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Timing of Orphanhood, Early Sexual Debut, and Early Marriage in Four Sub-Saharan African Countries

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Abstract

According to a growing body of literature, some orphans are at heightened risk of early sexual debut and early marriage. This study examines a rarely explored aspect of orphanhood: the timing and type of parental death and their relationship to these outcomes. The study also explores whether education mediates orphans' risk of early sexual initiation and early marriage. The data are drawn from the 2004 National Survey of Adolescents, which includes interviews with 12–19-year-old adolescents in Burkina Faso, Ghana, Malawi, and Uganda. Results from discrete-time event history analysis indicate that female double orphans, regardless of timing of orphanhood, have greater odds of early sexual debut than do nonorphans. Education explains little of their increased risk. In contrast, male orphans of any type reveal no increased vulnerability to early sexual debut. Uganda is the only country where female orphans, specifically double orphans and those who are paternal orphans before age 10, have greater odds of early marriage, with education accounting for a small portion of the risk.

During the transition to adulthood, adolescents experience a number of important life events such as sexual debut, marriage, and childbearing. The timing of these events, which is not always under the complete control of adolescents, can place them at increased risk of adverse outcomes, which are typically more severe for girls than for boys. Early sexual debut—which has been shown to be associated with low educational attainment, HIV/STD infection, and an increased number of lifetime sexual partners (Pettifor et al. 2004; Cooper et al. 2007; Biddlecom et al. 2008)—can put girls at risk of unintended pregnancy and childbearing. Schoolgirl pregnancies can result in school dropout or seeking illegal and unsafe abortions in order to stay in school (Bankole, Singh, and Haas 1998; Mensch et al. 2001; Calvès 2002; Lloyd 2005; Lloyd and Mensch 2008). Teen pregnancy can lead to early marriage and put girls at risk of maternal and child morbidity and mortality (LeGrand and Mbacké 1993; Howson et al. 1996; Zabin and Kiragu 1998). Early marriage, once believed to protect girls from premarital sex, can result in school dropout, early childbearing, HIV infection, and poor maternal and child health outcomes (LeGrand and Mbacké 1993; Howson et al. 1996; Zabin and Kiragu 1998; Clark 2004; Lloyd and Mensch 2008).

The HIV/AIDS epidemic in sub-Saharan Africa has brought attention to orphanhood as a potential risk factor for early sexual debut and early marriage. Although HIV incidence is

declining and access to life-prolonging antiretroviral (ARV) treatment is increasing (UNAIDS 2010), the number of AIDS orphans has increased by two-thirds from 2001 (8.9 million) to 2009 (14.8 million) (UNAIDS 2010). The fact that only 56 percent of HIV-infected adults in need of ARVs are actually receiving treatment (UNAIDS 2012) will, in all likelihood, lead to continued increases in the number of AIDS orphans, of which more than half will be adolescents (UNICEF, UNAIDS, and USAID 2004).

The rapid increase in the number of AIDS orphans living in sub-Saharan Africa has been accompanied by a body of research that has found orphans, or at least some types of orphans, to be at heightened risk of early sexual debut, risky sexual behavior, HIV/STD infection, and early marriage (Gregson et al. 2005; Thurman et al. 2006; Operario et al. 2007 and 2011; Beegle and Krutikova 2008; Birdthistle et al. 2008 and 2009; Nyamukapa et al. 2008; Palermo and Peterman 2009; Pascoe et al. 2010; Robertson, Gregson, and Garnett 2010). The present study builds upon this literature by investigating whether the timing and type of orphanhood influences the timing of sexual debut and marriage. In particular, this study examines whether losing one's father, mother, or both before age 10 has a greater association with early sexual debut and early marriage than does experiencing such a loss during adolescence. This study also explores whether education plays a role in orphans' greater risk of early sexual debut and early marriage. Understanding whether certain types of orphans are more vulnerable to early sexual debut and early marriage and understanding whether the timing of orphanhood is of consequence will allow policymakers and program designers to better target policies and interventions to the most vulnerable groups of orphans.

LITERATURE REVIEW AND HYPOTHESES

Timing of Orphanhood

No published studies have explored how timing of orphanhood is associated with early marriage. Two studies by Birdthistle and colleagues (2008 and 2009) have incorporated the timing of orphanhood into their analyses of early sexual debut, risky sexual behavior, and HIV and herpes simplex virus 2 (HSV-2) infection. In their study of married and unmarried 15–19-year-old girls in a high-density suburb of Harare, the capital of Zimbabwe, Birdthistle and colleagues (2008) used multistate life tables to determine that maternal orphans are at greater risk of early sexual debut, regardless of age at mother's death, and paternal orphans are only at risk if their father died before age 12. When these authors (2009) restricted their analysis to unmarried girls and focused on HIV/HSV-2 infection, they reached similar conclusions: multivariate logistic regression revealed that maternal orphans, regardless of the timing of the mother's death, and paternal orphans before age 12 are at increased risk of HIV/HSV-2 infection. Neither study, however, explained why the timing of orphanhood is critical for the outcomes of paternal but not maternal orphans.

The present study tests the hypothesis that the timing of orphanhood affects the transitions to two important life events: early sexual debut and early marriage. This study also speculates regarding why timing of orphanhood might matter. One explanation is that losing a parent during childhood (before age 10) may have a greater effect on adolescents' risk of early sexual debut and early marriage than losing a parent during adolescence. Younger children,

who are more dependent on their parents than are adolescents, may receive less support from friends and other adult figures. Rather than expressing their grief, they may internalize it or exhibit problematic behaviors such as aggression or poor school performance (Dowdney 2000). Such behaviors could result in orphans' dropping out of school prematurely, which can increase their risk of early sexual debut and early marriage. Furthermore, parental loss may not be an isolated event. Rather, it can mark the beginning of a series of exposures to economic and emotional hardships (Mojola 2011). For example, parental death can result in new living situations (Nyambedha, Wandibba, and Aagaard-Hansen 2003; van Blerk and Ansell 2006; Nyamukapa et al. 2010; Mojola 2011), declines in household income, and remarriage by the surviving parent. Studies conducted in the US on the effect of divorce on children's well-being indicate that children's outcomes are adversely affected by multiple moves during childhood (Wu and Martinson 1993). Constant adjustment to new situations could also increase levels of psychosocial distress. Analysis of data from a national survey of 12–17-year-old married and unmarried adolescents in Zimbabwe found that psychosocial distress explained part of the increased risk of early sexual debut experienced by paternal and maternal orphans (Nyamukapa et al. 2008).

An alternative explanation is that experiencing a parental death during adolescence may have a greater effect on the timing of sexual debut and marriage than undergoing such a loss during childhood. Adolescence is a difficult period during which children transition from childhood to adulthood, undergoing physical, hormonal, emotional, and psychological changes. These changes could make coping with a parental death more difficult for adolescents than for younger children. Some adolescents may turn to sexual activity as an emotional outlet. Others may view marriage as a means of building a new life for themselves (Oleke et al. 2006). Moreover, adolescents who experienced the loss of a parent before age 10 have had more time to grieve and to adjust to life without this parent.

