# Familial structure and the transition to adolescent sexual debut in Ghana

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*Prepared for presentation at the annual meeting of the Population Association of America, April 15-17 2010, Hyatt Regency, Dallas, Texas.*

## Background

The timing of first sex is a pivotal event in the life of adolescents with broader socio-economic and reproductive health implications over the life course (Billy et al., 1988; Small & Luster, 1994; Blanc, 2000; Meier, 2004). For instance, adolescents who initiate sex at younger ages have been found to have higher risk of STDs including HIV/AIDS (Sonnenstein et al., 1989; Glynn et al. 2001; Drain et al. 2004; Pettifor et al. 2004; Kaestle et al. 2005), unintended pregnancies (Smith, 1997; Hayes, 1987; Zelnik & Shah, 1983), maternal mortality (National Research Council, 1993), depressive symptoms (Meier, 2003), and delinquency and promiscuity (Koyle et al., 1989, Tilson & Larsen 2000; Armour & Hanie, 2007). The timing of first sex thus provides clues on the development of future life course alternatives with far reaching consequences.

Given the societal need to prevent adolescent pregnancies and sexually transmitted infections, particularly in the era of HIV, understanding the correlates of first sex timing has gained much currency in contemporary Western social science research (Upchurch et al., 1999; Teitler & Weiss, 2000; Meier, 2003). Among its most salient determinants is family structure. Indeed, several studies in the US have emphasized the relevance of family structure on adolescent health and reproductive outcomes in general (Flewelling & Bauman, 1990; Young et al., 1991; Day, 1992; Whitbeck et al., 1992; Wu & Martinson, 1993;Lauritsen, 1994; Upchurch et al., 1998). However, the bulk of this scholarship has focussed exclusively on the US and other Western countries. While some progress has been made toward understanding family structures in various cultures, the scholarship has been dominated by information on Western societies. As Adam (2004) notes, "expanding our base of knowledge to include international research on families implicitly stretches our points of reference, deepens our understanding of family dynamics, and fosters greater appreciation for a wealth of contextual factors outside of our own research".

The paucity of research on the subject in sub-Saharan Africa in particular is unfortunate given that about 9-13% of young women in the region had given birth by age 16. Moreover, adolescents in the region account for a disproportionate share of new HIV infections (UNAIDS & WHO, 2008). As Zaba and colleagues (2004) point out, in the era of the AIDS pandemic, accurate monitoring of trends in coital debut has become increasingly important as intervention programs seek to discourage premarital sexual activity.

Extant research in the West suggests that adolescents from two parent families are less likely to initiate sexual intercourse early compared with their peers from other familial arrangements. The structural-functionalist school, for instance, suggests that adolescents living with both biological parents are better adjusted psychosocially and they are therefore less likely to become sexually active at an early age. The African family, however, tends to be more complex and complicated than the nucleated families of the West. Family structure in the African context often intertwines with unique kinship systems which confer asymmetric sexual expectations on adolescent boys and girls. For instance, because inheritance passes through the female line in matrilineal groups (Fortes 1950; Hollos and Leis 1986), children are considered automatic members of the matrilineage regardless of the marital status of their mother (Meekers 1992; Djamba 2003). As a result, attitudes toward premarital sex tend to be weaker among such groups than patrilineal ones (Bronde 1975; Caldwell et al 1991; Meekers 1992).

While there are a few studies in sub-Saharan on how family structure affects the transition to first sex, there is a paucity of research on the interplay between family structure and kinship

system and the transition to first sex. To fully understand the effects of family structure, it is imperative to examine how it operates in matrilineal and patrilineal groups. The questions that this paper seeks to address are the following: how does family structure impact on first sex timing, and is that different in matrilineal and non-matrilineal groups? Are the effects mediated by parental class/wealth and monitoring? This paper examines these questions using data from the 2004 Ghana National Survey of Adolescents which has measures on the concepts of interest. Ghana provides a perfect case for the study because the population is evenly split between matrilineal and non-matrilineal groups.

**Theoretical framework**

Although the field of adolescent sexuality lacks a comprehensive theoretical framework, several hypotheses have emerged (Miller and Fox, 1987; Upchurch et al., 1999; Meier, 2003). In this section, we focus on the saliency of social processes, in particular, how family structure influences adolescent sexual behavior. As Upchurch *et al. (*1999) note, not only does the family provide socio-economic environment and general monitoring of adolescents, but it also instils and demonstrates norms and role models for sexual conduct. One perspective posits socialization as an important influence on sexual behavior (DiBlasio and Benda, 1990; Philliber, 1980). Kinnaird and Gerrard (1986) observed that adolescents from non-intact families were more likely not only to be sexually experienced but to have begun intercourse at younger ages than their counterparts from intact marriages. In general, adolescents who live with both biological parents have been found to be less likely to initiate sexual intercourse early than those in other familial arrangements through social learning, social control, and class (Maccoby & Martin, 1983; Rossi & Rossi, 1980).

