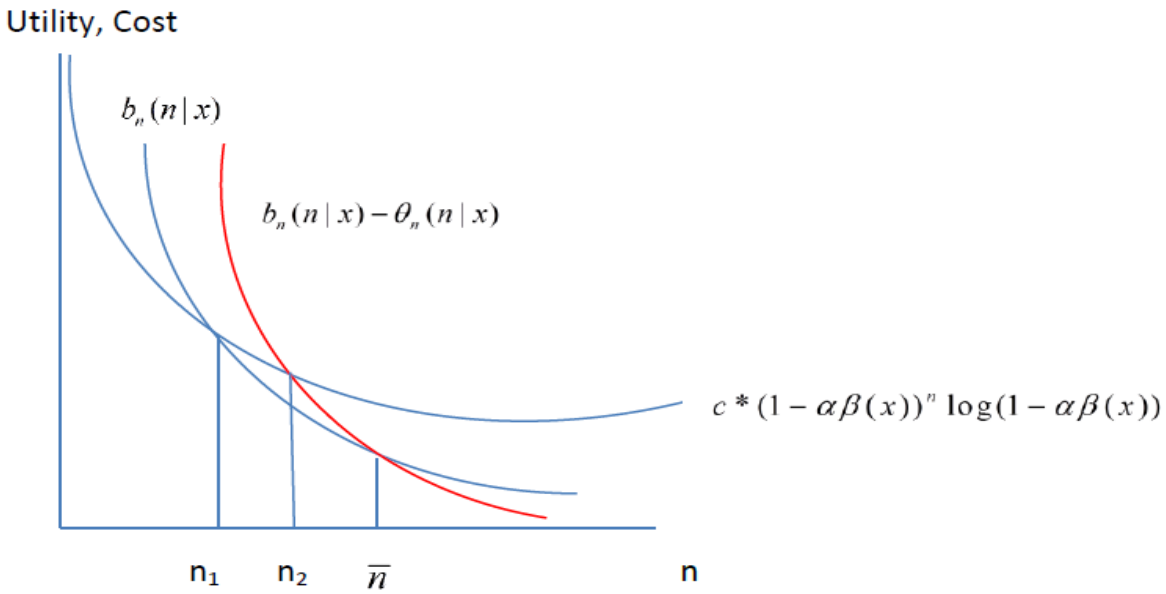
Assume first there are no cultural norms, so $\theta(n,x)=0\ \forall(n,x)$. Then, as stated earlier, the marginal benefit and marginal expected cost of illness decreases with each additional sexual partner. Suppose n=0, that is there are no sexual partners, then the marginal benefit will be infinity. However, the marginal cost will be the finite value $-\log(1-\alpha\beta(x))$. When there are no sexual contacts the individual stands essentially no risk of getting sick.[1] Ignoring that the number of sexual partners is a discrete number and assuming there are no costs for deviating from cultural norms, it is clear that when $n<1$ the marginal benefit is greater than the marginal cost. Thus the individual will increase n to the point where the marginal benefit is equal to the

[1] More realistically, we can construe *n* as the number of sexual partners greater than 1.

marginal cost. If the marginal benefit decreases at a faster rate than the marginal cost, n is finite. Holding x constant, utility is maximized when the marginal benefit with respect to n is equal to the marginal cost. When there are no cultural norms a finite solution is shown in by the two blue lines in figure 1 below and the optimum number of partners is given by n_1.

Cultural norms change the optimum choice, moving it towards the cultural norm. To ensure an internal solution, assume $b_n(n \mid x) - \theta_n(n \mid x) > 0 \ \forall (n \mid x)$. The effect of a cultural norm on the number of partners is to pivot the marginal benefit curve at $n = \bar{n}$ because the marginal cultural penalty, $\theta_n(n \mid x)$, decreases as $n \to \bar{n}$ from either direction. If $\bar{n}$ is larger than the number of partners that would be chosen in the absence of a cultural norm, then a cultural norm increases the number of sexual partners to $n2$. If instead $\bar{n} < n1$ then a cultural norm decreases the number of sexual partners.

Fig 1:



Cultural attitudes toward condom use have an analagous impact. Taking the derivative of (1) with respect to x we find

$$\frac{\partial U}{\partial x} = b_x(n,x) - \theta_x(n,x) - nc(1-\alpha\beta(x))^{n-1}\alpha\beta'(x) = 0 \quad (4)$$

hence

$$b_x(n,x) - \theta_x(n,x) = nc(1-\alpha\beta(x))^{n-1}\alpha\beta'(x) \quad (5)$$

Equation 5 shows that the marginal benefit of not using condoms is equal to the marginal cost of expected infection for the last unit of unprotected sex. Just as we considered the case when holding condom use constant, we can consider condom use when holding the number of sexual partners constant and assuming no cultural deviation costs – and the results mimic what we found for the number of sexual partners.

