Single Motherhood and Child Mortality in Sub-Saharan Africa: Is Poverty the Link?

Shelley Clark, Donatien Beguy, Cassandra Cotton, and Adebiyi Germain Boco

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Donatien Beguy (dbeguy@aphrc.org) is with the African Population and Health Research Center, Nairobi, Kenya. Shelley Clark (shelley.clark@mcgill.ca) and Cassandra Cotton (cassandra.cotton@mail.mcgill.ca) are with McGill University, Montreal, Canada, and Adebiyi Boco Germain (adebiyi.boco@mcgill.ca) is with the University of Lethbridge, Canada.

Abstract
In the slums of Nairobi, like elsewhere in Africa, children whose mothers were never married or divorced face a significantly higher risk of dying than children whose parents are married. Drawing on both qualitative and longitudinal quantitative data from two informal settlements in Nairobi, this study explores possible causal mechanisms, paying particular attention to the importance of poverty. We find that children living in the wealthiest households are 22% less likely to have a single mother than children residing in the poorest households. In-depth interviews support these findings and reveal the daily struggles single mothers face in meeting their children's basic needs. However, in contrast to studies from Western societies, we find little evidence that poverty is the missing link explaining the increased risk of mortality among children of single mothers. Instead, we contend that limited support from fathers, coupled with isolation from kin and discrimination from neighbors render these children particularly vulnerable.

Introduction

Much of the literature on the consequences of single motherhood on child well-being comes from Western societies. Extensive research on this topic generally shows that children living with single mothers, whether arising from out-of-wedlock births or divorce, have poorer outcomes than children being raised by both biological parents. Children raised by single mothers tend to perform less well in school (Downey 1994; Steele, Sigle-Rushton and Kravdal 2009), exhibit more deviant behaviors (Larson and Gillman 1999), have poorer cognitive development (Gennetian 2005; Kim 2011), behavioral adjustment (Magnuson and Berger 2009), and health outcomes (Heard, Gorman and Kapinus 2008; Luo et al. 2004). Despite these findings, there remains controversy about whether these negative effects persist over time and the extent to which heightened poverty among single parent households can explain these differences. Single mothers are disproportionately represented among the poor in Western societies (Amato 2000; Holden and Smock 1991; Juby et al. 2005; Tienda and Stier 1997; Waite and Gallagher 2000; Wu 1996). Moreover, several studies have shown that divorce is associated with a precipitous decline in household income for women (Holden and Smock 1991) and accounts for roughly half of the negative effects of divorce on child outcomes (Amato 2005).

Until recently, there has been virtually no research on the impact of single motherhood[1] on child well-being in sub-Saharan Africa and little on the importance of family structures in general. However, partly in response to the devastating impact of AIDS on the stability of family structures in eastern and southern Africa and in recognition of the family instability resulting from high rates of internal and circular migration throughout Africa, a growing body of literature is demonstrating that family structures matter for both child and adolescent outcomes in sub-Saharan Africa (Clark and Cotton 2012; Goldberg 2012; Marteleto et al., 2012; Sear et al. 2002, Townsend et al. 2002). Specifically, a recent study documented the strong relationship between single motherhood and child mortality in 11 countries across the continent (Clark and Hamplova, 2011). This study found that not only is single motherhood common with up to 70% of women becoming single mothers in some countries, but also that in 6 of the 11 countries children born

[1] Throughout this text we define single motherhood as women who are not in a union and have at least one dependent child under the age of 15. When we use the terms "marriage" and "married", we are including men and women who are both in formal marriages as well as those who are in informal unions or "living as married."

before marriage were significantly more likely to die before the age of 5 than children born within marriage. Children whose mothers were formerly married faced a significantly greater risk of dying in 9 of the 11 countries with children whose parents were divorced generally at greater risk than children whose mothers were widowed.

However, because this study relied on retrospective quantitative data, it can shed little light on the causal mechanisms that may link single motherhood and child mortality. The authors conjecture that poverty, lack of both financial and emotional support and protection from fathers, and limited support from other kin may all contribute. In this study, we aim to further examine the potential role of these potential causal mechanisms, particularly poverty, by drawing on both qualitative interviews and detailed longitudinal data from two informal settlements (i.e. slums) in Nairobi, Kenya. We will first examine whether the relationship between single motherhood and child mortality found using nationally representative data from Kenya (Clark and Hamplova 2011) holds in these settings of urban congestion and poverty. Next, we will assess whether even within these impoverished settings single mothers are disproportionately represented among the poorest of the poor. Lastly, we will draw upon our qualitative interviews to assess both married and unmarried mothers' assessments of their greatest challenges in meeting the needs of their children.

Single Motherhood in the Slums of Nairobi

Slum settlements present unique challenges to both married and unmarried women in these communities. These poor and often hostile environments are characterized by high risk of sexual and gender-based violence, high levels of substance use, and poor livelihood opportunities (African Population and Health Research Center 2002; Fotso et al. 2008a; Fotso, Ezeh and Oronje 2008b). High levels of risky sexual behaviors including early sexual debut, transactional sex and multiple sexual partnerships (African Population and Health Research Center 2002; Kabiru et al. 2010; Zulu, Dodoo and Ezeh 2002) also suggest that women in these communities are likely to have births out-of-wedlock. In addition, knowledge about contraception is inadequate among women living in slum communities, and access to contraceptive methods is limited (Ezeh, Kodzi and Emina 2010). Due to high rates of in- and out-migration (Beguy, Bocquier and Zulu 2010) and precarious living conditions in urban slums, we expect a higher percentage of women to be unmarried or living without their partners. In these conditions, the chances that women become pregnant unintentionally are high (Ngom, Magadi and Owuor 2003; Ziraba et al. 2009). Evidence showed that 31% of women living in the two slums reported that their pregnancies were either unwanted or mistimed (Fotso, Ezeh and Essendi 2009). Single mothers may also come to these urban slums in search of employment opportunities that are absent in rural areas.