The Role of Education in Early Sexual Debut and Early Marriage

Studies have produced conflicting findings regarding the relationship between educational attainment, as measured at the time of the survey, and early sexual debut among girls. Whereas some studies have found that girls with secondary education are less likely to initiate sexual activity than are girls who never attended school (Magnani et al. 2002; Gupta and Mahy 2003), others have not found differences in sexual initiation by level of education (Meekers and Ahmed 2000; Fatusi and Blum 2008). These inconsistent findings could be a result of educational attainment affecting sexual debut through opposing mechanisms. More-educated girls may delay sexual activity because they fear becoming pregnant, which could lead to school dropout, or they may think sexual activity will distract them from achieving educational success (Frye 2012). Other equally well-educated girls, in contrast, may engage in sexual activity with “sugar daddies” in order to finance their education (Oleke et al. 2007). Luke (2005) challenges the “sugar daddy” stereotype by showing that the prevalence of sugar daddies is quite low. Moreover, most sexual partners of female adolescents are only a few years older than they are (Poulin 2007). A more likely scenario is that more-educated girls have greater opportunities to interact with potential sexual partners at school, increasing their likelihood of engaging in sexual activity (Lam, Marteleto, and Ranchhod 2013). Although exceptions exist (Magnani et al. 2002), findings tend to be more consistent

among boys: those with higher educational attainment are at greater risk of sexual activity (Meekers and Ahmed 2000; Gupta and Mahy 2003; Fatusi and Blum 2008).

Several studies have found that current school attendance is associated with delays in sexual activity (Magnani et al. 2002; Lloyd 2005 and 2010; Kayembe et al. 2008), and this association is typically much stronger for girls than for boys. The cross-sectional nature of these studies, however, leaves unclear whether adolescents began sexual activity while attending school or after leaving school (if they ever attended). Through the use of event history methods, Biddlecom and colleagues (2008) attempted to sort out the temporal ordering of events in a study of adolescents who reported being in school at age 12 in Burkina Faso, Ghana, Malawi, and Uganda. Although girls were more likely to leave school once they had premarital sex, this was not so for boys. In contrast, Clark and Mathur (2012), using survival analysis methods, found that the ordering was the reverse: girls who dropped out of school were more likely to initiate sexual activity than those who were still in school. As in the study by Biddlecom and colleagues (2008), schooling status did not matter for the timing of sexual debut among boys.

Higher educational attainment, as measured at the time of the survey, has been consistently found to be associated with later age at marriage (Singh and Samara 1996; Ikamari 2005; Manda and Meyer 2005; Mensch, Singh, and Casterline 2006; Lloyd and Mensch 2008; Gyimah 2009). The effect of education on timing of marriage can work through several mechanisms. First, the institution of marriage is incompatible with schooling in many countries where school policies and societal expectations imposed upon married girls make attending school unlikely. Second, education increases the economic opportunities available to young women, and some of these opportunities require further education, making these careers incompatible with early marriage. In a study of educational aspirations in rural Malawi, many female secondary school students reported the desire to finish school and possibly hold a job before entering into marriage (Frye 2012). Finally, better educated girls, including those still in school, are more likely to practice modern contraception (Nichols et al. 1987; Lloyd 2006), leading to fewer unplanned pregnancies and, in turn, lowering the risk of early marriage.

Whereas little ambiguity exists in the finding that girls with no schooling marry earlier than their counterparts having primary or secondary education, the direction of this relationship is less clear among girls who have ever attended school. Rather than school dropout precipitating marriage, marriage may precipitate leaving school. In a study of five francophone African countries, Lloyd and Mensch (2008) found that marriage does precipitate school dropout; however, other reasons for dropout far exceed marriage. The more common scenario is school dropout preceding marriage. In countries where early marriage occurs, few girls are enrolled in school during the years when marriage is common (Lloyd 2006). Moreover, among girls who have ever attended school, the gap in years between school dropout and marriage is considerable (Lloyd 2006).

With few exceptions, studies have found that some types of orphans have poorer schooling outcomes than nonorphans (Case, Paxson, and Ableidinger 2004; Nyamukapa and Greg-son 2005; Case and Ardington 2006; Evans and Miguel 2007; Timaeus and Boler 2007;

Ardington and Leibbrandt 2010; Beegle, De Weerd, and Dercon 2010). Thus, a second hypothesis that will be tested is whether any associations found between (a) timing and type of orphanhood and (b) early sexual debut and early marriage may be mediated by education. Although this hypothesis has not yet been tested in relation to early sexual debut and early marriage, it has been tested with regard to HIV/HSV-2 risk among unmarried 15–19-year-old girls in Harare, Zimbabwe (Birdthistle et al. 2009). The researchers found that education explains a small portion of the HIV/HSV-2 risk experienced among double orphans but not among paternal or maternal orphans.

METHODS

Data

The data for this study are drawn from the 2004 National Survey of Adolescents (NSA), a set of four nationally representative household-based surveys of 12–19-year-olds in Burkina Faso, Ghana, Malawi, and Uganda.¹ These surveys were collected as part of a research project known as “Protecting the Next Generation: Understanding HIV Risk Among Youth,” a project designed by the Guttmacher Institute (United States) in collaboration with the Institut Supérieur des Sciences de la Population (Burkina Faso), the University of Cape Coast (Ghana), the African Population and Health Research Center (Kenya), the Centre for Social Research (Malawi), and the Makerere Institute of Social Research (Uganda) (Biddlecom et al. 2007). “Protecting the Next Generation” seeks to understand adolescents as they transition into adulthood in a context where unintended pregnancies and HIV/AIDS are highly prevalent. Though similar in design to the Demographic and Health Survey (DHS), these surveys exclusively targeted adolescents, including young adolescents aged 12–14 years who are often left out of survey research. The four countries, chosen to represent different subregions of sub-Saharan Africa, vary in levels of HIV prevalence. In 2001, Burkina Faso and Ghana had relatively low HIV prevalence (2.1 percent and 2.3 percent, respectively), whereas Malawi and Uganda had higher levels (13.8 percent and 7.0 percent, respectively) (UNAIDS 2010).

All four surveys used a two-stage cluster sampling design. In the first stage, enumeration areas were randomly selected. In the second stage, available household listings were used to randomly select households from these areas. Interviewers surveyed heads of households to determine whether eligible adolescents resided there. All 12–19-year-old adolescents living in selected households were eligible to be interviewed. After obtaining informed consent from parents or caregivers of 12–17-year-olds, interviewers asked adolescents to assent to survey participation. Adolescents who were 18–19 years old gave their own consent. Interviews were completed with 5,955 adolescents in Burkina Faso, 4,430 in Ghana, 4,031 in Malawi, and 5,112 in Uganda. Appendix Table A1 contains descriptive statistics of respondents in the analytic sample. Response rates were high, ranging from 87 percent in Uganda to 95 percent in Burkina Faso. This survey used a standard face-to-face interview mode. Because of the sensitive nature of some of the questionnaire topics, effort was made

¹For security purposes, enumeration areas in four districts in northern Uganda, comprising 7 percent of all enumeration areas, were omitted from the survey. To compensate for the loss of these predominantly Luo-speaking districts, the survey team collected data from two neighboring Luo-speaking districts (Neema et al. 2006).

to match interviewers with respondents of the same sex. More detailed information concerning the methodology of each survey is published elsewhere (Awusabo-Asare et al. 2006; Guiella and Woog 2006; Munthali et al. 2006; Neema et al. 2006).