More generally, from equations (3) and (5) we find

$$\frac{b_x(n,x) - \theta_x(n,x)}{n\alpha\beta_x(x)} = \frac{b_n(n,x) - \theta_n(n,x)}{-(1-\alpha\beta(x))\log(1-\alpha\beta_x(x))} \quad (6)$$

Equation 6 indicates that the marginal pleasure per an additional risk taken on by another unit of unprotected sex is equal to the marginal pleasure per additional risk of disease taken on by adding a partner.

We note that the condition given by (6) is equivalent to the optimal conditions that result from the following problem:

$$\max\ u(n,x) = b(n,x) - \theta(n,x)\ \text{ s.t. } \bar{R}=c^*(1-(1-\alpha\beta(x))^n) \quad (7)$$

where $\bar{R}$ is the maximum acceptable expected cost of disease to the individual. This problem is illustrated by Figure 2, where the blue concave curve indicates the tradeoff of x and n that gives the value $\bar{R}$.

Data Description and Method

The data used for the study is the Demographic and Health Survey (DHS) data set from 2003 to 2008. The specific data used is the most current national dataset which includes information of

the HIV/AIDS status of the respondents. The countries were grouped into three regions in sub-Sahara Africa; Eastern (Ethiopia (2005), Kenya (2008-2009) and Rwanda (2005)), Southern (Lesotho (2009), Swaziland (2006-2007), Zambia (2007) and Zimbabwe (2005-2006)) and Western Africa (Ghana (2003), Guinea (2005) and Sierra Leone (2008)). The DHS used a two stage sample design in the data collection process. Data were collected in both rural and urban areas. Self-reported data on women between the ages of 14-49 were used. The binary dependent variables used in the study were whether the individual used a condom in her last sexual encounter or not. A behavior is described least risky if the individual has 1 or less sexual partners and uses condoms. In addition, we constructed an index of risky sexual behavior based on the total number of sexual partners in the past 12 months and whether the woman used condom or not. An ordered logistic regression was used to analyze risky sexual behavior with this index variable. In the ordered logistic regression, women who reported having only one sexual partners and also used condoms during their last sexual encounter were labeled 0. The label 1, referred to two groups of women, the first were women who did not use condoms and had only one sexual partner. The second group referred to women who used condoms and had more than one sexual partners. The label two was used for those who were very risky, these were women who did not use condoms, but had various sexual partners.

Descriptive statistics:

Southern Africa

The average age of the respondents was 29 years. Eighty percent of the respondents used in the study indicated they did not use condoms during their last sexual intercourse. The average number of sexual partners per women was 1.03 but it ranged between 1 and 20. The average age at first intercourse was 17 years, however the youngest was 8 years and the oldest was 38 years. Average age at first marriage was 18 years, and this ranged from 8 years to 46 years. Seventy one percent of the respondents were married and 5 percent were living with their partners. The rest were either divorced, widowed or not living with their partners. Forty-four percent of the women reported they were employed at the time of the interview, 6 percent indicated they have had no education, 45 percent reported primary education as their highest level of education , 45 percent had a secondary school education and 5 percent had higher than secondary school education. Sixty eight percent of the respondents lived in rural areas.

Eastern Africa:

The average age of the respondents was 30 years. Ninety five percent on the respondents reported they did not use condoms during their last sexual intercourse, majority being those married or living with their partners. The average number of sexual partners including the respondent's husband in the past 12 months was 1.07 and ranged from 1 to 30. The average age for first intercourse was 17.5 years and this ranged from 7 to 38 years. The average age at first marriage was 18 years and ranged from 7 to 44 years. Fifty percent of the respondents indicated they were working at the time of interview. Based on their highest level of education, 39 percent reported they had not received any education, 42 percent had received at most a primary education, 15 percent secondary education and 4 percent higher. Seventy six percent of the respondents were living in rural areas.

Western Africa:

The average age of the respondents was 30 years. The percentage of respondents who reported not using condoms during their last sexual encounter was 93 percent, majority were those married and those living with their partners. Average number of sexual partners reported by women during the past 12 months was 1 .03 and this ranged from 1 to 3. The average age for first intercourse reported was 16 years, ranged from 8 to 46 years. Average age of marriage for girls was 18 years while the range was from 10 to 46 years. Eighty percent of the respondents were employed at the time of the interview. Educational level was low among respondents in Western Africa. About 52 percent reported they had had no education, 15 percent had at most a primary education, 30 percent had secondary education and 2 percent reported higher education. Sixty percent of respondents lived in rural areas.

Results:

Condom use:

No education, being married, living together with your partner and living in a rural area all significantly and negatively influenced the likelihood of condom use in Western, Eastern and Southern Africa. However, knowing that condoms are important for protection significantly increased the likelihood of use in all three regions as shown in table 1.

