Fertility among orphans in rural Malawi: Challenging common assumptions about risk and mechanisms

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Abstract

A substantial literature has been developed around whether orphans, a population rapidly expanding due to the HIV/AIDS epidemic, suffer disadvantage relative to their non-orphaned peers. Despite this attention, however, the exact nature of the orphan disadvantage and the specific mechanisms driving such disadvantage are poorly understood. This paper focuses on pregnancy outcomes, an area of particular concern for adolescent orphans and one in which the evidence is equivocal. When differences in fertility do emerge in the literature, there is an implicit assumption that the excess pregnancies are unintentional and reflect greater sexual risk taking among orphans. We pose an alternative explanation: orphans are intentionally becoming pregnant in an attempt to achieve a sense of normality, acceptance and love. Using data for rural Malawian youth (15-25 years old), this study compares orphans with non-orphans to identify differences in sexual risk behavior and fertility preferences. We find no evidence of increased sexual risk among orphans. There is, however, greater support for the second mechanism: we find maternal orphans report higher fertility desires. For male maternal orphans, this translates into greater actual fertility. Strategies that address personal desires for parenthood will need to be part of prevention programs aimed at orphaned youth.

Introduction

In sub-Saharan Africa, millions of youth have experienced parental bereavement due to the HIV/AIDS epidemic. A parental death can have a profound impact on children and young adults, leading practitioners and researchers alike to emphasize the adverse consequences of orphaning. There is a substantial body of literature examining health, education and economic disparities among orphaned children (Heymann et al., 2012), and there is growing concern about the reproductive health of adolescents and youth. We ask whether this concern is warranted and test potential mediators of risk. We focus this paper on fertility specifically, as early childbearing is associated with substantial mortality for both the mother and her infant in developing countries (World Health Organization, 2007). See Operario et al. (2011) for a review on the related topic of HIV infection.

We begin by reviewing the existing literature on orphanhood and fertility and questioning the widely-held belief that orphans are at substantially higher risk for early pregnancy. We emphasize that the exact mechanisms through which orphanhood affects risk behavior have not been clearly established through research. This is a critical oversight, as the success of programs to properly identify and intervene with at-risk youth likely hinges on a clear understanding of the mechanisms. Most studies to date suggest that fertility disparities are a result of heightened risk taking; we critically review the literature and find mixed evidence for this pathway. Thus we suggest a second mechanism: to achieve a sense of normality and acceptance, orphans may actively accelerate their childbearing. In this pathway, orphans would desire and have more children, but not engage in more risk behavior. Finally, we test alternative pathways and the pervasive assumption of greater fertility among orphaned youth, using a uniquely rich dataset from rural Malawi, a country in the grips of both extreme poverty and a generalized AIDS pandemic.

Orphanhood and Pregnancy

The relationship between orphanhood and pregnancy has not been decisively established. Six recent studies have assessed this relationship in sub-Saharan Africa. Four studies demonstrated greater rates of pregnancy among orphans compared with non-orphans, however their geographic scope was limited to Zimbabwe and South Africa (Birdthistle et al., 2008; Gregson et al., 2005; Kang et al., 2008; Operario et al., 2007). Importantly, these findings are contradicted by two more recent studies, also encompassing data from Zimbabwe and South Africa (Nyirenda et al., 2010; Palermo & Peterman, 2009). Moreover, Palermo and Peterman (2009) examined this relationship using data from 10 countries in sub-Saharan Africa, and found differences in only three countries.

Potential Mechanisms

When differences in fertility do emerge in the literature, they are implicitly ascribed to increased structural vulnerability and related sexual risk behavior among orphans. Thus, we start by exploring the evidence in support of such a mechanism.

1. Structural vulnerability and sexual risk

In this pathway, the adverse impacts of orphanhood, such as impoverishment and educational curtailment, reduce sexual power. As a result, orphans may be more easily exploited or coerced into high risk sex, and unwanted pregnancies may result. For example, Gregson et al (2005) attribute observed reproductive risk to educational disadvantage: "High proportions of HIV infections, STIs and pregnancies among teenage girls in eastern Zimbabwe can be attributed to maternal orphanhood and parental HIV. Many of these could be averted through further female secondary school education."

To examine supporting evidence, we have broken this pathway into three necessary components: 1) orphans experience greater socioeconomic disadvantage; 2) orphans engage in greater sexual risk behavior; and 3) socioeconomic disadvantage drives sexual risk among orphans. On all three counts, we find the evidence to be inconclusive.

An extensive body of research has examined economic insecurity and educational disadvantage among orphans (e.g., Guo et al., 2012). Evidence has been mixed. Longitudinal studies in South Africa and Kenya have documented lower rates of school enrollment (Case & Ardington, 2006; Evans & Miguel, 2007), while studies in Malawi, Tanzania and Burkina Faso have found no orphan disadvantage (Kurzinger et al., 2008; Sharma, 2006). Where educational disparities do appear, they are largely associated with maternal orphaning (Guo et al., 2012). The picture that emerges around economic disadvantage is equally varied, both in regard to country context and type of orphan (Ainsworth & Filmer, 2006; Bicego et al., 2003). In contrast with schooling, poverty is more common among paternal compared to maternal orphans (Ainsworth & Filmer, 2006). Taken together, this body of evidence suggests that orphan disparities in human capital accumulation are not always present; rather they depend on context, orphan type, and the specific outcome under study.