However, while all slum residents are poor by most absolute measures of poverty, within these impoverished communities some may be poorer than others. There are several reasons to expect that single women may be overrepresented among the poorest of the poor. Most obviously, they are more likely to be missing the income from the child's father. Although unemployment rates are high in general, men are typically more likely to be employed than women in urban settings (Agesa and Agesa 2005; Agwanda et al. 2004) and husbands and wives can often smooth income shortages when one or the other is temporarily out of work. In addition, the types of jobs

available to women in slums are rather restrictive. Women's small enterprises typically include selling used clothing, tailoring, or hair dressing with a large proportion of women engaged in producing and distributing local beer. Many women also resort to sex work either by formally entering into prostitution or by maintaining several sexual relationships with boyfriends who are expected to provide financial assistance. None of these enterprises, with the notable exception of beer selling, is typically very steady or lucrative. Thus, one may expect that all mothers, but especially single mothers, may find it difficult to meet the daily nutritional needs of their children or to pay for daycare (crèche) or schooling fees.

Lastly, single mothers in urban slums may face an additional disadvantage compared to their rural counterparts, namely the weakening of support from kin. Throughout sub-Saharan Africa bonds of kinship are considered to be exceptionally strong. Some researchers have even suggested that maternal grandmothers, for example, play a more critical role in maintaining children's health than fathers (Sears et al. 2002). Since many single mothers both can, and often do, rely on their relatives for both financial support and child care assistance, the absence of a father may have a less detrimental effect on children's well-being than in societies where support from kin is less common. Single mothers in urban slums, however, may receive less support from their kin. Specifically, since many slum residents are migrants, their ties to their kin are often weaker and distance may reduce the ability of kin to provide assistance in daily needs such as food and childcare. Thus, unlike in many other parts of Africa, single women in urban slums are likely to have to face the challenge of both caring for and supporting their children alone. In this paper, we rely on both qualitative and quantitative data to better understand the circumstances and challenges facing single mothers in urban slums.

Data and Methods

We draw on data collected under the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) that the African Population and Health Research Center has been running since 2002 in the two informal settlements in Nairobi. Every four months, fieldworkers visit all households in the two slum settlements to collect information on key demographic events (births, deaths, migrations, marital histories, etc.) as well as health (vaccinations, pregnancies, etc.) and socioeconomic data (Beguy et al. 2010). Data used in this paper include full marital histories, and birth histories collected between 2005 and 2009 in these two settings. After cleaning and merging with the socio-demographic characteristics, the analytical sample includes 16,289 women aged 12-49.

To examine pathways into single motherhood over the life course, we employ event history analysis techniques (Blossfeld, Hamerle and Mayer 1989). We first identify women's cumulative total risk of becoming a single mother by age, using women's reported dates of when their unions began and ended as well as the dates of their children's births and deaths (if they died before the last census round). We then examine the risks by different pathways into single motherhood. We first examine her risk of becoming a single mother by having a premarital birth. Thus, if a woman gives birth before her first marriage, she becomes a premarital single mother at the time of the child's birth. Since women who get married before they have their first birth are no longer at risk of having a premarital birth, we treat entry into marriage as a competing risk for premarital birth (Coviello and Boggess 2004). Second, we assess women who become single mothers because they got divorced or separated and had at least one living

child under the age of 15. These women became single mothers at the time of their union dissolution. Finally, we examine women who become single mothers because their spouse died when they had at least one living child under the age of 15. A small number of women who gave birth after being divorced or widowed (and before entering a new union) are also included in the categories divorced and widowed single mother, respectively.

To assess the effects of single motherhood on children's survival, we restrict our sample to 14,224 children born during the 10 year interval between 1997 and 2007. To examine children's risk of dying before the age of five, we employ logistic discrete-time event history analyses using monthly intervals. Our key independent variable is their mother's marital status. For each month of the child's life up to the age of five, we create a time-varying indicator variable for their mother's marital status. This variable equals "0" if the mother is married to the child's father, "1" if the mother was never married, "2" if the mother is divorced, "3" if she is widowed, and "4" if she enters into a new marriage (presumably not with the child's biological father). If the woman gets married within six months of the child's birth, previous literature in SSA suggests that they have most likely married the child's biological father (Hattori and Larsen 2007). Thus, we code these women as married ("0"). We also control for a host of other important maternal characteristics (mother's age at birth, birth cohort, education, religion, ethnicity, informal settlement area, and wealth) and children's characteristics (sex, birth order, length of previous birth interval, whether it was a multiple or single birth, and whether a previous sibling had died). In all our models, we cluster on mothers to at least partially account for unobserved correlations between siblings in our sample.