Dependent Variables

This analysis focuses on two outcomes: timing of sexual debut and timing of marriage. Timing of sexual debut is constructed from responses to two questions: (1) when did the respondent first have sexual intercourse (if at all), and (2) when did the respondent first marry or live with a person as if married.² The second question was asked if the respondent reported that first sexual intercourse occurred at the time of marriage. Timing of marriage is constructed only for female respondents because the proportion of boys reporting ever being married is small (ranging from 0.8 percent in Ghana to 2.3 percent in Malawi). Timing of marriage is constructed from responses to a question that asks when the respondent first lived with her husband/partner. Interviewers asked this question among respondents who reported ever being married or ever living with a man as if married.

In all four countries, the proportion of 15–19-year-old girls who have ever had sex and who have ever married is lower in the NSA than in the most recent DHS conducted before the NSA (Awusabo-Asare et al. 2006; Guiella and Woog 2006; Munthali et al. 2006; Neema et al. 2006). Differences in the proportions of girls ever having sex are most likely the result of differences in the proportions ever married. Munthali and colleagues (2006) note that the discrepancy in the proportion ever married may be the result of age heaping, whereby girls are listed as age 20 rather than 19, which could have occurred with greater frequency in the NSA than in the DHS, resulting in fewer ever-married women being included in the sample.

Independent Variables

The key independent variables pertain to timing of orphanhood. According to international guidelines, an orphan is defined as a child younger than age 18 whose father or mother (or both) has died (UNICEF, UNAIDS, and USAID 2004). This definition was extended in this study to include respondents up to age 19 because the United Nations' definition of adolescents refers to individuals aged 10–19 years. Respondents who report that their fathers or mothers, or both, are no longer alive are defined as orphans.³ Rather than classify orphan status as a binary variable— orphan versus nonorphan— orphan status was disaggregated into three categories: paternal, maternal, and double. Previous studies have shown that the risks of early sexual debut and early marriage differ by type of orphan (Gregson et al. 2005; Beegle and Krutikova 2008; Birdthistle et al. 2008; Nyamukapa et al. 2008; Palermo and Peterman 2009). A paternal orphan is a child whose father is no longer alive. A maternal

²Timing of sexual debut is constructed in the same manner as in the DHS. The questions used to construct this variable were designed to match DHS wording.

³Orphan status is determined according to the following question: "Where does your natural father (or mother) live, or is he (or she) no longer alive?" If respondents answered "No longer alive," they are classified as orphans. If they live with or reported the location of their parents, then they are classified as nonorphans. A small proportion of respondents reported "Don't know" or had missing data when asked about the status of their father (0.2 percent in Burkina Faso, 1.2 percent in Ghana, 0.4 percent in Malawi, 1.3 percent in Uganda) or mother (0.4 percent in Burkina Faso, 0.4 percent in Ghana, 0.1 percent in Malawi, 0.8 percent in Uganda). What respondents meant when they responded "Don't know" to this question is not clear. Two possibilities exist: (1) their father or mother is alive but they don't know their location, or (2) they don't know whether their father or mother is alive. Because of this uncertainty, these respondents were dropped from the analytic sample, as were those with data missing regarding parent's status.

orphan is a child whose mother is no longer alive. A double orphan is a child whose father and mother are no longer alive.

Timing of orphanhood is measured by three sets of variables: disaggregated orphan status before age 10, became a single orphan during adolescence, and became a double orphan during adolescence. Whereas orphan status before age 10 is time-constant, the latter two variables are time-varying. These variables were constructed using data drawn from reports of the age of respondents at the time of parental death. The majority of respondents recalled their age at the time of this event. A substantial proportion, however, ranging from 18.8 percent in Burkina Faso to 22.8 percent in Uganda, did not know their age. These respondents were not dropped from the analysis, because doing so might bias the analytic sample. Instead, these respondents were presumed to have been younger than age 10 when their parent(s) died. These deaths are also assumed to have taken place before sexual debut or marriage occurred.

Two arguments are provided in support of the assumption that orphaned respondents who did not know their age at parental death must have been younger than age 10 when their parent(s) died. First, the death of a parent is a traumatizing and life-changing experience. In instances of recent death, affected respondents would most likely know their age at the time of death,⁴ whereas in cases where death occurred during childhood, respondents may not recall their age or even remember the death itself, especially if they were fostered by another family, which is common after parental death. A counterargument could be that many adolescents in these countries do not know their age, affecting their ability to recall their age at parental death. Although this is a problem in many surveys conducted in sub-Saharan Africa, the problem is more common among older populations and should be minimal among adolescents.

The second argument in support of the assumption concerning age of orphanhood is drawn from quantitative evidence presented in Table 1. I compare orphan rates for children at age 10 using DHS data with orphan rates before age 10 using NSA data. For example, orphan rates for 10-year-old children from the 1998 Ghana DHS are compared with orphan rates before age 10 for 16-year-old respondents from the 2004 Ghana NSA. I use two sets of assumptions to calculate orphan rates using NSA data: (1) orphans who do not know their age at parental death became orphaned before age 10, and (2) orphans who do not know their age at parental death became orphaned during adolescence. Orphan rates calculated using Assumption 1 are closer to those calculated using DHS data than are those under Assumption 2. With the exception of Uganda, orphan rates are slightly higher when calculated using DHS data. This difference could be the result of the rates' referring to slightly different time periods. DHS calculations are based on children at age 10, some of whom may have lost a parent at age 10. In contrast, NSA calculations are based on children at age "x" who have lost a parent before age 10, excluding deaths that occur at age 10. A counterargument could be that the surveys are not representative of the same population. In

⁴Even if they do not know their exact age, they could probably report to the interviewer that their parent died "x" number of years ago. Probing for responses in cases in which respondents report "Don't know" is common among survey interviewers, although whether NSA interviewers probed for respondents' age at parental death is not known.

analyses not shown, orphan rates among 12–14-year-old children are found to be similar in the DHS and the NSA surveys.⁵

Education is measured by two variables: ever attended school and currently attending school.⁶ Whereas ever attended school is time-constant, currently attending school is time-varying and is constructed from a series of education-related questions. For respondents who had ever attended school, interviewers asked for their age at school entry and exit (if they had left school). Respondents also reported the number of grades of schooling they had completed. I combined this information with reports of ages at school entry and exit to determine whether respondents were in school from age 10 until the time of the survey. For a small proportion of respondents, ranging from 6 percent in Burkina Faso to 23 percent in Ghana, not enough information exists to determine schooling status at each age. For respondents currently attending school at the time of the survey and who reported not knowing their age at school entry, this age is constructed to be equal to their current age minus the median number of years taken to finish the reported number of grades of schooling completed in their country. Because students repeat grades and because withdrawing from school temporarily is not uncommon, I use the median number of years in lieu of the reported number of grades completed.⁷ For respondents who dropped out of school and who do not recall their age at either school entry or exit, measures are constructed in a similar manner. Respondents who dropped out of school and who do not know their age at school entry and exit are excluded from the regression analyses. The number of dropped cases range from 22 in Uganda to 46 in Ghana.