A similar pattern emerges for sexual risk. While research has often found earlier age of sexual debut among female orphans (Kang et al., 2008; Operario et al., 2007; Palermo & Peterman, 2009), other comparisons of orphans and non-orphans in sexual risk measures have produced conflicting results. Some studies document greater risk among female orphans, including multiple partnerships, transactional sex, and forced sex (Birdthistle et al., 2008; L. Cluver et al., 2011; Nyamukapa et al., 2008; Operario et al., 2007). Null findings on sexual risk behaviors are also widely reported among both female (Juma et al., 2013; 2010) and male orphans (Chae, 2013; Gregson et al., 2005; Nyirenda et al., 2010; Operario et al., 2007). Thus, despite the wealth of studies on the impact of orphanhood on sexual risk behavior, the results remain far from consistent.

Finally, a number of studies have tested the link between structural vulnerability and higher sexual risk taking among orphans, once again with mixed results. While two studies found poverty did mediate high risk sex for orphans (L. Cluver et al., 2011; Mkandawire et al., 2013), many more have found that the relationship between orphanhood and high risk sex persists after controlling for socioeconomic factors (Baird et al., 2010; Birdthistle et al., 2009; Chae, 2013; Cho et al., 2011; Operario et al., 2007).

2. Consequences of fertility preference

Taken together, the existing evidence falls far short of showing a universal pattern of high risk sexual behavior among orphans, and the reasons why orphan status may affect fertility remain poorly understood. As described above, investigations of reproductive health disparities among orphans have largely assumed that pregnancy is unintended. This focus obscures the fact that most adolescent pregnancies are in fact wanted: globally, three out of four adolescent births are planned (WHO, 2008). In sub-Saharan Africa, parenthood plays an important role in life aspirations and social standing (Dyer, 2007; Hollos & Larsen, 2008; Van Balen & Bos, 2010). For men, fatherhood further affirms masculinity (Barker & Ricardo, 2005; Nzioka, 2001). In this context, early births are socially acceptable and even encouraged. We hypothesize that in times of bereavement and uncertainty, orphans may see parenthood as a path to normalcy, social acceptance, and a more positive future. In this scenario, pregnancy intentions may drive sexual behavior, rather than be an unanticipated and unwanted outcome. We explore this alternative pathway in more detail below.

There is strong evidence that pregnancy intentions are robustly related to contraceptive use and pregnancy outcomes among adolescents (Jaccard et al., 2003; Rosengard et al., 2004). There is also a robust literature, though mostly from developed countries, that shows pregnancy intentions are higher among those in the most disadvantaged circumstances (Rubin & East, 1999). Specifically, low levels of perceived family support (Davies et al., 2003) and high levels of family stress (Ravert & Martin, 1996) have been identified as predictors of pregnancy desire among American adolescents. Under such circumstances, early childbearing is an opportunity to feel more loved, create family stability and reduce uncertainty (Afable-Munsuz et al., 2006; Geronimus, 1991). However, few studies have examined the psychosocial determinants of fertility intention among youth (Davies et al., 2003; Sipsma et al., 2011), and we know of none in sub-Saharan Africa.

Pregnancy intentions are not a static phenomenon however; they are dynamic and responsive to key life events (Heiland et al., 2008; Iacovou & Tavares, 2011; Liefbroer, 2009). Longitudinal research in Africa specifically has demonstrated temporal changes in the preferred number and timing of births (Kodzi et al., 2010; Sennott & Yeatman, 2012; Yeatman et al., 2013). In Ghana, 20% of women changed fertility preferences in the nine months between survey waves (Kodzi et al., 2010). A two year study of Malawian youth (ages 15-25) found even greater instability: approximately a quarter altered their preference in any given three-month wave, and only a third maintained a consistent preference across all eight survey waves (Yeatman et al., 2013). This is consistent with research from more developed contexts that suggests fertility preferences are most flexible at the beginning of the reproductive life cycle (Lacovou & Tavares, 2011).

Importantly, changes in fertility preference are not random: they are a response to changing circumstances and key life events (e.g., marriage, divorce, and impoverishment) (Heiland et al., 2008; Iacovou & Tavares, 2011; Kodzi et al., 2010; Liefbroer, 2009; Yeatman et al., 2013). As events unfold, individuals reassess the pros and cons of childbearing and adjust their

preferences accordingly (Heiland et al., 2008). Those who reap the anticipated benefit from childbearing may adjust their fertility preference further upward (Heiland et al., 2008). In the Malawi study, for example, fertility preference increased in the year after the death of a child (Yeatman et al., 2013). Less is known about whether the influence of key life events extends over a longer duration; research is limited to developed countries and provides only weak evidence for the impact of early life experiences (Heiland et al., 2008).

We suggest that orphanhood is a traumatic life event and that this experience influences fertility preferences. The death of a parent brings numerous psychological and social challenges. In addition to grief and bereavement, studies have shown that many orphans suffer from clinical depression and anxiety (Atwine et al., 2005; L. Cluver & Gardner, 2007). This can be accompanied by great social instability, including household disintegration, migration, and separation from siblings (Ford & Hosegood, 2005; Hosegood et al., 2004; Nyamukapa et al., 2010). In cases where AIDS is the suspected cause of death, orphans may experience secondary stigma (L. Cluver & Gardner, 2007; Lucie Cluver et al., 2008), exacerbating feelings of isolation.

