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Multiple Sexual Partnerships among Female Adolescents in Rural Uganda: The effects of family structure and school attendance

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Abstract

Background—A better understanding is needed of the contextual factors that influence HIV risk behaviors among female adolescents in sub-Saharan Africa. The objectives of this study were to assess the influence of family structure on lifetime sexual partners and on the number of sexual partners in the last year among female adolescents in rural Rakai, Uganda; and to determine if the influence of family structure on these outcomes differed by adolescents' school attendance status.

Methods—The sample consisted of 2,337 unmarried adolescent girls, aged 15-19, enrolled in the Rakai Community Cohort Study. The last survey interview within the time period 2001-2008 available for each girl was used. Analyses were stratified by age (15-17 year olds and 18-19 year olds) and school status. Multinomial logistic regression was used.

Results—Living in a household with a biological father was protective against both outcomes. Family structure was not associated with the outcomes among in-school adolescents but was significantly associated with outcomes among out-of-school adolescents.

Conclusions—Findings suggest that understanding the familial context in which female adolescents develop, as well as its interaction with school attendance, is important for HIV prevention efforts. Both research and programmatic initiatives must consider the interplay between the family and school domains when considering ways to reduce HIV acquisition among adolescent women.

Keywords

sexual partners; family structure; school attendance

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INTRODUCTION

Prevention of HIV in adolescents and young adults is critical to the control of the pandemic overall, as approximately 45% of the people who become HIV infected each year are aged 15-24 (1,2). Young women in sub-Saharan Africa account for 76% of HIV-infected youth in the region, with most acquisitions occurring through heterosexual intercourse (1-3).

Having multiple sexual partners is one of the important behavioral HIV risk factors (4,5). A systematic review of 68 African epidemiological studies from 1987 to 2006 found a clear relationship between number of lifetime sex partners and HIV infection (95% CI: 2.52–3.71) (5). A 2003 study of South African youth reported similar findings in younger age groups, aged 15-24; increasing lifetime number of sexual partners was significantly associated with HIV infection among both men and women (6,7). Moreover, there is an increase likelihood of dissemination of HIV in populations with dense sexual networks, such as where multiple and concurrent partnerships are common (4,8).

In order to lower the risk of HIV by reducing the number of sexual partners, a better understanding of the factors which affect young women's risk behaviors is needed (1). According to Bronfenbrenner's ecological system theory which provides a multisystem perspective for understanding how social and contextual factors influence adolescent development and behaviors, the adolescent's immediate environment generally has the most direct effect, as it is the context closest to the individual (9,11). Within this system, the family and the school can have significant influences on development and behaviors. However, the interaction between these two environments and the subsequent influences on HIV risk behaviors has received little attention in sub-Saharan Africa.

The role of the family in adolescents' risk of HIV

The family can play a critical role in adolescent's sexual behaviors through the provision of direct emotional, social and economic support as well as by providing positive or negative role models (12-15). Family structure in itself can affect the availability of support, supervision, and behavioral control, which can influence adolescent sexual behavioral outcomes.

Research conducted in the United States has shown that living in a family with both biological parents is associated with reduced sexual risk behaviors and HIV-related outcomes potentially as a result of greater supervision and monitoring compared to other family structure types (12-18). Moreover, the degree to which household adults provide support, supervision and control of adolescent behaviors depends on their relationship to the adolescent (13). In sub-Saharan Africa, adolescents face a substantial risk that one or both parents may have died of HIV, resulting in disruption in family structure and potentially the loss of emotional and economic support (13,15,19). However, there is limited information on the effect of growing up in different family structures on adolescent sexual risk behaviors in sub-Saharan Africa (20-22).

The role of school attendance in adolescents' risk of HIV

School attendance has been reported as playing an important role in reducing adolescents' risk of HIV (23-28) and is associated with smaller sexual networks, fewer sexual partners, less engagement in unprotected sex, and lower frequency of intercourse (25,27,29). For example, a study assessing the association between school attendance and risk of HIV infection in a rural South African population sample of unmarried persons aged 14-25, reported that women who were students were less likely to engage in sexual intercourse with partners more than 3 years older than themselves, and less likely to have had unprotected intercourse during the past year (25,27,29).

