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Beyond Orphanhood: Parental Nonresidence and Child Well-being in Tanzania

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Abstract

This article used data from the Rufiji Health and Demographic Surveillance System in Tanzania to examine the influence of parental non-residence on child survival and school entry. Using survival analysis methods, the article tested variations by parent and by cause, examining parental death, non-residence due to parental relationship status, and migration. In general, maternal non-residence was more consequential for child survival, while paternal non-residence influences school entry. This is consistent with gendered parenting patterns in the setting. There was important variation by cause and by outcome, particularly for paternal non-residence. Paternal non-residence due to non-marital birth was associated with increased risk of child death, while paternal migration was associated with improved survival. Paternal death and migration were associated with lower odds of school entry. This article moves beyond orphanhood to consider multiple causes of parental non-residence simultaneously, demonstrating that parental non-residence is not uniformly deleterious for children.

Keywords

Child survival; parental absence; extended kin; Tanzania; African Families; Education; Family Structure; Mortality

Introduction

Previous research on the consequences of parental non-residence for children in sub-Saharan Africa concentrates on the experience of orphans, particularly children affected by the AIDS epidemic (Crampin et al., 2003; Gregson, Zaba, & Garnett, 1999; Hosegood, McGrath, Herbst, & Timaeus, 2004; Nakiyingi et al., 2003). While certainly an important problem, a narrow focus on the death of biological parents to the exclusion of alternative causes of parental non-residence obscures children's heterogeneous experiences of family structure. Parents do not reside with their children for many reasons, including divorce, remarriage, non-marital childbearing, and migration. Indeed, one study in Tanzania found that death is the least common cause of parental absence (Gaydosh, 2015). While more children experience non-residence due to union status changes and migration, we know less about how these kinds of non-residence are associated with children's wellbeing (Clark & Hamplová, 2013; Madhavan, Schatz, Clark, & Collinson, 2012) and how they compare to each other (Thiombiano, LeGrand, & Kobiané, 2013). Moreover, it is likely that the consequences of non-residence depend on the reason, and the focus on parental death

reinforces the assumption that parental absence is always bad for children. Different causes may present distinct advantages or challenges for families, necessitating a cause-specific analysis of the consequences of parental non-residence.

This article examines multiple causes of parental non-residence in Tanzania, drawing on gendered parenting expectations and inputs to develop hypotheses regarding the differential impact of maternal and paternal non-residence depending on the cause of absence and the child outcome under examination. Using data from the Rufiji Health and Demographic Surveillance System in Tanzania, I employ survival analysis to examine how parental death, non-residence due to parental relationship status, and migration are associated with child survival and school entry. Parental non-residence in this setting is common, with roughly 35% of children living without their biological mother, and over 50% living without their biological father by age ten (author's calculations). By examining multiple causes and consequences of non-residence simultaneously, this article provides a window into the processes leading to absence, and a better understanding of the distinctiveness and similarity of these processes. Moreover, this article contributes to a growing body of work that moves beyond orphanhood, and more broadly beyond the AIDS epidemic, to examine other important dimensions of family life including single-motherhood, divorce, and migration (Clark & Hamplová, 2013; Dionne, Gerland, & Watkins, 2013; Goldberg, 2013; Madhavan et al., 2012).

The article proceeds with an overview of gendered parenting roles in Tanzania. Drawing on this literature, I provide a framework for examining the relationship between parental non-residence and child survival and school entry based on the types of parental input that are most closely related to each outcome. I predict how each type of non-residence implies variation in parental inputs and will be associated with child survival and school entry, summarizing the existing research on parental non-residence. This article demonstrates the importance of parental coresidence in shaping the survival and educational experiences of children. The findings underscore important variation in the causes of non-residence, demonstrating that some circumstances of parental non-residence are associated with no apparent disadvantage, and others may present advantages for children.

Background

Gendered Parenting

The family is a social institution with established roles that define acceptable behavior and provide individuals with a shared understanding of the norms and responsibilities of family members (Cherlin, 1978; Gerth & Mills, 1953). Parental roles and responsibilities follow institutionalized roles of childrearing. Such roles may be rooted in legal, customary, cultural, and social definitions of parenting responsibility. In Tanzania, and throughout much of the region, parenting roles are highly gendered (Lockwood, 1998; Notermans, 2008). Traditionally, mothers are caregivers and fathers are providers (Lockwood, 1998; Mkhize, 2015). Mothers are primarily responsible for cooking, feeding, and general caretaking such as bathing and dressing, as well as providing emotional support (Fouts & Brookshire, 2009; Notermans, 2008; Sear & Coall, 2011). Fathers are responsible for the provision of material resources, such as wages, as well as the education and discipline of children (Lesejane,

2015; Mkhize, 2015; Morrell, 2015; Whyte & Whyte, 2004). There is evidence that these expected responsibilities for mothers and fathers are enacted, as mothers spend more time providing direct care (i.e. feeding, bathing, healthcare and supervision) to children than fathers (Bruce, Lloyd, & Leonard, 1995; Budlender, Chobokoane, & Mpetsheni, 2001; Hawkes, O'Connell, & Blurton Jones, 1997), but have lower wage-earning potential (Budlender et al., 2001). Certainly, mothers and fathers provide other inputs beyond direct care and financial resources, respectively. However, much of the existing research supports this pattern, and the present analysis tests the implications of this gendered division of parenting.

Mothers must be coresident in order to provide direct care and support for the child (Bruce et al., 1995), and such care is not easily replaced by other relatives in the event of maternal non-residence (Sear & Mace, 2008). For example, mothers must be physically present in order to feed and bathe the child, or monitor his/her health; even when other female relatives assist, mothers remain the primary caregiver (Fouts & Brookshire, 2009). While mothers are key caregivers, fathers throughout the region have been referred to as “peripheral” and replaceable figures in childrearing (Budlender et al., 2001; Sear & Mace, 2008; Thomas, 1994). Father coresidence is important only insofar as it affects the availability of monetary resources, which he does not necessarily need to be present in order to provide (Case, Paxson, & Ableidinger, 2004; Fapohunda & Todaro, 1988; Townsend, Madhavan, Tollman, Garenne, & Kahn, 2002). There is a large body of evidence documenting the increased risk of poverty associated with father absence and female-headed households (Lawson et al., 2016; Richter, 2015).