In times of bereavement and family instability, orphans may see greater benefits to childbearing. Children can be a source of love, hopefulness and meaning when these are otherwise missing (Cooper et al., 2007). There is some empirical precedent: in the USA, a study of disadvantaged adolescents largely living outside of parental care found many wanted a baby to fulfill a need for love and to drive away loneliness (Montgomery, 2002). Similarly, girls from unstable families in Nicaragua reported seeking love and affection through alternative family formation (Berglund et al., 1997). Evidence from Africa is more limited, but in a qualitative study of people living with HIV in South Africa, participants reported that having children brought hope, happiness and a sense of normality (Cooper et al., 2007).

Orphans may also desire children in order to solidify relationships and increase the chances of marriage. Not only do many adolescent pregnancies precede marriage, but a Kenyan study showed premarital pregnancies were associated with a 13 fold increase in the likelihood of transitioning towards marriage (Clark et al., 2010). We know of only one study to examine the link between AIDS orphans' psychosocial state and entry into intimate relationships, and none that examine fertility specifically. Qualitative work by Majola (2011) suggests that orphaned girls describe a lack of parental love as motivating their relationship choices and sexual behavior.

Taken together, the above suggests that fertility preferences are malleable by key life events (Yeatman et al., 2013), and that orphanhood may be a particularly salient experience in this regard. We suggest that orphans are more likely to view childbearing as a pathway to a better future and greater social acceptance, and that this may explain excess pregnancy rates. We are not aware of prior literature that tests such a theory.

Our Study

With regard to fertility, neither the exact nature of the orphan disadvantage nor the specific mechanisms that explain the disadvantage are well understood. While the evidence on

orphanhood and sexual risk is inconclusive, the assumption that this drives fertility has persisted and alternative possibilities haven't been adequately tested. We thus use data from rural Malawi to answer the following questions:

1) Do orphaned youth experience greater structural disadvantage (via wealth and education) and sexual risk behavior compared with non-orphans?
2) Do orphaned youth report heightened fertility desires and childbearing compared to non-orphans?

To answer the above, we use a rich dataset that allows for nuanced exploration of how orphanhood type, orphanhood duration, and gender may influence the observed relationships. Previous literature suggests that reproductive health outcomes vary substantially between maternal and paternal orphans (Operario et al., 2011). While the role of orphanhood duration is far less studied, the existing literature and theory suggest it may be equally important in understanding impact (Birdthistle et al., 2008; Chae, 2013). Specifically, the recency of parental loss may drive an orphan's emotional state, and thus current fertility desires. Finally, all previous work on orphanhood and fertility is restricted to women. We examine these questions for men as well as women, recognizing that fertility is not solely a woman's issue. Moreover, we build gender-specific models to discern whether different mechanisms underlie risk for male and female orphans. By expanding the investigation to include fertility intentions, to investigate the salience of orphanhood duration, and to include men, this study opens the door to a more complete understanding of fertility among orphans.

Methods

Setting

Our data come from Malawi, where 10.6% of all adults aged 15-49 were HIV-positive in 2010 (National Statistical Office & ICF Macro, 2011). In addition to having one of the highest rates of HIV in the world, Malawi is also one of the poorest countries: it ranks 170th of the 186 surveyed countries in the 2013 Human Development Index. Over 7 million children under 18 are currently being raised in this environment, approximately 13% of whom have lost one or both parents (UNICEF, 2011). The 2004 Malawi Demographic and Health Survey shows that among orphans in Malawi, 57% are paternal orphans, 19% are maternal and 24% lost both parents (National Statistical Office & ICF Macro, 2005). The proportion of children aged 18 and younger who are orphans follows with HIV prevalence patterns in Malawi: orphanhood is higher in urban (18.2%) than rural areas (14.2%), and the southern region has both the highest HIV and orphanhood prevalence (15.7%) among the three regions of Malawi (National Statistical Office & ICF Macro, 2005).

Malawi shares several fertility-related characteristics with most other countries in sub-Saharan Africa. As in many other sub-Saharan African countries, Malawi has high rates of union formation with nearly all women enter their first marriage by their mid-20s ((National Statistical Office & ICF Macro, 2005). Malawi also has relatively high fertility with a TFR of 6.0 in 2004 (National Statistical Office & ICF Macro, 2005), and most childbearing taking place within marriage (Boileau et al., 2009). Residents of Malawi, however, marry at a relatively early age compared to most other countries (Reniers, 2003): the mean age of first marriage is

approximately 18 for women and 23 for men (National Statistical Office & ICF Macro, 2005). Given the young age at marriage, it follows that age at first childbearing and sexual debut is also relatively young: approximately 50% of women have started childbearing by age 18 in Malawi and age at sexual debut is 17.3 for women (aged 20-49) and 18.5 for men (aged 20-54) (National Statistical Office & ICF Macro, 2005).

Data: the Malawi Longitudinal Study of Families and Health

We used a dataset with several important features that enabled us to address our research questions. As we are interested in orphans in a high HIV prevalence setting, and potential differences between orphans and non-orphans in education, economic status, sexual behavior and fertility-related outcomes, we require data that contains measures for all of these features. Our research, importantly, goes beyond basic measures of these outcomes. We are interested in both actual fertility and desired fertility, and therefore require measures of both. We are also interested in the duration since parental death, as described above. Finally, unlike much research on fertility, orphanhood and sexual risk behavior, we are interested in examining relationships of interest for both men and women.

