

Education and the timing of sexual initiation and marriage in rural Malawi: a longitudinal analysis of the effect of grade attainment, school dropout and math and literacy skills

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The prevalence of early marriage has declined in sub-Saharan Africa in recent years; women aged 15–24, particularly those 15–19, are less likely to be married than in the past, as are men aged 20–24 (Mensch, Singh, and Casterline 2005). At the same time that marriage during adolescence has decreased throughout much of the region, the prevalence of premarital sex has risen. An analysis of Demographic and Health Survey (DHS) data indicates that in the vast majority of countries in which the likelihood of early marriage has declined, the proportion of young women initiating sex prior to formal marriage has increased. In Malawi, premarital sex by age 18 has risen from 25 percent among women 40–44 years old to 32 percent among 20–24 year olds while marriage by age 18 has declined from 56 percent to under 50 percent. However, no significant change has occurred in the percentage of young women initiating sex prior to age 18 because the rise in the percentage engaging in premarital sex has been offset by an increase in age at marriage (Mensch, Grant, and Blanc 2006).

Women's level of education has been widely documented to be strongly and positively associated with age at first marriage throughout sub-Saharan Africa. Moreover, an analysis of DHS data reveals that in about two-thirds of African countries, half or more of the observed decline in early marriage in recent years can be linked to an increase in educational attainment (Mensch, Singh and Casterline, 2005). While few studies examine age at first marriage among men, recent analyses suggest a weaker association between men's schooling and the timing of marriage.

The link between education and sexual initiation is not as clear as that between education and age at first marriage. While girls enrolled in school are less likely to engage in premarital sex than their out-of-school peers (Hargreaves et al., 2008; Lloyd 2008), this association may exist because those who engage in premarital sex are more vulnerable to school exit (Biddlecom et al 2007) rather than because school participation deters premarital sex. In the case of males, ever having had sex does not seem to be associated with either school attendance or school exit (Biddlecom et al 2007, Hargreaves et al 2008).

By and large, the literature that has explored the effect of education on premarital sex and marriage has limited the measurement of education to school participation and grade attainment. An exception is Marteleto, Lam, and Ranchhod's (2008) study in South Africa. They found that students who performed better on a literacy and numeracy exam administered during the first round were less likely to become sexually active in the three year period that followed. Surprisingly, however, 14–16 year-olds who had completed more grades in school, conditional on their age, were more likely to initiate sex. They suggest that this finding could be an indicator of peer effects; younger students who advanced further in school are exposed to older students in the same classroom, who are presumably more likely to be sexually active.

Not only have most studies on this subject relied on a narrow set of education variables, few have refined their examination to include the link between education and the nature of sexual debut, that is whether initiation occurred prior to or at marriage. While females with higher levels of schooling tend to marry at older ages than those with fewer grades attained, are the better educated more likely to initiate sex premaritally, perhaps because they are exposed to the risk of premarital sex for a longer period?

Finally, the empirical literature in this area suffers from an important methodological problem. Both schooling and family formation decisions reflect behavioral choices that depend on both measured and unmeasured characteristics of young people and their families. Indeed, studies have shown that those who are better off are more likely to achieve higher levels of education and to postpone marriage. That said, individuals with more education may also have "unobserved" characteristics such as increased motivation that may be correlated with both their success in school and their decision to postpone marriage. Two studies that have explored the

potential endogeneity between education and age at first marriage using different estimation techniques—Brien and Lillard (1994) who estimate a joint model for education and timing of first marriage using data from Malaysia, and Behrman and colleagues (2006) who follow a two-step instrumental variable approach using data from a longitudinal study in Guatemala—demonstrate that results ignoring this unobserved heterogeneity are likely to be biased.

In this study we will examine the association between education and sexual initiation and marriage using a unique longitudinal survey conducted among young people in rural Malawi. Specifically we will explore the effects of grade attainment, school dropout, and math and literacy skills on the timing of sexual initiation and, for females, the timing of marriage.

Data

The data come from the first two rounds of a longitudinal study of approximately 1,770 in-school and 890 out-of-school Malawian adolescents aged 14–16 when first interviewed in 2007. The study achieved a re-interview rate of 91% in 2008. Fifty nine primary schools in two southern districts of Malawi (Machinga and Balaka) were visited in the second term of the 2007 school year and again during the second term in 2008. The 30 schools visited in Machinga represent nearly 20 percent of the primary schools in the district, whereas those in Balaka represent nearly 25 percent of the primary schools in that district. The probability of a particular school being included in the sample was proportional to its enrollment in 2006.¹ At each school we interviewed approximately 30 students in standards 4–8, the last 4 years of primary school, stratified by gender and age.² The in-school adolescents were randomly selected from registers recording enrollment at the beginning of the 2007 school year. Adolescents were classified as out-of-school if they had not attended in the second term of the school year. Out-of-school adolescents were identified through key informants located at the school and within the randomly selected school catchment villages.