School attendance has also been shown to be protective against other HIV-related outcomes; reducing pregnancy and early marriage among adolescents (24,30). A 2007 randomized controlled trial in rural Zimbabwe tested whether comprehensive support to keep orphan adolescent girls in school (e.g. school fees, uniforms) could reduce HIV risk; after two years those in the intervention arm were less likely to drop out of school or get married, and were more likely to have concerns about the consequences of sex (24).

Study Objectives

Better understanding of the family's role in young women's sexual risk behaviors as well as the associations between the familial and school influences may highlight new avenues of intervention and HIV prevention. The objectives of the study are: 1) to assess associations between family structure and lifetime sexual partners and multiple sexual partners in the last year among female adolescents; and 2) to determine if the influence of family structure on lifetime and multiple sexual partners among female adolescents differs by adolescents' school attendance status. These associations were assessed separately for younger and older adolescents upon taking into consideration biological development and societal definition (31,32). Developmentally the age range 15-19 encompasses two distinct periods, middle (15-17) and late (18-19) adolescence, marked by distinct sexual and varying cognitive development. Cognitive development is more advanced and sexual maturation is typically complete in late adolescence relative to middle adolescence (31,32). Legally in Uganda, a young woman in late adolescence is an adult, which has different societal implications than a young woman who is considered a minor.

METHODS

Study Setting

The study setting is rural Rakai District, southwestern Uganda, where the first AIDS cases in East Africa were identified (33,34). HIV incidence from 1999-2008 was greater among young women aged 15-24 than young men (14.1 vs. 8.3 per 1000 person-years, respectively) (35, 36, 37,38).

This study utilized data from the ongoing Rakai Community Cohort Study (RCCS), a longitudinal, open, population-based surveillance cohort. The study setting and procedures has been described in detail elsewhere (39,40). Briefly, since 1994, the Rakai Health Sciences Program (RHSP) has enrolled and followed all consenting adolescents and adults,

aged 15-49, in 50 rural communities in rural Rakai District, Uganda. This open cohort consists of approximately14,500 people who are surveyed annually using a standardized questionnaire administered by trained same-sex interviewers. Newly age eligible individuals are enrolled at each follow-up study round. More than 90% of all residents present in the village at the time of the annual survey have participated in any given survey round. The RCCS and all nested studies have been approved by human subjects review boards in Uganda and the United States.

Study Population

The population for this analysis consisted of unmarried adolescent girls, aged 15-19, who were permanent residents of the 50 RCCS communities in any year between 2001 and 2008. Respondents who enrolled prior to 2001 but participated in the RCCS between 2001 and 2008 were included. The analytic sample consisted of 2,337 girls, ages 15-19. For these analyses, we used the last survey interview within the time period available for each girl, allowing for the potential accumulation of sexual partners.

Measures

Number of lifetime sexual partners—Adolescents self-reported their number of lifetime sexual partners in response to the following question: “How many different sexual partners have you had in your lifetime including married or consensual partners?” Responses ranged from zero to 15 sexual partners. Because only 11% of the sample had 3 or more sexual partners in their lifetime, we created a trichotomous variable for the outcome: zero partners, 1 partner, and 2 or more partners.

Number of sexual partners is the last year—The number of sexual partners was determined by asking “How many different sexual partners have you had in the last 12 months, including married or consensual partners and any other partners?” Since only 5.7% of the sample reported having two or more sexual partners in the prior year, a dichotomous variable for sexual partners in the last year was created: no partners and one or more partners.

Household family structure—Prior to each RCCS survey round, the Rakai program conducts a census of each dwelling in the RCCS villages, enumerates the residents of every household, and collects information on relationship to the head of the household, whether each member’s parent(s) resided in the household and if they did not, whether they were alive or deceased. This information was used to define the family level characteristics within the household. Household family structure was defined hierarchically and ten categories were identified for this unmarried sample. First, residence with a parent was ascertained and an adolescent’s structure was defined as living with either (1) two biological parents, (2) biologic father, step mother, (3) biologic mother, step father, or (4) single mother or (5) single father. Second, the structure of those whose parents did not reside in the household was defined based on their relationship to the head of household: (6) grandparent, (7) sibling, (8) other relatives and (9) non-relatives. Third, the final structure was adolescent girls who lived alone or were the head of the household; approximately 26% of the girls in this category lived alone.