We use data from the Malawi Longitudinal Study of Families and Health (MLSFH).[1] The MLSFH was designed as a couples' survey, targeting a population-based representative sample of approximately 1,500 ever-married women and 1,000 of their husbands in three rural sites of Malawi. Following a household enumeration in the three designated survey sites in 1998, a random sample of approximately 500 ever-married women aged 15–49 were selected to be interviewed in each site, along with all of their spouses. The first follow-up in 2001 included all respondents from the first wave, along with any new spouses. The MLSFH returned to interview all respondents in 2004, 2006, 2008 and 2010. In addition, the MLSFH added a new target sample of approximately 1,500 young adults aged 15-27 in 2004 (both ever- and never-married). As in 2001, all new spouses of respondents were added to the sample in each wave of data collection. Most, but not all, of the respondents used in the analysis here came from this 2004 adolescent sample. However, we also include those from the original 1998 sample who were 25 years of younger at the time of interview, or were new spouses to existing respondents in a prior MLSFH wave.

We created our cohort using data from the fourth (2006) wave of MLSFH, as these data capture features essential for our analyses. The additions to the original sample increased the target sample size in 2006 to approximately 5,000 respondents, of whom 3,431 (69%) were successfully interviewed. Our sample of interest is young adults in rural Malawi aged 15-25, and there are 1,033 in the 2006 MLSFH sample (575 women and 458 men) who have information for variables of interest to this study.

Descriptions of the MLSFH data and sampling are presented in Watkins et al. (2003); Bignami et al. (2003), and Anglewicz et al. (2009). The MLSFH study was approved by the Institutional

[1] Between 1998 and 2004 the MLSFH was known as the Malawi Diffusion and Ideational Change Project (MDICP).

Review Board at the University of Pennsylvania and the Malawi National Health Sciences Research Council.

Measures

The MLSFH 2006 included extensive data on orphanhood, sexual risk behavior, fertility-related measures, and other characteristics and behaviors. First, MLSFH includes information on both parents of all respondents, including whether they are alive; and if not, how long ago they passed away. We categorize this orphanhood variable to (0) parents still alive, (1) parental death to within the last five years (2001-2006), and (2) parent died more than five years ago (i.e., prior to 2001). We include separate measures each for mother and father, to identify the individual importance of each.

Sexual risk measures in the MLSFH include the overall number of sexual partners, engaging in transactional sex, and age at first sex. MLSFH also included data on fertility-related outcomes, including desired fertility and actual fertility. We also include several background characteristics for respondents used in this research, including an index measure of wealth (using principal components analysis of 12 household amenities, as described in Filmer & Pritchett (2001); educational attainment, (measured as a three category variable: no education, some primary, secondary or higher), age, region of residence, number of living children, and marital status..

Analytic Methods

An important feature of our analysis is establishing the sequence of events between orphanhood and other measures of interest. Although our data are cross-sectional, the time since the parent died is retrospective. Comparing these retrospective reports with current behaviors in 2006 reduces the likelihood that the behavior of interest (such as sexual risk, fertility desires) preceded orphanhood for respondents. In particular, research has established the fluid nature of fertility desires, and suggests that life events can substantial alter current desires. It is important to note, however, that we are unable to parse out whether orphanhood preceded actual fertility, particularly for respondents whose parents died in the past five years. While this noise may bias the results towards the null, it will not create correlation: while a parental death may influence fertility, it is unlikely that fertility preferences or childbearing contribute to parental death.

We conduct our analysis in three steps. First, we run multivariate regressions to examine whether orphans in Malawi experience structural disadvantage, as documented elsewhere. To do so, the dependent variables in our regressions are wealth and education.

Second, we investigate whether there are differences in sexual risk behavior between orphans and non-orphans. We again use multivariate regressions to identify these differences. The variables we select for this analysis are guided by the literature on sexual risk behavior for orphans, and sexual risk that may result from structural disadvantage (such as exchange of money for sex with a recent partner). The full list of risk factors we examine are number of sexual partners, exchange of sex for money with a recent partner, having an outside sexual

partner while married or in a steady relationship, ever had sex, and age at marriage. The type of regression (OLS, logistic) differs accordingly from the dependent variable. Independent variables include those described above (education, wealth, age, region, orphanhood), marital status, and number of living children.

Finally, we turn to fertility-related outcomes. To examine whether there are differences in fertility-related outcomes between orphans and non-orphans, we again run multivariate regressions, with the same set of independent variables listed above. We begin with a common proximate determinant of fertility, ever-married status. Next we examine two measures of fertility: desired total fertility and number of living children. Finally, we also examine the relationship between orphanhood and longer-term fertility by running regressions with total number of living children in 2010 as the dependent variable and the same orphanhood measure in 2006 as the key independent variable (along with other control measures).

For this analysis it is important to note that we include separate indicators for maternal and paternal death, as these may have differential impacts on socioeconomic and emotional sequelae. We further refine our measures to indicate duration since parental death, acknowledging that more recent deaths may have a more pronounced impact on current fertility desires. Finally, gender may modify the relationship between parental loss and reproductive choices (e.g., the consequences of a maternal death may be more pronounced for a female orphan); thus all analyses are stratified by the orphans' sex.

Results

Background characteristics for our sample of 587 women and 482 men are presented in Table 1. Men and women are similar in many respects: the average age for both is approximately 20 years old, regional distribution is roughly equal across the three sites, and many of the fertility-related outcomes (desired and actual number of children) are approximately the same. Regarding our variables of interest, orphanhood does not vary substantially by sex: higher percentages have lost their father compared to mother (26% compared with 15% whose mother has died), which likely reflects the older ages for men compared to their wives in Malawi.