Our last set of quantitative analyses examines the correlates of single motherhood.We examine women's characteristics associated with ever becoming a single mother through any pathway (premarital birth, divorce, or widowhood). We use Cox proportional hazard models to assess the factors associated with the age at which women become single mothers. Cox's models do not need specification of the form of the distribution of the baseline hazard rate (Blossfeld et al. 1989; Cox 1972; Cox and Oakes 1984) and also allow for use of time-varying covariates, i.e. characteristics acquired in each time of life explaining an event's timing of occurrence. However, they are, by definition, constrained to follow the proportionality-hazards assumption, which implies that hazard ratios are constant over time. Unfortunately, post-estimation tests indicate that, as is often the case with Cox models, our model violates the proportional hazard assumption. To explore the extent of the potential bias these violations may be producing, we run a simple logistic regression on the outcome "never single mother" ("0") and "ever single mother" ("1"). Our results from our logistic regression, which are presented in Appendix 1, are consistent with our findings in our Cox regression models. In future analyses, however, we will investigate alternative modeling techniques. Our model includes several key characteristics of women, which may be associated with their risk of becoming a single mother. We include important measures of women's socio-economic conditions, such as their education level (measured as less than or more than primary school education), household wealth assets (which uses an index derived from ownership of assets to classify women into relative wealth quintiles), and residence in the two informal settlement areas. We also explore the relationships between women's birth cohort, ethnicity and religion and their risk of becoming single mothers. Not all women received the questionnaire identifying their religion. Thus, we include a category of "missing" for the 28% of who were not asked about their religious affiliation. A much smaller

percentage of women (less than 2%) had missing information on their education and household assets. For these exploratory analyses, rather than dropping these women, we have included a separate category for "missing" for each of these variables.

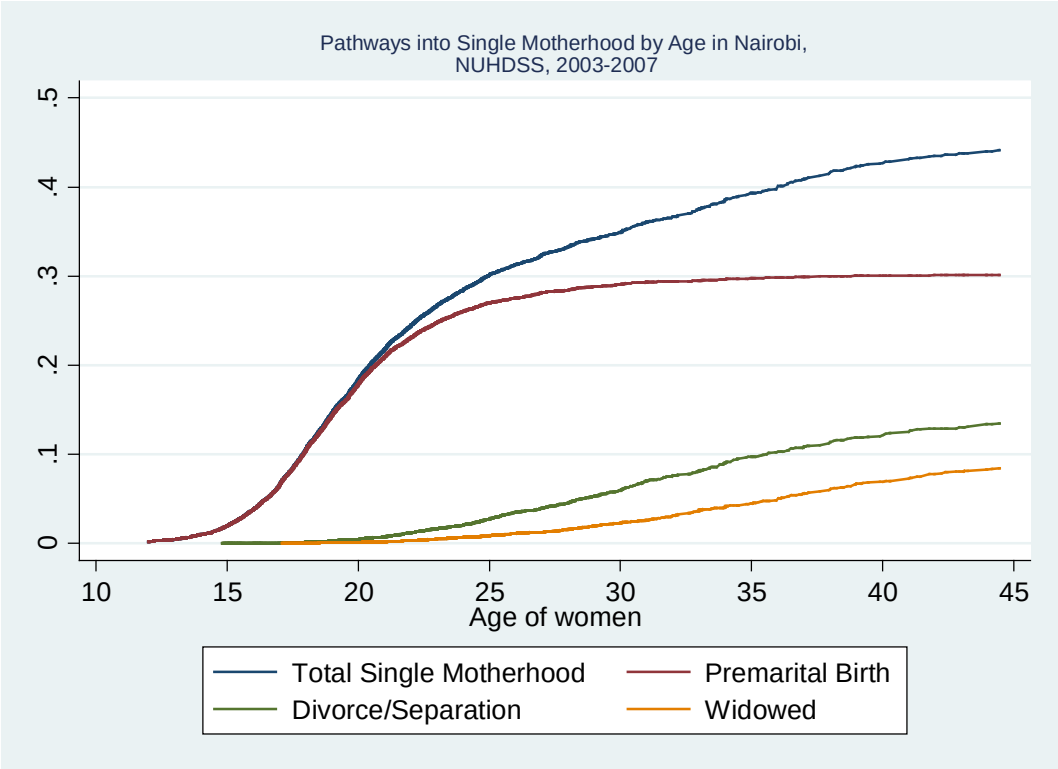
The qualitative section uses the results of in-depth, semi-structured interviews with women aged 15 to 49 in the Nairobi DSS. Forty interviews were conducted in July of 2011 in the Nairobi DSS sites of Korogocho and Viwandani. Respondents were originally sampled from the DSS data for certain characteristics (women between the ages of 15 and 49 living in a DSS household) and 20 respondents were selected each in Korogocho and in Viwandani. This paper uses the results of 32 women with one or more living children, 11 of whom are currently single mothers and 22 of whom are currently married mothers. The study has passed through the institutional review process at McGill University and received ethical clearance in May 2011. Informed written consent was received by all respondents after the project was explained. Anonymity of respondents has been maintained at all stages of the study. The interviews were conducted largely in Swahili by two community-based fieldworkers and were tape-recorded. These recordings were transcribed and translated verbatim into English by native Swahili speakers to ensure accuracy. Analysis of the transcriptions was conducted thematically through MaxQDA10.

