

Sexual Initiation among Adolescent Women and Men:
Trends and Differentials in Sub-Saharan Africa

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Abstract

This paper examines trends in adolescent sexual initiation in sub-Saharan Africa, with emphasis on differentials in social determinants across gender and contexts. Data are drawn from Demographic and Health Surveys in eight countries that had at least two surveys conducted approximately five years apart and each with distinct questionnaires for women and men regardless of marital status. The main analytical tool is multivariate logistic models using a generalised estimating equation to consider the probability of a young man or woman having first sex during adolescence. In some countries observed declines over time in the level of adolescent sexual activity were not statistically significant after taking into account changes in background characteristics, especially education. Important gender differentials were also found. While secondary schooling was consistently associated with lower risk of early sex among women, the relationship was often in the opposite direction among men. Influences of other socio-demographic and community status variables were generally less significant.

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SEXUAL INITIATION AMONG ADOLESCENT WOMEN AND MEN: TRENDS AND DIFFERENTIALS IN SUB-SAHARAN AFRICA

Sub-Saharan Africa has some of the highest levels of adult and adolescent childbearing and HIV/AIDS infection in the world. The risk of unplanned pregnancy and sexually transmitted infections (STIs) including HIV/AIDS may be affected by the age of sexual debut. An individual who initiates sexual activity at age 15, for example, will have more exposure to conception over the reproductive span than one who initiates sex at age 21. Early childbearing has been linked to higher rates of maternal and child morbidity and mortality, truncated educational opportunities, and lower future family income. Adolescent fertility has also been associated with larger completed family sizes, which in turn may lead to greater population growth rates (see Menken, 1980; Senderowitz and Paxman, 1985; Voydanoff and Donnelly, 1990; Wulf and Singh, 1991; Zabin and Kiragu, 1998). Moreover sexual activity at younger ages may be associated with greater likelihood of unprotected intercourse and multiple partners, potentially leaving the adolescent at greater risk of contracting an STI/HIV/AIDS (Blanc and Way, 1998). The serious health risks of early fertility and sexual activity underline the need for addressing adolescent reproductive behaviours both within and outside of marriage (Zabin and Kiragu, 1998).

The Programme of Action of the International Conference for Population and Development recently reaffirmed the priority of providing high quality, appropriate sexual and reproductive health services for youth (United Nations, 1999). Effective implementation requires an understanding of the causes and consequences of early initiation of reproductive-related behaviours. The purpose of this paper is to present a comparative perspective of trends and differentials in the timing of sexual activity among adolescents in selected countries of sub-Saharan Africa. The analysis draws on data collected from eight countries participating in the Demographic and Health Surveys (DHS) programme, for which at least two surveys were conducted approximately five years apart, each with distinct questionnaires for women and men of reproductive age regardless of marital status. The earlier round of surveys was conducted between 1987 and 1994; the later round between 1996 and 1999. The countries include Burkina Faso, Côte d'Ivoire, Ghana, Kenya, Mali, Senegal, Tanzania and Zimbabwe. Our main analytical tool is multivariate logistic models using a generalised estimating equation to consider the probability of a young man or woman having first intercourse during adolescence. We will examine the levels and trends of adolescent sexual activity, identify the main characteristics associated with those trends, and explore the contexts in which those trends are occurring. In the long-term, understanding the factors that influence adolescents' decisions will allow for interventions affecting overall health, fertility and population momentum for the region.

CONTEXT

A growing body of literature on reproductive health and behaviour among the adolescent populations in sub-Saharan Africa has emerged since the late 1980s. Adolescent fertility in particular has been increasingly viewed as a source of social and policy concern. However, fertility rates among teenagers have not necessarily increased over time; in fact, the proportion of young women having had a first birth before age 18 was found to have decreased in seven of eight countries under observation in the region (Mahy and Gupta, 2001). Similar trends can be seen from DHS data in terms of the propensity for sexual activity among adolescent women (Figure 1). Only in Kenya is a slight increase noted over survey periods. At the same time, wide differentials emerge across settings. In some countries fewer than half of young women had engaged in sexual activity before their 18th birthday, and in others the proportion surpasses three-quarters. The highest level of early sexual initiation is found in Mali (81 percent) while the lowest is in Zimbabwe (40 percent).