Due to similarity in the distribution of the number of sexual partners across household family structure containing a biological father, we combined these three categories into one. We conducted sensitivity analyses to ensure this did not alter the results of the adjusted models.

Because we are using household family structure at the last survey round to assess its association with lifetime number of sexual partners and number of sexual partners is the last year, we assessed whether the adolescent present household family structure is representative of the past 12 months or earlier years. Of female adolescents followed for at least three rounds, approximately 95% did not change household family structures within this period, suggesting stability of household family structure over periods of at least 3-5 years.

Other family characteristics—We constructed a wealth index as a proxy for economic status, based on household amenities and construction materials (41). Principle component analysis was used to create an asset score with a mean of 0 and standard deviation of 1 (42). The scores for the entire RCCS population were divided into quintiles to form household wealth: lowest, low, middle, high and highest. Household size was determined by the number of individuals reported living in a particular household at the time of the census. The census also indicates whether the household is polygamous (i.e. the male household head has multiple wives).

Control variables—At the individual level, we controlled for the adolescent's age, occupation (agricultural, housework, student, other [e.g. shopkeeper]), alcohol use in the prior 30 days (yes/no), and religion (Catholic, Protestant, Muslim, other [e.g. Pentecostal, non-religious]).

Statistical Analyses

Age Stratification—We stratified our analyses by age (15-17 year olds and 18-19 year olds), taking into consideration biological development and societal definition (31,32).

Descriptive analyses—Descriptive statistics, frequencies and means, were used to describe the adolescents' individual and family level characteristics. Differences of individual and family level characteristics by age were evaluated using Pearson chi-square and adjusted Wald tests for categorical and continuous variables, respectively.

Family Structure Effects—Multinomial logistic regression was used to assess the relationship between household family structure and lifetime number of sexual partners. Adjusted models controlled for adolescents' individual and other family level characteristics. We compared adolescent girls who reported no lifetime sexual partners, to those who reported 1 sexual partner and 2 or more sexual partners, respectively. We also compared those reporting 1 partner to those reporting 2 or more sexual partners (results not shown). Poisson regression with robust error variance was used to assess the relationship between family structure and having a sexual partner in the last year. Robust error variances were used for the possibility of violation of the distributional assumption that the variance equals the mean in Poisson regression (43).

Intersection of Family Structure and School Attendance—To determine associations between family structure and numbers of sexual partners in relation to school attendance, we conducted stratified analysis based on student status. We carried out analyses with both age groups and school stratification as well as stratification by school attendance alone. The effects of school were similar, irrespective of age, and therefore we present the results where stratification was done by school attendance alone. Multinomial logistic regression and Poisson regression with robust error variance was used to assess the association for lifetime partners and partner in the last year, respectively.

Clustering Effects—Because data were collected within community based clusters, we used the Taylor linearization method and the clustered sandwich estimator to account for potential cluster effects and to produce the appropriate standard error estimates (44,45). Relative risk ratios (RRR) and 95% confidence intervals (CI) were obtained. All analyses were done using STATA.SE, version 11.1 (StataCorp LP, College Station, Texas, USA).

RESULTS

Population characteristics

Adolescent girls' individual and family level characteristics, stratified by age, are presented in Table 1. Younger and older adolescent girls' significantly differed on number of sexual partners in their lifetime, number of partners in the last 12 months, occupation, alcohol use, family structure, wealth and family size. In their lifetime, 26.8% of older adolescent girls did not have any sexual partners, 32.7% had one sexual partner and 40.5% had two or more sexual partners; 56.3% of younger adolescent girls did not have any sexual partners in their lifetime, 24.4% had one sexual partner and 19.3% had two or more partners. Younger adolescents were more likely to be students and less likely to use alcohol than older adolescents.

At the family level, older adolescents were more likely to live alone or to be household heads than younger adolescents. Older adolescents lived in wealthier and smaller size households than younger adolescents.

Younger Adolescents (age 15-17)

Lifetime number of sexual partners—Table 2 presents the results from the adjusted multinomial logistic regression analyses comparing those reporting zero partners in their lifetime to those reporting one partner and two or more partners in their lifetime, stratified by the adolescent age.

At the individual level, increasing age was associated with a higher risk of having any lifetime sexual partners. Being a student was associated with reduced risk of having any lifetime sexual partners.

