Sexual risk behavior: Factors associated with the number of sexual partners and consistent condom use among adolescents in four sub-Saharan African countries

Guiella Georges[1], LeGrand K. Thomas[2] and Bignami Simona[2]

[1]Institut Supérieur des Sciences de la Population (ISSP), Ouagadougou, Burkina Faso

[2]Université de Montréal, Montréal, Canada

Introduction

Despite some signs of stabilization in the global HIV/AIDS epidemic (UNAIDS, 2008; 2010), halting the spread of HIV remains a challenge for programs and policies worldwide. Sub-Saharan Africa is the region most heavily affected by HIV/AIDS, accounting for 68% of all people living with HIV and for 72% of AIDS deaths in 2009 (UNAIDS, 2008; 2010). Moreover, in this part of the world the epidemic among adolescents is the fastest growing. Among HIV infected adults, adolescents aged 15-24 accounted for 45% of new HIV infections in 2007, notwithstanding evidence that, in recent years, knowledge of the epidemic and prevention methods among this population has increased (UNAIDS, 2010). With no HIV/AIDS cure on the horizon at present, the global HIV epidemic will not be reversed in the near future unless adolescents adopt protective behaviours (Marston and King, 2006; Bankole et al., 2007; UNAIDS, 2008; 2010).

Multiple sexual partners and lack of condom use remain two of the most important risk factors of HIV spread among adolescents in sub-Saharan Africa (Shelton et al., 2004; Stoneburner and Low-Beer, 2004). In Namibia, it was shown that improvements across behavior indicators, including condom use among males and females aged 15–24 years, were associated with declines in HIV prevalence from more than 10% in 2007 to about 5% in 2009 (UNAIDS, 2010). In Zambia, HIV incidence declined by more than 25% between 2001 and 2009 mainly because of the increased age of sexual debut and abstinence among adolescents, as well as the decline in the number of young adults with multiple partners (UNAIDS, 2010). However, in sub-Saharan Africa a sizeable proportion of adolescents continue to have multiple partners, and condom use remains low. In a study on changes in HIV-related knowledge and behaviors in Sub-Saharan Africa, Mishra et al. (2009) showed that the proportion of adolescents who had more than two sex partners in last 12 months varied substantially across the 23 countries included in the study. Among adolescent girls aged 15-24, the percentage ranged from one percent or less in several countries, including Niger, Ethiopia, and Rwanda, to a high of 10 percent in Cameroon. Adolescent boys of the same age were substantially more likely to have had two or more sexual partners in previous 12 months, ranging from 4–5percent in Rwanda and Ethiopia to 41 percent in Cameroon.

There is a vast literature about the factors associated with adolescents' risky sexual behaviors. For instance, it has been shown that adolescents' growing independence from parents makes them more vulnerable to peer pressures about sexual initiation, especially at younger ages (Biddlecom et al., 2009). For boys, having sexual intercourse is perceived to be important in affirming masculinity and their transition from boyhood to manhood (Marston and King, 2006). On the other hand, parental monitoring (Biddlecom et al., 2009, Harrison et al., 2008) as well as religiosity and spiritual convictions (rather than membership of a given religion) have been identified as protective resources (Bozon, 1993 ; Sauvain-Dugerdil, 2008).

Having multiple sexual partners may also be seen as a matter of prestige, which can encourage adolescent males to pursue numerous sexual partners in order to express their virility (Juarez and LeGrand, 2005; Marston and King, 2006; Juarez et al., 2008), leading to overlapping partnerships (Mensch et al., 2006). In addition, adolescents often have multiple sequential partners because many of their relationships are of short duration (Santelli et al., 1998). For girls, the changing context of sexual initiation is suggested to lead to a greater likelihood of having multiple partners (Mensch et al., 2006).

A significant limitation of the existing literature about the determinants of multiple sexual partners and condom use among adolescents is, however, that these two outcomes have been analyzed separately, resulting in a lack of understanding of the joint factors that affect them. While it is important to know which adolescents are likely to have multiple sexual partners and which ones are also likely to use condoms, in terms of prevention it maybe more important to know which adolescents are likely to use condoms when they have multiple partners. As stated by UNAIDS (2:68), "for maximum effect [in halting HIV spread], all routes to reducing the risk of sexual exposure to HIV must be pursued simultaneously".