Gendered patterns of caregiving likely shape the ways in which parental coresidence influences child wellbeing depending on the type of parental inputs that are required for a given outcome. I propose that child survival is more sensitive to direct care, and school entry is more responsive to financial resources. Examining two outcomes that are differentially sensitive to types of parental input provides a more nuanced examination of the relative importance of maternal and paternal coresidence.

There is a growing literature in South Africa that interrogates this simplified vision of fatherhood challenging the deficit model of fatherhood (Chikovore, Makusha, & Richter, 2013; Madhavan, Richter, Norris, & Hosegood, 2014; Morrell, 2015; Richter, 2015). Nevertheless, this literature continues to demonstrate the salience of father's roles as providers, linking paternal non-residence to the structural and institutional factors that prevent men from attaining this role (Hunter, 2015; Ramphele & Richter, 2015). We can gain insight into how the gendered parenting model is insufficient where predictions are not supported. This section proceeds with an overview of the types of parental inputs that are most directly related to each outcome, how the non-residence of the mother and father is predicted to be related, and a review of the existing empirical evidence.

Child Survival

Potential mechanisms underlying the relationship between parental coresidence and child survival include nutrition and access to food; adult supervision, which may influence the occurrence of accidents, as well as monitoring of symptoms and timely response to illness;

and access to treatment and health care (Mosley & Chen, 1984). This does not disregard the importance of other parental investments and resources in child health and survival, but proposes that survival will be most responsive to direct parental inputs of feeding, care, and supervision.

Given mothers' primary responsibility for direct caregiving, I predict that maternal non-residence will be associated with increased child death. Studies of the influence of maternal non-residence on child survival are limited primarily to an examination of maternal orphans (Clark et al., 2013; Sear & Coall, 2011). I review variation by cause of non-residence in a proceeding section. As Mosley and Chen outline, paternal influences often operate on the proximate determinants of child survival via income or level of household resources; in contrast, many maternal characteristics have a direct effect (1984). Because father non-residence may be accompanied by a decline in resources, I predict that paternal non-residence will be associated with increased child death. However, the magnitude of the association will be greater for maternal non-residence. Existing research on paternal non-residence and child mortality is mixed. One cross-national study used female-headedness to capture father absence, finding no effect on child survival (Akinyemi, Chisumpa, & Odimegwu, 2016). On the contrary, a study in Ethiopia found that children in female-headed households were more malnourished than those in male-headed households (Fentaw, Bogale, & Abebaw, 2013), which could translate into increased mortality.

School Entry

Primary schooling in Tanzania is, in principle, free. In practice, school attendance often requires the purchase of uniforms, transportation, and examination fees. As such, financial resources will be most closely linked to school entry; recent research demonstrates the importance of credit constraints in predicting school enrollment (Glick, Sahn, & Walker, 2016; Roby, Erickson, & Nagaishi, 2016). Because fathers are the primary wage-earner, and the availability of monetary resources is on average greater when he is coresident, I predict that paternal non-residence will be associated with lower odds of school entry. Fathers may also provide other inputs, such as supervision, discipline, and encouragement to stay in school, that positively influence school entry when he is coresident.

When mothers are absent, children may need to fill in for domestic duties. A recent report documents demands for child labor as an obstacle to universal enrollment in the region (Human Rights Watch, 2005). Maternal non-residence may also result in less supervision of the child. I predict that maternal non-residence will be associated with lower odds of school entry. However, given the primary importance of monetary resources for schooling in this context, and fathers' role as primary wage-earners, I predict that the influence of paternal non-residence on school entry will be greater than maternal non-residence. While mothers may also earn money, it is often less than fathers, and is allocated to different expenses (Gummerson & Schneider, 2013). Indeed, children's schooling expenses are an explicit paternal responsibility in some contexts (Notermans, 2008; Thomas, 1994), including Tanzania (author).

Research on education in sub-Saharan Africa generally finds a beneficial effect of parental coresidence (Roby et al., 2016). In a cross-national study, Huisman and Smits find that

children living apart from the mother or the father were less likely to be enrolled in school (2009). Several studies find that maternal absence decreases the odds of school entry by increasing the demand for domestic child labor (Huisman & Smits, 2009; Webbink, Smits, & Jong, 2012).

Reasons for Non-Residence

In addition to comparing maternal and paternal coresidence, I investigate variation in the association by reason for non-residence. I examine parental death, non-residence due to parental relationship status (non-marital childbearing and union status change), and migration. These causes provide an opportunity to examine variation in the ability and willingness of the mother and father to provide direct care and monetary inputs. There are few studies in this context that compare different reasons for parental non-residence simultaneously on which to guide predictions (Thiombiano et al., 2013). However, with widespread and increasing paternal absence (Gaydosh, 2015; Ibisomi & De Wet, 2014; Posel & Devey, 2015), it is necessary to examine different causes of non-residence and the pattern of their relationship with various child outcomes. This can provide greater insight into whether and why parental coresidence matters for child wellbeing. In the following sections, I outline how parental inputs may change following each type of non-residence, and review existing evidence regarding how each type of non-residence is related to both child survival and school entry.

Parental Death—Parental death is a distinct type of non-residence, as it results in permanent absence and the complete loss of all types of support from the parent. I predict that parental death in general will be associated with higher mortality and lower school enrollment. Given the gendered pattern of childrearing discussed above, the death of the mother will have greater repercussions for child survival, while the death of the father will matter more for child education. Mothers are not only primarily responsible for the care and feeding of children, but maternal health may be directly related to infant health. Similarly, the death of the father may have greater implications for children's education, as fathers are responsible for wage earning, and school attendance, even for primary school, incurs substantial monetary costs.

There is empirical evidence that the risk of death is especially elevated for maternal orphans (Clark et al., 2013; Sear, Steele, McGregor, & Mace, 2002; Watts, Lopman, Nyamukapa, & Gregson, 2005; Zaba et al., 2005). In a cross-national review of 45 studies, Sear and Coall find that maternal death is almost always associated with increases in child mortality (2011). The same review finds that paternal death is consistently less detrimental than maternal death, and is often inconsequential in terms of child survival (Sear & Coall, 2011).