The following control variables are included in the regression models: age, age squared, urban residence, urban residence before age 12, wealth quintile,⁸ food shortages before age 10, religion, and ethnicity. These control variables were selected because the literature has shown that they are correlated with early sexual debut and early marriage. Note that urban residence and wealth quintile represent characteristics measured at the time of the survey. They may not reflect characteristics at the time of sexual debut or marriage, especially among older respondents. Thus, urban residence before age 12 and food shortages before age 10 are included to act as proxies for childhood characteristics.

⁵Orphan rates are based on 12–14-year-old children because the 2004 Burkina Faso and Ghana DHSs limited collection of data concerning orphan status to children aged 14 and younger.

⁶Although the NSA collected data regarding number of grades of schooling completed and educational attainment, coding these variables is not possible at each age that respondents are in the risk set. Thus, these variables are not included in the regression models.

⁷Sensitivity analyses were conducted to test whether results differ when using the reported number of grades of schooling completed rather than median number of years. Odds ratios and significance levels of orphanhood and schooling variables remained virtually unchanged.

⁸For each country, wealth quintiles were generated using a similar methodology to that used by the DHS (Filmer and Pritchett 1999). Interviewers asked household heads whether their household possessed certain durable goods. The following assets were used to calculate wealth scores: water source, type of toilet, electricity, radio, television, phone, refrigerator, type of cooking fuel, type of floor, number of rooms, ox/donkey cart, bike, motorcycle, and car. With this information, principal components analysis was used to create wealth scores for each household. Wealth quintiles were constructed based on the weighted distribution of the household population rather than the distribution of households. This distribution represents the national household population. All household members were ordered by their scores and the distribution was divided equally into five sections, representing wealth quintiles. Each adolescent's household wealth quintile was used to represent the adolescent's wealth quintile.

Analyses

Discrete-time event history analysis (Allison 1982) is used to examine whether timing of orphanhood is associated with timing of sexual debut and marriage. This method is appropriate because it can handle censored data, time-varying covariates, and a substantial number of ties in the age at which outcomes occur. For both timing of sexual debut and timing of marriage, censoring occurs at the time of the survey if the respondent has not yet experienced the outcome of interest. The time-varying independent variables are: became a single orphan during adolescence, became a double orphan during adolescence, and currently in school.

The data are organized into units of time that correspond to a year at a given age for each individual. For timing of sexual debut, respondents enter the risk set at age 10. This age was chosen on the basis that a nonnegligible proportion of respondents reported initiating sexual activity at age 10. Whereas a small proportion of respondents reported initiating sexual activity before age 10, some respondents, especially boys, may have exaggerated their age at first sex. Moreover, sexual activity at such young ages may not have been consensual. Thus, these respondents were omitted from the analyses of sexual debut. For timing of marriage, respondents enter the risk set at age 12. This age was chosen on the basis of a nonnegligible proportion of respondents reporting marrying at age 12. Similar to sexual debut, respondents who reported marrying before age 12 were omitted. Upon entering the risk set, respondents contribute annual observations until they experience the event of interest or are censored.

For each country, all person-years of observation are pooled and a logistic regression model by maximum likelihood is estimated using the following specification:

$$\log \frac{P_{it}}{1 - P_{it}} = \alpha + \beta x_{it} + \delta z_{i(t-1)},$$

where P_{it} represents the probability that an event occurs at time t , given that it has not already occurred, x_{it} represents a vector of covariates for individual i at time t , $z_{i(t-1)}$ represents a vector of covariates for individual i at time $t-1$, and β and δ represent the respective coefficients. The following variables are lagged: became a single orphan during adolescence, became a double orphan during adolescence, and currently in school. These variables are lagged to maintain the temporal ordering of events. For example, an individual could become a single orphan at the same age he or she experiences sexual debut, making unclear which event took place first. Lagging the orphanhood variables ensures that individuals became orphans before events of interest occurred.

Two sets of models are used for each outcome. Model 1 includes timing of orphanhood and control variables (age, age squared, urban residence, urban residence before age 12, wealth index, food shortages before age 10, religion, and ethnicity). Model 2 adds education variables (currently attending school and ever attended school) to examine whether education explains the association between timing of orphanhood and outcomes of interest. Because each individual contributes multiple person-years, all models are adjusted for clustering at the individual level. Survey weights are used in estimations of models.

RESULTS

Table 2 provides descriptive statistics for timing and type of orphanhood by country for both sexes combined.⁹ In Burkina Faso and Ghana, fewer than 17 percent of respondents are orphans at the time of the survey. This figure is much greater (approximately 30 percent) in Malawi and Uganda, where HIV prevalence is higher. In all four countries, more than half of all orphans are paternal orphans. Maternal orphans are the second most common type of orphan, followed by double orphans, except in Uganda, where double orphans outnumber maternal orphans.

The pattern of the distribution of respondents by orphan status before age 10 is similar to the pattern observed for orphan status at the time of the survey. The only exception is in Uganda, where the proportion of maternal orphans is greater than that of double orphans before age 10. As can be expected, levels of orphanhood are lower before age 10 than at the time of the survey in all four countries.

In Burkina Faso and Ghana, approximately 7–8 percent of respondents reported a parental death during adolescence (between ages 10 and 19). The proportions are much higher in Malawi and Uganda, where 16 percent and 12 percent, respectively, suffered the death of at least one parent. In all four countries, the majority of nonorphans who experienced a parental death became single orphans. Only a small proportion became double orphans. Whereas 5–8 percent of single orphans in Burkina Faso and Ghana became double orphans during adolescence, these figures are much higher in Malawi and Uganda, where 16–20 percent became double orphans.

Table 3 presents the age-standardized distribution of respondents by outcome and country according to orphan status at the time of the survey.¹⁰ Not all types of female orphans are more likely than nonorphans to report ever having sex. The proportion of female double orphans who report having had sexual intercourse is significantly greater than the proportion among female nonorphans in all countries except Uganda. Rates of sexual debut among girls with one deceased parent are not significantly different from the rates among nonorphans, with the exception of female paternal orphans in Ghana and Malawi, where the rates are higher than among female nonorphans. In Malawi, this difference is marginally significant ($p = 0.06$). Uganda is the only country where differences in reports of sexual activity are not observed by orphan status.

Among boys, the proportions of orphans and nonorphans who reported sexual initiation are similar. The only exceptions are in Ghana and Malawi, where a greater proportion of double orphans (in Ghana) and maternal orphans (in Malawi) than nonorphans report experiencing

⁹Chi-squared tests were conducted to examine whether timing of orphanhood differs by sex. Because no statistically significant differences were found, both sexes are combined in Table 2.