That said, several key variables differ between men and women: men have higher educational attainment (29% attended at least some secondary school, compared with 17% for women), and women are more likely to be currently married (and divorced or widowed) and marry at an earlier age. Whereas most of the sample is sexually active, men claim more lifetime partners than do women.

We first examine our regression results for structural disadvantage for orphans in Malawi (results shown in Table 2). It is evident that orphans in Malawi do indeed suffer from the same disadvantages as demonstrated elsewhere, and these differences appear to be primarily for orphans whose parents died a longer time in the past. Female orphans whose mother died more than five years ago have significantly less wealth, as do male orphans whose father died five or more years ago. For education, while there are no significant differences for female

orphans, male orphans whose mother died more than five years ago have less educational attainment. While these results generally show a disadvantage for orphans, it is important to note that men whose mother died more than five years ago actually have greater wealth than non-orphan peers.

Our results for differences in sexual behavior between orphans and non-orphans (Table 3 for women, Table 4 for men) are striking in the lack of significant results. Although some studies have shown that orphans may have greater sexual risk than non-orphans, we do not find any differences here. Specifically, in all regressions we run for men and women (including measures for number of sexual partners, exchange of money with recent sexual partners, having another partner while in a steady relationship, and ever had sex), we find only one instance where sexual risk is greater for orphans: women whose mother died in the past five years were significantly more likely to have another sexual partner while married or in a steady relationship. However, it is interesting to note an instance in which orphans actually have significantly *less* sexual risk: men whose fathers died in the past five years were less likely to have sexual partners outside of a marriage or steady relationship.

Next, we examine whether there are different fertility preferences and behaviors for orphans. As shown in Tables 5 (women) and 6 (men), there is evidence that there are differences in a determinant of fertility: marriage. Female orphans (whose mother died five or more years ago) are far more likely to be married (OR 5.37, $p \leq 0.05$) than non-orphans. The opposite, however, is true of men: men whose father died in the past five years are less than half as likely to be married (OR 0.44, $p \leq 0.10$). Orphans also have relatively different fertility-related outcomes. Both male and female orphans have greater desired fertility: female and male orphans whose mother died within the past five years have significantly higher desired fertility than non-orphans (0.52 and 0.97 more children respectively, $p \leq 0.05$). This is consistent for actual fertility as well: women whose father died more than five years ago have significantly more children ever born than non-orphans (0.31 more children, $p \leq 0.05$), as do male orphans whose mother died either recently or more than five years ago (1.06 and 0.47 more children respectively, $p \leq 0.01$). Finally we turn to the longer-term analysis of orphanhood and fertility, as shown in Table 7. As with the previous regressions, we find higher fertility among orphans, in which female orphans whose mother died five or more years ago in 2006 and male orphans whose mother died in the past five years (from 2006) have significantly more children than non-orphans by 2010.

Discussion

Previous studies have reported differences in fertility by orphan status; this study investigated two potential mechanisms that may individually or collectively underlie this risk. We found no evidence of a structural vulnerability mechanism: only limited educational and economic deficits were present in our sample, and these did not translate into riskier sexual behaviors for orphans compared to non-orphans.

We did find empirical support for the role of childbearing intentions in shaping fertility outcomes: orphans demonstrated greater fertility desires and had more children ever born.

This is the first study to demonstrate higher fertility desires among orphans living in areas characterized by high HIV prevalence. This finding suggests that orphans may exercise greater agency over reproductive outcomes than previously thought, though we caution that these decisions are still made within very constrained and difficult circumstances.

Fertility preferences were sensitive to both the type and duration of orphanhood. Only orphans who had recently lost their mother reported wanting a greater number of children. Previous research has similarly underscored the need for a more nuanced view of orphanhood: two studies demonstrated higher reproductive risk among maternal orphans only (Gregson et al., 2005; Kang et al., 2008); a third found that risk emerged for paternal orphans only if the death occurred before age 12 (Birdthistle et al., 2008). Qualitative research is needed to better understand orphan's emotional response to their mother's death, how this influences their desire to have children, and how social norms and context guide this process.

Further, studies of fertility, particularly within the context of HIV/AIDS, often exclude men. Given that men occupy a position of greater power in marital reproductive decisions, however, the preferences of male orphans may shift demographic trends far more than those of female orphans. Importantly, the findings contained here highlight that male orphans are reformulating their fertility desires and potentially modifying their reproductive behavior as a result of maternal loss. Future work could examine whether motivations are similar across genders, or whether men utilize a different rationale than women. For example, Nattabi et al. (2009) suggest lineage preservation may be important for men living with HIV, whereas women place more emphasis on health in explaining their fertility preferences.

One other finding highlights the importance of a gendered lens. Our finding that recent orphanhood was associated with pregnancy intentions but not realized childbearing among women in the 2006 survey is curious. Given that this discrepancy was not present for men, a potential explanation is that women face greater barriers to achieving their desired fertility. Men still dominate contraceptive and fertility decisions (Derose et al., 2002; Ezeh, 1993b), particularly in the early years of a marriage (Bankole, 1995). Women who want fewer children may fear violent reprisals if they use contraceptives (Bawah et al., 1999; Ezeh, 1993a; Fort, 1989; Heise et al., 2002); women who want more children may similarly be constrained by their partner's stated or assumed preferences. This explanation is consistent with a substantial body of literature on relationship power dynamics and fertility outcomes in sub-Saharan Africa (Blanc, 2001; Stephenson et al., 2012; Varga, 2003). An alternative explanation is that the 2006 preferences had recently changed in response to a parental death, but women had not yet had time to realize these new preferences. Support for the latter theory comes from the 2010 survey data: by this time, female orphans do have significantly more children than their non-orphaned counterparts.