Using data from nationally-representative surveys of adolescents, this study examines the simultaneous effects of individual, socio-economic and contextual factors on multiple sexual partners and condom use among adolescent boys of 12-19 years old in four sub-Saharan African countries: Burkina Faso, Ghana, Malawi and Uganda. More specifically, we examine the extent to which individual characteristics as well as parental support are acting simultaneously as predictors of risky and protective behaviors. The study design, based on comparative approaches (across countries and within a country), enables identification of patterns and relationships, as well as significant differences either in adolescents' sexual behaviors or countries' prevention efforts. In addition, new information from different subregions of sub-Saharan Africa (East, West, and Southern) that shows different stages of HIV/AIDSis likely to increase understanding of adolescents' risk for HIV/AIDS, STDs and unintended pregnancy and how they manage the multiple risks they face in different contexts.

Data

Data come from national surveys of adolescents (NSA) fielded in Burkina Faso, Ghana, Malawi, and Uganda. The surveys were nationally representative and household-based. The sampling design entailed a first-stage systematic selection of census areas and a second stage selection of households within the selected census areas based on the sample frame and the same clusters used by the National Statistical Offices for the latest Demographic and Health Surveys.All eligible 12 to 19 years old and de facto residents in each sampled household were included in the survey. Consent from a parent or caretaker was required for minor adolescents (12-17 years old) before the adolescent was authorized to participate in the survey.

The NSA are modeled on the Demographic and Health Surveys (DHS), but have two particular features that make them appropriate for the purposes of the present analysis: first, they interviewed adolescents starting at 12 years of age (whereas the DHS only interviews respondents age 15 and above); and second, they included detailed questions on adolescents' characteristics and sexual behaviors. Sample size varies from 2017 boys and 1781 girls in Malawi to 2996 boys and 2534 girls in Burkina Faso. Only never married adolescents are included in the present analysis.

Methods of analysis

We use descriptive as well as multivariate analytical methods. The descriptive analysis begins by tabulating key measures of sexual behaviour for interviewed respondents during the 12 months preceding the survey, separately for boys and girls, for each country and by age.
We use multivariate regression analysis to determine the joint probability of having multiple sexual partners and using condom consistently. This latter part of the analysis focuses on male adolescents because of small sample sizes for multi-partnership and condom use for girls. Since multi-partnership and consistent condom use are correlated and thus the probabilities of occurrence of the two events are not independent, we use a bivariate probit model in the analysis (Green, 2005; 2008).

The first dependent variable of the bivariate probit model is "having had multiple sexual partners in the past 12 months". It has been coded 0 if an adolescent has had one sexual partner and 1 if he has had two and more. Therefore, those who have not had sexual intercourse in the last 12 months are excluded from the multivariate analysis. The second dependent variable is "having used condom consistently at last act of sexual intercourse with all sexual partners in the past 12 months". An adolescent who has had two sexual partners in the past 12 months and used condoms with only one of them is thus not a consistent condom user (coded 0).

Formally, the "multiple sexual partners" equation is the following:
$Y_1^* = \beta_1' * Educ + \delta_1 * Pc + \gamma_1 * CR + \omega_1 * Z + \varepsilon_1$, if $Y_1=1$, and 0 otherwise, where Educ, Pc, CR and Z represent respectively highest level of education, parental control, country of residence and a vector of other factors influencing multi-partnership while ε_1 is the disturbance term. As regards to the "condom use" equation it is expressed as follows:
$Y_2^* = \beta_2' * Educ + \delta_2 * Pc + \gamma_2 * CR + \omega_2 * Z + \varepsilon_2$, if $Y_2=1$, and 0 otherwise.