Compared to adolescent girls aged 15-17 living with a biological father, adolescents living in stepfather households had a significantly higher risk of reporting one lifetime partner (aRR = 2.56, 95% CI: 1.29 - 5.07). The risk of having two or more partners as compared to zero partners was significantly higher for girls living in a range of household structures:

stepfather (aRR =3.53, 95% CI: 1.28 - 9.73), grandparent (aRR =2.00; 95% CI: 1.22 - 3.30), sibling (aRR=4.05; 95% CI: 1.75 - 9.39), and non-relative households (aRR=3.08; 95% CI: 1.37 - 6.92).

Sexual partners in the last year—Table 3 presents the results for those reporting zero sexual partners in the last year to those reporting one or more, stratified by the adolescent age.

Compared to girls living with biological fathers, those living in other household family structure had increased risk of having one or more sexual partners in the previous year, with the exception of girls living with single mothers, whose risk was not increased.

Older Adolescents (age 18-19)

Lifetime number of sexual partners—Age, occupation and alcohol use were significantly associated with number of lifetime sexual partners among older adolescents (Table 2).

The risk of having one lifetime partner partners was higher for adolescent girls living with other relatives (aRR = 2.18; 95% CI: 1.09 - 4.40), compared to girls living with biological fathers. Girls living with single mothers (aRR =1.62, 95% CI: 1.05 – 2.35), grandparents (aRR =2.19, 95% CI: 1.24 – 3.86), or alone [aRR =3.65, 95% CI: 1.27 – 10.44) were significantly more likely to report two or more lifetime partners compared to adolescents living with a biological father.

Sexual partners in the last year—Compared to girls living with their biological fathers, those living with single mothers, siblings, other relatives or alone were significantly more likely to have one or more sexual partners in the previous year (table 3). The risk was marginally significantly higher for those living in households headed by grandparents and non-relatives.

Intersection of Family Structure and School Enrollment

Family structure was not significantly associated with the number of lifetime sexual partners (table 4) or number of sexual partners in the last year (results not shown) among adolescent girls who reported being a student at their last visit. However, family structure was more strongly associated with risk of having one or more lifetime sexual partners among girls out of school (Table 4). Among non-attendees, girls living with stepfathers (aRR=2.98, 95% CI: 1.63 - 5.45), Grandparents (aRR=5.54, 95% CI: 1.07 - 28.67) and other relatives (aRR=2.16, 95% CI:1.31 - 3.56) had significantly higher risk of having one lifetime sexual partner compared to girls living with biological parents. Similarly, risks of having two or more lifetime partners were higher among school non-attendees living in almost all family structures which did not include a biological father.

DISCUSSION

Study results indicate that household family structure is significantly associated with differences in adolescent girls' number of lifetime sexual partners and in reported sexual

partners in the past 12 months after controlling for individual-level and other family factors such as family size and wealth. We found distinct differences in the family structures that influence younger and older female adolescents' risk of having multiple partners that warrant further investigation into family processes and dynamics in different age groups. We also found that the influence of the family structure appears to differ by school attendance but this intersection of the school and family requires future research to understand the pathways of influence.

Living with a biological father, irrespective of his marital status, was protective against having multiple sexual partners for both younger and older adolescent girls. Several reasons may explain the importance of the fathers. In patrilineal societies like the predominantly Buganda culture of Rakai, fathers serve as the authoritative figure in the household, and have been reported in prior research to have strict values in regards to their daughters' sexual behaviors (46-49). Father-headed homes may also provide more supervision as well as protection from sexual advances and exploitation (50,51). Another possibility is that girls who become pregnant may be put out of their father's home; instances of fathers "washing their hands" of such girls have been reported in the literature (52). Our findings might partly be an artifact of this phenomenon. Nonetheless, our study suggests the importance of fathers in the discourse of young women's sexuality and sexual risk for HIV.

Living in stepfather and sibling-headed households was associated with higher risk of sexual activity in younger adolescent girls but not older adolescent girls. Potentially, children with stepfathers receive fewer parental investments (including attention and support) and younger adolescent girls maybe more dependent on such investments than older girls (53). Adolescent girls in stepfather families have been reported to be more likely to disengage from the family and to seek support from others outside of the home (54). It is also possible that the presence of a stepfather exposes an adolescent girl to a potentially exploitive sexual network which may include his relatives or friends. In one qualitative study, young women noted that girls who grew up in stepfather households are more likely to experience sexually abuse, often committed by their stepfathers (55). Younger adolescent girls maybe more vulnerable to such exploitive situations because older adolescents tend to have greater autonomy and spend more time out of the home (56).