The study was conducted in rural Malawi, which is characterized by early onset of both marriage and childbearing. This may have influenced the strength of the above findings and partially explain deviations from past research from neighboring countries. Only one other study has examined pregnancy outcomes among orphans in Malawi; they also found no

differences between female orphans and non-orphans (Palermo & Peterman, 2009). Thus, it is possible that the social desirability of early marriage and early childbearing in Malawi may weaken the impact of orphanhood on related outcomes, particularly among the older cohort included in this study. We encourage further exploration of these hypotheses under different cultural settings.

Limitations

There are several limitations worth noting. The MLSFH is a particularly rich dataset, but it was not collected with this study question in mind. The study population was 15-25 years old at the time of the first interview, and 58% were already parents. Thus we cannot distinguish the motivations underlying early pregnancies – those prior to age 15 and which may have the most profound health and education consequences - from later or second pregnancies. Nor can this study speak to total fertility across the reproductive cycle. Studies in Malawi have found that the fertility response to HIV varies by age, and suggest that the largest impact may be to hasten childbearing rather than to increase the total number of children born (Durevall & Lindskog, 2011). Our study focuses on a youth cohort, and thus data do not allow us to make inferences about net fertility, although our analysis of fertility by 2010 shows the same higher rate among orphans. We also note the relatively small sample size of respondents who lost a parent within the past five years, which may limit our ability to detect statistical significance in some regression models.

One advantage of our study is the use of retrospective reports of parent's death to establish the ordering of events of interest. For example, among respondents whose parents died five or more years before the study, it's unlikely that fertility preferences developed prior to parental death. That said, this ordering of events becomes more challenging to establish for individuals whose parents died within the past five years.

Policy relevance

While we acknowledge that the above findings are contextualized by Malawi's high fertility rates and generalized HIV epidemic, we still believe they have wider relevance for programmers trying to reduce sexual risk among orphans throughout the region. First, our findings suggest that structural interventions will fall short of fully addressing early childbearing and associated HIV risk among orphans. We are not suggesting that such interventions are not needed more generally - cash transfers, for example, are an increasingly popular structural intervention with demonstrated impact on sexual behaviors among adolescents (Pettifor et al., 2012) – but rather that their utility is in targeting more universal disadvantage. Our research suggests that orphans may have additional issues contributing to their fertility risk, and that programs should consider offering counseling to help orphans understand their grief and develop healthy coping mechanisms in response to uncertainty. We are not the first to suggest that improving coping skills may be one means to reduce risk (Sipsma et al., 2011), and there is some empirical support for this notion: in the USA, a family coping intervention reduced early pregnancy among daughters of HIV+ parents. However, the authors cautioned that this was not enough to mitigate risk among youth with extreme emotional distress (May 2006). For this group, we suggest psychological interventions, such as those focused on depression (Bolton et al., 2007),

may be necessary. Delivered in tandem with the structural interventions orphans may begin to conceptualize a more positive future independent of childbearing.

Second, HIV and pregnancy prevention programs that persist in approaching unprotected sex as solely an adverse outcome may alienate youth who want to start a family. For example, many HIV prevention interventions focus on shifting sexual activity and contraceptive use, with an underlying assumption that adolescents are already motivated to avoid pregnancy. However, our findings add to an existing literature that questions the utility of this approach in isolation. For example, McQueston et al. (2012) suggest that contraceptive knowledge and access are not the primary determinants of adolescent fertility; they suggest that interventions should be redirected towards underlying causes, including fertility preferences. Thus, we recommend that programs incorporate two additional components. First, they should directly address fertility preferences through interventions such as those described above. Second, they explicitly recognize that many youth, orphaned and otherwise, will still desire children. Thus, information must be available on how to do so safely in the context of a generalized HIV epidemic – and must be provided to young men as well as young women.

Conclusion

The study findings suggest that orphanhood is not associated with sexual risk taking in a cohort of Malawian youth ages 15-25 years old, but is associated with greater fertility desires and greater childbearing. Fertility impacts were observed, however, only among specific sub-populations of orphans, and male maternal orphans were the only category to demonstrate both greater fertility desires and actual childbearing. Programs intended to reduce HIV risk behaviors and early pregnancy among this population need to acknowledge and address personal desires for parenthood as part of a multi-pronged approach.