Results

Rates of Single Motherhood over the Life Course

Figure 1 displays the cumulative risk of becoming a single mother between the ages of 10 and 45. The first curve shows the total risk of becoming a single mother via any pathway. By the age of 45, we find that about 45% of women have spent at least part of their lives as single mothers. The total risk of becoming a single mother, however, is lower than the simple addition of the risk via a premarital birth, divorce or widowhood, since several women experience more than one episode of single motherhood. For example, a woman who had a premarital birth may later get divorced. In this population, premarital births are quite common, with 30% of women giving birth before they get married. Not surprisingly, there is a steep rise of the risk of becoming single mother before first marriage, between ages 15 and 25. The rate starts plateauing from age 25. The risk of becoming a single mother through divorce rises steadily after the age of 20, reaching 13.5% by the age of 45. Rates of widowhood do not begin to rise at slightly older age, but by the age of 45 already 8.4% of women have lost their spouse and have young children to care for. Unlike rates of premarital single motherhood, the risk of becoming a single mother through divorce or widowhood continues to rise past the age of 45 (risks not shown in Figure 1).

Figure 1: Pathway into Single Motherhood by Age.



The Effects of Single Motherhood on Child Mortality

In Table 1 we examine the relationship between child mortality and single motherhood. Children of never married women are 28% more likely to die than children whose parents are married. In addition, we find that children of separated or divorced women face the highest mortality rate. The odds that these children die are more than 50% higher than children of married parents. In contrast, children of widowed or married mothers (who are not married to the child's biological father) are not at a significantly higher risk of dying.

(insert Table 1 about here)

With respect to mother's characteristics, as expected we find that children whose mothers are over 35 are more likely to die. Interestingly, we find no strong effects of either women's education or wealth on children's mortality. However, we do find that the risk of dying before the age of five is almost twice as high among the Luo as among the Kikuyu women, while there is no significant variation with respect to religion. Our measures of the effects of children's characteristics are broadly consistent with our expectations. Male children are slightly, although in this case not significantly, more likely to die. In addition, children who had a relatively short preceding birth interval (less than 2 years), had a previous sibling who died, or who were part of a multiple birth (usually twins) were significantly more likely to die. The first month posed the greatest risk of dying, with the mortality rate following off precipitously thereafter.

Poverty and Single Motherhood

Given the strong mediating role that poverty plays in explaining the link between single motherhood and child outcomes in Western societies, we examine both our quantitative evidence and qualitative interviews to determine whether single mothers experience higher levels of poverty. Table 2 presents the results of our multivariate analysis of the social, demographic, and economic characteristics associated with becoming a single mother. Somewhat surprisingly, we find that women living in Viwandani are significantly less likely than women living in Korogocho to become a single mother. One might expect that Viwandani, which is made up of a highly mobile population with many migrants, would be associated with higher rates of single motherhood. This would have suggested that family disruption associated with migration is also linked to higher rates of single motherhood. However, we find that women in Korogocho, a more established informal settlement, have higher rates of single motherhood. Since the majority of our single mothers are comprised of women who have a premarital birth, this association may also suggest that never-married mothers are unlikely to move to urban slums, but that young women who grow up in the slum area are more likely to become single mothers. [These differences will be further investigated in future analyses]

(insert Table 2 about here)

Table 2 also shows that Catholics experience the highest risks of single motherhood, particularly compared to Muslims and Protestants. In addition, we find that Kikuyu women, who belong to the largest ethnic group in our study, and Luo women, who are members of the dominant ethnicity in Western Kenya, are most likely to become single mothers, while women belonging to the Kamba, Luhya, and other tribes face a significantly lower risk. Compared to women with a primary school education or who have never attended school, those who attended at least secondary school are significantly less likely to become single mothers (at a later age).

Perhaps the most striking and interesting finding is that there is a sharp decline in the risk of single motherhood as household wealth rises. The richest 20% of women are almost 25% less likely to ever become a single mother compared to women in the poorest quintile. However, while it is important that all of our findings are interpreted as mere associations and not causal relationships, extra caution is warranted when interpreting this relationship. Since household wealth was measured at the most recent survey, we cannot determine whether poorer women were more likely to become single mothers or whether becoming a single mother lead to greater poverty. Both causal directions are plausible. In future analyses, we plan to use data collected on household assets from earlier time periods to gain a better understanding of this complex relationship between single motherhood and poverty.

The greater poverty single mothers experience is reflected in their qualitative interviews as well. All 11 of the single mothers interviewed noted that they worked whenever possible. Most of these women were engaged in selling or making goods or providing services such as laundry or cleaning, while 3 earned most of their income from sex work. In contrast, only about half of married mothers worked and several of these women only work occasional jobs when money was scarce. Moreover, while discussions of economic hardships and the absence of money were

commonly mentioned by both married and unmarried mothers, the chronic nature of poverty and its impact on their children were strikingly more acute among single mothers.