In general, orphaned children have poorer educational outcomes than their peers with living parents (Evans & Miguel, 2007; Parikh et al., 2007; Parker & Short, 2009). However, contrary to my prediction, there is some evidence that maternal death is more consequential for schooling than paternal death (Case & Ardington, 2006). One study in Zimbabwe contributes this pattern to the fact that paternal orphans are more likely to live with the surviving parent, who is invested in the child's education (Nyamukapa & Gregson, 2005). A

study in Kenya attributes the greater effect of maternal death to earlier and larger disruptions in family caregiving routines that occur when the mother is sick (Evans & Miguel, 2007). The present study controls for the timing and cause of non-residence for both parents simultaneously, which can help address these possible confounders.

Non-Residence due to Parental Relationship Status

Non-marital childbearing: Non-marital childbearing is the leading cause of paternal non-residence in the research area (see Table 1). In the absence of marriage, fathers who bear children out of wedlock forego all paternal rights and therefore have no claim over future returns to children (Mair, 1971). Under some conditions, unmarried fathers may provide support to children. For example, unmarried Tanzanian fathers may pay damages to the mother's family, acknowledging paternity without agreeing to marriage (Rwezaura, 2000). Across the region, fathers who claim paternity sometimes maintain contact with and provide support for the child, at least in the short term (Clark, Cotton, & Marteleto, 2015; Hollos & Larsen, 2004; Madhavan, 2010). However, without such formal acknowledgement, extramarital children in Tanzania belong to the mother's lineage and are not entitled to inherit their father's estate (Rwezaura, 2000). I propose that paternal non-residence due to non-marital childbearing implies a lack of paternal resources, and will be negatively associated with both children's survival and school entry.

When fathers refuse paternity, the responsibility for raising the child falls on the mother, who oftentimes leaves the child with her family in the event that she is able to secure marriage to another man (Christiansen, Yamba, & Whyte, 2005; Hollos & Larsen, 2004; Weisner, Bradley, & Kilbride, 1997). There is some evidence that this lack of support from the father translates into poorer health for children; in a cross-national study, Clark and Hamplová found that children of never-married mothers are more likely to die than children of married mothers (2013). Children of single mothers are disproportionately malnourished (Gage, 1997; LeVine & LeVine, 1981), and have higher mortality (Omariba & Boyle, 2007). In Tanzania, children of unmarried mothers are more likely to be stunted (Mamiro et al., 2005). As of this writing, there are no studies that examine non-marital childbearing and children's schooling.

Divorce and remarriage: In the event of parental divorce, mothers traditionally lose claim over their children. When children are old enough, they leave the maternal household following a divorce, particularly if the mother remarries (Grant & Yeatman, 2013). On the contrary, fathers retain rights over their children even in the event of divorce or remarriage, and children remain in the paternal household (Rwezaura, 2000). Following divorce or remarriage, fathers are still available and motivated to invest resources in children. I predict that paternal non-residence due to marital status changes will not be associated with child survival or school entry. In contrast, mothers are less able to provide direct care and supervision, and may be less motivated to see their children attend school because they are no longer entitled to the long-run benefits that parents expect from children in old age (Caldwell & Caldwell, 1987). I predict that maternal non-residence due to marital status changes will be associated with poorer child outcomes, particularly child survival. In the few examinations of maternal divorce in the region, children of divorced mothers experienced

the worst mortality outcomes (Clark & Hamplová, 2013), and were had lower educational outcomes compared to children of married mothers (Chae, 2016; Thiombiano et al., 2013). However, these studies are limited to samples drawn from mothers only, and do not provide specific evidence on maternal non-residence due to marital status changes.

Parental Migration—Parents may also migrate out of the household; migration in this context is usually labor related and internal to Tanzania's major cities (Beegle, De Weerd, & Dercon, 2011). Migration may be circular, with periods away followed by a return to the household (Collinson, Tollman, Kahn, Clark, & Garenne, 2006). Maternal migration prevents the mother from providing direct care for her children; I predict that maternal migration will be associated with poorer child outcomes, particularly child survival. On the other hand, paternal migration may actually increase the resources available to children through remittances (Luke & Singh, 2011; Smith-Greenaway & Madhavan, 2015; Tsai & Dzorgbo, 2012). Moreover, there is evidence that, controlling for socioeconomic status, paternal migration can be beneficial for children's outcomes if it increases maternal autonomy and ability to allocate additional resources to children (Luz & Agadjanian, 2015; Yabiku, Agadjanian, & Cau, 2012). If paternal non-residence is accompanied by an increase in the level of resources and more direct investment of resources in children, this will lead to better survival and higher odds of school entry. This is distinct from other causes of non-residence because it involves an increase in resources and the continued coresidence of the mother.

There is evidence from previous research that paternal migration is associated with improved child mortality (Collinson, 2008; Yabiku et al., 2012), whereas maternal migration is associated with worse child mortality (Brockerhoff, 1994; Collinson, 2008). In a cross-national study including sub-Saharan Africa, paternal migration is associated with better educational outcomes; children in households with migrant fathers have higher educational attainment than children in households with resident fathers (DeRose, Garcia, Salazar, & Tarud, 2014). Research on maternal migration and children's education in this context is limited.

In summary, I investigate predictions based on gendered parenting regarding the association between maternal and paternal non-residence and child survival and school entry. Mothers primarily provide direct care, while fathers provide financial resources. Child survival is more directly influenced by care, while school entry is more determined by financial constraints. As such, maternal non-residence will be more predictive of child survival, while paternal non-residence will be more predictive of school entry. I examine three causes of parental non-residence that imply varying levels of parental input; this provides further insight into the potential mechanisms underlying the relationship between parental non-residence and child wellbeing. Non-resident mothers are unable to provide direct care, regardless of the reason for non-residence. Paternal death and non-marital childbearing imply the total absence of paternal resources, and will be associated with the worst child outcomes. Paternal investment should not change with marital status changes because fathers retain rights over their children. Finally, paternal migration may increase the level and allocation of resources to children, and be associated with improved child outcomes.