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Table 1: Background characteristics, 2006 MLSFH women and men

	Women	Men	Total
Age	20.7	21.0	20.9
Wealth	-0.019	0.070	0.000
Marital status			
Currently married	73.7	41.2	59.3
Never married	19.1	57.3	36.0
Divorced/separated/widowed	7.2	1.5	4.7
Region			
Central	34.6	27.3	31.4
South	33.6	37.5	35.3
North	31.8	35.2	33.3
Education			
No education	14.7	9.8	12.1
Primary	69.3	61.2	65.8
Secondary or higher	17.0	29.0	22.1
Mother died			
Mother alive	83.5	86.2	84.7
Died in past 5 years	5.3	2.8	4.2
Died 5+ years ago	11.2	11.0	11.1
Father died			
Father alive	73.3	74.0	73.6
Died in past 5 years	7.2	7.9	7.5
Died 5+ years ago	19.5	18.1	18.9
Risk behavior			
Number sexual partners	1.8	3.4	2.5
Sex exchange money	18.9	29.4	25.0
Multiple sexual partners	3.4	18.3	9.8
Ever had sex	90.5	87.5	89.1
Age at marriage	17.3	20.3	18.1
Fertility outcomes			
Desired number of children	3.7	3.6	3.7
Children ever born	1.7	0.7	1.2
Number living children	1.5	0.7	1.2
Ever married	81.1	43.2	64.3
N=	587	482	1069

Note: sample size varies by some variables above

Table 2: Regression results for differences between orphans and non-orphans in wealth and education, 2006 MLSFH women and men

	Women				Men			
	Wealth		Education		Wealth		Education	
	Coef.	SE	Odds	SE	Coef.	SE	Odds	SE
Age	-0.09***	0.03	0.88***	0.03	-0.08**	0.03	1.05	0.04
Region								
Central	-----	-----	-----	-----	-----	-----	-----	-----
South	-0.47**	0.19	0.72	0.23	-0.08	0.20	0.76	0.26
North	1.38***	0.19	7.21***	0.26	1.41***	0.20	5.17***	0.26
Mother alive								
Mother alive	-----	-----	-----	-----	-----	-----	-----	-----
Died in past 5 years	-0.36	0.35	0.73	0.41	-0.56	0.50	2.35	0.59
Died 5+ years ago	-0.61**	0.25	0.72	0.30	0.66**	0.26	0.57*	0.34
Father alive								
Father alive	-----	-----	-----	-----	-----	-----	-----	-----
Died in past 5 years	0.09	0.31	0.94	0.37	-0.11	0.29	1.34	0.37
Died 5+ years ago	-0.17	0.20	0.99	0.24	-0.49**	0.22	0.80	0.28
N=	587				482			

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were ordinary least squares (wealth) and ordered logistic regression (education).

Table 3: Regression results for differences between orphans and non-orphans in sexual risk behaviors, 2006 MLSFH women

	# Sex Partners		Sex exchange money		Multiple sex partners		Ever had sex	
	Coef.	SE	Odds	SE	Odds	SE	Odds	SE
Age	0.03*	0.01	1.06	0.05	1.06	0.09	2.11***	0.27
Wealth	-0.02	0.02	0.86**	0.06	0.84	0.14	0.81**	0.07
# living children	-0.01	0.02	0.9	0.06	0.99	0.1	-----	-----
Marital status								
Currently married	-----	-----	-----	-----	-----	-----	-----	-----
Never married	-0.71***	0.14	1.86**	0.56	1.09	0.72	-----	-----
Divorced/widowed	0.26**	0.12	1.14	0.43	0.42	0.44	-----	-----
Region								
Central	-----	-----	-----	-----	-----	-----	-----	-----
South	0.05	0.08	2.28***	0.53	0.86	0.38	0.78	0.46
North	-0.32***	0.10	0.82	0.22	0.31**	0.19	0.24**	0.13
Education								
No education	-----	-----	-----	-----	-----	-----	-----	-----
Primary	-0.12	0.09	1.3	0.38	0.89	0.46	0.48	0.53
Secondary or higher	-0.08	0.15	1.7	0.71	1.81	1.47	0.26	0.30
Mother died								
Mother alive	-----	-----	-----	-----	-----	-----	-----	-----
Died in past 5 years	0.1	0.15	1.75	0.73	3.07*	1.95	1.4	1.31
Died 5+ years ago	-0.1	0.12	0.84	0.27	0.98	0.65	2.31	1.90
Father died								
Father alive	-----	-----	-----	-----	-----	-----	-----	-----
Died in past 5 years	-0.08	0.15	1.08	0.41	0.75	0.60	2.22	2.39
Died 5+ years ago	0.04	0.09	1.29	0.32	1.08	0.54	0.95	0.54

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were poisson (# sex partners), logistic (sex exchange, multiple sexual partners, ever had sex), and ordinary least squares (age at marriage).

Table 4: Regression results for differences between orphans and non-orphans in sexual risk behaviors, 2006 MLSFH men

	# Sex Partners		Sex exchange money		Multiple sex partners		Ever had sex	
	Coef	**SE**	**Odds**	**SE**	**Odds**	**SE**	**Odds**	**SE**
Age	0.06***	0.01	1.08	0.05	1.18***	0.06	1.43***	0.11
Wealth	-0.02	0.02	0.91	0.06	0.92	0.07	0.89	0.08
# living children	-0.02	0.01	0.98	0.04	1.09*	0.05	----	----
Marital status								
Currently married	----	----	----	----	----	----	----	----
Never married	-0.21***	0.07	1.24	0.32	1.07	0.30	----	----
Divorced/widowed	0.28	0.18	3.44	3.29	2.43	1.90	----	----
Region								
Central	----	----	----	----	----	----	----	----
South	0.27***	0.07	3.80***	0.98	1.49	0.4	2.11	1.13
North	-0.29***	0.09	1.52	0.43	0.88	0.28	0.31**	0.15
Education								
No education	----	----	----	----	----	----	----	----
Primary	-0.04	0.10	1.38	0.52	1.10	0.43	4.89***	2.95
Secondary or higher	-0.06	0.12	1.05	0.44	0.86	0.39	5.02**	3.32
Mother died								
Mother alive	----	----	----	----	----	----	----	----
Died in past 5 years	-0.15	0.20	0.37	0.27	0.82	0.58	a	a
Died 5+ years ago	0.15	0.09	1.03	0.35	1.01	0.37	0.74	0.47
Father died								
Father alive	----	----	----	----	----	----	----	----
Died in past 5 years	0.01	0.10	1.32	0.49	0.36**	0.18	1.2	0.82
Died 5+ years ago	0.16**	0.07	0.68	0.19	0.93	0.28	1.92	1.15

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were poisson (# sex partners), logistic (sex exchange, multiple sexual partners, ever had sex), and ordinary least squares (age at marriage); a=dropped due to complete separation.