Studies have shown that siblings can be very influential in adolescents' sexual behaviors by serving as role models (20,46,57-62). Living with a single mother represented a higher risk situation for older adolescent girls but not younger girls. It has been posited that by witnessing the relationships of their caregivers, adolescents learn to interact in their own relationships (13-15). For example, a young woman who lives with a mother who has several sexual partners may view this as normative and engage in similar behaviors. As a further explanation of this finding, colleagues from Rakai have noted that single mothers might encourage their older daughters, especially if they are not in school, to seek husbands in order to have financial stability while younger adolescent girls are protected or advised against sexual relationships, especially if they are in school (Gertrude Nakigozi (RHSP Director of Clinical Services) in discussion with author, June 2013).

The finding that family structure was not associated with risk of sexual activity among in-school adolescents but was significantly associated with risk among out-of-school adolescents is novel. As noted previously, studies have shown that school attendance is associated with lower risk behavior (23-28). However, school attendance requires a support system (e.g. emotional support, school fee) that would ensure continued school participation (19). It is possible that girls who are in school reside in families who are more supportive and therefore, play a protective role against risky sexual behaviors. More research is needed to understand the risk and protective pathways underlying this finding.

This study has a number of limitations. The findings may not be generalizable to urban settings. Though family structure is an important factor affecting girls' risk behaviors, it does not address actual family processes, such as parenting practices. In addition, self-reported data may contain biases (e.g. social desirability) which could lead to inaccurate reporting of the number of sexual partners. We did not control for other sexual behaviors such as condom use because a large proportion of the sample did not have a lifetime sexual partner and thus, would have no need to use a condom.

The family must be a part of programs and interventions targeted at preventing and reducing the adoption of sexual risk behaviors of young women. However, further research is needed on the dynamics and processes underlying sexual risk behaviors among adolescent girls within each type of structure. Our findings lend support to advocacy initiatives that call for access to education for adolescent girls. However, both research and programmatic initiatives must consider the interplay between the family and school domains when considering ways to reduce HIV acquisition among adolescent women.

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Table 1

Description of adolescent girls

	15-17 Year Olds (n=1,347)	18-19 Year Olds (n=990)	Total (n=2,337)
	N (%)	N (%)	N (%)
Sexual Behavior			
No. of Lifetime Partners			
0	758 (56.3)	265 (26.8)	1023 (43.8)
1	329 (24.4)	324 (32.7)	653 (27.9)
2	157 (11.7)	237 (23.9)	394 (16.9)
3+	103 (7.6)	164 (16.6)	267 (11.4)
No. of Partner in Last 12 Months			
0	877 (65.1)	378 (38.2)	1255 (53.7)
1	405 (30.1)	543 (54.8)	948 (40.6)
2+	65 (4.8)	69 (7.0)	134 (5.7)
Adolescent Characteristics			
Age (yrs)			
15	390 (29.0)	-	390 (16.7)
16	477 (35.4)	-	477 (20.4)
17	480 (35.6)	-	480 (20.5)
18	-	518 (52.3)	518 (22.2)
19	-	472 (47.7)	472 (20.2)
Occupation			
Agricultural	262 (19.5)	349 (35.3)	611 (26.1)
Housework	120 (8.9)	128 (12.9)	248 (10.6)
Student	945 (70.4)	461 (46.6)	1406 (60.2)
Other	20 (1.5)	52 (5.3)	72 (3.1)
Religion			
Catholic	751 (55.8)	570 (57.6)	1321 (56.5)
Protestant	261 (19.4)	217 (21.9)	478 (20.5)
Muslim	248 (18.4)	155 (15.7)	403 (17.2)
Other	87 (6.5)	48 (4.8)	135 (5.8)
Alcohol Use			
No	1259 (93.5)	871 (88.0)	2130 (91.1)
Yes	88 (6.5)	119 (12.0)	207 (8.9)
Family Characteristics			
Family Structure			
Biological father	589 (43.7)	381 (38.5)	970 (41.5)
Single Mother	229 (17)	206 (20.8)	435 (18.6)
Stepfather/bio mother	43 (3.2)	30 (3.0)	73 (3.1)