One single mother expressed her frustration with trying to support herself and her children as follows:

"You know in Nairobi people have different problems and when I don't have a job and I am told from that my child needs books, here in Nairobi I haven't paid my house rent, I don't [have] money to buy food, I just feel a lot is demanded from [me] but I cannot provide." (35 year old, Korogocho, divorced & widowed (two previous marriages), 2 children)

Two other single mothers vividly described their struggles to feed their children regularly:

"Yesterday my kids went to bed hungry. Sometimes I go without work for a while and sit at home, very depressed. I can't even feed my kids when they come home from school—I do not have the money to buy them at least a cup of tea or porridge. They wake up hungry but there is nothing I can do but encourage them to stay strong." (29 year old, Korogocho, divorced, 3 children)

"Yes, I engage in prostitution sometimes when I am desperate for money for food. I have no choice. I need to feed my children... I pray that God blesses me with a better job. I am really tired of earning a living in this way." (29 year old, Korogocho, divorced, 3 children)

Several of the single mothers explicitly acknowledged that being married could help alleviate some of their financial difficulties:

"I have had to fend for the children by myself. Sometimes putting food on the table is a struggle. Paying school fees and rent is also a challenge sometimes." (49 year old, Korogocho, widowed, 4 children, 1 grandchild plus 3 nieces/nephews)

"It [being a single parent] has affected me because if we were two parents then things could have been very easy." (35 year old, Korogocho, divorced & widowed (two previous marriages), 2 children)

The comments of single mothers stand in sharp contrast to those of married women. Although many of these women also struggle to meet their children's needs, particularly when their spouses are out of work, their overall assessment of life in Nairobi's informal settlements is often much more optimistic.

"Yes he [my husband] does [provide]. This doesn't mean that sometimes we don't go without some essentials, but it's much better than it was before I got married." (21 year old, Viwandani, married, 1 child)

"On the positive side: it has been good because I have been able to put my children through school. Right now some are in secondary school and some in college. Back home, this would not have been possible... The food here is much better than the food back home, especially for my children." (42 year old, Viwandani, married, 4 children)

Given both the quantitative and qualitative evidence that single mothers are significantly poorer than married mothers and that they report greater difficulties in providing for their children's food, medical care, and schooling, one might expect that controlling for women's economic conditions would partially, if not fully explain the positive relationship between single motherhood and child mortality. In Table 3, we include measures of women's household wealth index. Surprisingly, the inclusion of these household wealth measures has very little effect on the relationship between single motherhood and child mortality. Moreover, these wealth indicators are not significantly correlated with child mortality. Even in bivariate analyses women's household wealth is not associated with child mortality (results not shown). Since this lack of an association is unexpected, it requires further investigation. Given that these wealth measures were taken at the time of the last survey round, it is possible that some of the women whose children died became systematically wealthier after their death. (Obtaining indicators of women's household wealth status before the child's death is possible given these longitudinal data and is one of the primary objectives of our future research.) However, given that (contrary to many individuals' expressed hope) individual's wealth status (certainly their wealth quintile) actually changes very little over time, it is unlikely that these improvements in our measures of wealth will fully explain these findings.

(insert Table 3 about here)

Another plausible explanation is that given the close proximity of these slums to urban government clinics (which are usually free or charge a nominal fee) and the presence of numerous health NGO's which work in the slum areas to ensure that children are vaccinated and that sick children are given medications, poverty itself may not be the most important obstacle to ensuring children's survival. Thus, we turn next to differences in the care and social support that children of single mothers receive relative to children of married mothers.

The Role of Fathers

The role fathers play in supporting their children is quite complex. Not only might fathers make valuable economic contributions to the household as discussed above, but also by taking care of the family's financial needs, fathers may also grant mothers more time to spend caring for their children. In addition, our qualitative interviews indicate that fathers are often not only a source of discipline, but also of love and support for their children. Lastly, having a father and recognizing paternity affords children considerable social protection and can have a strong effect on the support children receive not only from their paternal kin, but from neighbours and other members of the community.

Single mothers gave mixed reports about whether their children's fathers helped to care for their children. Unmarried mothers who were in non-cohabiting relationships with the child's father generally stated that the fathers were very involved and regularly visited their children often when they came to see the mother. However, divorced women often reported leaving their husbands because they did not care for them or their children. Many of these women claimed that the child's father provided little support after the divorce. As one divorced women with four children stated:

"He doesn't take care of them; all they have is his last name." (48 year old, Korogocho, divorced, 4 children plus supporting nieces/nephews)

In contrast, married women tend to speak appreciatively of their husband's financial and emotional support of their children. One married mother caring not only for her own children but two foster children and three grandchildren notes that:

"We divide responsibilities [for the children]. He is responsible for providing food and I take care of other things." (39 year old, Korogocho, married, 5 children plus 2 foster children and 3 grandchildren)

One women even notes that his support increased after their first child:

"He relates well and he is happy with the child… In the past he was not giving me enough money but ever since we got a baby, he gives me enough money" (21 year old, Viwandani, married, 1 child)

Beyond financial assistance, several married mothers remark on the bonds of love and affection between fathers and their children. As one states:

"He takes care of our child; he tends to her and feeds her—when he gets home he makes sure he sees her first, even if it means waking her from her sleep." (20 year old, Viwandani, married, 1 child)

Interestingly, a few married women, while grateful for their husband's support and presence in the household, simultaneously resent their dependence on his earnings.