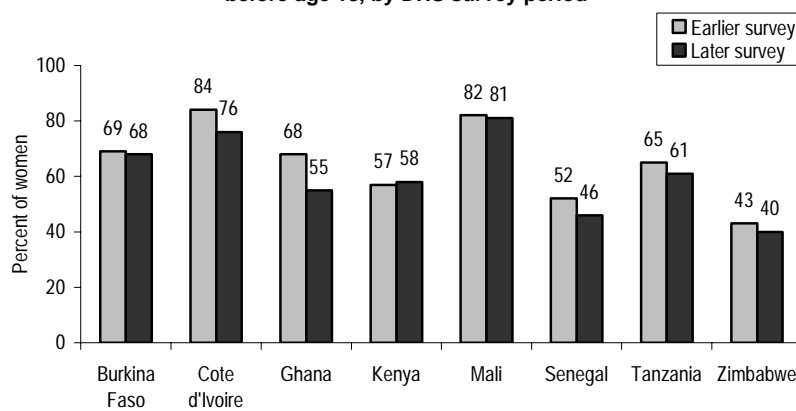
Declines over time are also observed in the percentage of young men having had first sex during adolescence in the four countries for which time-trend data are available (Figure 2). Early sexual initiation is most common among men in Kenya, Côte d'Ivoire and Tanzania, where some 80 percent of young men had first sex before age 20. Levels are lowest in Senegal (53 percent). It is interesting to note that in no country did more than 20 percent of men report having had first union before age 20, suggesting widespread premarital sexual activity across the region (results not shown).

Although in many countries boys are more likely than girls to engage in sexual activity at an early age, the vast majority of the literature on consequences of adolescent childbearing has tended to focus on the effects on the mother, and to a lesser extent on the adolescent father (Gage, 1998). Only recently has attention been increasingly placed on the reproductive health

practices and needs among young men, largely in light of the AIDS epidemic.

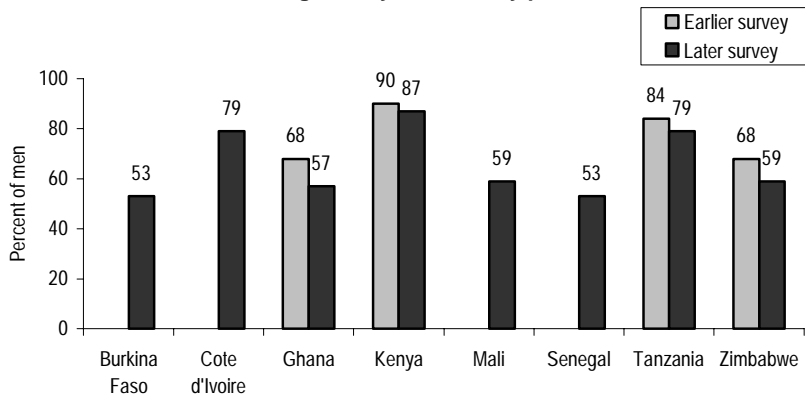
There are large differences in the trends and impacts of reproductive behaviour between young men and young women. Many analyses on the role of gender in early initiation of reproductive activities have commented on the differences in societal expectations and norms for females and males (Singh et al., 2000).

FIGURE 1: Percent of women 18-24 years who had first sex before age 18, by DHS survey period



Adolescents’ contextual surroundings can profoundly affect their reproductive and sexual attitudes and practises. In most African societies women enter into union at a younger age than men, and in some premarital sexual activity is common and even favoured. An early birth is seen to secure marriage for a woman because it demonstrates her fecundity to the man’s family and increases her social standing.

FIGURE 2: Percent of men 20-29 years who had first sex before age 20, by DHS survey period



The phenomenon of “sugar daddies” (older men offering gifts of cash or kind to young unmarried women in exchange for sexual favours) has also been widely documented (Castle and Konaté, 1999; Djamba, 1997; Singh et al., 2000). Poverty may be considered a root cause. It has further been suggested that economic transactions following intercourse are frequent among both adolescent men and women in many countries of sub-Saharan Africa, and are not necessarily perceived as a source of social condemnation (Castle and Konaté, 1999). Reciprocity of the giving and receiving between girls and boys is common, and characterise a majority of early sexual encounters in some areas. Teenagers whose sexual activities are often accompanied by financial rewards exhibit behaviours that put them at greater risk of STI/HIV/AIDS infection.

Sexual health knowledge

Individuals who are adequately informed about reproductive and sexual health may be better able to exercise options favouring an improved health status. As seen in Table 1, knowledge of modern contraception¹ among the adolescent populations varies considerably across countries. Knowledge tends to be higher among males. At least 90 percent of men ages 15-19 know of one or more modern contraceptive methods in Côte d’Ivoire, Ghana, Kenya, Senegal and Zimbabwe according to the most recent DHS results. The lowest levels of knowledge are found in Tanzania (65 percent) and Mali (75 percent). Among women, the proportion with knowledge of modern

¹ Modern contraceptive methods include orals, IUD, injectables, implants, condoms, vaginal methods (foam, jelly or diaphragm), and male or female sterilisation.

contraception reaches at least 90 percent in Côte d'Ivoire, Kenya and Zimbabwe. Only two-thirds have knowledge in Burkina Faso, Mali and Tanzania.