Being married and belief in protection by condoms were highly significant (99 percent in all three regions. No education was more significant in Western and Eastern Africa (99 percent) than in Southern Africa (90 percent). Living together and living in a rural area were at a 99 percent level significance in Eastern and Southern Africa, but at a 95 percent significance level in Western Africa. Not reading the newspaper was more significant in Southern Africa (99 percent) than in Eastern and Western Africa (95percent).

Some factors were significant in some regions and not significant in others. In Eastern and Southern Africa, female employment, reporting of genital infection in the past 12 months, watching television less than once a week and not having a radio, were significant but had varied impacts on condom use. Females in Eastern Africa who were employed at the time of the survey were less likely to use condoms, but those in Southern Africa were more likely to use condoms. Employment was significant at the same level in both regions. Women who reported of genital discharge in the past 12 months were significantly more likely to use condoms. This was stronger in Eastern region than in the Southern region. Females who reported to watch television less than once a week were less likely to use condoms in Eastern Africa and more likely to use condoms in Southern Africa. Having no radio negatively and significantly decreased the likelihood of using condoms in Eastern and Southern Africa. This is stronger in Eastern Africa than Southern Africa. All these factors did not influence the likelihood of condom use in Western Africa.

Being a widow and the age at first intercourse were significant in Western and Eastern regions. Widowhood significantly and positively influenced use of condoms. It was however more significant in Eastern Africa than Western Africa. Age at first intercourse had varied influence; it was negative and more significant (95percent) in Eastern Africa. In the Western Region, age at first intercourse, was positive and significant (90 percent).

Sexual violence and not having TV negatively and significantly influenced condoms use in Western and Southern Africa. Sexual violence was more significant in Western region than Southern region and having no TV was more significant in Southern Africa than in Western Africa.

Primary education, never been married and listening to the radio less than once a week influenced condom use in East Africa alone. Women who reported that their highest level of

education was primary education and women who listened to the radio less than once a week were less likely to use condoms. Women who have never been married however were more likely to use condoms during sex.

In Southern Africa alone, the age of the individual, knowing an infected person and belief that a healthy person could be infected positively and significantly influenced condom use. There were no variables that were significant to Western Africa alone.

Risky Sexual Behavior in Women 14-49 years

No education, primary education, married, living together and not reading the newspaper positively influences risky sexual behavior while employment, age at first intercourse and watching television less than once a week have varied significant effect on risky sexual behavior in all three regions as shown in table 2.

Possessing at most a primary education and being married was positive highly significant in all three regions (99 percent). Having no education and not reading the newspaper at all were also positive and had the same level of significance (95 percent) in all three regions. Respondents who lived together with their sexual partners in Eastern and Southern Africa, were more likely to engage in risky sexual behavior than those in Western Africa. Women in Western and Eastern Africa who reported they were employed during the survey employed were more likely to engage in risky sexual behavior while women in Southern Africa who were employed were less likely to engage in risky sexual behavior. Employment was more significant in Western and Eastern Africa than Southern Africa. Age at first had a significantly negative influence on risky behavior in Western and Southern Africa but a significant positive effect in Eastern Africa. Women in Western and Eastern Africa who watched television less than once a week were more to engage in risky sexual behavior and Women in Eastern Africa were less likely to do so.

In Eastern and Southern Africa, never been married, widowhood and belief in condom use influenced risky sexual behavior negatively and significantly and rural residence influenced risky sexual behavior positively. Widowhood was more significant in Eastern Africa than Southern Africa.

Sexual violence and not watching TV, positively and significantly influenced risky sexual behavior of women in Western and Southern Africa. There were no variables that were similar in Western and Eastern Africa.

In Southern Africa alone, age, belief that a healthy person could be infected and keeping AIDS infection secret in the society negatively and significantly influenced risky sexual behavior, while experience, being a smoker and reading the newspaper once a week positively influenced risky sexual behavior. In Eastern Africa alone, reading the newspaper at least once a week, not having a radio and listening to the radio at least once a week positively and significantly influenced risky sexual behavior. In Western Africa alone, women who reported having genital discharge positively and significantly influenced their risky sexual behavior.

Robustness Check:

To check for robustness of the analysis, we considered a lower age group 14-25 years. This is because this age group has the highest reported incidence of HIV/AIDS in the sub-Sahara Africa. Similar to the analysis involving all women, rural residence, no education and belief that condoms are effective in protecting against STDs significantly influenced use of condoms among younger girls in Southern, Eastern and Western respectively. Rural residence and no educational attainment decreased the probability of using condoms and belief in the effectiveness of condoms increased the use of condoms among young girls in the region. Rural residence in Eastern Africa had a stronger level of significance than in Western and Southern Africa and the belief in the effectiveness of condom use was stronger in Southern Africa compared to Eastern and Western Africa.