The socialization hypothesis partly operates through role modelling and social learning. This perspective argues that because parents are one of the most powerful socializing influences on their children, single-parenthood may produce a role model effect which could overwhelm their attempts to control their adolescents' sexual behaviour. For example, Thornton and Camburn (1987) found that mothers who had experienced divorce were more sexually permissive in attitudes and behaviour than their counterparts in intact families. Other aspects of the socialization effect operate through role modelling. It has been noted that being the daughter of a teenage mother or having a sister who got pregnant in the teens is associated with earlier intercourse among adolescent girls (East et al., 1993; Handler, 1990). In addition, having a child in the teen years produces a spiral effect that tends to perpetuate the cycle over generations. This is because women who have children in their teens invariably end up with less education, low occupational status and lower income than their counterparts who delay childbearing until adulthood. Consequently, a child born to a teenage mother is likely to begin life in a home where socio-economic conditions are relatively unfavourable, and s/he is likely to seek material support through avenues which could result in early sexual debut.

Family structure also affects adolescent sexual behaviour though social control. This perspective portrays the onset of adolescent sexual activity as a function of weak familial ties. Drawing on the work of Hirschi (1969), this perspective postulates that individuals are naturally inclined toward deviance but bonds to conventional ties alleviate involvement from such behavior. Deviance (in this context, adolescent sexuality) then occurs among individuals whose familial bonds are weak whereas strong positive familial bonds (characterized by a sense of emotional closeness and understanding) create an atmosphere in which parents' opinions regarding sexual activity are internalized by the adolescent leading to lower risk of sex (

Rodgers, 1999; Luster & Small, 1994). Newcomer and Udry (1987) argued that adolescents experience less control in single-parent households than in two-parent households because the presence of two parents may provide more parental control and supervision than the presence of only one parent, and that it is more difficult to escape parental surveillance when there are four watchful eyes than when there are two. Also, because the presence of a nonbiological parent often increases family tension, it is likely that adolescents in other familial arrangements may be at risk for conflict with their guardians which undermines the quality of their relationships.

Another pathway through which family structure affects first sex timing is parental wealth and class (Hogan & Kitagawa, 1985;Miller & Bingham, 1989; Scott-Jones & White, 1990). Most single parents, probably due to the lack of financial support, are more likely to work full-time than are those in two-parent households and therefore may have less opportunity to monitor and supervise the activities of their adolescents. This relationship is plausible because lower class youth may have limited opportunities for future advancement, which from a social control perspective, could reduce their stake in the system and weaken their bonds to conventional norms (Crockett et al., 1996). In the African context, this often manifests in the anecdotal 'sugar daddy' phenomenon where resourceful adult men entice younger women with material rewards in return for sexual favours. The economic disadvantages associated with single parent households may lead to higher likelihood of school drop outs and subsequently low earnings which potentially affects the risk of early sexual onset.

As argued earlier, family structure in the African context is enmeshed within the broader kinship systems. Parents are expected to be responsible for the monitoring of their children but the complex household structure is such that biological parents are not necessarily the ones responsible for communication and monitoring of children on a wide range of issues, including sexual and reproductive health. In this context, how does the kinship system interact with family structure on coital debut, and this does this manifest differentially among males and females?

**Data and method**

The data for the study came from the 2004 National Adolescent Survey conducted in among 12-19 year olds (Awusabo-Asare et al., 2004). The Ghanaian survey was part of the National Survey of Adolescents undertaken in four Sub-Saharan African countries to provide detailed information on adolescent risk-taking and health-seeking behaviors relating to HIV, STDs and unintended pregnancy. Funded by the Bill and Melinda Gates Foundation, the Rockefeller Foundation, and Eunice Kennedy Shriver National Institute of Child Health and Human Development, the survey was administered between January and May 2004. Using a two-stage stratified sample design that selected households from rural and urban clusters, 9,445 households were listed for initial screening. After an initial interview in each household, individual surveys were administered in person to adolescents between the ages of 12 and 19 who were de facto or de jure members of the household. A total of 4,430 eligible adolescents were interviewed (face-to-face) with an overall response rate of 89.3 percent. Questions on sex and other sensitive topics were asked of only those above 15 years at the time of the survey. The analysis reported here is based only on those completed the interview and are usual residents and whose first sex did not occur at marriage. This yielded an effective sample size of 2387 composed of 51% males and 49% females.

Consistent with similar studies in other parts of sub-Saharan Africa (eg Magadi and Agwanda, 2008), a key limitation of the data relates to the accuracy of reporting on first sex

which is subject to recall bias due to retrospective reporting. The quality of reporting on sexual behavior could have been affected by the mode of data collection. In particular, sexual activity in sub-Saharan Africa is often under-reported among adolescent girls (Zaba, 2004).) As Singh and colleagues (2000) argue, unmarried adolescents in settings where sexual relationships outside marriage are censured are likely to be reticent on sexual behaviour. On the other hand, some young men over report their sexual activity to give the impression that they are conforming to what they think society expects of them. Considering these limitations, the results presented here must be interpreted with some caution.

**Measures**

The adolescents were asked if they had ever had sex and if so, how old they were when they had first intercourse. The dependent variable in this study, timing of first sex, measures the duration from age 10 till the age at first sex, if they had had first sex. For censored observations, duration is measured as age at survey minus age 10.