Although awareness of HIV/AIDS is widespread, the means of prevention are less well known. Most AIDS-prevention programmes focus on condom use, limiting the number of sexual partners, staying faithful to one partner, and sexual abstinence as means to prevent transmission of HIV. Recent survey findings suggest that knowledge of condoms as a barrier method is highest in Côte d'Ivoire and Zimbabwe, where about half of adolescent women and two-thirds of adolescent men reported knowledge. Preventive means related to the level of sexual activity (abstinence, limiting sex to one faithful partner, avoiding multiple partners, avoiding prostitutes) were reported by at least 60 percent of women in Côte d'Ivoire, Ghana and Zimbabwe, and at least 60 percent of men in Senegal and Zimbabwe. In most countries knowledge of these latter ways was as great or greater among women than among men, in contrast to knowledge of condoms, which was substantially lower among women across all countries.

At the same time, misconceptions about means of HIV/AIDS transmission are common. More than half of adolescent women in Burkina Faso, Mali and Senegal indicated misconceptions about AIDS prevention, either reporting no knowledge of any means or giving erroneous responses not associated with changes in sexual behaviour (including avoiding kissing, avoiding mosquito bites, or seeking protection from a traditional healer). Over 40 percent of men in Burkina Faso, Ghana and Mali had misconceptions. In all countries except Ghana adolescent women were less likely to be properly informed about AIDS prevention than their male counterparts.

TABLE 1:
Percentage of adolescent women and men (ages 15-19) according to sexual health knowledge,
Demographic and Health Surveys

	Burkina Faso 1999	Côte d'Ivoire 1998	Ghana 1998	Kenya [§] 1998	Mali [§] 1996	Senegal [§] 1997	Tanzania 1996	Zimbabwe 1999
WOMEN								
Knows modern contraceptive method	67	90	87	91	65	72	65	91
Knows condom use prevents AIDS	22	52	22	33	27	23	29	59
Knows limiting partners prevents AIDS	39	65	61	52	39	55	39	61
Has misconceptions about AIDS	67	27	24	28	59	60	47	16
MEN								
Knows modern contraceptive method	83	96	89	94	75	94	65	98
Knows condom use prevents AIDS	51	72	36	53	51	64	44	73
Knows limiting partners prevents AIDS	40	44	55	47	30	72	44	63
Has misconceptions about AIDS	41	12	47	17	44	28	32	11

[§] Note: For Kenya, Mali and Senegal, the male sample considers those ages 20-24.

Socio-demographic characteristics

Large disparities in the socio-demographic status of the adolescent populations can also be observed. Many such characteristics have been linked in the literature to changes in reproductive behaviour. Fertility transition theory suggests that modernisation - as characterised in part by increasing education, urbanisation and media exposure - brings about forces dissolving traditional tendencies toward large families and replaces them with individualism marked by material aspirations. Based on early research and observation in pre-modern populations and contemporary industrial countries, the theory claims that, with sufficient modernisation, fertility (and mortality) will inevitably fall (see Caldwell, 1976; Coale, 1973; Farooq and DeGraff, 1988; Simmons, 1985). Later age at first sex can be a major contributor to fertility decline.

In most countries of sub-Saharan Africa, levels of schooling are substantially lower among women than among men (Table 2). Only in Tanzania, where education levels are very low for both sexes, and in Zimbabwe, where education is relatively high, are the levels similar for young women and young men. Fewer than 10 percent of women ages 15-19 have some secondary schooling² in Burkina Faso, Mali and Tanzania. Only in Zimbabwe and Ghana have at least half of adolescent women attained this level of schooling. A majority of young men have some secondary schooling in Kenya, Zimbabwe, Ghana and Côte d'Ivoire.

Increases in schooling are noted in a few countries. The proportion of better-educated adolescent women rose across survey periods in Kenya (from 38 to 42 percent), Senegal (8 to 11 percent) and especially Zimbabwe (53 to 66 percent). The level dropped somewhat in Ghana (from 56 to 51 percent) and Burkina Faso (8 to 6 percent). Rapid increases in educational attainment among men were seen in Mali (9 to 16 percent), Senegal (23 to 26 percent), Zimbabwe (56 to 65 percent) and most noticeably Côte d'Ivoire (from 32 to 58 percent). Again Burkina Faso experienced a small decrease (from 18 to 13 percent).

The countries under observation tend to be predominantly rural. Only in Senegal are a majority of young men (55 percent) living in urban areas. Burkina Faso is the least urban society. Kenya and Senegal are characterised with a somewhat more urban male population than female population, but in all countries the differences by sex remain under 10 percentage points.

² In the present analysis secondary education is referred to as eight or more years of formal schooling, while primary education is indicated by one to seven years of schooling. Although the educational systems vary by country, these levels have been chosen to maintain comparability.