¹⁰Because orphans are, on average, older than nonorphans, I standardized the age distribution of paternal, maternal, and double orphans to match that of nonorphans. I calculated the percentage of orphans who have experienced the outcomes of interest—sexual debut and marriage—using the following equation: $P^j = \sum_{i=12}^{19} R_i^j * C_i^s$, where P^j equals the age-standardized proportion of orphans (paternal, maternal, or double) who have experienced sexual debut or marriage; R_i^j is the proportion of orphans at age i who have experienced sexual debut or marriage; and C_i^s is the proportion of nonorphans at age i .

sexual debut. The difference in Ghana is marginally significant ($p = 0.07$). Transitions to marriage are examined among girls. In Malawi and Uganda, girls who are maternal orphans are more likely to report marriage than are nonorphans. In Uganda, this difference is only marginally significant ($p = 0.08$).

Event History Analysis

Table 4 displays odds ratios from discrete-time event history models of early sexual debut among girls. In Model 1, in which all socioeconomic characteristics except education are controlled for, girls who became double orphans before age 10 in Burkina Faso, Malawi, and Uganda have significantly higher odds of early sexual debut than do nonorphans. In Ghana, the odds ratio is 1.52 and is close to being significant ($p = 0.09$). The odds ratios for becoming a double orphan during adolescence in Burkina Faso (2.01) and Malawi (1.59) are large but not statistically significant, possibly because of low statistical power resulting from small numbers of respondents becoming double orphans during adolescence. Not shown are results of a test of whether odds ratios of becoming a double orphan before age 10 are statistically different from odds ratios of becoming a double orphan during adolescence. In Burkina Faso, Ghana, and Malawi, timing of orphanhood does not appear to be of consequence. Double orphans, regardless of when they were orphaned, are at increased risk of early sexual debut. In Uganda, only girls who became double orphans before age 10 are at greater risk of early sexual debut. After controlling for education (in Model 2) the strength of the relationship between being a double orphan before age 10 and early sexual debut declines slightly in Burkina Faso, Ghana, and Uganda, but remains the same in Malawi, suggesting that education explains very little of their increased risk.

Table 5 presents odds ratios of early sexual debut among boys. For some types of orphans, odds ratios are greater than one, but none are statistically significant. Malawi is the only country where a marginally significant association is found. Boys who became paternal orphans before age 10 have marginally higher odds of experiencing early sexual debut ($p = 0.09$).

Table 6 displays odds ratios of early marriage among girls. In Model 1, Uganda is the only country that appears to have a positive and statistically significant relationship between timing of orphanhood and early marriage. Paternal and double orphans have 74 percent and more than double the odds, respectively, of early marriage than those of nonorphans. Similar to tests conducted for early sexual debut among girls, I tested whether becoming a paternal or double orphan before age 10 is statistically different from becoming a single or double orphan during adolescence, respectively (results not shown). Whereas timing of orphanhood appears to matter for paternal orphans, it does not matter for double orphans in Uganda. Ghana is the only country where a negative association exists between orphanhood and early marriage. Girls who became paternal orphans before age 10 are significantly less likely to marry early than are nonorphans. When education is controlled for in Model 2, odds ratios for being a paternal and double orphan before age 10 in Uganda decline from 1.7 to 1.6, and 2.2 to 1.8, respectively, indicating that education explains a small portion of their increased risk.

Sensitivity analyses (not shown) were conducted to test whether results differ when orphans who do not know their age at parental death are dropped from the analytic sample. Among girls, the direction of odds ratios for early sexual debut generally remained the same. P-values increased, however, resulting in the odds ratio of being a double orphan before age 10 no longer being statistically significant in Malawi. For boys, the direction of odds ratios and significance levels remained the same. For the timing of marriage outcome, minimal differences were found in all countries except Burkina Faso, where odds ratios increased and became highly significant for maternal and double orphans before age 10.

LIMITATIONS

This study has a number of limitations. First, it is unable to control for unobserved heterogeneity. Childhood conditions such as household poverty could affect both orphan status and outcomes of interest, creating ambiguity regarding whether orphan status truly affects the timing of sexual debut and marriage. Whereas the National Survey of Adolescents did not collect data concerning childhood conditions before parental death, information on food shortages before age 10 and urban residence before age 12 was collected. These measures cover an extended period of time during which parental death could have happened at any age, however. Regardless, these measures are included in the regression analyses to act as proxies for childhood household wealth and childhood urban residence. When these proxy measures are excluded from the regression analyses, odds ratios and significance levels remain relatively stable.

Second, in the case of most ever-married adolescents, the wealth index variable refers to the household adolescents married into, rather than the household from which they came. Thus, this measure introduces some bias into the analysis of timing of marriage. Although a proxy variable for household wealth—food shortages before age 10—is included, this variable may not reflect the household's economic situation in the immediate years before marriage.

Third, some respondents may not know their exact age, resulting in some degree of age misreporting. Although age misreporting is common in surveys conducted in sub-Saharan Africa, especially in older populations, misreporting would seem to be minimal among adolescents. Even if some age misreporting exists, it would seem to be random and to not disproportionately affect orphans.

Fourth, roughly 20 percent of orphans did not know their age at parental death. This poses a major problem because this study examines how the timing of orphanhood is associated with early sexual debut and early marriage. Omitting orphans who do not know their age at parental death could introduce bias into estimates that are based on the analytic sample. Rather than removing these orphans from the analysis, I assumed that they must have been younger than age 10 when they lost their parent(s). As described in the Methods section, I provide support for this assumption by using data from the Demographic and Health Surveys.

Fifth, a certain amount of measurement error is expected with self-reports of sexual debut. As observed in many surveys, social desirability bias can result in boys over-reporting and girls under-reporting sexual activity (Mensch et al. 2003; Zaba et al. 2004; Luke, Clark, and

Zulu 2011). Whereas boys are expected to engage in sexual activity, girls are expected to abstain until marriage. Conforming to social mores can even extend to married adolescents because some may alter their reports of the timing of sexual activity to coincide with marriage. In regard to this study, results can be biased if misreporting of sexual activity differs by orphan status. Adolescents who have at least one living parent may be more careful about reporting sexual activity because they fear that their parent(s) will find out. This could possibly explain why only female double orphans were found to be at increased risk of early sexual debut.

Sixth, events of interest are reported in years, making it impossible to determine the ordering of events that occurred at the same age. To ensure the temporal ordering of events, I lagged orphanhood and schooling variables by one year. Doing so provides conservative estimates of associations between lagged variables and timing of sexual debut and marriage. Odds ratios may, in reality, be higher if orphans turn to sexual activity or marry soon after a parent dies.

Finally, the survey's sampling frame is limited to households, excluding street children and those living in boarding schools and orphanages, opening up the possibility of sample bias. Adolescents not residing in households may be at greater risk of early sexual debut and possibly early marriage. Street children, for instance, may engage in sexual activity as a survival mechanism, exchanging sex for money and/or food. Thus, the generalizability of findings may be limited to adolescents living in households. In addition, orphans with stronger family ties and/or wealthier family members may be more likely to be placed in households. These matters should not greatly affect the analyses, however, because the vast majority of orphans live in households. In a study of two large cities—Blantyre (Malawi) and Kingston (Jamaica)—99 percent of orphans and vulnerable children were found to be living in households (UNICEF 2006).