In Eastern and Southern Africa, not reading the newspaper, not listening to the radio, being married and having primary education as the highest educational level, decreased the probability of young women using condoms. Employment and reportedly having some form of genital discharge had similar effects compared to that for older women. Young women in Eastern Africa who were employed were less likely to use condoms while young women in Southern Africa who were employed were more likely to use condoms.

The study showed that age and keeping AIDS a secret in the society, influenced condom use among young women in Western Africa. Living together decreased the use of condoms among young women in Eastern Africa. Women in Southern Africa who were never married were more likely to use condoms.

Risky Sexual Behavior Among Young African Women

Comparing this to all women, young women who lived in rural areas in all three regions were more likely to engage in risky sexual behavior. No education and primary education had similar effects like that for older women. Marriage and belief in the effectiveness of condoms influenced risky sexual behavior in Eastern and Southern Africa but was not significant in Western Africa. Marriage increased risky sexual behavior of young women in Eastern and Southern regions and belief in the effectiveness of condoms decreased risky sexual behavior. Being employed was only significant in Eastern Africa and it increased risky sexual behavior in the region.

Discussion of Results:

The age for marriage and the responsibilities of both parties in a marital union are influenced by societal and cultural norms. Girls in most rural parts of Africa especially, are forced to marry when they turn 18. Furthermore, in most African cultures, it is acceptable for men to have other wives and extra marital affairs, while women on the other hand are expected to remain monogamous. Women are supposed to always supply sex when it is demanded by their partners and men have the right to demand sex anytime. The multiple sexual network, increase in sexual intercourse in marriage, inability for women to negotiate safe sex, for fear of mistrust or beating from their husbands has contributed to married women reporting lower use of condoms and a higher HIV/AIDS infection rate than men. Trust in any sexual relationship also prevents the use of condoms. This could explain why people who lived with their sexual partners were less likely to use condoms or practice other safe sex behaviors. This finding is similar to Dunkle et al., (2008) who studied new HIV infections among married and cohabiting partners in Zambia and Rwanda.

Fewer girls in sub-Sahara Africa marry young as compared to decades ago. However there still exist cultures in sub-Sahara Africa where early marriage of girls is still being promoted. Girls who marry young have partners who are several years older. These young girls also have limited

access to information about sex and HIV/AIDS, and they are mostly married into polygamous homes and have more sexual encounters than their unmarried counterparts (Clark, 2006). These factors reduce girls' ability to engage in safe sex with their partners or even to negotiate it. Early marriage of girls also affects their ability to get some education or even complete basic education.

Culture has a strong influence on education in the society. In some countries, sex education cannot be included in the curriculum and where it is included, certain portions such as use of condoms are eliminated. This is because parents and religious leaders believe that such an education will lead to promiscuity. However, including sex education in the curricula can lead to behavior change. Hence women with less education were more likely to engage in risky sexual behavior than women who were more educated. Girls that marry young do not get any basic education, and few who do, are not able to complete school. Families, that enroll their girls in school, do not marry them off when they are still very young. Given that sex cannot be discussed in most African societies, incorporating sex education into the educational curriculum informs more women about sexual issues and the need to protect and how to protect. Women who are more educated are able to negotiate safe sex and discuss HIV/AIDS with their partners, something that they could not have done formerly. Education also bridges the power difference between men and women thereby making women more independent. Increase in girls' enrollment in schools has also contributed to a reduction in early girl marriage in most part of Africa. In most parts of Africa, cultural norms are stronger in rural areas than in urban areas Therefore it is more difficult for a person living in a rural area to deviate from a cultural norm compared with those in urban areas. People in rural areas have lower education, are poorer, less informed and have more difficulty accessing condoms than those in the urban areas.

In a number of African cultures, sexual violence is acceptable and is to be treated as a private issue (UNAIDS, 2006; Burgonye 2008). Physical and sexual violence against women have been reported in South Africa, Rwanda and Ethiopia (Kalichman et al., 2005, Ntaganira et al., 2008, Garcia-Moreno et al., 2006). Sexual violence increases risky sexual behavior and decreases use of condoms. In our study, women in Southern and Western Africa, who reported that their husbands were justified to beat them for refusing to have sex with them were more likely to engage in risky sexual behavior. Intimate partner violence has been associated with low level of

condom use and inability of women to suggest safe sex with their partners in Southern Africa and Western Africa. Sexual violence was not significant in Eastern Africa which was against what was expected. A possible explanation could be that since intimate partner violence is a more private issue in Eastern Africa than other regions and respondents were not willing to discuss it. There is the need for further study to be done on Eastern Africa analyzing the impact of sexual violence on risky sexual behavior.