TABLE 2:

Percentage of adolescent women and men (ages 15-19) by socio-demographic characteristics, according to survey period, Demographic and Health Surveys, 1987-1999

	Burkina Faso		Côte d'Ivoire		Ghana		Kenya [§]		Mali [§]		Senegal [§]		Tanzania		Zimbabwe	
	1993	1999	1994	1998	1993	1998	1993	1998	1987	1996	1993	1997	1991	1996	1994	1999
WOMEN																
Has 8 or more years of schooling	8	6	14	14	56	51	38	42	5	5	8	11	6	6	53	66
Lives in urban area	26	21	48	45	46	37	16	22	30	41	46	46	27	24	30	35
Listens to radio regularly	43	15	44	26	50	56	68	51	52	65	69	68	50	43	41	43
MEN																
Has 8 or more years of schooling	18	13	32	58	58	59	70	72	9	16	23	26	6	7	56	65
Lives in urban area	31	23	44	42	35	31	23	30	28	43	54	55	24	24	24	29
Listens to radio regularly	...	23	...	48	63	66	88	82	...	84	77	67	77	66	43	47

[§] Note: For Kenya, Mali and Senegal, the male sample considers those ages 20-24.

Characteristics refer to those reported at the time of the survey. ... = not available due to questionnaire design

Exposure to the mass media varies across the countries in the region. The majority of adolescents of both sexes listen to the radio regularly³ in Ghana, Kenya, Mali and Senegal. In contrast, at most one-quarter of adolescent women reported listening to the radio in the latest survey in Burkina Faso and in Côte d'Ivoire. In most countries radio exposure remains higher among young men than among young women.

The levels and trends in early initiation of reproductive behaviour may be affected by young women's and men's background characteristics. We will attempt to model these basic social influences and examine how changes in reproductive-related practises occur within different subgroups among the adolescent populations of the eight countries. We systematically look at changes over time for any evidence of patterns at the individual and contextual levels that could help explain early initiation of sexual activity. Understanding the socio-demographic causes of changes in behaviours will assist programme planners and policymakers in creating programmes aimed at improving reproductive health care for adolescents.

DATA AND METHODS

The DHS programme has been producing cross-national and comparative quantitative data on reproductive health knowledge, attitudes and behaviours throughout the developing world since 1985. The present study draws on

³ Trends in radio listening habits must be analysed with caution, as changes in the questionnaire design across surveys hamper comparability. In the earlier surveys for Burkina Faso, Côte d'Ivoire, Ghana and Kenya, and in both surveys for Mali, Senegal and Tanzania, respondents were asked whether or not they usually listen to the radio once a week. In the later surveys for Burkina Faso, Côte d'Ivoire, Ghana and Kenya, and for both surveys in Zimbabwe, respondents were asked whether or not they usually listen to the radio every day.

information collected from samples of women and men regardless of marital status from surveys conducted at least four years apart to allow for time-trend analyses within a given age group. Each survey included independent individual women's and men's questionnaires for examining gender differentials. The DHS countries retained are all in sub-Saharan Africa: Burkina Faso, Côte d'Ivoire, Ghana, Kenya, Mali, Senegal, Tanzania and Zimbabwe.

The surveys are carried out in a relatively standardised manner, though questionnaires may be adapted to the needs and conditions of a specific country. Survey samples are designed using scientific sampling probability. Most samples use two-stage stratified designs: selection of area units or clusters in a single stage, normally with probability proportional to size, followed by selection of households. Samples generally cover six to eight thousand women and two to three thousand men of reproductive age,⁴ distributed across some two to three hundred clusters.

The standard DHS questionnaire collects data on age at first sexual intercourse for male and female respondents.⁵ For our multivariate models we have limited our analyses to young adults in order to minimise potential recall bias, which tends to be more problematic among older respondents for whom such a first reproductive-related experience generally would have taken place several years earlier. Our analysis focuses on the likelihood of an individual reporting having first engaged in sexual activity during adolescence. Because the implications of early sex are different for men and women, age at sexual debut is measured differently. For women, early sex is defined as having occurred before her 18th birthday. The multivariate models include women aged 18-24 at the time of the survey to avoid problems of censored observations, given that women younger than 18 have not yet completed the period of exposure. For men, early first sex is considered before his 20th birthday. Men aged 20-29 are included in the multivariate models to provide a more complete picture of their recent reproductive histories and to ensure sufficient sample sizes.

Data quality

As with all household survey data, responses from the DHS are not immune to various types of error including recall errors due to memory lapses, duration heaping and event omission (both deliberate and accidental). Changes in questionnaire design, training of interviewers and fieldwork implementation, and data processing across survey phases can affect the quality of the information retrieved. Previous studies have examined data quality on current age reported at the time of interview (Rutstein and Bicego, 1990), age at initiation of reproductive behaviour (Blanc

⁴ Women ages 15-49. Men ages 15-54 in most countries; age groups 20-54 in earlier Kenya survey, 20-55 in earlier Mali, and 20 and over in both Senegal surveys.

⁵ Due to differences in questionnaire design, comparable information on age at first sex among men is not available for the earlier surveys in Burkina Faso, Côte d'Ivoire, Mali and Senegal, and is not used here.

and Rutenberg, 1990; Gage, 1995), and other demographic measures (Marckwardt and Rutstein, 1996). In general data quality can be considered better among the youngest age groups and improving over time.