Table 5: Regression results for differences between orphans and non-orphans in fertility-related behaviors, 2006 MLSFH women

	Ever married		Desired # C		Children ever born	
	Odds	**SE**	**Coef**	**SE**	**Coef**	**SE**
Age	1.55***	0.00	0.08***	0.02	0.28***	0.00
Wealth	0.75***	0.00	-0.10***	0.03	0.02	0.53
# living children	13.50***	0.00	0.06**	0.03	----	----
Marital status						
Currently married	----	----	----	----	----	----
Never married	----	----	-0.08	0.17	-0.79***	0.00
Divorced/Widowed	----	----	-0.61***	0.21	-0.11	0.61
Region						
Central	----	----	----	----	----	----
South	0.99	0.97	0.23	0.13	0.03	0.79
North	0.40**	0.03	-0.04	0.14	-0.09	0.54
Education						
No education	----	----	----	----	----	----
Primary	0.35	0.22	-0.14	0.16	-0.52***	0.00
Secondary or higher	0.21*	0.1	-0.26	0.22	-0.87***	0.00
Mother alive						
Mother alive	----	----	----	----	----	----
Died in past 5 years	0.63	0.55	0.52**	0.24	0.13	0.58
Died 5+ years ago	5.37**	0.03	0.15	0.17	0.26	0.13
Father alive						
Father alive	----	----	----	----	----	----
Died in past 5 years	1.97	0.31	0.00	0.14	-0.21	0.32
Died 5+ years ago	0.54	0.24	0.07	0.17	0.31**	0.03

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were ordinary least squares (children ever born, desired # children), and logistic (ever married).

Table 6: Regression results for differences between orphans and non-orphans in fertility-related behaviors, 2006 MLSFH men

	Ever Married		Desired #C		Children ever born	
	Odds	**SE**	**Coef**	**SE**	**Coef**	**SE**
Age	1.69***	0.11	-0.06*	0.03	0.03	0.02
Wealth	0.78**	0.08	-0.06	0.04	0.02	0.03
# living children	2.24***	0.38	0.10***	0.03	-----	-----
Marital status						
Currently married	-----	-----	-----	-----	-----	-----
Never married	-----	-----	-0.19	0.18	-1.27***	0.12
Divorced/Widowed	-----	-----	0.06	0.57	0.30	0.39
Region						
Central	-----	-----	-----	-----	-----	-----
South	2.61***	0.84	0.12	0.18	0.26**	0.13
North	0.57	0.20	0.25	0.20	0.15	0.14
Education						
No education	-----	-----	-----	-----	-----	-----
Primary	2.25*	1.04	-0.42	0.28	-0.66***	0.18
Secondary or higher	1.79	0.94	-0.59*	0.31	-0.82***	0.21
Mother alive						
Mother alive	-----	-----	-----	-----	-----	-----
Died in past 5 years	2.23	1.66	0.97**	0.43	1.06***	0.31
Died 5+ years ago	1.08	0.48	0.03	0.24	0.47***	0.17
Father alive						
Father alive	-----	-----	-----	-----	-----	-----
Died in past 5 years	0.44*	0.21	0.17	0.26	0.08	0.19
Died 5+ years ago	1.5	0.50	0.00	0.19	0.01	0.14

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were ordinary least squares (children ever born, desired # children), and logistic (ever married).

Table 7: Regression results for differences between orphans and non-orphans in 2010 fertility (number of children ever born), MLSFH men and women

	Women		Men	
	Coef.	**SE**	**Coef**	**SE**
Age	0.21***	0.04	0.04	0.03
Wealth	0.01	0.07	-0.03	0.05
Marital status				
Currently married	-----	-----	-----	-----
Never married	-1.02***	0.30	-1.82***	0.18
Divorced/widowed	-0.97**	0.39	-1.46**	0.66
Region				
Central	-----	-----	-----	-----
South	0.44*	0.22	0.44**	0.19
North	0.17	0.25	0.33	0.21
Education				
No education	-----	-----	-----	-----
Primary	-0.74***	0.26	-1.13***	0.30
Secondary or higher	-1.28***	0.39	-1.08***	0.33
Mother died				
Mother alive	-----	-----	-----	-----
Died in past 5 years	0.36	0.42	1.44***	0.43
Died 5+ years ago	0.99***	0.30	0.23	0.25
Father died				
Father alive	-----	-----	-----	-----
Died in past 5 years	-0.32	0.35	-0.06	0.29
Died 5+ years ago	0.27	0.24	-0.07	0.20

Notes: *p≤ 0.10 **p ≤ 0.05; ***p ≤ 0.01; regressions used for this analysis were ordinary least squares