	15-17 Year Olds (n=1,347)	18-19 Year Olds (n=990)	Total (n=2,337)
	N (%)	N (%)	N (%)
Grandparent	200 (14.8)	125 (12.6)	325 (13.9)
Sibling	38 (2.8)	34 (3.4)	72 (3.1)
Other relatives	196 (14.6)	120 (12.1)	316 (13.5)
Non-relatives	40 (3.0)	36 (3.6)	76 (3.3)
Alone	12 (0.9)	58 (5.9)	70 (3.0)
Wealth			
Lowest	227 (16.9)	147 (14.8)	374 (16)
Low	262 (19.5)	196 (19.8)	458 (19.6)
Middle	303 (22.5)	194 (19.6)	497 (21.3)
High	242 (18.0)	165 (16.7)	407 (17.4)
Highest	313 (23.2)	288 (29.1)	601 (25.7)
Polygamous Household			
No	1134 (84.2)	818 (82.6)	1952 (83.5)
Yes	213 (15.8)	172 (17.4)	385 (16.5)
Family Size [mean (sd)]	7.23 (2.7)	6.95 (2.9)	7.1 (2.8)

Table 2

Adjusted relative risk for household family structure association with one and two or more lifetime sexual partners relative to zero sexual partners stratified by adolescent girls' age.

	15-17 Year Olds (n=1,347)		18-19 Year Olds (n=990)	
	1 Partner,[a] AdjRR (95% CI)	2+ Partners,[a] AdjRR RR (95% CI)	1 Partner,[a] AdjRR RR (95% CI)	2+ Partners,[a] AdjRR RR (95% CI)
Adolescent Characteristics				
Age (y)	1.58*** (1.31 - 1.89)	1.85*** (1.55 - 2.21)	1.41* (1.02 - 1.94)	1.62** (1.17 - 2.22)
Occupation				
Agricultural	1.00	1.00	1.00	1.00
Housework	0.89 (0.55 - 1.44)	1.55 (0.91 - 2.64)	0.76 (0.38 - 1.54)	1.05 (0.57 - 1.96)
Student	0.47*** (0.33 - 0.65)	0.27*** (0.19 - 0.40)	0.75 (0.48 - 1.19)	0.38*** (0.25 - 0.56)
Other	0.81 (0.27 - 2.41)	1.40 (0.61 - 3.22)	3.19 (0.94 – 10.75)	2.66 (0.95 – 7.46)
Religion				
Catholic	1.00	1.00	1.00	1.00
Protestant	0.84 (0.56 - 1.25)	0.79 (0.45 - 1.41)	0.89 (0.61 - 1.30)	0.89 (0.57 - 1.41)
Muslim	1.20 (0.83 - 1.73)	1.00 (0.63 - 1.56)	1.07 (0.67 - 1.72)	1.24 (0.71 - 2.19)
Other	0.80 (0.46 - 1.40)	0.56 (0.23 - 1.37)	0.31*** (0.17 - 0.56)	0.24** (0.09 - 0.59)
Alcohol Use				
No	1.00	1.00	1.00	1.00
Yes	0.47 (0.22 - 1.01)	0.93 (0.49 - 1.78)	1.40* (1.02 - 1.94)	2.55** (1.39 - 4.66)
Family Characteristics				
Family Structure				
Biological father	1.00	1.00	1.00	1.00
Single Mother	1.02 (0.63 - 1.64)	1.32 (0.80 - 2.18)	1.21 (0.74 - 1.95)	1.62* (1.05 - 2.35)
Stepfather/bio mother	2.56** (1.29 - 5.07)	3.53* (1.28 - 9.73)	1.05 (0.36 – 3.01)	1.45 (0.68 - 3.88)
Grandparent	1.51 (0.98 - 2.31)	2.00** (1.22 - 3.30)	1.51 (0.91 – 2.51)	2.19** (1.24 - 3.86)
Sibling	1.44 (0.57 - 3.60)	4.05** (1.75 - 9.39)	1.56 (0.62 - 3.95)	1.49 (0.59 - 3.78)
Other relatives	1.34 (0.94 - 1.90)	1.18 (0.74 - 1.92)	2.18* (1.09 - 4.40)	1.96 (0.99 - 3.88)
Non-relatives	1.42 (0.52 - 3.89)	3.08** (1.37 - 6.92)	2.35 (0.73 - 7.71)	2.34 (0.82 - 6.71)
Alone	1.83 (0.27 - 12.40)	3.02 (0.50 – 18.12)	0.62 (0.36 - 2.29)	3.65* (1.27 - 10.44)
Wealth				
Lowest	1.00	1.00	1.00	1.00
Low	0.89 (0.52 - 1.52)	0.83 (0.51 - 1.36)	0.76 (0.36 - 1.60)	0.79 (0.36 - 1.71)
Middle	1.07 (0.66 - 1.73)	1.49 (0.94 - 2.35)	0.67 (0.33 - 1.35)	0.72 (0.34 - 1.53)
High	1.40 (0.82 - 2.41)	1.06 (0.60 - 1.85)	0.73 (0.34 - 1.56)	0.73 (0.36 - 1.49)
Highest	1.22 (0.75 - 1.98)	0.98 (0.53 - 1.78)	0.79 (0.40 - 1.57)	0.60 (0.30 - 1.21)
Polygamous Household				
No	1.00	1.00	1.00	1.00