Women culturally depend on their sexual partners for economic sustenance. Economic independence from their sexual partners should make it easier for women to negotiate safe sex. Women employment in Western and Eastern Africa, increased their risky behavior while women employed in Southern Africa decreased their risky behavior. Possibly, women in Western and Eastern Africa were not engaging in sex for money or gifts but rather for pleasure. It may also be that these women trust their partners more and were more willing to have unprotected sex with them. In Southern Africa, it may be that women who were employed practice safer sex because of the high prevalence of HIV/AIDS in the region and the risk of trusting anyone during sex. Women in Southern Africa may be are more careful and risk averse compared with those in Eastern and Western Africa. We also find that women in Southern Africa believe that a healthy person could be infected and therefore are more likely to use condoms.

Though knowledge of HIV/AIDS is high in all three regions, it is only in Southern Africa that this knowledge influences a change in behavior. Probably because the prevalence rate is so high, more people in Southern Africa might have seen an infected person and this informs their sexual decisions. Possibly, when people see or have a personal contact with an infected person, they become more careful. In Western Africa and Eastern Africa, since prevalence is lower, it is possible that most people have not even seen an infected person before so they still may not believe that it exists and therefore does not influence their risky sexual behavior decision. Some reports have shown that role models who are infected are better in bringing about a behavioral change.

Conclusions:

The aim of this study was to identify how culture contributes to difference in HIV/AIDS prevalent rate in sub-Sahara Africa. This study focused on two main HIV/AIDS prevention

factors, use of condoms and multiple sexual partners. Using data from the Demographic and Health Survey, we classified the countries into three regions based on HIV/AIDS prevalence rate, country location and the availability of data. We used a theoretical model to show that cultural norm could promote multiple sexual partners and also prevent people from using condoms. However in situations where the individual's choice is greater than the set cultural norm, then the cultural norm is able to reduce that choice to what is acceptable.

Results from the empirical analysis, showed women who were married, lived in rural areas, did not read the newspapers and women who were not educated were more influenced by culture and were less likely to use condoms or engage in more risky sexual behavior. Being employed in western Africa did not significantly affect the decision to use condoms. Women in Eastern Africa who were employed were less likely to use condoms and women in Southern Africa who were employed were more likely to use condoms. Knowing an infected person, keeping AIDS a secret, and practical knowledge on HIV/AIDS increased condom use in Southern Africa. We also considered risky sexual behavior which is a combination of having multiple sexual partners and not using condoms. The age at first intercourse was significant in all three regions. Age at first intercourse increased risky sexual behavior in Eastern Africa, but decreased risky sexual behavior in Southern and Western Africa.

Though cultural norms are common and similar in most parts of Africa, their influence on risky sexual behavior varies. It is important that policy makers, and researchers consider and understand these differences in order to design effective solutions to the various regions.

Further Studies:

The study will further analyze the marginal effects of the cultural norms on risky sexual behavior. Additionally, the study will consider the difference in the effect of cultural norms with respect to different sexually transmitted diseases. Furthermore, we will also have a policy brief discussing effect of cultural norms in disease spread in sub-Sahara Africa. The results presented are just preliminary and therefore we hope to do further analysis and discussion on the issue of cultural norms in sub-Sahara Africa.

Limitations of Study:

The study used a self-reported data set from the Demographic health Survey. As customary with self-reported data, there is the possibility of individual biases in answering some of the questions, particularly the ones related to sexual behaviors. Secondly, we used the most current data set that included the results for HIV/AIDS test. This varied in years with some countries such as Ghana having data as far as 2003 and other countries like Kenya with 2008 data set. The difference in time could also affect the results of the study. Thirdly the study combined the data set for different countries based on the assumption that they might have similar culture as a result of geography and approximately equal HIV prevalence rates. This may affect the results of the study.

Table 1: Condom Use in different Geographical Regions in Africa

	West	East	South
	(6959)	(8057)	(13220)
	All	All	All
	(14-49)	(14-49)	(14-49)
Age	0.01	-0.02	0.07**
	(0.05)	(0.06)	(0.02)
(Age*Age)	-0.001	0.0002	-0.001
	(-1.05)	(0.0009)	(0.0004)
Employment	-0.15	-0.36**	0.16**
	(0.13)	(0.133)	(0.05)
Education			
No education	-1.27***	-1.42***	-0.33*
	(0.34)	(0.36)	(0.18)
Primary	-0.39	-0.71**	-0.15
	(0.32)	(0.26)	(0.12)
Secondary	-0.15	-0.21	0.06
	(0.28)	(0.24)	(0.11)
Higher Education(Excluded)			
Marital Status			
Never married	0.20	0.50**	0.12
	(0.27)	(0.24)	(0.13)
Married	-1.6***	-2.29***	-1.68***
	(0.27)	(0.23)	(0.12)
Living together	-0.60**	-1.39***	-1.07***
	(0.29)	(0.28)	(0.17)
Widowed	0.84*	1.34***	0.21
	(0.49)	(0.33)	(0.16)
Divorced	-0.43	0.53	0.13
	(0.44)	(0.39)	(0.17)
Not living together(Excluded)			
Cultural Factors/AIDS			
Rural residence	-0.41**	-0.61***	-0.20***
	(0.13)	(0.15)	(0.06)
AIDS and witchcraftsy	-0.144	0.29	-0.04
	(0.13)	(0.29)	(0.10)
Know infected Person	0.13	-0.09	0.16**
	(0.12)	(0.16)	(0.06)
Keep AIDS a secret	0.14	0.05	0.13**
	(0.11)	(0.13)	(0.05)
Belief in Condoms	0.43***	0.69***	0.44***
	(0.16)	(0.20)	(0.08)
Healthy person can be infected	-0.05	0.08	0.21**
	(0.15)	(0.22)	(0.10)
Age of first sexual intercourse	0.03	-0.07**	0.009
	(0.02)	(0.02)	(0.01)
Smoker	0.57	1.22*	-0.30
	(0.49)	(0.65)	(0.31)
Genital discharge	-0.03	0.69**	0.15*
	(-0.14)	(0.27)	(0.09)
Sexual Violence	-0.48***	0.122	-0.22**
	(0.15)	(0.16)	(0.07)