Method

Research Setting

To examine the relationship between parental vital, residency, and marital statuses, and child survival and schooling, I used data from the Rufiji Health and Demographic Surveillance System (HDSS) in Tanzania, managed by the Ifakara Health Institute. Settled along the flood plains of the Rufiji River for which it is named, the research setting is mainly rural, with 80% of households having a dirt floor, 90% using water from a shared source (usually a community well), and 95% using a traditional pit latrine. Subsistence farming is the primary occupation, and the average educational attainment is four years. While rural, the population is concentrated around four trading centers or townships. The trading centers are located along a main road, which leads to Dar es Salaam, the country's largest city and commercial capital. The 180km journey to the city costs about 30 cents by bus and takes roughly four hours.

There are several features of the site that make it particularly interesting for the study of parental vital, residency, and marital status. First, parental non-residence is common; by age ten, over half of children will have experienced at least one instance of parental separation (author's calculations). Second, parents do not reside with their children for a variety of reasons, including death, divorce, remarriage, non-marital childbearing, and migration. This constellation of causes represents the intersection of underlying demographic processes of mortality, marriage, and migration that shape children's living arrangements.

Under-five mortality levels and trends in the area were similar to national estimates. In the Rufiji HDSS, under-five mortality was high but declining, from 137 deaths per 1000 live births in 1999, to 68 deaths per 1000 live births in 2011 (author's calculations). Nationally, the under-five mortality rate was at a similar level and following a similar pattern, at 143 deaths per 1000 live births for 1996–2000, and 81 deaths per 1000 live births for 2006–2010 (National Bureau of Statistics & ICF Macro, 2011). The leading cause of death for children under five was malaria, followed by febrile illness, pneumonia, and malnutrition. Transmission of HIV from mother to child has declined across the region (United Nations Children's Fund & Fund, 2013), and AIDS related deaths accounted for a very small share (less than 2%) of under-five mortality in the site (author's calculations).

Mandatory schooling in Tanzania begins at age seven, although children are often delayed in school entry due to long distances, lack of necessary funds, or other household demands. The school year begins in January. Nationally, roughly 30% of seven year olds were not enrolled in school, with rates higher in rural areas (National Bureau of Statistics & ICF Macro, 2011).

Data

The Rufiji HDSS is an ongoing surveillance system that follows an open cohort of approximately 110,000 individuals living in an area of 1,800 square kilometers. Established in 1998 with an initial census of all individuals living in the area, the surveillance team visits all households three times per year to collect the residency and vital status of every registered member. Households are defined as groups of individuals who "eat from the same

pot”. This definition is commonly used in surveillance platforms and surveys, and is intended to capture both shared physical residence as well as shared social identity and economic resources. Without data on childcare or remittances, household residence is a proxy for care and support for the child; this is a limitation of the available measure of household membership common across studies in the region.

New members are added through birth or in-migration, and members exit through death or out-migration. Migration events are defined as moves in or out of the site that are documented at two consecutive household visits; exits, entries, or returns of durations less than four months are not captured. Internal migration from one household to another within the site may be of any duration. More detailed information on this demographic surveillance system are available elsewhere (Mrema et al., 2015).

This paper examined two child outcomes – survival and school entry. First, to examine child survival from birth to age five, I used the dates of births, deaths and migration events to construct exposure episodes for all children born in the site from 1998 – 2011. Exposure began at birth and ended either with an event, here the death of the child, or with censoring. Censoring refers to a situation where the child was no longer included in the analysis, or exposed to the risk of death. This occurs in three instances – when the child turns five, if the child moves out of the site, and at the end of observation, here December 31, 2011.

Second, to examine school entry, I created annual exposure episodes for all children born in the site from 1998–2003. I restricted the analysis to these years because children in Tanzania are eligible to enter school at age seven, and observation ended in 2011. These inclusion criteria ensure that all children are exposed to the risk of school entry for complete yearly intervals. Exposure began in the calendar year after which the child has turned seven (2011 for a child born in 2003), and ended either with an event, here the entry of the child into school, or with censoring. In this analysis, censoring occurs if the child moves out of the site or at the end of observation, again the end of calendar year 2011. Only intervals with complete exposure were included; if a child migrates out of the site in the middle of a calendar year, that partial year of exposure was discarded and the child was censored at the end of the preceding year. Between 60–70% of the 1998–2003 birth cohorts were still living in the site by age seven; this attrition may influence the findings if child migration out of the site is associated with parental non-residence and characteristics involved in school entry. In particular, educational fostering may increase schooling of children who live apart from their parents, and would not be captured in these data.

Measures

Parental Coresidence—The predictors of interest were time-varying measures of parental coresidence, as shown in Table 1. First, for each parent vital and residency status was measured using a three-category variable to indicate whether the parent is alive and coresident (reference), deceased, or alive and non-resident (hereafter non-resident). Note that if the parent left the site and was therefore no longer under observation, his/her status remained non-resident; it is not possible to know whether this parent dies following exit. Furthermore, approximately one-quarter of children born in the Rufiji HDSS do not have an identifiable father; these children were born to unmarried mothers and the father was never

coresident. In more detailed classifications, this was its own category as a reason for father non-residence; however, in this first measure, these fathers were considered simply non-resident.

I disaggregated the non-resident category by reason for non-residence. Non-residence was defined as related to parental relationship status if it occurred within six months of a union status change, or due to non-marital childbearing. Parents may be non-resident due to marriage/remarriage to someone other than the biological parent, and divorce. Fathers may also be non-resident due to non-marital birth; this was the category for fathers who were not identifiable because they were not married to the mother and were never coresident with the child. Parents may also be non-resident due to other migration events; such migration events were assigned as unrelated to marital status changes if they did not occur within six months of a union status change.

Controls—All models included several controls for child, maternal and household characteristics (Table 2). I included an indicator for whether the child is male. There was no evidence of sex differences in the associations (results not shown). Using the pregnancy history of mothers, I constructed a categorical measure of birth order, with a reference category of first birth. I included a three-category measure of mother's education separating no formal schooling (reference), some primary schooling, and primary schooling completed or greater. In Tanzania, primary school refers to grades 1–8. As the child and parental covariates were constant and data collection occurs multiple times per year giving field staff the opportunity to fill in incomplete information, missing data on these measures were minimal.