	15-17 Year Olds (n=1,347)		18-19 Year Olds (n=990)	
	1 Partner,[a] AdjRR (95% CI)	**2+ Partners,[a] AdjRR RR (95% CI)**	**1 Partner,[a] AdjRR RR (95% CI)**	**2+ Partners,[a] AdjRR RR (95% CI)**
Yes	1.11 (0.72 - 1.72)	0.67* (0.49 - 0.93)	1.14 (0.68 - 1.94)	1.02 (0.65 - 1.60)
Family size	1.00 (0.95 - 1.06)	0.99 (0.92 - 1.08)	0.98 (0.91 - 1.05)	0.99 (0.92 - 1.07)

NOTE: RRs are adjusted for all other variables in table.

[a] Zero sexual partners is the base outcome category

*** p<0.001,

** p<0.01,

* p<0.05

Table 3

Unadjusted and adjusted relative risks for at least one sexual partner in the last year relative to zero sexual partners among adolescent girls

	15-17 Years Olds (n=1,347)		18-19 Year Olds (n=990)	
	UnadjRR (95% CI)	**AdjRR (95% CI)**	**UnadjRR (95% CI)**	**AdjRR (95% CI)**
Individual Characteristics				
Age (yrs)	1.40*** (1.27 - 1.55)	1.32*** (1.21 - 1.45)	1.12* (1.02 - 1.23)	1.07 (0.97 - 1.17)
Occupation				
Agricultural	1.00	1.00	1.00	1.00
Housework	1.01 (0.86 - 1.18)	1.05 (0.89- 1.24)	1.02 (0.89 - 1.16)	1.00 (0.88 - 1.17)
Student	0.50*** (0.43 - 0.58)	0.56*** (0.49 - 0.65)	0.80** (0.70 - 0.93)	0.83* (0.71 - 0.98)
Other	0.98 (0.64 - 1.52)	0.92 (0.61 - 1.39)	1.21* (1.01 - 1.45)	1.13 (0.84 - 1.37)
Religion				
Catholic	1.00	1.00	1.00	1.00
Protestant	0.86 (0.69 - 1.07)	0.91 (0.72 - 1.15)	0.89 (0.79 - 1.00)	0.91 (0.81 - 1.03)
Muslim	0.97 (0.79 - 1.19)	1.04 (0.84 - 1.29)	0.91 (0.80 - 1.05)	0.96 (0.84 - 1.10)
Other	0.78 (0.56 - 1.10)	0.81 (0.59 - 1.12)	0.57** (0.41 - 0.80)	0.57** (0.41 - 0.80)
Alcohol Use				
No	1.00	1.00	1.00	1.00
Yes	1.12 (0.83 - 1.50)	0.95 (0.73 - 1.24)	1.28*** (1.13 - 1.44)	1.21** (1.07 - 1.36)
Family Characteristics				
Family Structure				
Biological father	1.00	1.00	1.00	1.00
Single Mother	1.21 (0.94 - 1.56)	1.19 (0.91 - 1.55)	1.14* (1.01 - 1.28)	1.15* (1.01 - 1.30)
Stepfather/bio mother	1.44*** (1.19 - 1.74)	1.64** (1.16 - 2.32)	1.22** (1.06 - 1.40)	0.92 (0.66 - 1.28)
Grandparent	1.90*** (1.39 - 2.60)	1.38** (1.13 - 1.68)	0.98 (0.70 - 1.37)	1.16 (0.99 - 1.35)
Sibling	1.68** (1.13 - 2.49)	1.54* (1.06 - 2.24)	1.35** (1.11 - 1.64)	1.31** (1.08 - 1.61)
Other relatives	1.38** (1.10 - 1.72)	1.23 (0.98 - 1.52)	1.22* (1.03 - 1.45)	1.23* (1.03 - 1.46)
Non-relatives	1.69** (1.23 - 2.31)	1.47* (1.05 - 2.05)	1.27* (1.02 - 1.58)	1.21 (0.98- 1.48)
Alone	2.66*** (1.75 - 4.04)	1.72* (1.07 - 2.76)	1.48*** (1.28 - 1.73)	1.35** (1.08 - 1.70)
Wealth				
Lowest	1.00	1.00	1.00	1.00
Low	1.01 (0.78 - 1.32)	1.01 (0.78 - 1.30)	1.01 (0.78 - 1.32)	0.97 (0.81 - 1.16)
Middle	1.10 (0.85 - 1.43)	1.17 (0.92 - 1.49)	1.10 (0.85 - 1.43)	1.00 (0.84 - 1.190)
High	1.11 (0.83 - 1.49)	1.17 (0.89 - 1.53)	1.11 (0.83 - 1.49)	0.99 (0.85 - 1.16)
Highest	0.98 (0.75 - 1.29)	1.04 (0.79 - 1.36)	0.98 (0.75 - 1.29)	0.91 (0.77 - 1.07)
Polygamous Household				
No	1.00	1.00	1.00	1.00