The expected trend of fewer problems of incompleteness or inconsistency of age reporting among younger respondents and over time can be noted for the eight countries under observation. In most countries, at least 90 percent of young respondents of either sex provided current age or year of birth information in the latest survey. However some problems remain. In Mali in particular, only a third of female respondents provided age or year information in the earlier survey, but in the later survey the information was recorded as essentially complete. This difference is probably due to a change in survey implementation and training as opposed to an increase in respondents' knowledge of dates and ages.

With regard to the timing of first sex, some researchers have voiced concerns that respondents, especially young women, might be uncomfortable with the topic of sexual activity. However low overall levels of non-response or inconsistency in reporting of age at first sex in the DHS seemingly indicate willingness among the target populations to answer such questions. In most countries under observation (and where data were available), in fewer than 10 percent of cases was the age at first sex missing or inconsistent. Moreover a recent experimental study of interviewing methodologies in Kenya did not uncover evidence of under-reporting of sexual activity among either adolescent women or men. The results gave little support to the largely speculative assumption that girls may be less likely than boys to report sensitive behaviours such as early sex (Mensch, Hewett and Erulkar, 2001).

While some caution must be exercised when using survey data particularly in certain countries in sub-Saharan Africa with poor documentation and knowledge of dates, the quality of age reporting can be considered better among the youngest age groups and improving over the course of the DHS programme. The impact of such improvements on the direction of timing of first sex remains unknown. However, by limiting our focus on respondents in the youngest age groups, we may minimise the damaging bias of recall errors, which tend to be more frequent among older respondents. This approach marks a distinct advantage in analysing trends within a given age group over comparing information from various cohorts from one cross-sectional database.

Statistical methods

Our analysis uses multivariate regression models to evaluate trends and determinants of adolescent sexual practises. We focus on the probability of a young woman having first sex before age 18. We also examine the risk of a young man having first sex before age 20. A logistic link is used to model the dichotomous outcomes. We use a

generalised estimating equation to avoid the inefficient estimation of coefficients which results from the cluster-based DHS sampling structure. Standard logistic models assume that the distribution of the error term follows a binomial distribution and the outcomes are random and independent. However, respondents within the same community or cluster are likely to demonstrate similar characteristics and behaviours (due to a number of unmeasured and unmeasurable factors), implying that the outcomes are not independent within clusters. General estimating equations allow us to estimate the model parameters while controlling for intra-cluster correlation (Liang and Zeger, 1993).

The key hypothesis being tested is that changes in the risk of early sexual activity can be associated with selected socio-demographic and contextual variables associated with modernisation. In particular, we seek the answers to three questions: Have there been significant changes over time in the risk of first sex during adolescence? Which socio-demographic and community characteristics are most associated with these trends? Are they different for women and men?

A number of background and community-level variables are included in the multivariate models as potential confounding factors. The selection of variables can be traced to Easterlin's (1983) list of four empirically identifiable aspects of modernisation: innovations in formal schooling; urbanisation; the introduction of new goods; and innovations in public health and medical care. Time-trends in the effects of the explanatory variables are analysed through interaction terms of the characteristic on the survey period.

To ease interpretation of the outputs of the regression models, our results will be expressed in terms of odds ratios, which are calculated by exponentiating the parameters. A ratio greater than unity implies that an individual in the given category would be more likely to have first sex before age 18 (or 20) compared to a counterpart in the base category, all else being equal. A ratio lower than unity signals an individual in the given category is less likely to experience the event compared to a counterpart in the base category, and a ratio equal to one suggests similar likelihood.

Description of explanatory variables

Education: A strong correlation between higher educational attainment and delayed reproductive behaviour consistently emerges from empirical applications throughout the developing world (see, for example, Ainsworth, 1994; Martin and Juarez, 1995; Robey et al., 1992). Mboup and Saha (1998) found that in many countries of sub-Saharan Africa (including Burkina Faso, Ghana and Senegal), women with secondary or higher education have about two to three fewer children than those with no schooling. Among adolescents, while we expect education to

be associated with a lower probability of early sexual activity, the direction of causality is less clear. Teenagers, especially women, may decide to delay reproductive-related behaviour in order to complete their formal education. On the other hand, some sexually active girls may be forced to leave school early after having a child. For example, according to the 1996 DHS in Mali, 12 percent of adolescent women (ages 15-19) who were no longer attending school indicated a pregnancy or marriage as the main reason they left. We have elected to limit the category for high educational attainment in our multivariate models to eight or more years of schooling, in hopes of reducing the likelihood of biases in terms of the numbers of young respondents who might not have finished their education at the time of the survey, or who may have been obliged to leave school early due to a reproductive-related event.

Place of residence: The rural and urban distinction is important because of differences in access to health facilities, cultural beliefs, and living situations.