"I thought that it would be different when I moved here. I thought I would be able to develop myself. However, I am still dependent on my husband for everything. I thought I would be able to find a job, but this hasn't changed." (25 year old, Viwandani, married, 4 children)

"[I]f I was at home I would be able to work on the farm. Right now I am fully dependent on whether my husband makes money or not... I now have children so my life is better." (27 year old, Viwandani, married, 2 children)

The Role of Kin and Neighbors

Across sub-Saharan Africa extended kin often play a central role in helping to raise children, through directly fostering related children, through the creation of extended households, or by providing financial assistance and child care to mothers living in independent households. Young single mothers are especially likely to reside in their parents' households. One young divorced mother describes her situation as follows:

"I still live with my parents but I have my separate room where my children and I sleep. But we are in the same plot and we all eat at our parent's house." (26 year old, Korogocho, divorced, 2 children)

However, not all kin are willing to support single mothers and their children. Instead, as is depicted in the story below, mothers may go to the city to earn money, but entrust the daily care of their children to relatives in their rural home areas.

"After the burial of my husband, I stayed home for 2 months but nobody was helping me and my children were crying for food and other basic things. So I decided to [go] back to Nairobi since I could sell fish. When I came back I began fish selling. And they wanted the first born to go back home and school there and I agreed." (32 year old, Viwandani, widowed, 2 children)

Overall, this support from kin is welcome, but single mothers living in the slum areas frequently noted its absence either because they "had no one" or their relatives lived too far away. In one interesting narrative by a married mother, she highlights that one of the advantages of living in an urban area away from rural kin is the relative independence it brings.

"At home, everything was provided for me. When I moved here I had to learn to take care of myself. I learnt to be independent. Back home, I was really dependent on my parents... [Now] I am independent and can live anywhere on my own. I can bring up my child on my own terms without my mother's guidance." (24 year old, Viwandani, married, 1 child (and pregnant), plus living with 2 of 5 step children)

The potentially vital role that kin play in sustaining children is also (possibly) reflected in our quantitative analyses shown in Table 3. Even after controlling for household wealth, Kikuyu children, whose homeland encircles Nairobi, are significantly less likely to die than Luhya and Luo children, whose ethnic tribe is primarily located in Nyanza Province in western Kenya. Although this interpretation is speculative, these findings are consistent with the qualitative narratives, which indicate that women often turn to nearby relatives to help support their children.

When relatives are not nearby, however, neighbors may become increasingly important. Distant relatives can offer little assistance in overcoming short-term food shortages or emergency health problems. However, single mothers reported considerable discrimination against themselves and their children. Often this stigma was generated simply because of the absence of a father in the household.

"The child is considered as outcast member of the society… He is discriminated upon and sometimes he is abused by the neighbors [because] he does not have a father." (32 year old, Viwandani, widowed, 2 children)

"I am disrespected because I don't have a husband. The women around there feel that since I am not married then I am not a good member of the community… Community members think I just decided to walk out of my marriage without any proper reason, it is like I should not have left my husband. Even if I try to explain to them what exactly happened that made me leave my marriage, they would not believe me." (26 year old, Korogocho, divorced, 2 children)

In other instances single mothers and their children are ostracized in the community because they are often perceived to be sexually promiscuous, whether or not they engage in formal sex work.

"Here there is serious discrimination because some mothers would not want my children to play with their children because they say that their mother is a prostitute." (26 year old, Korogocho, divorced, 2 children)

Sometimes this stigma is met with defiance.

"They [my women neighbours] hate me. But I don't care because they do not provide any food for me. None of them will help me survive. They can talk all they want." (48 year old, Korogocho, divorced, 4 children plus supporting nieces/nephews and grandchildren)

In other cases, single mothers noted that the stigma is less in Nairobi than in their rural homes.

"Living in Nairobi is good, because I am living on my own with my children. There are so many people who are like me here, I don't feel excluded. Back home, because it is a small community; people mock each other's lives constantly—for example: women who aren't married get mocked a lot." (45 year old, Korogocho, divorced & widowed (three previous marriages), 2 biological children, 2 foster children)

Discussion

This study has shown that even in notoriously precarious settings like the informal settlements of Nairobi, some women and children are more vulnerable than others. We find that almost half of the women living in these informal settlements can expect to become a single mother before the age of 45. Most of these women will become single mothers because they gave birth before their first marriage, but a sizeable proportion – about 23% in total – will become a single mother through the death of their spouse or through union dissolution. Indeed, some women are likely to both have a premarital birth and then later become divorced or widowed, while their children are still young. We also find that having a single mother has large impact on children's survival. Children whose mothers have never been married are significantly more likely to die before the age of five (O.R. 1.33). The risk of dying for children with divorced or separated mothers is even higher (O.R. 1.62). These findings are remarkably consistent with a previous study, which examined the effects of single motherhood on child survival across Kenya (Clark and Hamplová 2011).

However, we know very little about *why* children of single mothers differ from those with mothers in more stable and enduring unions. One of the most plausible explanations is that children in single-parent homes are poorer than those in two-parent homes, since differences in household income account for roughly half of the negative effects of single parenthood in Western countries (Amato 2000). In this study, we find abundant quantitative and qualitative evidence that even among slum residents, single mothers are disproportionately represented among the poorest of the poor. Single mothers are not only more likely to work than married

mothers, but even working mothers often struggle to meet the basic needs of their children. Yet, surprisingly, differences in poverty in these overall impoverished conditions do not have a major effect on child mortality rates and cannot account for differences by women's marital status.