The family-level characteristics examined included parental monitoring, family structure, whether the family talked about sex, and household wealth. Family structure was derived from the question on the living arrangement of the adolescent combined with the question asked of household heads on the nature of their relationship to the adolescent child. On the basis of these, living arrangements of adolescents were classified as: both biological parents, with biological mum, with biological dad, with grandparent, with sibling, alone, and other living situations. While it is unheard of and illegal for minor children (under 18years) to live by themselves in the West, it is not an uncommon occurrence in many African countries and the situation in Ghana is no exception. The economic disadvantages associated with those who live alone may lead to higher likelihood of school drop outs which could potentially affect the risk of early sexual onset. To control for this, we included a variable on whether the respondent is currently in school or otherwise.

We created an index of parental monitoring following the approach adopted by Kumi-Kyereme and colleagues (2007). Information about parental monitoring was obtained from three questions about how much adolescents thought their parents or guardians knew about 1) where the respondent goes out at night, 2) what the respondent does with free time and 3) who the respondent's friends are. An index of parental monitoring was constructed by summing responses to these three questions (alpha=0.65) with higher values representing closer monitoring. The essence of parental monitoring is to ensure that children or wards avoid risky environments and behaviors. Consistent with prior research, it is expected that highly monitored adolescents will be less likely to initiate coital debut. Also, given gender asymmetry in socialization in that girls are expected remain virgins until marriage, it is expected that monitoring will be higher for females than males.

We also included a variable on whether or not adolescents talked to family about sex. The general expectation is that positive communication about sex-related issues will lead to positive behavioral outcomes including sexual and reproductive health. In the context of Ghana, however, because parent-child communication about sex-related matters is relatively uncommon, such communications are reactive and often initiated only after the adolescent has been found to be sexually active. For this reason, we expect a negative relationship contrary to the literature in the West.

The household wealth status is derived from information on 26 household assets, amenities and materials for housing using Principal Components Analysis (PCA). The PCA is a

powerful tool in identifying the underlying patterns in the data and reducing the number of dimensions without much loss of information. Following Filmer and Pritchett (1998) and McKenzie (2003), the variables were first standardized before using the PCA, and the first factor based on the Eigen Values and assumed as a measure of wealth and status was extracted .The resulting single wealth index, which is a linear combination of the variables on household possessions, amenities and housing materials, was then classified into three quintiles representing the lowest third, middle third and the top third. The bottom third was classified as "poor", middle as "average" and the top third as "rich". Consistent with the literature, we expect the risk to be higher among those from poor households.

Many studies have examined the influence of religiosity on adolescent sexual behavior. Much of this research suggests that religious individuals have first sex at a later age than those who are less religious (Brewster et al. 1998; Ku, Sonenstein & Plecket 1993; Lammers et al. 2000;Gyimah et al., *forthcoming*). To control for this, we created a dummy for those who attend religious service at least once a week as highly religious. To account for socio-cultural factors that affect first sex, we also controlled for ethnicity by creating a dummy for matrilineal Akan or otherwise.

**Statistical method**

For the multivariate analyses, a multilevel discrete time logit model is used. Since most adolescents were censored at the time of the survey, an event history model was used to account for censoring in the estimation of exposure time. The timing of first sex was retrospectively collected in discrete values so a discrete formulation of time was preferred to a continuous one. In order to fit a discrete-time model, each duration must be expanded so that an individual contributes a series of records, one for each discrete time point until the event or censoring occurs (Singer & Willet 2003). Consequently, we restructured the data so that each individual had a sequence of observations, one for each time interval until event occurrence or censoring. This resulted in a total observation of 40,102 person year periods from the 2387 adolescents. For each given period, the dependent variable is whether first sex occurred within the interval or not. In its most flexible form, time dependency was treated as a categorical variable with a category for each time interval. The time intervals were then grouped as piecewise constants where it is assumed that the risk of experiencing first sex is constant within the interval.

The discrete-time hazard rate *pit* is defined as the conditional probability that an adolescent *i* experiences first sex at discrete-time *t*, given the event has not already occurred to that individual before *t*. This conditional probability is called the discrete-time hazard rate, or the risk of experiencing an event at discrete-time t which plays a major role in the analysis of event histories. The parameter estimates from the model reflect negative or positive effects on the timing of first sex. A positive coefficient increases the hazard of first sex and reduces the transition to first sex while a negative coefficient decreases the hazard but and increases the transition.

An important characteristic of the data that needed to be analytically taken into account was the nested structure with children nested in households and survey clusters. Children in the same household and clusters are expected to be more alike at least in part because they share common characteristics (environmental, genetic, behavioral, sociocultural) thus violating the independence assumption of conventional models. Thus, unless some allowance is made for within this, standard statistical methods are no longer valid as they generally underestimate the variance. To account for this, we specified a three-level random intercept model with

respondents *i,* nested in households *j,* that are nested in survey clusters *k*. The three-level discrete time logit can be expressed as:

$$\log\left(\frac{p_{ijk}}{1-p_{ijk}}\right) = \alpha_{t-1} + x'_{ijk}\beta + \omega_{jk} + \upsilon_k$$

where,

$p_{ijk}$ is the probabilty of first sex for the i$^{th}$ adolescent belonging to the j$^{th}$ family in the k$^{th}$ cluster

$x_{ijk}$ is a vector of covariates corresponding to the i$^{th}$ adolescent of j$^{th}$ household in the k$^{th}$ cluster