Mass media exposure: Access to modern goods and ideas can affect an individual's reproductive decisions. Cleland and Wilson (1987) suggest that the spread of new knowledge and technology can help explain observed patterns of fertility decline in many low-income countries, independent of economic circumstances. Research has found that exposure to modern forms of mass communication in particular has a strong effect on reproductive practises, especially on contraceptive use and age at first union (Adamchak and Mbvizo, 1991; Westoff and Bankole, 1997). We consider in this analysis radio listenership as representative of access to the mass media and new ideas. Listening to the radio can occur in a number of locations including outside of the home and, therefore, is considered less associated with economic status than radio ownership. Radio is the medium selected here because of the diversity of development levels among the countries studied. This variable needs to be interpreted carefully since television and newspapers may be more popular among young respondents in some countries.

Family planning environment: At the contextual level, indirect variables include access (physical, financial and socio-cultural) to reproductive health care which affects the risk of early childbearing or STI/HIV/AIDS infection. For example, a strong reproductive health programme in the community could influence an individual's familiarity with contraception and knowledge of the health risks of early sexual activity. However there is a general lack of comparable time-trend data across most countries in the region on the level of accessibility to reproductive health services and duration of contraceptive use among all adolescents regardless of marital status. Instead, the effort of public health care services is evaluated indirectly through the community-level family planning environment. In particular, the strength of local health programmes is measured through proxy indicators of whether a large

proportion of the adult population⁶ in the community has ever used modern contraceptives. Community characteristics are captured through aggregating men and women's individual-level responses within a cluster. For most countries, communities where at least 50 percent of adults had ever used contraceptives are considered to have a better reproductive health care environment. For Mali the cut-off for stronger family planning environment is at least 10 percent of adults ever used, and for Zimbabwe it is at least 80 percent.

Community development indicator: Lastly, there is increasing evidence that adolescents are strongly influenced by their environment, suggesting that community characteristics might influence reproductive behaviours. Lloyd, Kaufman, and Hewett (2000) suggest that in areas that have not yet achieved mass schooling, development will be slow because of the slower pace of social interaction and diffusion, resulting in a lagging fertility decline. A proxy for community development is measured (albeit imperfectly) through the proportion of adult women and men in the cluster who have eight or more years of schooling.⁷ Communities where at least 20 percent of all adults have achieved this level of schooling are considered to have a higher development status. An exception was made for Mali, where due to small numbers of educated adults the cut-off for higher status was set at 10 percent.

RESULTS

Risk of early first sex among women

Table 3 presents the results of the multivariate models examining the risk of early sexual initiation among women for the eight countries under observation. An independent trend toward lower propensity for first sex during adolescence is found in three countries. There was a statistically significant reduction ($p < 0.05$) in the proportion of women who had sex before age 18 between survey periods in Côte d'Ivoire, Ghana and Senegal. This was not the case in Mali where adolescents were somewhat more likely to have engaged in early sex at the later survey period, after controlling for individual and contextual differences. (Given the previously noted important differences in the completeness of recording of age-related information across the 1987 and 1996 Mali surveys, it is also possible that

⁶ In order to capture the community-level characteristics, each cluster must have a sufficient number of respondents to make a valid assessment of the situation. In cases where we are only interested in a subgroup of the population, it is unlikely that there will be enough individuals per cluster that match the criteria. Moreover attempts to include indicators based on self-reported knowledge and practises among youth may fail to completely overcome the problems of endogeneity of current reproductive health status. Thus cluster-level estimates for the proportion of adolescents who have ever used modern contraception are not deemed reliable. Our indicators rely on information collected from older adults alone: women ages 25-49 and men ages 25-54.

⁷ In most countries, adult education was obtained from the number of women and men ages 25 or over with eight or more years of schooling as reported in the household schedule, offering a somewhat larger sample size per cluster. In the later Côte d'Ivoire, later Senegal and both Mali surveys, the level of adult schooling was compiled by combining responses from the individual datasets for women (ages 25-49) and men (ages 25-54).

there are other unmeasured influences at work here.) Moreover any observed declines in the level of early sex in Burkina Faso, Tanzania and Zimbabwe were no longer significant after controlling for confounding influences.

In each country, women with at least some secondary education were significantly less likely to have had sex before age 18 than women with no education. The difference in risk was widest in Tanzania, however the significance of the interaction term suggests that the magnitude of the effect has changed over time. Primary education had a less consistent depressive influence; only in Burkina Faso, Senegal and Tanzania was the effect statistically discernible.

Place of residence had an independent effect on a woman's probability of early sexual debut in five countries. Urban residence was associated with a reduction by about half in the probability of first sex before age 18 in Côte d'Ivoire, Ghana, Mali, Senegal and Zimbabwe. There were little interaction effects suggesting that this association remained essentially stable between survey periods.