At the household level, I included a time-varying measure of household wealth constructed from an asset ownership index using principal components analysis (Rutstein & Johnson, 2004). Asset ownership data were collected in 2001, 2005 and annually from 2008 – 2011. Missing wealth data were imputed both forwards and backwards in time. After imputation, wealth data were completely missing for the households of approximately 2,000 children in the mortality analytic sample, and 600 children in the school entry analytic sample. These cases were not included in the analysis. Results were robust to multiple imputation for missing wealth data, including an indicator for missing wealth and including these cases in the analysis, and excluding all cases with any missing data. In robustness checks (not shown), I also estimated models with a constant measure of wealth at the start of the exposure interval; the conclusions were unchanged. To account for resource dilution and competition due to other children in the home, and the possibility of sibling care, I included an indicator for whether there are any other children under age 15 living in the household. Finally, I included an indicator for adult kin coresidence, capturing the presence of any maternal or paternal related adults living in the same household.

To capture variation in mortality trends and parental non-residence prevalence over time, models for child death included a measure of the child's birth cohort in three intervals: 1998–2002 (reference), 2003–2007, and 2008–2011. The school entry subsample only included children born from 1998–2003, and did not include a control for birth cohort. As child death is greatest at very young and old maternal ages, measures of maternal age and

maternal age squared were included in the mortality analyses. Only maternal age was included in the school entry analyses

Methods

To examine the influence of parental status on child survival, I estimated piecewise exponential survival models. For this semi-parametric estimation, I divided children's exposure episodes into intervals from 0 to 1 month, 1 to 6 months, 6 to 12 months, 12 to 24 months, and 24 to 60 months. These cutpoints captured distinct empirically documented periods of child mortality and include at least 100 deaths per interval, an adequate number of deaths within each period to allow for estimation (UNICEF, 2014; Wardlaw, You, Hug, Amouzou, & Newby, 2014).

The model makes three assumptions: 1) the baseline hazard is constant within each interval; 2) survival time of siblings is independent conditional on a shared frailty term for the mother, which controls for common, unobserved characteristics of the mother; and 3) the random effect for the mother has a gamma distribution with a mean of one. The model is expressed as

$$\lambda_{imj} = \theta_m \lambda_j \exp\{X_{imj}\beta\},$$

where λ_{imj} is the hazard of individual i of mother m in interval j , θ_m is a mother-specific random effect, λ_j is the baseline hazard in interval j , and X_{imj} is a vector of time-constant and time-varying covariates. The model also assumes that the effect of covariates (β) is the same at every age; I explored the validity of this assumption by including an interaction between indicators for parental non-residence and child age in robustness checks. Conclusions were unchanged (results not shown).

To examine the association between parental status and school entry, I estimated discrete-time logit models. The choice of discrete-time is appropriate because the school calendar begins at the start of the calendar year, and school entry is therefore truly discrete. Only annual intervals with complete exposure are included. This model assumes that the odds of school entry are proportional to the baseline hazard. Time-varying covariates are assumed to be constant within the annual intervals. The model can be expressed as

$$\text{logit } \lambda_{im}(t_j|x_i) = \alpha_j + x'_{im}\beta + \theta_m$$

where λ_{im} is the hazard of school entry at time t_j given non-entry up to that time for individual i of mother m , $\alpha_j = \text{logit } \lambda_0(t_j)$ is the logit of the baseline hazard, $x'_{im}\beta$ is the effect of the covariates on the logit of the hazard, and θ_m is a mother-specific random effect.

Results

Descriptive Results

Table 1 presents prevalence estimates for parental non-residence at the start and end of observation for the two analytic samples. In the child survival sample, at birth all children

had a living mother and 1% had a deceased father; by the end of observation, 1% and 2% of children had a deceased mother and father, respectively. All children were coresident with their mothers at the time of birth, yet 37% of children did not live in the same household as their fathers. At the end of observation, 10% of children lived apart from their mothers, and 36% lived apart from their fathers. These estimates included non-residence due to both parental relationship status and migration.

Union status change accounted for 40% of all maternal non-residence at the end of observation. Fewer children experienced paternal non-residence due to union status changes. However, 26% of children had a non-resident father due to non-marital birth; these fathers were not identifiable, did not marry the biological mother, and have never resided in the same household as the child. At birth, 10% of children had a father who is non-resident because he has migrated. At the end of observation, 6% of children had a migrant mother, compared to 9% with a migrant father.

Columns 3 and 4 of Table 1 present parallel prevalence estimates for the school entry sample. Observation began at age 7, when children were eligible to start school. At this time, 12% of children did not live with their biological mothers, and 32% did not live with their biological fathers. A small proportion of this non-residence was due to parental death, while a larger share was attributable to parental migration and non-marital birth. Maternal non-residence due to all causes increased over the period of observation, while paternal non-residence remained relatively stable.

Child Survival

Table 3 presents piecewise exponential estimates for the association between time-varying measures of parental non-residence and child death. Hazard ratios greater than one indicate an elevated risk of death or a detrimental association with parental non-residence, while hazard ratios less than one indicate a better chance of survival. In Model 1, I examined parental death and non-residence, combining relationship status and migration causes of non-residence. Maternal death was associated with a risk of child death more than 15 times as high as the risk of death for children with a living, coresident mother controlling for child, maternal, and household demographics. Results were robust to excluding child deaths in the first 30 days of life to address the correlation between maternal and infant health (not shown).

In contrast to the large and significant association with maternal death, paternal death was not significantly associated with child death. Unlike parental death, both maternal and paternal non-residence were associated with an elevated risk of child death. Children who did not live in the same household as their mother had a 40% higher hazard of death compared to children with a coresident mother. The magnitude of the association with paternal death was smaller but still significant; the hazard of death was 16% higher for children with a non-resident father compared to those living with their father.