DISCUSSION

The present study builds upon previous studies that have examined the relationship between orphanhood, sexual debut, and marriage among adolescents in sub-Saharan Africa. What sets it apart is the use of discrete-time event history models to take into account the ordering of events, especially between orphanhood, sexual debut, and marriage. Previous studies may have overestimated these associations by failing to exclude respondents who became orphans after the outcome of interest occurred (Gregson et al. 2005; Thurman et al. 2006; Operario et al. 2007; Nyamukapa et al. 2008; Palermo and Peterman 2009; Robertson, Gregson, and Garnett 2010). This study also examines a rarely explored aspect of orphanhood—the timing and type of parental death and their relationship to early sexual debut and early marriage. Earlier studies, with the exception of Birdthistle and colleagues (2008), did not make this distinction. In instances where differences exist by orphan status, this study examines whether education acts as a mediating factor between orphanhood and outcome variables, specifically early sexual debut and early marriage.

In this study, female double orphans were found to be at increased risk of early sexual debut. With a few exceptions, this finding conflicts with conclusions reached in previous studies

that disaggregated orphan status. Robertson, Gregson, and Garnett (2010) found that maternal and double orphans are at greater risk of early sexual debut in countries with high HIV prevalence (greater than 5 percent) but did not find any differences in risk by orphan status in countries with low HIV prevalence. In a study of ten sub-Saharan African countries, Palermo and Peterman (2009) reported a finding similar to mine for Malawi but found that maternal orphans are at increased risk in Uganda. In the remaining eight countries, they did not find a distinct pattern between type of orphan and early sexual debut. Other studies have focused specifically on Zimbabwe and have shown that paternal and maternal orphans are at greatest risk (Birdthistle et al. 2008; Nyamukapa et al. 2008). To my knowledge, Birdthistle and colleagues (2008) were the only other researchers to take into account in their study the timing of orphanhood, finding paternal orphans before age 12 to be at increased risk. The researchers, however, used multistate life tables rather than multivariate regression models to reach this conclusion, making it questionable whether their finding still holds when control variables other than age are taken into account. The present study, in contrast, found no difference by timing of orphanhood, except in Uganda, where only double orphans before age 10 are at increased risk. This unexpected finding demonstrates that, in at least some countries, having a living parent during adolescence is important in reducing the risk of early sexual debut.

This study reveals that education does not explain double orphans' increased risk of early sexual debut. Rather, other causal mechanisms associated with being a double orphan could be working to raise their risk. A low level of parental monitoring, by either biological parents or caregivers, is associated with an elevated risk of premarital sexual activity (Biddlecom et al. 2009).¹¹ In instances where sexual debut preceded marriage, lack of parental monitoring could have placed double orphans at higher risk. In contrast to double orphans, single orphans may still be under the direct supervision of their surviving parent. Even if this is not so, caregivers may do a better job of closely supervising them, especially if they had been entrusted into their care by the orphans' surviving parent. Qualitative studies have shown that some, but not all, orphans report being treated differently from caregivers' biological children (Abebe and Aase 2007; Mojola 2011). Feeling neglected, double orphans, more so than single orphans, may turn to sexual activity as a means of gaining love and affection that is not provided at home (Long-field et al. 2004; Juma, Askew, and Ferguson 2007; Mojola 2011). Poverty is another mechanism that could explain double orphans' greater risk of early sexual debut. Lack of material goods, such as food and clothing, may lead double orphans to use transactional sex as a means of acquiring these goods (Muula et al. 2003; Thurman et al. 2006; Juma, Askew, and Ferguson 2007; Cluver et al. 2011; Mojola 2011). Single orphans, on the other hand, may continue to receive financial and material support from their living parent.

Only a handful of studies have examined the relationship between disaggregated orphan status and early sexual debut among boys. Nyamukapa and colleagues (2008), combining both boys and girls, found that paternal and maternal orphans are at greater risk of early

¹¹Biddlecom, Awusabo-Asare, and Bankole (2009) created an index of parental monitoring based on how an adolescent perceives parent or parent-figure knowledge of three matters: where the adolescent goes at night, what the adolescent does with his or her free time, and who the adolescent's friends are.

sexual debut in Zimbabwe. Robertson, Gregson, and Garnett (2010), in contrast, did not find male orphans of any type to be at increased risk of early sexual debut in their study of 10 sub-Saharan African countries. My findings are consistent with those of the latter study. Considering that sexual transactions often involve gift-giving, typically from boys to girls (Moore, Biddlecom, and Zulu 2007; Poulin 2007; Swidler and Watkins 2007), I find it surprising that male orphans and nonorphans have similar odds of sexual debut. Orphans are more likely to come from poorer households (Case, Paxson, and Ableidinger 2004), decreasing the likelihood that male orphans will have the economic resources to provide gifts in exchange for sex. Furthermore, many girls seek romantic and sexual relationships with aspirations for marriage (Clark, Poulin, and Kohler 2009). They may perceive male orphans as lacking the financial means to provide for them once they are married. Two reasons could explain why no difference exists in the risk of early sexual debut by orphan status. Whereas male orphans may be successful in finding girls with whom to have sex, they may be engaging in sexual activity less frequently than nonorphans. Moreover, male orphans could also be over-reporting their sexual activity because they are “supposed to be” having sex (Mensch, Hewett, and Erulkar 2003; Zaba et al. 2004; Luke, Clark, and Zulu 2011). They may either misreport engaging in sexual activity or misreport their age at sexual debut.

This study finds that orphanhood is not associated with early marriage, except in Uganda, where paternal and double orphans are at increased risk. Whereas Palermo and Peterman (2009) found paternal orphans to be at increased risk in Uganda, they also found this to be true among maternal orphans. In Malawi, they found that only double orphans had greater odds of early marriage. Of the remaining eight countries in their analytic sample, the researchers found no distinct pattern between type of orphan and early marriage. In a longitudinal study of the Kagera region in Tanzania, Beegle and Krutikova (2008) reported a heightened risk among 17–23-year-old paternal orphans.

Although previous findings have shown, for the most part, that some types of orphans are more vulnerable to early marriage than nonorphans, this does not appear to be so in the data I used, except in Uganda. One possible explanation for my finding could be that benefits to caregivers act as incentives to delay early marriage. Adolescents have reached the age where they can contribute to both household welfare and income. For instance, orphans can carry out household chores such as cleaning and cooking, take care of younger children, sell goods in the market, and perform agricultural labor (Ansell and van Blerk 2004; Mojola 2011). Because of orphans’ potential to contribute to household needs, caregivers may agree to take care of them. Furthermore, families taking care of orphans may receive financial, food, and material benefits from the government or local NGOs (Chirwa 2002; Abebe and Aase 2007; Oleke et al. 2007; Nyamukapa et al. 2010). Alternatively, orphans may encounter obstacles that delay early marriage. For instance, in countries with high HIV prevalence, orphans may face HIV-related stigma because of suspicions about their parent's death (Cluver and Gardner 2007; Thupayagale-Tshweneagae and Mokomane 2012), making them less attractive in the marriage market. In instances of recent death, adolescent orphans may be forced to migrate to another household (Ansell and van Blerk 2004; van Blerk and Ansell 2006), often in a different village, resulting in more time spent becoming acquainted with potential marriage partners.