$\alpha_{t-1}$ is a function of time indexed by a series of dummies

$\beta$ is a vector of unknown regression parameters associated with the explanatory variables

$\omega_{jk}$ is the variance associated with the j$^{th}$ household in the k$^{th}$ cluster

$\upsilon_k$ is the variance with the k$^{th}$ cluster

Different types of intra-class correlation can be derived for the latent responses of two adolescents. For example, for the same cluster *k* but of different households *j* and *j'* , we obtain $\rho(\text{cluster}) = \left(\frac{\upsilon_k}{\omega_{jk} + \upsilon_k + \pi^2/3}\right)$; whereas for the same household *j* and obviously in the same community *k* we get $\rho(\text{household, cluster}) = \left(\frac{\omega_{jk} + \upsilon_k}{\omega_{jk} + \upsilon_k + \pi^2/3}\right)$,where $\omega_{jk}$ (omega jk)is the estimated household level variance, $\upsilon_k$ (upsilon k) is the estimated cluster level variance, and $\pi^2/3$ is the variance of a standard logistic distribution. In a three level model, if $\omega_{jk} > 0$ and $\upsilon_k > 0$, it follows that $\rho(\text{household, cluster}) > \rho(\text{cluster})$ since children of a given household are more similar than from the same cluster but different households. The GLLAMM program as implemented in STATA was used for the estimation of the multilevel discrete time logit (for description and technical details, see Rabe-Hesketh et al., 2004; Rabe-Hesketh & Skrondal, 2005).

**Findings and Discussion**

The last two columns of Table 1 show the percentage distribution of the sociodemographic characteristics stratified by sex. Boys and girls in the sample are very similar with respect to family structure, and parental wealth. The dominant familial arrangement is those who live with both parents while about a fifth lives with their biological mother, and 7% lives with grandparents. Although the proportion may be small, it is worth noting that about 4% of adolescents live on their own which is not uncommon in the Ghanaian case. With respect to migration, the majority are those whose place of current residence is the same as childhood place

of residence although females are more likely than males to move. Overall, about a fifth of the adolescents have had premarital sex, however, there are significant gender differences. More than a quarter (26.1%) of adolescent females reported first sex compared with 15.46% of males. Also, while more than a quarter is not currently in school, the percentage is significantly higher among females than males (31.47% vs. 24.92%). More than half (52.32%) of girls indicated that their families talked about sex compared with about a third (34%) of boys. Given the patriarchal nature of Ghanaian culture and the asymmetry in gender socialization, it is not surprising that girls are monitored more closely than boys.

Overall, about a fifth of the sample had premarital sex but as Table 2 indicates, there are substantial gender differences; more than a quarter of the girls compared with 15% of the boys. With regard to family structure, the percentage with premarital sex is lowest among those who live with both parents but highest among those who live alone or with grandparents. In particular, more than half of those who live with grandparents and a quarter of those who live alone had premarital sex compared with 15% of those who live with biological parents. Also, adolescents involved in activities outside the home, such as church and school attendance are less likely to engage in premarital sex. For example, about 20% of adolescents who attend religious services regularly have engaged in sex compared with 25% of those who do not. Similarly, about 40% of those who are not currently in school have engaged in premarital sex compared with 13% of those still in school. Additionally, those highly monitored by parents are less likely to have premarital sex; only 12.39% of the highly monitored adolescents had premarital sex compared with 39% of the less monitored. While these findings are consistent with the literature, to what extent would these hold in a multivariate context?

The results of the multivariate discrete time models are presented in Table 3. The coefficients for the duration dummies suggest that the risk of premarital sex is significantly lower at younger ages but significantly increases as the adolescent gets older. In examining the effects of family structure, Model 1 suggests that adolescents in all familial arrangements have a faster transition to premarital sex compared with those who live with both biological parents. Statistically, the risk is 93% higher (exp 0.66) among those who live with grandparents and over 4 times higher among those who live alone compared with those who live with biological parents. The risk associated with those who live alone is not surprising as they are more likely to be independent with no adult or parental supervision. The risk among those who live with grandparents could be attributed to the general perception in Ghana that grandparents are too permissive and lax in disciplining their grand children. After controlling for other theoretically relevant covariates in Model 2, although there is a significant attenuation of the family structure variables, the effects are still large and significant. While controlling for the other variables slightly moderates the coefficients of those who live alone, it increases for those who live with grandparents.

In Models 3-6, we explore if the family structure differences are mediated or confounded by parental monitoring, family discussion on sex, and household wealth. As discussed in the literature, one of the hypothesized pathways between family structure and first sex timing is family wealth. In Model 5 thus, we explore if the differential household risk is mediated through household wealth and class. Although there is some attenuation in the coefficients, the effects are still large and statistically significant indicating that the disadvantage could not be attributed to household wealth alone. Model 4 explores if the family structure differences are mediated by parental monitoring. Indeed, there is a significant attenuation of the family structure variables suggesting that some of the difference perhaps operates through parental monitoring. Evidence

in Model 6 suggests that a significant portion of the family structure differences could be attributed to parental monitoring and household wealth Between Models 3 and 6, for instance, the coefficient associated with those living 'alone' decreases by about 16% while that associated with 'grandparents' declines by almost 25%. This may indicate that adolescents who live alone or with grandparents may have poor resources and/or low parental monitoring which partly account for their high risk.