In Model 2, I disaggregated parental non-residence due to relationship status and other migration events. Maternal non-residence due to union status change was associated with an over two-fold increase in the hazard of death. While smaller in magnitude, maternal

migration was also associated with a significant elevation in the risk of death for children compared to those with a living, coresident mother. Maternal death remained strongly associated with child death.

Paternal non-residence due to non-marital childbearing was associated with a 40% increase in the hazard of mortality for children compared to those with a living, coresident father. Recall that these fathers were consistently non-resident from the time of birth. Unlike the elevation in the risk of death associated with maternal migration, paternal migration was associated with a significant decline in the risk of death. Children with migrant fathers faced a hazard of death that was 20% lower than that for children with a living, coresident father. Paternal non-residence due to union status change was not significantly associated with child survival.

School Entry

Table 4 presents odds ratios estimated using discrete-time logit models for the association between time-varying parental non-residence and school entry. Odds ratios greater than one indicate that a child is more likely to have entered school by a given age. Model 1 included controls for parental vital status and non-residence; children with a deceased father had 34% lower odds of entering school by a given age compared to children with a living, coresident father. Maternal death, while in the same direction, was not significantly associated with school entry. Both maternal and paternal non-residence were associated with lower odds of school entry: 14% lower when the mother was non-resident, compared to 22% lower when the father was non-resident.

In Model 2, I disaggregated parental non-residence by reason. Unlike the deleterious associations observed for child survival, maternal non-residence due to union status change was not significantly associated with school entry. However, maternal migration remained associated with worse child outcomes; here, the odds of school entry were 18% lower for children with a migrant mother compared to those with living, coresident mothers. Paternal non-residence due to union status changes and non-marital birth were not associated with school entry. Paternal migration was associated with 33% lower odds of school entry compared to children with living, coresident fathers.

Robustness

Even after controlling for all available confounders, it was possible that the observed associations may result from selection. Unobserved characteristics of the parent may explain both their non-residence and the elevated mortality risk and lower odds of school entry of their children. To address this possibility, in robustness checks I estimated Cox proportional hazard models stratified by shared mother (Table 5), comparing siblings with different experiences of non-residence. The strong and significant association between maternal death and child survival remained when comparing children of the same mother (Model 1). Maternal non-residence was not significantly associated with child death, but the direction was consistent with findings in the full sample. While parental vital and residency status were not significantly associated with school entry (Model 2), paternal non-residence was marginally associated with lower odds of school entry, consistent with the results from the

full model. While the fixed effects results supported the robustness of the findings to time-invariant unobserved characteristics with time-invariant effects, the possibility of unobserved heterogeneity remains. The circumstances that lead to parental exit from the household may simultaneously influence child survival and schooling. It may not be the absence of the parent per se, but events that lead to or follow non-residence that determine child outcomes. Future research is needed to better understand the process of parental non-residence and its relationship to patterns of care and support for children.

Discussion

The findings demonstrated differential associations between parental non-residence and child outcomes depending on which parent is non-resident, for what reason, and what outcome is examined. Consistent with gendered parenting roles in this context, maternal non-residence was more predictive of child survival, while paternal non-residence was more related to school entry.

All types of maternal non-residence were associated with an elevated risk of mortality for children, which is line with the predictions based on gendered parenting roles wherein mothers supply direct care that cannot be substituted for by other family members. Similarly, the magnitude of the associations with the different types of maternal non-residence followed the predicted pattern, with maternal death associated with the greatest increase in mortality, and maternal migration the least. Even though maternal death was the least common cause of non-residence, it was associated with the greatest elevation in the risk of child death. The fifteen-fold increase in the risk of child death is consistent with the size of the relationship documented in other research on maternal orphans (Clark et al., 2013; Ronsmans, Chowdhury, Dasgupta, Ahmed, & Koblinsky, 2010). It is likely that there is correlation between maternal health and child health, which may explain this strong relationship, and the lack of a relationship between maternal death and school entry. While mother-to-child-transmission of HIV certainly plays a role, it is more likely that mothers in poor general health give birth to frailer, less healthy babies. Complications in childbirth may also result in correlated maternal and child death, as well as early weaning. Nevertheless, this is an important finding, and may justify policy interventions that target maternal and infant health, particularly for infants who are at higher risk due to maternal death.

Consistent with predictions based on gendered parenting roles, paternal non-residence due to non-marital childbearing was associated with an elevated risk of mortality, while paternal migration was protective in terms of child survival. Father non-residence due to union status changes was not associated with either outcome, which is consistent with the prediction that paternal motivation to invest in children should not change following union status changes in this patrilineal context. Finally, paternal death was associated with lower odds of school entry.

Paternal death was not associated with child survival. This finding is counter to what was predicted, particularly given the total absence of paternal inputs in the event of death. However, the findings are in keeping with the general prediction that fathers matter less for child survival. Furthermore, they are consistent with previous research demonstrating the

null effect of paternal death on child mortality (Sear & Coall, 2011; Sear & Mace, 2008). It is possible that fathers provide few inputs that are essential for child survival, or that paternal inputs that are relevant can be replaced by other kin (Sear & Mace, 2008; Thomas, 1994). It is a limitation of the analysis that the ability of extended kin to substitute for parental non-residence is not considered, and an area for future research.

Maternal migration was associated with lower odds of school entry, but maternal death and non-residence due to union status changes were not associated with school entry. As of writing, this was the first study to examine the relationship between maternal migration and children's schooling in this context, and therefore scant previous research on which to draw. It is possible that maternal migration is detrimental because it is inconsistent with expectations of motherhood; there is evidence from China that children feel particularly neglected when their mothers are absent (Jingzhong & Lu, 2011). Alternatively, the process of selection for female migration is unclear (Omariba & Boyle, 2010; Ssengonzi, De Jong, & Shannon Stokes, 2002), and it is possible that the characteristics that compel mothers to leave their young children may also make these children more likely to die and less likely to enter school. Further research is needed to better understand the mechanisms underlying maternal migration and child wellbeing, as well as mothers' role in children's education.