Some of my findings are not consistent with conclusions reached in previous studies. These discrepancies are most likely a product of methodological differences. Unlike previous studies, my study takes into account the temporal ordering of events, specifically the timing of parental death in relation to sexual debut and marriage. Not all prior studies excluded respondents who became orphaned after sexual debut or marriage occurred, likely leading to associations that were overestimated. Alternatively, orphan status may not necessarily be a predictor of early sexual debut or early marriage in all sub-Saharan African countries because considerable heterogeneity exists in different contexts. As the present study has already shown, only one country demonstrates an association between orphanhood and marriage. Instead, country-specific mechanisms, associated with cultural norms of orphan care, sexual debut, and marriage, could be driving these differences. The literature on orphanhood and child well-being provides support for this possibility, and studies have increasingly shown that these relationships vary across contexts, differing by orphan type and country (Case, Paxson, and Ableidinger 2004; Gregson et al. 2005; Nyamukapa and Gregson 2005; Case and Ardington 2006; Thurman et al. 2006; Evans and Miguel 2007; Operario et al. 2007 and 2011; Timaeus and Boler 2007; Beegle and Krutikova 2008; Birdthistle et al. 2008 and 2009; Nyamukapa et al. 2008; Palermo and Peterman 2009; Ardington and Leibbrandt 2010; Pascoe et al. 2010; Robertson, Gregson, and Garnett 2010).

Results from this study also indicate that timing of orphanhood does have an effect on the outcome in some, but not all, countries. Whereas female double orphans, regardless of timing of parental death, are at greater risk of early sexual debut in Burkina Faso, Ghana, and Malawi, this is not the case in Uganda, where only double orphans before age 10 are at increased risk. Furthermore, Uganda is the only country where some types of orphans are found to be at risk of early marriage. Double orphans, regardless of the timing of parental death, and paternal orphans before age 10 are especially vulnerable to early marriage. The inconsistency of these results point to the possibility that context probably does matter. As stated earlier, country-specific mechanisms could be driving these differences. Future studies examining orphan well-being should consider taking into account the timing of parental death. In cases where the timing of orphanhood is of consequence, policymakers and program designers can create policies and interventions to better target the most vulnerable groups of orphans.

CONCLUSION

This study examines orphans in both high- and low-HIV-prevalence countries. In both sets of countries, female double orphans are at greatest risk of experiencing early sexual debut. Only in Uganda are girls who became paternal and double orphans more likely to marry early. No associations are found between orphan status and early marriage in the other three countries. These results thus indicate that female double orphans are a vulnerable, high-risk group, regardless of the magnitude of a country's AIDS epidemic. The proportion of double orphans, however, is small in countries with low HIV prevalence, less than 2 percent at the time of the survey, and will in all likelihood decline as adult mortality improves, unless HIV prevalence increases unexpectedly. Although double orphans constitute a relatively small proportion of adolescents in countries with high HIV prevalence (less than 8 percent at the time of the survey), the prevalence of double orphans will probably increase (Monasch and

Boerma 2004), at least for the time being because only 56 percent of all HIV-positive adults in need of ARVs are receiving treatment (UNAIDS 2012).

This analysis demonstrates that, at least in the four countries studied here, orphans as a whole are not necessarily a high-risk group for early sexual debut and early marriage. Rather, their risks differ by sex, type of orphan, timing of parental death, and country. Whereas female double orphans are at increased risk of early sexual debut and early marriage, they constitute fewer than 10 and 25 percent of orphans in low- and high-HIV-prevalence countries, respectively. More importantly, they comprise only a small fraction of adolescents, making it difficult to specifically target them through policy and programming. Further research, possibly looking at other dimensions of orphan care is needed to pinpoint the causal mechanisms working to increase double orphans' vulnerability to early sexual debut and early marriage, before substantial efforts are made to target them as a high-risk group.

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Appendix

Table A1

Percentage of respondents aged 12–19 years, by selected background characteristics, according to sex and country, four sub-Saharan African countries, 2004

Characteristic	Girls				Boys			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Highest education completed								
None	63.3	9.0	3.2	4.4	51.3	6.3	2.1	2.2
Incomplete primary	19.4	72.5	80.0	73.0	27.3	76.6	81.3	73.4
Complete primary	8.6	12.3	5.2	9.3	10.6	10.3	6.4	9.9
Incomplete or complete secondary	8.8	6.2	11.6	13.4	10.9	6.7	10.2	14.6
Number of grades of schooling completed (mean)	2.0	5.7	4.9	5.0	2.5	5.6	4.8	5.1
Currently in school	21.9	71.1	71.3	70.8	30.4	77.4	79.1	80.5
Urban residence	26.4	48.6	22.8	11.8	21.2	44.9	23.9	9.6
Food shortages before age 10								
Rare/does not know ^a	87.5	74.1	41.2	50.8	89.5	68.2	30.5	61.5
Occasional	9.4	19.0	40.6	34.2	8.4	20.0	47.3	31.4
Frequent	3.2	6.9	18.2	15.0	2.1	11.8	22.2	7.2
Religion								
Catholic	22.3	17.6	26.2	42.6	18.8	16.8	25.0	43.2
Protestant	4.6	61.9	57.3	45.0	3.7	55.7	58.5	41.2

Characteristic	Girls				Boys			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Muslim	61.1	15.6	12.1	11.6	63.7	20.3	12.1	13.5
Other	12.1	5.0	4.5	0.7	13.9	7.2	4.5	2.0
Age at sexual debut among respondents who have ever had sex (mean)	15.4	15.4	15.3	14.7	14.8	15.3	14.2	14.3
Age at first marriage among ever-married female adolescents (mean)	15.9	16.1	15.7	16.0	—	—	—	—
Weighted (N)	(3,004)	(2,116)	(1,981)	(2,520)	(2,872)	(2,152)	(1,947)	(2,380)

— = Not applicable.

^aFor Burkina Faso, this category includes “never.”

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TABLE 1

Percentage of respondents orphaned by age 10, by country and survey, four sub-Saharan countries, 1998–2004

Country/survey ^a	Survey year	Assumption ^b	Age	Weighted (N)	Percentage who were orphans by age 10			
					Any type	Paternal	Maternal	Double
Burkina Faso								
DHS	2003	na	10	(1,979)	10.5	6.5	2.9	1.2
NSA	2004	1	12	(911)	8.5	5.1	3.0	0.4
NSA	2004	2	12	(911)	5.2	3.4	1.7	0.1
Ghana								
DHS	1998	na	10	(671)	7.5	4.5	2.6	0.4
NSA	2004	1	16	(520)	6.1	4.4	1.7	0.0
NSA	2004	2	16	(520)	3.4	2.4	1.1	0.0
Malawi								
DHS	2000	na	10	(1,788)	18.9	10.1	5.6	3.2
NSA	2004	1	14	(571)	14.6	10.0	3.2	1.4
NSA	2004	2	14	(571)	9.1	6.0	2.3	0.8
Uganda								
DHS	2000	na	10	(1,375)	20.9	11.5	4.7	4.6
NSA	2004	1	14	(831)	20.7	12.8	4.6	3.3
NSA	2004	2	14	(831)	13.1	7.9	3.6	1.6

na = Not applicable. DHS = Demographic and Health Survey. NSA = National Survey of Adolescents.