Derived mean probabilities can be estimated according to adolescent's sexual behavior in the last 12 months:
$p_{11} = \vartheta_2(x_1'\beta_1 + \gamma y_2, x_2'\beta_2, \rho)$
$p_{10} = \vartheta_2(x_1'\beta_1 - x_2'\beta_2, -\rho)$
$p_{01} = \vartheta_2[-(x_1'\beta_1 + \gamma y_2), \beta_2 x_2, -\rho]$
$p_{00} = \vartheta_2(-x_1'\beta_1, -x_2'\beta_2, \rho)$

where p_{11} is the probability that an adolescent who has had multiple partners in the last 12 months has also used condom systematically; p_{10} is the probability that he has had multiple partners but did not use condom systematically; p_{01} is the probability that he did not have multiple partners (that is, he had only one sexual partner) and has used condom systematically; and finally, p_{00} is the probability that he did not have multiple partners (he had only one sexual partner) but did not use condom. The ρ parameter measures the correlation that adolescent boys have had multiple partners in the last 12 months and have simultaneously used condom systematically. The estimated coefficients $\beta_1$and β_2 allow us to gauge direction and statistical significance of each variable's effects on the two dependent variables (Greene, 2005).

Results

The prevalence of multiple sexual partnerships during the 12 months preceding the survey among never married boys and girls is overall 16.6% and 7.7%, respectively. Ghana is the country where the prevalence of multi-partnership is highest among boys (25.3%) as well as for girls (8.8%). Among adolescents who had multiple partners in the previous 12 months, a quarter of boys (25.5%) and slightly more than 30 percent of girls (34.4%) used condoms at last intercourse. Consistent condom use is highest among boys in Ghana (30.8%) and among girls in Uganda (42.1%).

Older adolescent boys have both risky and protective behaviors

Findings from multivariate analysis show a co-occurrence of multiple sexual partners and consistent condom use among older adolescent boys (18-19 years) compared to younger adolescents (12-14 years). Indeed, the former group is significantly more likely to have multiple sexual partners (coefficient of 0.38 and $p<0.05$), but also more likely to use condoms consistently (coefficient of 1.02 and $p<0.001$) than the latter group. The probability of using condoms consistently with multiple sexual partners is about 5 times higher among older adolescents (5.3%) than among younger ones (1.2%).

Formal education is associated with protective behavior

Formal education is positively associated with protective sexual behaviors. Most educated adolescent boys are less likely to engage in behaviors that put them at risk for HIV. Results from gross effects as well as in the full model, show that adolescents with a secondary or higher level of education are more likely to use condoms consistently than adolescents with primary or no education. The probability of using condoms consistently in case of multi-partnership (P11) is higher among more educated adolescents (7.5%) than among their less educated counterparts. This tendency is confirmed by the other predicted probabilities: the probability of having multiple partners without consistent use of condoms (P10) is lower among adolescents with a secondary and higher level of education than among adolescents with primary level and adolescents without formal education. Furthermore, among adolescents who have had one partner in the last 12 months (P01), the probability of consistent condom use is 48% for those with a secondary and higher level of education compared to 29.1% for those with primary level and 18.5% for adolescents without formal education. Finally, among those who had only one partner in the last 12 months the probability of not using condom consistently (P00) is higher among adolescents without any education and among those with primary school level (64.6% and 55.9% respectively), as compared to adolescents with a secondary and higher level (35%).

Parental control is associated with protective behaviours

Adolescent boys who reported high parental control are significantly less likely to have multiple sexual partners (coefficient of -0.49 and $p<0.001$; -0.44 and $p<0.01$ respectively for gross effects model and full model). The probability of having multiple sexual partners without consistent condom use (P10) is twice as high among adolescents who reported a low level of parental control (15%) compared to those with a high level of parental control (7.7%). In addition, among those who have had one partner in the last 12 months (P01), the probability of consistent use of condom is higher among those with a high level of parental monitoring compared to those with medium and low level of parental control.