Only in Senegal and Zimbabwe was there a significant effect of radio exposure on early sexual debut. In both countries the effect was in the expected direction, with women listening regularly to the radio having about a 25 percent lower risk of early sex. Moreover in Zimbabwe there was an interaction effect. Stratification of the analysis by survey revealed a strong inverse association at the earlier survey and no significant difference at the later survey (results not shown). Thus in Zimbabwe, the effects of radio exposure on delayed sexual debut among women, which were appreciable in 1994, had dissipated by the time of the 1999 survey.

The community-level effects were generally less significant and occasionally inconsistent across countries. In Ghana young women living in communities of higher development status experienced a higher chance of early sex, while in Tanzania the opposite was true. In neither of these two countries did the effect vary considerably across surveys. Effects of family planning environment on the probability of adolescent sexual initiation were negligible in seven of the eight countries.

TABLE 3:
Odds ratios from the multivariate logistic models for the risk among women of having first sex before age 18,
Demographic and Health Surveys, 1987-1999

	Burkina Faso (N=3368)	Côte d'Ivoire (N=3276)	Ghana (N=2388)	Kenya (N=4489)	Mali (N=3083)	Senegal (N=3941)	Tanzania (N=4919)	Zimbabwe (N=3452)
Survey period								
Earlier survey (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Later survey	1.04	0.49 *	0.60 *	0.78	1.61 *	0.56 *	0.80	1.10
Education								
No formal schooling (r) §	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68
1-7 years of school	0.64 *	1.00	0.84	0.76	1.07	0.54 *	0.59 *	1.00
8+ years of school	0.33 *	0.53 *	0.44 *	0.30 *	0.44 *	0.22 *	0.13 *	0.21 *
Interaction: Education - Survey								
1-7 years of school * Later	1.15	1.11	1.10	2.19 *	0.67	1.14	1.06	0.73
8+ years of school * Later	1.01	0.91	1.21	1.82	0.68	1.33	1.80 *	0.68
Residence								
Rural (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Urban	0.83	0.58 *	0.54 *	0.88	0.50 *	0.52 *	1.15	0.60 *
Interaction: Residence - Survey								
Urban * Later	0.57	1.44	0.96	1.31	1.10	0.77	1.20	1.33
Radio exposure								
Does not listen to radio regularly (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Listens to radio regularly	1.12	0.95	1.20	0.94	0.90	0.75 *	0.87	0.72 *
Interaction: Radio exposure - Survey								
Listens to radio * Later	0.74	1.27	0.66 *	0.98	0.78	1.37	1.03	1.57 *
Community development								
Lower (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Higher	0.75	0.82	1.77 *	1.02	1.05	0.71	0.51 *	1.00
Interaction: Community development - Survey								
Higher * Later	1.32	1.08	1.21	0.71	0.99	1.23	1.25	1.01
Community family planning environment								
Lower (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Higher	0.89	0.83	1.13	0.85	2.27 *	0.59	0.84	0.97
Interaction: Community FP environment - Survey								
Higher * Later	1.14	1.29	0.89	0.94	0.43 *	1.57	1.11	0.97

* $p < 0.05$ (r)=reference category

§ Note: The reference category for education is no schooling in all countries except Zimbabwe where 1-7 years of schooling is reference.

Risk of early first sex among men

Among males, Zimbabwe was the only country out of the four for which time-trend data are available that showed a significant change in the probability of early sex (Table 4). Zimbabwean men were 71 percent less likely to have had first sex before age 20 at the later survey compared to the earlier survey, all else being equal.

The male data suggest that education is related to age at first sex, however the relationship is often in the opposite direction as the female models. For Côte d'Ivoire, Mali and Senegal we find that young men with only primary education are significantly more likely to have first sex before age 20 as compared to their counterparts with no education. A positive effect of secondary education on early sexual debut is also observed in these three countries.

Likewise, Zimbabwean men with no education are characterised with lesser probability of early sex compared to those who have attended primary school. (Note that the Zimbabwe male sample had few cases in the no schooling category, so the findings should be interpreted with caution.) Tanzania alone presents results in the expected direction: lower risk of first sex during adolescence among better-educated men. Even here, the interaction term points to changes over time. Further stratification of the model by survey period reveals that the significant inverse relationship between secondary education and early sex at the time of the earlier survey was no longer statistically discernible at the later survey (results not shown).