^a In the DHS, orphan rates are calculated for children at age 10. In the NSA, orphan rates refer to orphan status before age 10 for respondents listed as being age “x.”^b Assumption 1: Orphans who do know their age at parental death became orphans before age 10. Assumption 2: Orphans who do not know their age at parental death became orphans during adolescence.

TABLE 2

Percentage of 12–19-year-old respondents, by timing and type of orphanhood, according to country, four sub-Saharan African countries, 2004

Timing of Orphanhood	Burkina Faso	Ghana	Malawi	Uganda
Orphan status at the time of the survey				
Nonorphan	83.2	87.0	71.3	70.5
Paternal orphan	10.8	9.8	15.3	16.3
Maternal orphan	4.2	2.6	7.0	5.7
Double orphan	1.9	0.6	6.4	7.4
Orphan status before age 10				
Nonorphan	90.6	93.8	84.8	80.2
Paternal orphan	5.9	4.6	8.5	12.2
Maternal orphan	2.7	1.5	4.5	4.2
Double orphan	0.8	0.1	2.1	3.4
Changes in orphan status during adolescence (age 10–19)				
Experienced any change in orphan status	8.1	7.1	16.1	12.3
Progressed from nonorphan to single orphan	7.0	6.6	11.9	8.3
Progressed from nonorphan to double orphan	0.4	0.2	1.7	1.3
Progressed from single orphan to double orphan	7.5	4.7	19.8	16.1
Adult HIV prevalence in 2001	2.1	2.3	13.8	7.0
Weighted (N)	(5,876)	(4,268)	(3,927)	(4,890)

SOURCES: National Survey of Adolescents; UNAIDS (2010).

TABLE 3

Age-standardized percentage distribution of respondents aged 12–19 who experienced sexual debut or marriage, by country, according to orphanhood status at time of survey, four sub-Saharan African countries, 2004

Outcomes	Nonorphan	Paternal orphan	Maternal orphan	Double orphan
Ever had sex (girls)				
Burkina Faso	25.1	25.1	21.7	40.9 *
Ghana	15.7	20.2 *	12.4	22.3 *
Malawi	17.3	21.5	22.7	31.2 ***
Uganda	26.2	28.3	27.3	28.4
Ever had sex (boys)				
Burkina Faso	20.6	22.6	23.6	25.2
Ghana	8.9	6.5	11.1	9.9
Malawi	37.9	42.9	46.6 *	42.1
Uganda	29.7	32.2	30.2	30.6
Ever married (girls)				
Burkina Faso	13.4	11.8	16.2	19.3
Ghana	4.5	5.9	4.4	1.7
Malawi	7.7	9.7	15.6 *	11.4
Uganda	9.8	11.5	13.0	14.1

NOTE: Samples are weighted according to survey weights. Age standardization is based on age distribution of nonorphans.

SOURCE: National Survey of Adolescents.

* Difference from nonorphans is significant at $p < 0.05$

*** $p < 0.001$.

TABLE 4

Odds ratios from discrete-time event history models identifying associations between timing and type of orphanhood and early sexual debut among 12–19-year-old girls, by country, four sub-Saharan African countries, 2004

Timing of orphanhood	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Nonorphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.13	0.96	0.82	1.22	1.12	0.94	0.75	1.20
Maternal orphan	1.01	1.11	1.58	1.07	0.97	1.01	1.58	1.02
Double orphan	3.17**	1.52	1.95*	1.52*	2.97**	1.33	1.95*	1.47
Became single orphan during adolescence	1.21	1.30	0.97	0.86	1.25	1.37	0.86	0.88
Became double orphan during adolescence	2.01	0.79	1.59	0.71	1.97	0.85	1.60	0.71
Number of person-years of observation	16,251	12,231	10,692	13,319	16,251	12,231	10,692	13,319
Number of respondents	(2,901)	(2,102)	(1,934)	(2,489)	(2,901)	(2,102)	(1,934)	(2,489)
Pseudo R ²	0.27	0.21	0.21	0.17	0.27	0.21	0.22	0.18

NOTE: Model 1 includes controls for age, age squared, urban residence, urban residence before age 12, wealth index, food shortages before age 10, religion, and ethnicity. Model 2 includes controls from Model 1 plus ever attended school and currently attending school.

SOURCE: National Survey of Adolescents.

* Significant at $p < 0.05$

** $p < 0.01$.

TABLE 5

Odds ratios from discrete-time event history models identifying associations between timing and type of orphanhood and early sexual debut among 12–19-year-old boys, by country, four sub-Saharan African countries, 2004

Timing of orphanhood	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Nonorphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.20	0.75	1.33	1.17	1.19	0.76	1.34	1.16
Maternal orphan	1.02	1.41	1.36	0.86	1.04	1.35	1.35	0.86
Double orphan	0.39	ne	0.73	1.31	0.40	ne	0.76	1.30
Became single orphan during adolescence	1.11	0.66	0.83	1.19	1.11	0.63	0.84	1.19
Became double orphan during adolescence	1.80	2.08	0.94	1.16	1.77	2.08	0.91	1.13
Number of person-years of observation	16,698	12,707	10,280	12,640	16,698	12,707	10,280	12,640
Number of respondents	(2,965)	(2,140)	(1,979)	(2,377)	(2,965)	(2,140)	(1,979)	(2,377)
Pseudo R ²	0.12	0.11	0.10	0.09	0.12	0.12	0.10	0.09

ne = Not estimated, perfectly collinear.

NOTE: Model 1 includes controls for age, age squared, urban residence, urban residence before age 12, wealth index, food shortages before age 10, religion, and ethnicity. Model 2 includes controls from Model 1 plus ever attended school and currently attending school.

SOURCE: National Survey of Adolescents.

TABLE 6

Odds ratios from discrete-time event history models identifying associations between timing and type of orphanhood and early marriage among 12–19-year-old girls, by country, four sub-Saharan African countries, 2004

Timing of orphanhood	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Nonorphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.18	0.12 *	1.16	1.74 **	1.07	0.11 *	0.98	1.60 *
Maternal orphan	1.78	0.38	1.74	1.44	1.67	0.36	1.74	1.30
Double orphan	2.67	ne	0.66	2.17 **	2.12	ne	0.60	1.81 *
Became single orphan during adolescence	0.99	0.94	1.36	0.81	1.08	0.99	1.15	0.80
Became double orphan during adolescence	2.49	ne	1.21	1.24	2.61	ne	1.25	1.18
Number of person-years of observation	11,164	8,594	7,357	9,316	11,164	8,594	(7,357)	(9,316)
Number of respondents	(2,900)	(2,118)	(1,952)	(2,493)	(2,900)	(2,118)	1,952	2,493
Pseudo R ²	0.24	0.18	0.16	0.21	0.25	0.21	0.18	0.24

ne = Not estimated, perfectly collinear.

NOTES: Model 1 includes controls for age, age squared, urban residence, urban residence before age 12, wealth index, food shortages before age 10, religion, and ethnicity. Model 2 includes controls from Model 1 plus ever attended school and currently attending school.

SOURCE: National Survey of Adolescents.

* Significant at $p < 0.05$

** $p < 0.01$.