Table 1 cont….: Condom Use in different Geographical Regions in Africa

	West (6959) All (14-49)	East (8057) All (14-49)	South (13220) All (14-49)
Media information			
No TV	-0.38**	-0.27	-0.26***
	(0.17)	(0.20)	(0.07)
Watch less than once a week	-0.34	0.39*	-0.17*
	(0.17)	(0.21)	(0.10)
Watch at least once a week	0.02	-0.07	-0.09
	(0.16)	(-0.24)	(0.11)
No Newspaper	-0.66**	-0.71**	-0.42***
	(0.32)	(0.30)	(0.10)
Read less than once a week	-0.24	-0.44	-0.23**
	(0.33)	(0.29)	(0.10)
Read at least once a week	-0.30	-0.55**	-0.11
	(0.32)	(0.29)	(0.10)
No Radio	-0.05	-0.55**	-0.12*
	(-0.21)	(0.23)	(0.07)
Listen less than once a week	0.08	-0.55**	-0.07
	(0.18)	(0.21)	(0.10)
Listen at least once a week	-0.13	-0.012	-0.09
	(0.14)	(-0.18)	(0.08)
Country variables			
Ghana	1.39***		
	(0.20)		
Guinea	1.86***		
	(0.22)		
Sierra Leone (excluded)			
Ethiopia		-0.86***	
		(0.21)	
Rwanda		-0.39*	
		(0.19)	
Kenya(excluded)			
Lesotho			0.45***
			(0.08)
Zambia			-0.72***
			(0.08)
Zimbabwe			-1.28***
			(0.08)
Swaziland(excluded)			
constant	-1.73*	1.88*	-1.03**
	(0.94)	(1.03)	(0.42)

Table 2: Risky Sexual Behavior in different Geographical Regions in Africa

	West (6959) All (14-49)	East (8057) All (14-49)	South (13220) All (14-49)
Age	.05	0.005	-0.04**
	(0.04)	(0.05)	(0.02)
	-0.001	-8.1e-05	0.0008**
Age*Age	(0.001)	(0.001)	(0.0003)
Employment	0.33***	0.43***	-0.09*
	(0.11)	(0.12)	(0.04)
Education			
No education	0.75**	0.85**	0.37**
	(0.30)	(2.69)	(0.16)
Primary	0.65**	0.61**	0.28**
	(0.31)	(2.33)	(0.12)
Secondary	.25	0.23	0.04
	(0.27)	(0.98)	(0.11)
Marital Status			
Never married	-0.06	-0.64**	-0.22*
	(0.27)	(0.24)	(0.13)
Married	0.90***	2.03***	1.27***
	(0.26)	(0.23)	(0.12)
Living together	0.628**	1.35***	0.92***
	(0.29)	(0.28)	(0.17)
Widowed	-0.26	-1.15***	-0.32**
	(0.50)	(0.33)	(0.16)
Divorced	0.53	0.25	-0.07
	(0.45)	(0.45)	(0.18)
Cultural Factors/AIDS			
Rural residence	0.12	0.43**	0.11**
	(0.10)	(0.14)	(0.06)
AIDS and witchcraftsy	0.10	-0.22	0.03
	(0.11)	(0.25)	(0.09)
Know infected Person	0.06	0.10	-0.06
	(0.11)	(0.15)	(0.05)
Keep AIDS a secret	-0.102	-0.05	-0.09*
	(0.09)	(0.12)	(0.05)
Belief in Condom use	-0.09	-0.48**	-0.31***
	(0.10)	(0.16)	(0.06)
Healthy person can be infected	0.08	0.06	-0.17**
	(0.10)	(0.17)	(0.08)
Age of first sexual intercourse	-0.04**	0.05**	-0.02**
	(0.02)	(0.02)	(0.01)
Smoker	0.04	-0.81	0.54*
	(0.31)	(0.68)	(0.30)
Genital discharge	0.28**	0.12	0.06
	(0.12)	(0.32)	(0.10)
Sexual violence	0.29**	-0.13	0.20**
	(0.10)	(0.14)	(0.06)

Table 2 cont…..: Risky Sexual Behavior in different Geographical Regions in Africa cont...