Looking at the effects of the other variables in Model 6, there is evidence that parental strictness as measured by the degree of parental monitoring reduces the likelihood of engaging in premarital sex. Also, those from wealthier households have a lower first sex compared with those from average of poor households. There is also evidence that highly religious adolescents are less likely to initiate premarital sex. While the high risk associated with adolescents who discuss sex with parents sounds counter-intuitive to the Western literature, it is reasonable in the Ghanaian context where there is a general culture of silence regarding communication about sexual matters. Although it is difficult to disentangle the causal direction between communication and behavior, parents and guardians rarely talk to their children about sex but are often prompted to do in instances where the unmarried adolescent is found to be sexually active which perhaps accounts for the positive association (Kumi-Kyeremeh et al, 2007).

To interpret the random part of the model, it is important to consider the estimated residual intra-class correlations. As discussed earlier, different types of intra-class correlations can be estimated. In the Model 6, for adolescents from the same cluster, we obtain rho (cluster) =0.10 if they have are from different households, and rho=0.23 if they are from the same household. This finding adds to increasing evidence elsewhere (e.g., (Mahy & Gupta, 2001) that adolescents are strongly influenced by their environment, suggesting that community and household characteristics influence sexual initiation behavior.

Table 4 stratifies the analysis by sex. Although the directions of the coefficients are for the most part consistent for both males and females, some significant differences are worth highlighting. For instance, while adolescents who live alone have an elevated risk of premarital sex, the risk is higher among females than males. Although not statistically significant at conventional alpha levels, Akan males are about 26% less likely while Akan females are about 18% more likely to have premarital sex. Also important is the finding that girls from wealthier households have a lower risk than boys from similar background. This could be because girls from rich households have material and financial support.

**Conclusion**

While there is substantial research that examines the effects o family structure of first sex timing, the scholarship has been dominated by information on Western societies. As Adam (2004) notes, expanding our base of knowledge to include international research on families implicitly stretches our points of reference, deepens our understanding of family dynamics, and fosters greater appreciation for a wealth of contextual factors outside of our own research. Understanding how family structure affects the transition to first sex in the African context is important considering predominance of other familial arrangements. In this paper, we examined the influence of family structure on the transition to first sexual experience for adolescents in Ghana Guided by several theoretical frameworks and using data from the 2004 Ghana National Adolescent Survey of Youth, this paper examines if there are differential risks of first sex

associated familial structure and whether these differences are mediated and confounded by other theoretically relevant factors.

The multivariate results revealed that adolescents who live alone, with grandparents, or other families have a higher risk of first sex compared with those who live with biological parents. The results from the best fit model suggest however that much of this advantage can be attributed to parental monitoring and household wealth. In support of a mediation model, family structure differences in the timing of first sex were smaller, and in some cases statistically insignificant when levels of parental monitoring and wealth were held constant. In general, adolescents who are closely monitored by parents as well as those from wealthier households have a significantly lower risk.The evidence suggests that what matters is that parents keep a close eye on their children, confirming similar studies in the US. The negative association with wealth particularly for adolescent girls may suggest increased vulnerability due to poverty, particularly the desire for material goods.

When the analysis was stratified by sex, we found that matrilineal Akan males were less likely while females were more likely to have premarital sex compared with non Akans. The male-female difference among the matrilineal Akans could be explained through the system of descent with respect to the extent of control over female sexual behaviour. In matrilineal societies, where mostly marriages are conducted by a simple payment (Fortes 1950; Hollos and Leis 1986), female premarital sexual behaviour tends to be more permissive since the lineage is more important than conjugal ties. Children are considered automatic members of their mothers lineage regardless of the marital status of the mother. In the words of Hollos and Leis (1986:339) " matrilineal bias would accord with a weak interest in paternal certitude and help account for permissive premarital sex." On the other hand, the desire to establish paternity in patrilineal societies, as rights in genetricem are exchanged for the bridewealth, means that female sexuality is more restrictive in patrilineal societies (Bronde 1975; Caldwell et al 1991; Meekers 1992; Gage-Brandon and Meekers 1993). This restrictive control of female sexuality in marriage goes in tandem with the tendency to restrict sexual intercourse before marriage. As pointed by Goody (1976:13-14) "when one is attempting to control marriage, it is important to control courtship too". Thus, the intolerance of premarital sexual relations for women is mainly typical with patrilineal societies, where pregnancy outside of marriage is proscribed (Caldwell et al, 1991).

References

Awusabo-Asare, Kofi, Ann Biddlecom, and Eliya Zulu. National Survey of Adolescents, 2004: Ghana [Computer file]. ICPSR22409-v1. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2008-07-24. doi:10.3886/ICPSR22409

Billy, J, Landale N, Grady W, Zimmerle D (1988) Effects of sexual activity on adolescent social and psychological development. Soc Psychol Q 51(3):190–212.

Brewster, K. L. (1994). Race differences in sexual activity among adolescent women: The role of neighbourhood characteristics. American Sociological Review 59: 408-424.

Brewster, K. L., Billy, J. O. G., and Grady, W. R. (1993). Social context and adolescent behaviour: The impact of community on the transition to sexual activity. Social Forces 71: 713-740.