Instead, qualitative evidence suggests that children of single mothers have weaker family and social support networks and often face considerable stigma and discrimination within the community. Specifically, the absence of fathers in the household tends to increase the need for mothers to work and reduce the time she can spend with her children. Non-resident fathers, particularly divorced fathers, often contribute little to their children's care and upkeep. Moreover, single mothers living in the slums of Nairobi have limited support from kin. Some single mothers may chose to send their children back to their relatives in the rural areas, but depending on their proximity to Nairobi, this may be a difficult decision for many mothers. Although distant kin may provide periodic financial support, typically residents in Nairobi are expected to send remittances back and not to receive them. The importance of proximity to ethnic kin is potentially shown by the higher rates of child mortality found among children whose ethnic groups are concentrated furthest from Nairobi.

Overall, these findings indicate that conjugal ties, although fragile and unstable, are important determinants of children's survival. Fathers play an important and often overlooked role in protecting and preserving their children's welfare. Moreover, at least within urban informal settlements, they suggest that social rather than economic factors are largely responsible for the higher mortality of children of single mothers. This opens up an important area for policies and programmatic interventions. If single mothers suffer from social isolation and periodic shortages of essential household needs (like food) for their children, there is scope to enhance these women's social networks and reduce the stigma that surrounds them and their children. There is also room to recognize and encourage support provided by both residential and non-residential fathers. Men in these slum areas are frequently portray them as drunkards who are prone to violence against both their wives and children. Certainly this characterization fits some fathers. However, many fathers are also loving, caring, and tender towards their children and these images are rarely shown. Lastly, while the slum areas are fraught with extreme poverty, crime, and violence, they also afford mothers a potentially greater degree of (albeit limited) economic independence both from their husbands and from their parents that is not found in rural areas.

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Table 1: ***The effects of single motherhood on child mortality (Logistic Discrete-Time Event History Analysis).***

	O.R.	P>|z|	Sig.		lower CI	upper CI
Single Motherhood						
Continuously married (ref)	1.00	--				
Never married	1.28	0.034	*		1.02	1.61
Separated/divorced	1.53	0.044	*		1.01	2.32
Widowed	1.07	0.802			0.63	1.81
Newly (re)married	1.14	0.672			0.62	2.10
Mother's Characteristics						
Mother's age at birth						
<20 (ref)	1.00	--				
20-24	1.08	0.492			0.86	1.35
25-29	1.27	0.096	†		0.96	1.69
30-34	0.86	0.410			0.59	1.24
>=35	1.54	0.032	*		1.04	2.29
Ethnicity						
Kikuyu (ref)	1.00	--				
Luhya	1.56	0.000	***		1.22	2.01
Luo	2.13	0.000	***		1.69	2.68
Kamba	1.13	0.409			0.85	1.49
Other	1.09	0.646			0.76	1.54
Religion						
Catholic (ref)	1.00	--				
Protestant	0.92	0.641			0.66	1.29
Pentecostal	1.08	0.488			0.86	1.36
Other Christian	1.22	0.234			0.88	1.70
Muslim	1.02	0.932			0.64	1.63
(Missing)	1.01	0.931			0.80	1.28
Education						
Primary school (ref)	1.00	--				
Secondary school or higher	0.89	0.230			0.73	1.08
(Missing)	1.28	0.429			0.69	2.37
Slum area						
Korogocho (ref)	1.00	--				
Viwandani	0.83	0.068	†		0.69	1.01
Child's Characteristics						
Male (ref=female)	1.10	0.238			0.94	1.29
Birth Order						
First (ref)	1.00	--				
Second	0.81	0.079	†		0.64	1.03
Third	0.90	0.462			0.67	1.20
Fourth or higher	0.98	0.925			0.71	1.36
Preceding birth interval						
Less than two years	1.47	0.000	***		1.19	1.82
Two or more years (ref)	1.00	--				
Previous siblings death	2.97	0.000	***		2.31	3.82
Multiple birth	3.14	0.000	***		2.21	4.45
Child's age						
Less than 1 month (ref)	1.00	--				
One to eleven months	0.24	0.000	***		0.19	0.29
One to two years	0.12	0.000	***		0.10	0.16
Two to three years	0.05	0.000	***		0.04	0.07
Three to five years	0.04	0.000	***		0.03	0.05

Significance: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10

Table 2. Correlates of Single Motherhood (Cox Proportional Hazard Models)

	Hazard Ratio	P>|z|	Sign.	[95% Conf. Interval]	
Slum area					
Korogocho (ref)	1.00	--	--	--	--
Viwandani	0.86	0.000	***	0.80	0.92
Birth cohort					
Before 1965 (ref)	1.00	--	--	--	--
1965-74	2.30	0.000	***	2.04	2.60
1975-84	2.14	0.000	***	1.89	2.42
1985-1996	1.77	0.000	***	1.54	2.03
Religion					
Catholic (ref)	1.00	--	--	--	--
Protestant	0.83	0.000	***	0.75	0.92
Pentecostal	0.90	0.012	*	0.82	0.98
Other Christian	0.86	0.036	*	0.75	0.99
Muslim	0.72	0.000	***	0.59	0.86
Missing	0.81	0.000	***	0.75	0.89
Ethnicity					
Kikuyu (ref)	1.00	--	--	--	--
Luhya	0.86	0.002	**	0.78	0.95
Luo	1.00	0.963		0.91	1.09
Kamba	0.84	0.000	***	0.77	0.92
Other	0.78	0.000	***	0.69	0.88
Wealth index					
Poorest (ref)	1.00	--	--	--	--
Poorer	0.93	0.107		0.85	1.02
Middle	0.81	0.000	***	0.74	0.89
Richer	0.79	0.000	***	0.72	0.87
Richest	0.78	0.000	***	0.71	0.86
Missing	1.00	0.994		0.78	1.28
Education					
Primary or lower (ref.)	1.00	--	--	--	--
Secondary or higher	0.80	0.000	***	0.74	0.85
Missing	0.88	0.187		0.72	1.07