	15-17 Years Olds (n=1,347)		18-19 Year Olds (n=990)	
	UnadjRR (95% CI)	**AdjRR (95% CI)**	**UnadjRR (95% CI)**	**AdjRR (95% CI)**
Yes	0.96 (0.81 - 1.15)	1.08 (0.88 - 1.34)	1.00 (0.87 - 1.13)	1.08 (0.95 - 1.25)
Family Size	0.98 (0.95 - 1.01)	1.01 (0.97 - 1.04)	0.99 (0.97 - 1.00)	1.01 (0.98 - 1.03)

*** p<0.001,

** p<0.01,

* p<0.05

Table 4

Adjusted relative risks for household family structure association with number of lifetime sexual partners stratified by school attendance status among adolescent girls

	In School (n=1,428)		Out of School (n=909)	
	1 Partner Ref: 0 Partners AdjRR (95% CI)	2+ Partners Ref: 0 Partners AdjRR (95% CI)	1 Partner Ref: 0 Partners AdjRR (95% CI)	2+ Partners Ref: 0 Partners AdjRR (95% CI)
Family Structure				
Biological father	1.00	1.00	1.00	1.00
Single Mother	1.06 (0.71 - 1.57)	1.00 (0.64 - 1.56)	1.26 (0.71 - 2.23)	2.17* (1.21 - 3.89)
Stepfather/bio mother	1.16 (0.80 - 1.68)	1.36 (0.78 - 2.35)	2.98*** (1.63 - 5.45)	4.17*** (2.51 - 6.92)
Grandparent	1.39 (0.70 - 2.76)	0.99 (0.39 - 2.56)	5.54* (1.07 - 28.67)	11.21** (1.88 - 66.99)
Sibling	1.83 (0.71 - 4.74)	2.04 (0.90 - 4.66)	1.37 (0.55 - 3.43)	3.07** (1.38 - 6.83)
Other relatives	1.26 (0.76 - 2.10)	1.43 (0.87 - 2.37)	2.16** (1.31 - 3.56)	1.59 (0.94 - 2.70)
Non-relatives	1.9 (0.71 - 5.06)	1.08 (0.30 - 3.88)	2.15 (0.90 - 5.18)	4.14** (1.67 - 10.24)
Alone	0.76 (0.10 - 5.97)	1.07 (0.18 - 6.25)	1.61 (0.38 - 6.73)	9.29*** (2.77 - 31.13)

NOTE: RRs are adjusted for age, religion, wealth, family size, polygamous household, alcohol use.

*** p<0.001,

** p<0.01,

* p<0.05