Caldwell, J. C., Orubuloye, I. O. and Caldwell, P. (1991). The destabilization of the traditional Yoruba sexual system. Population and Development Review 17 (2): 229-262

Crockett, L. J., Bingham, R. C., Chopak, J. S., and Vicary, J. R. (1996). Timing of first sexual intercourse: The role of social control, social learning, and problem behaviour. Journal of Youth and Adolescence 25 (1): 89-111.

Crosby, R. A., and Miller, K. S. (2002). Family influences on adolescent females' sexual health. In G. M. Wingood and R. J. DiClemente (Eds.), Handbook of women's sexual and reproductive health. New York: Plenum Publishers, 113-127.

DiBlasio, F. A., and Benda, B. B. (1990). Adolescent sexual behaviour: Multivariate analysis of a social learning model. Journal of Adolescent Research 5: 449-466.

Djamba, Y. (2003). Social capital and premarital sexual activity in Africa: the case of Kinshasa, Democratic Republic of Congo. Archives of Sexual Behaviour 32 (4): 327-337.

East, P. L., Felice, M. E., and Morgan, M. C. (1993). Sisters' and girlfriends sexual and childbearing behaviour: Effects on early adolescent girls' sexual outcomes. Journal of Marriage and Family 55: 953-963.

Fortes, M. (1950). Kinship and marriage among the Ashanti. In African Systems of Kinship and Marriage, ed. A. R. Radcliffe-Brown and D. Forde. New York: Oxford University Press.

Gage-Brandon, A., and Meekers, D. (1993). Sex, contraception and childbearing before marriage in sub-Saharan Africa. International Family Planning Perspectives 19 (1): 14-18.

Goody, J. (1976). Production and Reproduction: a comparative study of the domestic domain. New York: Cambridge University Press.

Gyepi-Garbrah, B. 1985. Adolescent Fertility in Sub-Saharan Africa: An Overview. Boston and Nairobi: Pathfinder Fund

Handler, A. (1990). The correlates of the initiation of sexual intercourse among young urban black females. Journal of Youth and Adolescent 19: 159-170.

Heatherington, M. (1979). Children of divorce. In R. Henderson (ed.), Parent-Child Interaction: Theory, Research and Prospect. New York: Academic Press.

Hirschi, T. (1969). Causes of delinquency. University of California Press, Berkeley.

Hogan, D., and Kitagawa, E. (1985). The impact of social status, family structure and neighbourhood on fertility of black adolescents. American Journal of Sociology 90: 825-855.

Hollos, M., and Leis, P. E. (1986). Becoming Nigerian in Ijo Society. New Brunswick: Rutgers University Press.

Kinnaird, K. L., and Gerrard, M. (1986). Premarital sexual behaviour and attitudes toward marriage and divorce among young women as a function of their mothers' marital status. Journal of Marriage and Family 48 (4): 757-765.

Kumi-Kyereme, Akwasi; Awusabo-Asare, Kofi; Biddlecom, Ann E., "Influence of social connectedness, communication and monitoring on adolescent sexual activity in Ghana." *African Journal of Reproductive Health*. Dec 2007, 11, (3), 133 - 149.

Lloyd CB, editor. Growing up global: The changing transitions to adulthood in developing countries. Washington, D.C.: The National Academies Press; 2005 (Table 8.3, p. 517.

Luster, T., and Small, S. A. (1994). Factors associated with sexual risk-taking among adolescents. Journal of Marriage and Family 56: 622-630.

Meekers, D. (1992). The process of marriage in African societies: a multiple indicator approach. Population and Development Review 18 (1): 61-78.

Meier, Ann. (2003). Adolescents' Transition to First Intercourse, Religiosity and Attitudes about Sex. *Social Forces* 81(3): 1031-1052.

Miller, B. C., and Bingham, C. R. (1989). Family configuration in relation to the sexual behaviour of female adolescents. Journal of Marriage and Family 51 (2): 499-506.

Miller, B. C., Benson, B., and Galbraith, K. A. (2001). Family relationships and

adolescent pregnant risk: A research synthesis. Development Review 21 (4): 515-544.

Newcomer, S. F., and Udry, J. R. (1987). Parental merital status effects on adolescent sexual behaviour. Journal of Marriage and Family 49 (2): 235-240.

Philliber, S. G. (1980). Socialization for childbearing. Journal of Social Issues 36: 30-44.

Rodgers, K. B. (1999). Parenting processes related to sexual risk-taking behaviours of adolescent males and females. Journal of Marriage and Family 61: 99-109.

Roebuck, J., and McGee, M. (1977). Attitudes toward premarital sex and sexual behaviour among black high school girls. Journal of Sex Research 13: 104-114.

Scott-Jones, D., and White, A. B. (1990). Correlates of sexual activity in early adolescence. Journal of Early Adolescence 10: 221-238.

Stern, M., Northman, J. E., and Van Slyck, M. R. (1984). Father absence and adolescent 'problem behaviours': Alcohol consumption, drug use and sexual activity. Adolescence 19 (74): 301-312.