Two inconsistent patterns of association between paternal non-residence and child outcomes warrant additional attention. First, paternal non-residence due to non-marital childbearing was associated with elevated mortality, but was not associated with school entry. There is little prior research in this context to draw from to gain insight into this finding, particularly regarding school entry. Nevertheless, the results here confirm existing evidence that unmarried mothers have children with worse health outcomes (Clark & Hamplová, 2013; Gage, 1997; LeVine & LeVine, 1981; Ntoimo et al., 2014). Unmarried mothers are more educated on average (DeRose et al., 2014), which may make them place more value on education for their children. It is also possible that the group of children born to single mothers who survive to school age are particularly resilient and robust. The findings suggest that the disadvantage associated with single-motherhood may dissipate over the child's life course. There is a need for further research on single motherhood in this context, as there is a poor understanding of the customs of care and support available to children born outside of wedlock.

Second, perhaps the most intriguing finding was that paternal migration was associated with a higher chance of child survival, but lower chance of school enrollment. Unlike other types of non-residence, paternal migration is likely accompanied by an important confluence of factors that may account for this contrast. Migrant fathers continue to provide support for children, and the level of resources may increase with remittances (Madhavan et al., 2014; Madhavan & Roy, 2012). Furthermore, unlike the case of divorce, the mother often remains coresident with the children. The absence of the father from the household may increase the autonomy of the mother, allowing her more control over the allocation of household resources (Yabiku et al., 2012). Indeed, in other studies of household expenditures there is evidence that women spend money differently than men (Gummerson & Schneider, 2013). Mothers are particularly likely to dedicate financial resources to food and health care expenses (Case, Lin, & McLanahan, 2000; Case & Paxson, 2001; Udry & Woo, 2007).

Therefore, even in the absence of additional resources, sustained paternal migration may increase the nutritional and health promoting resources devoted to children, increasing their chances of survival. This may also explain the negative association between paternal non-residence and school entry if mothers divert resources away from school expenses in favor of increased food and healthcare expenditures. Similarly, if households sending migrant fathers are already resource constrained, any additional resources from remittances will be dedicated to the most pressing needs for survival. It is also possible that fathers are migrating in search of greater wage-earning opportunities in preparation for their children's schooling, and that delayed school entry may be postponed but compensated down the line by greater eventual educational attainment.

There is a large literature on paternal migration from other contexts that may be useful in providing insight into the findings. Several studies in other contexts have found a positive influence of paternal migration on child health and survival (Donato & Duncan, 2011; Hildebrandt, McKenzie, Esquivel, & Schargrotsky, 2005; Kanaiaupuni & Donato, 1999; Nobles, 2011). Many attributed these positive relationships to the receipt of remittances from migrant fathers (Donato & Duncan, 2011; Frank, 2005; Lu & Treiman, 2011). However, in the present study this association between paternal migration and child death was not explained by differing levels of household wealth. This may be due to a lack of sensitivity in the measure of wealth to remittance income. It is also likely that the relationship between paternal migration and child health operates through social remittances such as the diffusion of health knowledge and technologies, which may improve child survival but not school entry (Frank, 2005; Levitt, 1998; Lindstrom & Muñoz-Franco, 2006). Other confounding factors that were not observed may also account for the findings.

The present study had limitations that should be addressed in future research. In this context, children may be requested by, or sent to live with, non-parental kin (Goody, 1982; Verhoef, 2005). In the present study, when children exit the household of the parent, and oftentimes the site, they were censored from observation. It is likely that this experience has implications for child wellbeing, particularly given past research on fostering practices motivated by educational opportunities (Isiugo-Abanihe, 1985), and the consequences of fostering for educational outcomes (Alber, 2003; Hampshire et al., 2014). I was unable to examine child fostering as a type of parent/child separation.

Kin may also be involved more informally with childrearing, providing support, particularly in instances where parents are non-resident. While all models included a measure of coresident kin as a control, the present analysis was focused on parental coresidence. It is a limitation that the paper does not explore the role of kin in childrearing, and an area for future research.

Finally, this study was limited to one geographic locale in Tanzania, where local customs surrounding the types of parental non-residence examined influence their consequences for children. A cause-specific examination of parental non-residence in different African contexts may produce different results; for example, in matrilineal communities, children usually remain with their mother following divorce and remarriage, which will shape expectations for paternal support. Future work on consequences of parental non-residence

done in a comparative framework would provide insight into whether the observed patterns are specific to Tanzania. Nevertheless, the findings are relevant given that the demographic patterns of elevated prime-age adult mortality, high non-marital childbearing, relatively longstanding acceptability of divorce, and increasing urbanization and migration observed in the site are characteristic of many developing African nations, particularly in South and East Africa.

The findings underscore the importance of considering which parent is non-resident and for what reason, and further research is needed to document the opportunities and challenges associated with different types of non-residence. Previous research has concentrated on parental death and the consequences of orphanhood. Comparing different reasons for non-residence challenges the assumption that maternal non-residence is always deleterious and paternal non-residence is inconsequential. The findings support the centrality of mothers in children's health, and fathers in children's schooling.

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Table 1

Parental Residency Status

	<u>Child Mortality Sample</u>		<u>School Entry Sample</u>	
	Birth	End of observation	Age 7	End of observation
Maternal status				
Coresident	100%	89%	88%	81%
Deceased	0%	1%	1%	2%
Non-resident	0%	10%	11%	17%
<i>Non-resident due union status change</i>	0%	4%	5%	8%
<i>Non-resident, migrant</i>	0%	6%	6%	9%
Paternal status				
Coresident	62%	62.5%	68%	67%
Deceased	1%	1.5%	2%	4%
Non-resident	37%	36%	30%	29%
<i>Non-resident due to non-marital birth</i>	26%	26%	15%	15%
<i>Non-resident due union status change</i>	1%	1%	2%	2%
<i>Non-resident, migrant</i>	10%	9%	13%	12%
<i>Children</i>	38,023		12,626	

Table 2

Sample Descriptive Statistics at Start of Observation

	Child Mortality Sample	School Entry Sample
Male	50%	50%
Twins	4%	-
Birth order (first born)	20%	18%
2 to 3	31%	30%
4 to 5	20%	22%
6 and up	29%	30%
Birth cohort (1998–2002)	32%	59%
2003–2007	40%	14%
2008–2011	28%	-
Mother's age	26.4 (7.5)	27.0 (7.4)
Mother's education (none)	42%	43%
Some primary	16%	15%
Primary or higher	42%	42%
Asset index	−0.12 (2.37)	−0.04 (2.53)
Any children in household	89%	78%
Any adult kin in household	31%	21%
<i>Children</i>	38,023	12,626
<i>Mothers</i>	20,295	8,172
<i>Events</i>	2,435	6,123

Percentages or means, with standard errors in parentheses.