Significance: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10

Table 3: ***The effects of single motherhood on child mortality (Logistic Discrete-Time Event History Analysis).***

	O.R.	P>|z|	Sig.		lower CI	upper CI
Single Motherhood						
Continuously married (ref)	1.00	--				
Never married	1.33	0.015	*		1.06	1.68
Separated/divorced	1.62	0.024	*		1.06	2.47
Widowed	1.15	0.603			0.68	1.94
Newly (re)married	1.17	0.612			0.64	2.16
Mother's Characteristics						
Mother's age at birth						
<20 (ref)	1.00	--				
20-24	1.07	0.552			0.86	1.34
25-29	1.23	0.148			0.93	1.64
30-34	0.82	0.296			0.56	1.19
>=35	1.52	0.038	*		1.02	2.26
Ethnicity						
Kikuyu (ref)	1.00	--				
Luhya	1.62	0.000	***		1.26	2.09
Luo	2.19	0.000	***		1.73	2.77
Kamba	1.15	0.329			0.87	1.54
Other	1.11	0.565			0.78	1.58
Religion						
Catholic (ref)	1.00	--				
Protestant	0.91	0.579			0.65	1.27
Pentecostal	1.07	0.545			0.85	1.35
Other Christian	1.21	0.260			0.87	1.68
Muslim	1.01	0.958			0.63	1.62
(Missing)	1.02	0.897			0.80	1.29
Education						
Primary school (ref)	1.00	--				
Secondary school or higher	0.89	0.224			0.73	1.08
(Missing)	1.31	0.391			0.71	2.42
Slum area						
Korogocho (ref)	1.00	--				
Viwandani	0.84	0.079	†		0.69	1.02
Wealth Asset Quintiles						
Poorest (20%) (ref)	1.00	--				
Poorer (20%)	1.03	0.830			0.80	1.32
Middle (20%)	1.19	0.182			0.92	1.53
Richer (20%)	1.14	0.332			0.88	1.47
Richest (20%)	1.16	0.271			0.89	1.50
Child's Characteristics						
Male (ref=female)	1.09	0.270			0.93	1.28
Birth Order						
First (ref)	1.00	--				
Second	0.83	0.117			0.65	1.05
Third	0.88	0.415			0.66	1.19
Fourth or higher	1.01	0.930			0.73	1.41
Preceding birth interval						
Less than two years	1.50	0.000	***		1.21	1.85
Two or more years (ref)	1.00	--				
Previous siblings death	2.99	0.000	***		2.32	3.85
Multiple birth	3.09	0.000	***		2.17	4.40
Child's age						
Less than 1 month (ref)	1.00	--				
One to eleven months	0.24	0.000	***		0.19	0.30
One to two years	0.13	0.000	***		0.10	0.16
Two to three years	0.05	0.000	***		0.04	0.07
Three to five years	0.04	0.000	***		0.03	0.05

Significance: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10

Appendix 1. Correlates of Single Motherhood (Logistic Regression).

	Odds Ratio	P>z	Sign.	[95% Conf. Interval]	
Slum area					
Korogocho (ref)	1.00				
Viwandani	0.83	0.000	***	0.77	0.91
Religion					
Catholic (ref)	1.00				
Protestant	0.79	0.000	***	0.70	0.90
Pentecostal	0.86	0.007	**	0.77	0.96
Other Christian	0.82	0.024	*	0.70	0.97
Muslim	0.62	0.000	***	0.50	0.76
Missing	0.78	0.000	***	0.71	0.87
Ethnicity					
Kikuyu (ref)	1.00				
Luhya	0.83	0.002	**	0.74	0.93
Luo	1.00	0.960		0.89	1.13
Kamba	0.81	0.000	***	0.73	0.90
Other	0.74	0.000	***	0.64	0.85
Wealth index					
Poorest (ref)	1.00				
Poorer	0.89	0.050	*	0.80	1.00
Middle	0.75	0.000	***	0.67	0.84
Richer	0.71	0.000	***	0.63	0.79
Richest	0.72	0.000	***	0.64	0.81
Missing	0.93	0.648		0.69	1.26
Education	1.00				
Primary or lower (ref.)					
Secondary or higher	0.79	0.000	***	0.72	0.86
Missing	0.89	0.332		0.69	1.13
Birth cohort					
Before 1965 (ref)	1.00				
1965-74	2.42	0.000	***	1.92	3.05
1975-84	2.05	0.000	***	1.56	2.71
1985-96	1.09	0.586		0.81	1.47
Age					
Under 20 (ref)	1.00				
20-29	3.59	0.000	***	3.05	4.22
30-39	5.52	0.000	***	4.48	6.81
40 & +	5.73	0.000	***	4.23	7.75

Significance: ***p<=0.001, **p<=0.01, *p<=0.05, +p<=0.10