Sturgeon, S. W. (2008). The relationship between family structure and adolescent sexual activity. The Heritage Foundation, Massachusetts. No.1

Thornton, A., Camburn, D. (1987). The influence of the family on premarital sexual attitudes and behaviour. Demography 24 (3): 323-340.

Upchurch, D. M., Aneshensel, C. S., Sucoff, C. A., and Levy-Storms, L. (1999). Neighbourhood and family contexts of adolescent sexual activity. Journal of Marriage and Family 61 (4): 920-933.

Zelnick, M., Kantner, J. F., and Ford, K. (1981). Sex and pregnancy in adolescence. Beverly Hills: Sage.

Table 1: Descritpive data of variables used in the study

| | Total sample | Gender | |
|---|---|---|---|
| | | Male | Female |
| | % | % | % |
| **Had sexual intercourse** | | | |
| Yes | 20.68 | 15.46 | 26.21 |
| No | 79.32 | 84.54 | 73.79 |
| **Family structure** | | | |
| Live with both biological parents | 41.32 | 40.15 | 42.43 |
| Live alone | 3.81 | 3.00 | 4.67 |
| Live with biological mother | 22.26 | 22.4 | 22.12 |
| Live with biological father | 7.26 | 9.62 | 4.76 |
| Live with grandparent | 7.62 | 6.55 | 8.76 |
| Live with Siblings | 3.69 | 3.86 | 3.51 |
| Other living situation | 14.03 | 12.15 | 16.03 |
| **Dropped out of school** | | | |
| yes | 28.1 | 24.92 | 31.47 |
| no | 71.9 | 75.08 | 68.53 |
| **Childhoood-current residence** | | | |
| urban-urban | 41.2 | 36.99 | 45.66 |
| rural-urban | 6.45 | 6.31 | 6.59 |
| rural-rural | 39.21 | 46.06 | 31.97 |
| urban-rural | 13.14 | 10.65 | 15.78 |
| **Ethnicity** | | | |
| Akan | 47.53 | 46.53 | 48.58 |
| Non Akan | 52.47 | 53.47 | 51.42 |
| **Did you talk to family about sex?** | | | |
| No | 57.1 | 66 | 47.66 |
| yes | 42.9 | 34 | 52.34 |
| **Level of religiosity** | | | |
| At least once a week | 91.08 | 88.41 | 93.91 |
| Otherwise | 8.92 | 11.59 | 6.09 |
| **Degree of parental monitoring** | | | |
| low | 8.96 | 11.2 | 6.59 |
| medium | 48.82 | 56.15 | 41.07 |
| high | 42.21 | 32.65 | 52.34 |
| Total sample size | 2387 | 1216 | 1171 |

Table 2: A bivariate analysis on whether or not respondent had first sex

| | Had first sex (%) | |
|---|---|---|
| | yes | no |
| **Gender** | | |
| Female | 26.2 | 73.8 |
| Male | 15.46 | 84.54 |
| **Family structure** | | |
| Both parents | 15.31 | 84.69 |
| Live alone | 52.13 | 47.87 |
| Live with biological mother | 21.68 | 78.32 |
| Live with biological father | 22.35 | 77.65 |
| Live with grandparent | 26.6 | 73.4 |
| Live with Siblings | 20.88 | 79.12 |
| Other living situation | 22.25 | 77.75 |
| **Dropped out of school** | | |
| yes | 40 | 60 |
| no | 13.14 | 86.86 |
| **Childhoood-current residence** | | 100 |
| urban-urban | 20.08 | 79.92 |
| rural-urban | 23.91 | 76.09 |
| rural-rural | 18.92 | 81.08 |
| urban-rural | 26.23 | 73.77 |
| **Ethnicity** | | |
| Akan | 21.16 | 78.84 |
| Ga | 18.39 | 81.61 |
| Ewe | 26.25 | 73.75 |
| Mole-Dagbani | 15.92 | 84.08 |
| Other | 20.6 | 79.4 |
| **Did you talk to family about sex?** | | |
| No | 18.25 | 81.75 |
| yes | 23.91 | 76.09 |
| **Level of religiosity** | | |
| At least once a week | 20.68 | 79.32 |
| Otherwise | 25.91 | 74.09 |
| **index of parental monitoring** | | |
| low | 38.91 | 61.09 |
| medium | 24.5 | 75.5 |
| high | 12.39 | 87.61 |
| **index of household wealth** | | |
| poor | 20.8 | 79.2 |
| average | 23.72 | 76.28 |
| rich | 17.68 | 82.32 |

Notes: relationship statistically significant unless otherwise indicated

Table 3: Multilvel discrete time logit model of transition to premarital sex, Ghana