Table 3

Hazard ratios for the risk of child death by parental vital and residency status

	<u>Model 1</u>		<u>Model 2</u>	
	Hazard ratio	SE	Hazard ratio	SE
Maternal status (living, coresident)				
Mother deceased	15.53 ***	(2.72)	15.22 ***	(2.67)
Mother non-resident	1.40 ***	(0.14)		
Union status change			2.19 ***	(0.40)
Migration			1.33 *	(0.16)
Paternal status (living, coresident)				
Father deceased	1.46	(0.40)	1.51	(0.42)
Father non-resident	1.16 **	(0.06)		
Non-marital birth			1.40 ***	(0.08)
Union status change			0.59	(0.20)
Migration			0.80 **	(0.06)
Male	1.11 *	(0.05)	1.11 *	(0.05)
Twins	4.05 ***	(0.36)	3.95 ***	(0.35)
Birth order (first born)				
2 to 3	1.06	(0.07)	1.09	(0.08)
4 to 5	1.10	(0.10)	1.12	(0.10)
6 and up	1.23 *	(0.10)	1.22 *	(0.10)
Birth cohort (1998–2002)				
2003–2007	0.73 ***	(0.03)	0.72 ***	(0.03)
2008–2011	0.62 ***	(0.04)	0.61 ***	(0.04)
Mother's age	1.01	(0.00)	1.01	(0.00)
Mother's age squared	1.00	(0.00)	1.00	(0.00)
Mother's education (none)				
Some primary	0.99	(0.06)	0.97	(0.06)
Primary or higher	0.93	(0.05)	0.92	(0.05)
Asset index	0.91 ***	(0.02)	0.91 ***	(0.02)
Any children in household	0.43 ***	(0.02)	0.40 ***	(0.02)
Any adult kin in household	1.45 ***	(0.08)	1.34 ***	(0.07)
<i>Children</i>	38,023		38,023	
<i>Mothers</i>	20,295		20,295	
<i>Deaths</i>	2,435		2,435	

Results for piecewise exponential models. All models control for age group categories 0–1, 1–6, 6–12, 12–24, and 24–60 months and include a frailty term for shared mother.

* p<0.05,

** p<0.01,

p<0.001.

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Table 4

Odds ratios for the risk of school entry by parental vital, residency, and marital status

	<u>Model 1</u>		<u>Model 2</u>	
	Odds ratio	SE	Odds ratio	SE
Maternal status (living, coresident)				
Mother deceased	0.80	(0.16)	0.80	(0.16)
Mother non-resident	0.86 *	(0.06)		
Union status change			0.90	(0.09)
Migration			0.82 *	(0.07)
Paternal status (living, coresident)				
Father deceased	0.66 **	(0.09)	0.66 **	(0.09)
Father non-resident	0.78 ***	(0.04)		
Non-marital birth			0.94	(0.07)
Union status change			0.77	(0.13)
Migration			0.67 ***	(0.05)
Male	0.62 ***	(0.03)	0.62 ***	(0.03)
Birth order (first born)				
2 to 3	0.95	(0.06)	0.97	(0.06)
4 to 5	0.66 ***	(0.05)	0.68 ***	(0.05)
6 and up	0.66 ***	(0.06)	0.68 ***	(0.06)
Mother's age	1.00	(0.00)	1.00	(0.00)
Mother's education (none)				
Some primary	1.25 **	(0.09)	1.23 **	(0.09)
Primary or higher	1.38 ***	(0.07)	1.37 ***	(0.07)
Asset index	1.51 ***	(0.03)	1.51 ***	(0.03)
Any children in household	1.18 **	(0.06)	1.17 **	(0.06)
Any adult kin in household	1.18 **	(0.07)	1.13	(0.07)
<i>Children</i>	12,626		12,626	
<i>Mothers</i>	8,172		8,172	
<i>School entries</i>	6,123		6,123	

Results for discrete-time logit survival models. All models control for annual intervals starting at age 7 and include a frailty term for shared mother.

*
p<0.05,**
p<0.01,***
p<0.001.

Table 5

Hazard ratios for the risk of child death and school entry, sibling comparison

	<u>Child Death</u>		<u>School Entry</u>	
	Hazard ratio	SE	Hazard ratio	SE
Maternal status (living, coresident)				
Mother deceased	3.96 [*]	(2.13)	0.86	(0.57)
Mother non-resident	1.46	(0.30)	1.21	(0.24)
Paternal status (living, coresident)				
Father deceased	0.62	(0.54)	1.27	(1.01)
Father non-resident	0.93	(0.17)	0.63	(0.18)
Male	1.36 [*]	(0.19)	0.68 [*]	(0.11)
Birth order (first born)				
2 to 3	1.25	(0.28)	1.07	(0.25)
4 to 5	1.15	(0.39)	0.96	(0.38)
6 and up	1.11	(0.44)	0.94	(0.49)
Birth cohort (1998–2002)				
2003–2007	1.04	(0.25)	-	-
2008–2011	1.26	(0.55)	-	-
Mother's age	0.91	(0.05)	0.92	(0.05)
Mother's age squared	1.00	(0.00)	-	-
Asset index	1.00	(0.14)	1.09	(0.16)
Any children in household	0.54 ^{***}	(0.10)	0.99	(0.20)
Any adult kin in household	1.70 [*]	(0.37)	0.88	(0.34)
<i>Children</i>	6,716		1,285	
<i>Mothers</i>	2442		607	
<i>Event</i>	435		649	

Results for Cox proportional hazard models stratified by shared mother. All models control for age group categories.

^{*}
p<0.05,^{**}
p<0.01,^{***}
p<0.001.