The adolescent instrument included an extensive set of questions on household and family characteristics, educational attainment, schooling history and experiences, household labor and employment, sexual behavior, marriage, and health. The majority of questions were asked both in 2007 and again in 2008. In 2007 all sampled adolescents were asked to read two sentences in Chichewa (the national language) and two sentences in English, tasks at which they should have been proficient by standard 4. Adolescents also completed a short mathematical evaluation consisting of 12 questions drawn from the Malawi Institute of Education (MIE) achievement tests for standard 3.³ In 2008, these assessments were repeated for comparability and expanded. A reading comprehension section (in both English and Chichewa) was added to further measure cognitive ability, while a selection of questions from the MIE mathematical tests for standard 5 was included to capture more recently acquired knowledge.

To obtain more accurate reporting from students on sexual behavior, we employed audio computer-assisted self-interviewing (ACASI) with handheld computers. With ACASI, the respondent hears both the question and the response categories through headphones connected to a computer. The respondent answers each question by pressing a number on the computer screen associated with a response option. The advantage of ACASI over face-to-face interviews is that the respondent is afforded greater privacy and confidentiality when answering questions and interviewer influence in the survey is minimized. Computerized interviewing has been used successfully by the investigators in household-based surveys in Kenya and Malawi (Hewett et al. 2004; Mensch et al. 2003; Mensch et al. 2008).

¹ The number of schools visited in each district was based on estimates of (1) the proportion of students in the age group attending primary school, (2) estimated attendance rates (3) estimated attrition rates, (4) estimates of transitions to secondary school and school dropout.

² The overwhelming majority (93%) of 14–16 year olds attend standards 4–8 (National Statistical Office and ORC Macro 2003).

³ The Malawi Institute of Education is a para-statal organization that is charged by the Ministry of Education with curriculum development, assessment and teacher training programs.

Preliminary estimates of premarital sex based on life table analyses of Round 1 data indicate that in and out-of-school boys have virtually the same likelihood of having sex by their 16th birthday, around 46 percent. While school status is also unrelated to premarital sex among girls through age 16—around 25 percent of in- and out-of-school girls are estimated to have had premarital sex by that age—the behavior of in- and out-of-school girls begins to diverge after age 16, with those in school significantly less likely to engage in premarital sex. As for marriage, while only eight males in the entire sample are married and virtually no female currently enrolled in school is married, about 37 percent of the out-of-school female sample has married.⁴

Analysis

The analysis will consist of three stages and will be conducted separately for males and for females since we expect gender differences in the effect of education on the timing of these transitions and because for males we will only investigate the transition into first sex as too few young men have transitioned into marriage.

First, we will estimate a multiple decrement life table looking at two competing risks: sexual initiation prior to marriage and sexual initiation within marriage.

Second, we will look at the association between the education variables and each of the transitions—first sex and first marriage—separately, using discrete time multivariate survival analysis models. Formally, we will estimate the following equations using a Cox proportional hazards model:

Age sex first time:

$$h^s(t) = h_0^s(t) \exp[a_1 \text{Educ}(t-1) + a_2 \text{Married}(t-1) + a_3 X(t) + u^s] \quad (1)$$

Age at first marriage:

$$h^m(t) = h_0^m(t) \exp[b_1 \text{Educ}(t-1) + b_2 \text{Sexinit}(t-1) + b_3 X(t) + u^m] \quad (2)$$

where:

$h^s(t)/h^m(t)$: hazard rate for sexual initiation (s)/marriage (m)

$h_0^s(t)/h_0^m(t)$: baseline hazard

$\text{Educ}(t-1)$: selected education variables at time t-1

$\text{Married}(t-1)$: indicator variable for being married at time t-1

$\text{Sexinit}(t-1)$: indicator variable for having had a first sexual experience at time t-1

$X(t)$: vector of exogenous individual and time varying covariates, for example adolescents' age and parents' education and occupation

u^s/u^m : unobserved heterogeneity

In equations (1) and (2) we introduce the schooling and marriage/sexual initiation terms lagged one year to lessen the possibility of reciprocal causality, as schooling may be affected by the transition to marriage (or the expectation of it) as well as sexual debut.

In addition to reverse causality, we cannot directly control for the unobserved heterogeneity (u^s/u^m) terms; if these are also correlated with the in-school and educational attainment variables the estimated coefficients will be biased. To address this issue, in the third stage we will adapt the approach used by Lillard (1993) and Brien and Lillard (1994) to estimate a joint model for the probability of continuing in school/schooling attainment and sexual initiation, and, in the case of females, we will also address the interrelation between sex and marriage by simultaneously estimating the probability of continuing in school/schooling attainment and equations (1) and (2).

⁴ Data regarding the timing of sexual initiation and marriage have not yet been analyzed for the 2nd round of data.

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