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| **Time/Duration** | | | | | | |
| under 10 years | -5.70*** | -5.62*** | -5.62*** | -5.67*** | -5.60*** | -5.65*** |
| 10-11 years | -3.31*** | -3.23*** | -3.23*** | -3.28*** | -3.22*** | -3.26*** |
| 12-13 years | -2.54*** | -2.46*** | -2.46*** | -2.50*** | -2.45*** | -2.49*** |
| 14-15 years | -0.87*** | -0.77*** | -0.77*** | -0.80*** | -0.77*** | -0.79*** |
| 18-19 years | 0.13 | -0.04 | -0.05 | -0.02 | -0.04 | -0.01 |
| 16-17 years (reference) | - | - | - | - | - | - |
| **Family structure** | | | | | | |
| alone | 1.45*** | 1.10*** | 1.11*** | 0.96*** | 1.07*** | 0.93*** |
| biological mother only | 0.38* | 0.26! | 0.26* | 0.25! | 0.23 | 0.19 |
| biological father only | 0.41* | 0.42* | 0.42* | 0.32 | 0.42* | 0.3 |
| grandmother | 0.66* | 0.61* | 0.60* | 0.45* | 0.57* | 0.40* |
| sibling | 0.07 | 0.05 | 0.04 | 0.02 | 0.05 | 0.01 |
| other | 0.37* | 0.23 | 0.23 | 0.25 | 0.25 | 0.27 |
| Both biological parents (reference) | - | - | - | - | - | - |
| **Sex of respondent** | | | | | | |
| male | | -0.67*** | -0.65*** | -0.86*** | -0.67*** | -0.83*** |
| female (reference) | | - | - | - | - | - |
| **Current age** | | 0.09* | 0.09* | 0.07 | 0.10* | 0.08! |
| **Currently not in school** | | 0.93*** | 0.91*** | 0.91*** | 0.90*** | 0.87*** |
| **Migration** | | | | | | |
| ruralurbanmigrant | | 0.24 | 0.25 | 0.17 | 0.21 | 0.17 |
| ruralnonmigrant | | .26! | 0.28! | 0.28! | 0.08 | 0.11 |
| urbanruralmigrant | | 0.41* | 0.43* | 0.42* | 0.25 | 0.26 |
| urban nonmigrant (reference) | | - | - | - | - | - |
| **Ethnicity** | | | | | | |
| Akan | | -0.04 | -0.04 | 0.02 | -0.02 | 0.01 |
| **Religiosity** | | | | | | |
| Attends religious service at least once weekly | | -0.49** | -0.51** | -0.37* | -0.47* | -0.35* |
| **Family have discussion on sex** | | | 0.12 | | | 0.18! |
| **index of parental monitoring (ref: average)** | | | | | | |
| lowparentalmonitoring | | | | 0.51*** | | 0.53*** |
| highparentalmonitoring | | | | -0.92*** | | -0.92*** |
| **Index of household wealth (ref: average)** | | | | | | |
| richwealth | | | | | -0.36* | -0.37* |
| poorwealth | | | | | -0.03 | -0.02 |
| **Constant** | -2.99*** | -4.18*** | -4.45** | -3.79*** | -4.28*** | -3.68*** |
| **Log Likelihood** | -2080.76 | -1999.66 | -1998.74 | -1952.55 | -1996.52 | -1949.37 |
| **Variance of random effect** | | | | | | |
| level 2 (household) variance | 0.81*** | 0.63*** | 0.63*** | 0.59** | 0.61*** | 0.56** |
| level 3 (cluster) variance | 0.49*** | 0.49*** | 0.49*** | 0.49*** | 0.46*** | 0.45*** |
| rho (same clusters, different households) | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.10 |
| rho (same household, same clusters) | 0.28 | 0.25 | 0.25 | 0.25 | 0.25 | 0.23 |

Notes: Statistical significance ***p<0.001; **<0.01; *p<0.05; !p<0.10

| | |
|---|---|
| **Number of level 1 units** | 40102 |
| **Number of level 2 units** | 1911 |
| **Number of level 3 units** | 196 |

Table 4: Multilvel discrete time logit model of transition to premarital sex stratified by sex

| | Male | Female |
|---|---|---|
| **Time/Duration** | | |
| under 10 years | -4.75*** | -6.65*** |
| 10-11 years | -2.61*** | -3.75*** |
| 12-13 years | -1.98*** | -2.81*** |
| 14-15 years | -0.77*** | -0.80*** |
| 18-19 years | -0.01 | -0.04 |
| 16-17 years (reference) | | |
| **Family structure** | | |
| alone | 0.49 | 1.26*** |
| biological mother only | -0.08 | 0.32! |
| biological father only | 0.32 | 0.31 |
| grandmother | 0.75* | 0.40! |
| sibling | -0.48 | 0.45 |
| other | 0.58* | 0.16 |
| Both biological parents (reference) | | |
| **Current age** | 0.1 | 0.04 |
| **Currently not in school** | 0.78*** | 0.99*** |
| **Migration** | | |
| ruralurbanmigrant | 0.32 | 0.07 |
| ruralnonmigrant | 0.04 | 0.13 |
| urbanruralmigrant | 0.01 | 0.32 |
| urban nonmigrant (reference) | | |
| **Ethnicity** | | |
| Akan | -0.30! | 0.17 |
| **Religiosity** | | |
| Attends religious service at least once weekly | -0.47* | -0.3 |
| **Family have discussion on sex** | 0.38* | 0.02 |
| **index of parental monitoring (ref: average)** | | |
| lowparentalmonitoring | 0.44* | 0.64** |
| highparentalmonitoring | -1.05*** | -0.821*** |
| **Index of household wealth (ref: average)** | | |
| richwealth | 0.07 | -0.63*** |
| poorwealth | 0.26 | -0.18 |
| **Constant** | -5.02*** | -2.84*** |
| **Log Likelihood** | -854 | -1075 |