	West (6959) All (14-49)	East (8057) All (14-49)	South (13220) All (14-49)
Media information			
No TV	0.29*	0.12	0.20**
	(0.15)	(0.20)	(0.07)
Less than once a week	0.40**	-0.37*	0.22**
	(0.17)	(0.21)	(0.10)
At least once a week	-0.5	-0.03	0.12
	(-0.15)	(0.24)	(0.10)
No Newspaper	0.63**	0.82**	0.32**
	(0.31)	(0.29)	(0.09)
Read Less than once a week	0.34	0.45	0.19**
	(0.33)	(0.28)	(0.10)
Read at least once a week	0.43	0.48**	0.08
	(0.31)	(0.28)	(0.09)
No Radio	-0.04	0.48**	0.06
	(0.14)	(0.19)	(0.06)
Listen at less than once a week	-0.03	0.62***	0.05
	(0.14)	(0.19)	(0.08)
Listen at least once a week	0.03	0.09	0.06
	(0.11)	(0.17)	(0.07)
Country variables			
Ghana	-1.43***		
	(0.14)		
Guinea	-1.36***		
	(0.14)		
Sierra Leone(excluded)			
Ethiopia		0.44**	
		(0.19)	
Rwanda		0.23	
		(0.17)	
Kenya(excluded)			
Lesotho			0.012
			(0.08)
Zambia			0.66***
			(0.08)
Zimbabwe			1.05***
			(0.08)
Swaziland(excluded)			
Cut1	-1.24	0.79	-1.04
Cut2	5.8	10.41	4.92

Table 3: Condom Use by Adolescents (14-25 years) in different Geographical Regions

	West (2454)	East (2662)	South (5260)
Age	0.67*	-0.04	-0.09
	(0.38)	(0.49)	(0.20)
Experience(age*age)	-0.02*	-0.0002	0.002
	(0.01)	(0.01)	(0.005)
Employment	-0.02	-0.49**	0.21*
	(0.15)	(0.19)	(0.08)
Education			
No education	-1.62**	-1.39**	-0.71**
	(0.51)	(0.53)	(0.33)
Primary	-0.61	-1.06**	-0.37*
	(0.48)	(0.39)	(0.22)
Secondary	-0.28	-0.54	-0.22
	(0.43)	(0.36)	(0.20)
Higher (excluded)			
Marital Status			
Never married	13.5	-0.68	0.53**
	(616)	(0.46)	(0.23)
Married	11.7	-3.43***	-1.3***
	(616)	(0.46)	(0.23)
Living together	12.7	-2.67***	-0.38
	(616)	(0.54)	(0.28)
Divorced(excluded)			
Cultural Factors/AIDS			
Rural residence	-0.43**	-0.59***	-0.25**
	(0.17)	(0.21)	(0.09)
AIDS and witchcraftsy	-0.2	0.70**	-0.09
	(0.17)	(0.41)	(0.16)
Know infected Person	0.23	-0.19	0.11
	(0.16)	(0.22)	(0.08)
Keep AIDS a secret	0.23*	-0.21	0.07
	(0.14)	(0.19)	(0.08)
Belief in Condom use	0.52**	0.70**	0.36***
	(0.22)	(0.29)	(0.11)
Healthy person can be infected	-0.12	-0.15	0.14
	(0.18)	(0.29)	(0.14)
Age of first sexual intercourse	0.06*	-0.07**	0.03
	(0.04)	(0.04)	(0.02)
Smoker	0.78	0.63	-0.06
	(0.87)	(1.64)	(0.60)
Genital discharge	-0.08	0.89**	0.27*
	(0.18)	(0.45)	(0.14)
Sexual Violence	-0.31*	-0.13	-0.31**
	(0.18)	(0.25)	(0.11)

Table 3 cont…..: Condom Use by Adolescents (14-25 years) in different Geographical Regions Cont...