Table: Coefficients of probit models for multipartnership and consistent condom use in last 12 months among never married boys in the four countries (pooled data)

	Gross effects		Full model		Predicted probability (%)[1]			
	Multi-partnership	Consistent condom use	Mult-ipartnership	Consistent condom use	P11	P10	P01	P00
Age								
12-14 (Ref)	0	0	0	0	1.2	9.3	17.9	71.7
15-17	0.24	0.64***	0.22	0.41**	3.0	11.7	27.4	57.8
18-19	0.38*	1.02***	0.35*	0.72***	5.3	12.4	35.3	47.0
Education								
None (Ref)	0	0	0	0	2.3	14.6	18.5	64.6
Primary	-0.20	0.10	-0.08	0.39*	3.4	11.6	29.1	55.9
Secondary and higher	-0.07	0.97***	-0.001	1.05***	7.5	9.3	48.2	35.0
Religion								
Christian (Ref)	0	0	0	0	4.4	13.1	29.4	53.0
Muslim	-0.09	0.19*	-0.21	008	3.4	9.4	32.9	54.3
Traditionalist and other	0.32	-0.51*	0.04	0.08	5.1	13.4	31.4	50.1
Religious attendance								
More than once a week (Ref)	0	0	0	0	5.6	14.0	32.0	48.4
At least once a week	-0.21‡	-0.09	-0.25*	-0.08	3.4	10.3	31.5	54.8
Less than once a month	-0.03	-0.03	-0.16	-0.26‡	3.3	12.5	26.1	58.2
Parental control								
Low (Ref)	0	0	0	0	5.4	15.0	28.9	50.7
Medium	-0.05	0.08	-0.01	-0.07	4.9	15.2	27.3	52.6
High	-0.49***	0.15	-0.44**	0.08	2.8	7.7	33.9	55.6
Coresidence with biological parents or parent-figures								
None of parents (Ref)	0	0	0	0	3.9	11.1	31.1	53.8
Father only	0.02	0.11	-0.13	0.21	3.9	8.5	38.1	49.5
Mother only	0.08	-0.17	0.06	0.01	4.3	12.0	31.0	52.6
Lives with both parents	0.14	-0.19*	0.10	-0.07	4.3	13.2	28.5	54.0
HIV prevalence in the region of residence								
Less than 2% (Ref)	0	0	0	0	2.2	14.8	16.9	66.2
2-4%	0.16	0.18	0.14	0.49**	5.0	15.7	27.0	52.4
4-8%	-0.16	0.23*	-0.10	0.87***	5.0	9.7	38.9	46.4
More than 8%	-0.32*	0.37**	-0.25	1.08***	4.7	7.0	46.3	42.0
Household wealth quintile								
Poorest (Ref)	0	0	0	0	5.0	14.9	26.9	53.1
Second	-0.14	0.30*	-0.15	0.12	4.5	11.6	31.2	52.7
Middle	-0.22	0.22	-0.21	0.09	4.0	10.8	30.8	54.4
Fourth	-0.04	0.35*	-0.12	0.06	4.5	12.5	29.4	53.6
Wealthiest	-0.32‡	0.97***	-0.38‡	0.18	3.3	8.1	34.3	54.3
Place of residence								
Rural (Ref)	0	0	0	0	3.6	11.5	30.3	54.6
Urban	0.03	0.66***	0.16	0.10	5.2	13.6	32.1	49.1
Country of residence								
Burkina Faso (Ref)	0	0	0	0	7.4	8.1	51.5	32.9
Ghana	0.23	-0.15	0.02	-0.83***	3.7	12.4	29.1	54.7
Malawi	-0.19	-0.37**	0.04	-1.32***	2.1	14.5	17.7	65.8
Uganda	-14,0	-0.09	0.01	-1.00***	3.0	12.7	25.0	59.3
rho			-0.203**					

Significant at: ‡ p<0.1; * p<0.05; ** p<0.01; *** p<0.001.

Note: All figures were calculated using the appropriate country survey weights, or pooled weights for all countries to adjust for the surveys' complex sample design.

[1]Predicted probability:

P11=Probability that an adolescent who had multiple partners in the last 12 months has also used condom consistently;

P10=Probability that he had multiple partners but did not use condom consistently

P01=Probability that he did not have multiple partners (he had only one sexual partner) and has used condom consistently

P00=Probability that he did not have multiple partners (he had only one sexual partner) but did not use condom consistently