Effects of other variables were even less conclusive. Overall, place of residence had no statistical bearing on the risk of early sex (although in most countries the trend suggested that men who lived in urban areas were more likely

TABLE 4:
Odds ratios from the multivariate logistic models for the risk among men of having first sex before age 20, Demographic and Health Surveys, 1987-1999

	Burkina Faso (N=744)	Côte d'Ivoire (N=306)	Ghana (N=821)	Kenya (N=1901)	Mali (N=606)	Senegal (N=1177)	Tanzania (N=1227)	Zimbabwe (N=1551)
Survey period								
Earlier survey (r)			1.00	1.00			1.00	1.00
Later survey			0.66	1.98			0.65	0.29 *
Education								
No formal schooling (r) [§]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.12 *
1-7 years of school	0.84	2.92 *	1.53	2.02	1.58 *	1.60 *	0.59	1.00
8+ years of school	1.16	3.22 *	1.84	2.27	2.01 *	1.54 *	0.21 *	0.67
Interaction: Education - Survey								
1-7 years of school * Later			1.28	0.34			2.21	15.11 *
8+ years of school * Later			0.79	0.27			5.33 *	1.05
Residence								
Rural (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Urban	0.92	1.63	1.14	1.18	1.57	1.33	1.17	0.70
Interaction: Residence - Survey								
Urban * Later			0.44 *	1.15			0.69	1.22
Radio exposure								
Does not listen to radio regularly (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Listens to radio regularly	1.14	0.55	1.41	1.05	2.16 *		2.34 *	0.63 *
Interaction: Radio exposure - Survey								
Listens to radio * Later			0.73	1.35			0.38 *	2.06 *
Community development								
Lower (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Higher	0.91	0.99	1.02	0.79	1.23	0.88	0.38 *	1.56
Interaction: Community development - Survey								
Higher * Later			1.80	0.93			1.96	0.76
Community family planning environment								
Lower (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Higher	1.36	1.09	0.80	0.93	1.06	1.13	1.60	0.86
Interaction: Community FP environment - Survey								
Higher * Later			1.19	1.12			1.12	1.87 *

* $p < 0.05$ (r)=reference category

§ Note: The reference category for education is no schooling in all countries except Zimbabwe where 1-7 years of schooling is reference.

to have sex before age 20, the findings were not statistically significant). Effects of radio exposure were negligible in most countries. An association was noted in Zimbabwe and Tanzania, but in the opposite direction for the two countries, plus the effect shifted across survey periods. Regular radio listening habits were found to have directly affected the probability of early sex in the later Mali survey (questions on media exposure were not asked to men in the earlier survey).

For the most part the variables aiming to capture level of community development and family planning environment did not appear to be significant factors in determining the risk among males for early first sex.

DISCUSSION

This paper has investigated trends and differentials in sexual behaviour during adolescence in eight countries of sub-Saharan Africa, drawing on data from successive Demographic and Health Surveys. Despite the brief time between surveys (about five years), there has been a decline in the levels of early sexual initiation among young women and men in most countries. However in many cases the decline was no longer statistically significant after considering changes in the socio-demographic and contextual background of these populations. Strong disparities are observed from country to country, and by gender, suggesting that the pace of modernisation and its influences on the risk of early sexual initiation have not been consistent across the region.

In the majority of the countries studied, women tended to be less likely to have early sex if they were better educated, urbanised, and had more exposure to the media. However for men the associations were often contradictory. The consequences of modernisation may have unexpected impacts on adolescent sexual activity. On the one hand, modernisation may offer to young women alternatives outside the domestic sphere, and reduce their reliance on sexual favours for men as a means of financial support. Our multivariate analysis revealed secondary education as having the strongest impact on timing of sexual initiation among women. It was the only variable to be consistently and significantly associated with lower risk of first sex before age 18 in each country. Women having more education may better appreciate the health and economic advantages of smaller family sizes, and be more likely to protect themselves from unwanted pregnancy, and concomitantly from STI/HIV/AIDS infection, through delayed sexual activity. On the other hand, modernisation may offer to adolescent boys greater economic opportunities to have a sexual partner at a younger age. The school setting also allows greater opportunities to meet members of the opposite sex, removed from traditional familial constraints.

Moreover many important differences were seen across women's and men's sexual health knowledge. While awareness of modern contraception is generally widespread, other aspects remain less well known. Women

especially tend to be less well informed of ways to prevent transmission of HIV/AIDS. These differentials in reproductive health knowledge could hold important implications for adolescents' decision-making processes.

Such distinctions imply that programme managers and policy makers must emphasise gender-specific considerations in all sexual health interventions. In addition, the strong differentials in timing of sexual initiation among women and men suggest that efforts aimed at improving the reproductive health of youth must be directed with equal importance at adolescents and older adults alike.

Lastly, our attempts at modelling community-level influences—family planning environment and local development context—on adolescent reproductive-related behaviours produced inconclusive results. The associations were mostly insignificant, or sometimes in opposite directions across countries. While this may suggest that there is no established relationship between contextual variables and young people's reproductive behaviour, measuring community-level effects remains problematic. Ideally the contextual variable on the effort of reproductive health care services would be compiled from independent sources, such as from health facility data on youth outreach programmes and service utilisation. The availability of such data is still limited in the DHS. Instead we used a cluster-level aggregate indicator for the proportion of adult women and men of reproductive age having used modern contraceptives. Likewise, our assessment of community development relied on a proxy for the level of adult educational attainment. The definition of these variables may be inadequate and should be considered further.

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