	West (2454)	East (2662)	South (5260)
Media information			
No TV	-0.49**	-0.31	-0.25**
	(0.22)	(0.28)	(0.11)
Watch less than once a week	-0.56**	0.47*	-0.23
	(0.22)	(0.29)	(0.16)
Watch At least once a week	0.04	0.13	-0.18
	(0.20)	(0.33)	(0.17)
No Newspaper	-0.39	-1.05**	-0.49***
	(0.43)	(0.44)	(0.14)
Read less than once a week	0.07	-0.45	-0.24
	(0.45)	(0.43)	(0.15)
Read at least once a week	0.04	-1.03**	-0.10
	(0.43)	(0.44)	(0.14)
No Radio	0.17	-0.68**	-0.18*
	(0.25)	(0.33)	(0.10)
Listen less than once a week	0.15	-0.82**	-0.13
	(0.23)	(0.31)	(0.14)
Listen at least once a week	-0.21	-0.36	-0.16
	(0.17)	(0.26)	(0.12)
Country variables			
Ghana	1.65***		
	(0.26)		
Guinea	2.09***		
	(0.27)		
Sierra Leone(excluded)			
Ethiopia		-1.16***	
		(0.29)	
Rwanda		-0.40	
		(0.28)	
Kenya(excluded)			
Lesotho			0.60***
			(0.12)
Zambia			-0.36***
			(0.12)
Zimbabwe			-1.20***
			(0.13)
Swaziland(excluded)			
constant	-22.4	4.61	0.43
	(616)	(4.98)	(2.07)

Table 4: Risky Behavior by Adolescents (14-25 years) in different Geographical Regions

Risky sex	West Young(2454)	East Young(2662)	South Young(5260)
Age	-0.46	-0.22	0.008
	(0.31)	(0.44)	(0.19)
Experience	0.01	0.006	-2.3e-0
(age*age)	(0.007)	(0.01)	(0.005)
Employment	0.15	0.54**	-0.11
	(0.13)	(0.17)	(0.08)
Education			
No education	0.93**	1.01**	0.78**
	(0.46)	(0.46)	(0.29)
Primary	0.84*	0.76**	0.48**
	(0.46)	(0.38)	(0.21)
Secondary	0.41	0.41	0.29
	(0.41)	(0.34)	(0.19)
Higher(excluded)			
Marital Status			
Never married	-0.14	-0.51	-0.73**
	(0.35)	(0.37)	(0.24)
Married	0.56	1.86***	0.71**
	(0.35)	(0.37)	(0.24)
Living together	0.31	1.55***	0.07
	(0.38)	(0.44)	(0.29)
Widowed	-0.14	-1.8**	-0.46
	(1.32)	(0.77)	(0.40)
Divorced(excluded)			
Cultural Factors/AIDS			
Rural residence	0.31**	0.40*	0.16*
	(0.14)	(0.20)	(0.09)
AIDS and witchcraftsy	0.17	-0.60*	0.09
	(0.14)	(0.35)	(0.14)
Know infected Person	-0.08	0.23	-0.043
	(0.14)	(0.21)	(0.08)
Keep AIDS a secret	-0.17	0.14	-0.05
	(0.12)	(0.17)	(0.07)
Belief in Condom use	-0.22	-0.39*	-0.28**
	(0.15)	(0.23)	(0.10)
Healthy person can be	0.04	0.17	-0.11
infected	(0.14)	(0.23)	(0.12)
Age of first sexual	-0.05*	0.05	-0.05**
intercourse	(0.03)	(0.03)	(0.02)
Smoker	-0.56	-0.74	0.31
	(0.52)	(1.59)	(0.61)
Genital discharge	0.35**	0.05	-0.08
	(0.15)	(0.52)	(0.13)
Sexual violence	0.14	0.04	0.23**
	(0.13)	(0.23)	(0.09)

Table 4 Cont…..: Risky Behavior by Adolescents (14-25 years) in different Geographical Regions

Risky sex	West Young(2662)	East Young(2454)	South Young(5260)
Media information			
No TV	0.51**	0.08	0.21**
	(0.19)	(0.27)	(0.10)
Less than once a week	0.70***	-0.45	0.26*
	(0.21)	(0.29)	(0.15)
At least once a week	0.07	-0.28	0.25
	(0.19)	(0.32)	(0.16)
No Newspaper	0.51	1.27**	0.36**
	(0.43)	(0.42)	(0.14)
Read Less than once a	0.31	0.73*	0.20
week	(0.45)	(0.41)	(0.14)
Read at least once a week	0.26	1.02**	0.06
	(0.44)	(0.42)	(0.13)
No Radio	-0.17	0.53*	0.09
	(0.19)	(0.28)	(0.09)
Listen at less than once a	0.70	0.81**	0.01
week	(0.19)	(0.26)	(0.12)
Listen at least once a week	0.13	0.51*	0.04
	(0.15)	(0.25)	(0.11)
Country variables			
Ghana	-1.42***		
	(0.19)		
Guinea	-1.44***		
	(0.19)		
Sierra Leone (excluded)			
Ethiopia		0.61**	
		(2.35)	
Rwanda		0.13	
		(0.5)	
Kenya(excluded)			
Lesotho			-0.26**
			(0.12)
Zambia			0.39***
			(0.12)
Zimbabwe			1.04***
			(0.12)
Swaziland(excluded)			
Cut1	-6.56	-0.14	-0.99
Cut2	-0.59	8.68	4.90

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