The Unequal Burden of Child Loss: Evidence from sub-Saharan Africa and Latin America

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Abstract

Despite declining global mortality rates, maternal bereavement remains common in developing countries. Current estimates suggest that between 25% and 50% of mothers in contemporary African populations have experienced the loss of at least one child. While considerable efforts have been made to quantify the burden of maternal bereavement, gaps remain in understanding disparities by socioeconomic levels. This study uses data from the Demographic and Health Surveys (DHS) to examine the association between maternal education and the overall composition of bereavement experiences. Results from 15 sub-Saharan African (SSA) and five Latin American (LA) countries reveal a consistent educational gradient in maternal bereavement, with lower educated mothers experiencing a higher prevalence of child loss. Estimates across countries over time show differences in terms of the pace of prevalence decline, and convergence of educational levels. Additionally, preliminary results from Kenya and Peru—countries that have experienced significant educational expansion in recent years—indicate that after controlling for other demographic characteristics, there is strong evidence of an association between maternal education level and child loss.

Keywords: socioeconomic factors; sub-Saharan Africa; Latin America; bereavement

INTRODUCTION

Despite the overall decline in mortality rates and health improvements worldwide, parental bereavement - the experience of losing a child - remains a common occurrence, particularly in developing countries. Child loss represents a combination of different mortality regimes experienced over the life course, with the legacy of high mortality rates, persisting into the later stages of the parent's life. Estimates suggest that between one-quarter and one-half of mothers in contemporary African populations have experienced the death of at least one child (Smith-Greenaway and Trinitapoli, 2020).

From a parental perspective, the death of a child can have profound consequences, including increased prevalence of depressive symptoms, physical health deterioration, lower self-rated health, and diminished overall quality of life (Smith-Greenaway and Trinitapoli, 2020). Furthermore, the impact of child loss extends to the instability of marital unions and changes in fertility desires (Alburez-Gutierrez et al., 2021). The timing of such losses at different life stages may produce varying effects, as parents may have differing levels of financial stability, emotional support, or accumulated human capital to cope with the stress and emotional burden. Additionally, experiencing multiple losses may have compounded effects, with each additional loss potentially intensifying the overall impact.

Evidence suggests heterogeneity in the maternal age of child loss, which has been projected to decline in more recent cohorts transitioning from a common event experienced by young mothers to a rare event spread across the maternal life course (Alburez-Gutierrez et al., 2024). However, despite efforts to quantify the burden of parental bereavement (Smith-Greenaway et al., 2021; Smith-Greenaway and Trinitapoli, 2020), gaps persist in understanding the socioeconomic determinants of this phenomenon, particularly in high-mortality countries where child deaths often cluster within families (Gupta, 1990).

In this paper, we aim to provide a more comprehensive understanding of disparities in mothers' experiences of child loss. In particular, we aim to explore the association of maternal education with the overall composition of bereavement experiences - i.e. the timing, and number of losses. The focus on maternal education is given its observed effect on infant and child survival (Balaj et al., 2021), and relative stability after the beginning of a women's reproductive period. This characteristics allows for a better identification of the effect of this socioeconomic proxy on child loss. We focus our research area in Sub-Saharan Africa and Latin America, regions known for high mortality and health inequalities.

DATA AND METHODS

This study uses data from the Demographic and Health Survey (DHS). DHS data come from nationally representative household surveys (see https://dhsprogram.com/), and detailed information is collected from various household members, including birth history data for mothers aged 15 to 49.

Using the birth histories, we first analyze the prevalence of child loss among mothers who have had at least one child death experienced by the time of survey on 15 sub-Saharan African (SA) and 5 Latin American (LA) countries. For this analysis, we present estimates using all DHS surveys available per country. Because our main interest is in showing trends over time, we focus the analysis on countries covering at least four DHS surveys after 2000. We compare estimates by level of education of the mother (No education, Primary, Secondary, Tertiary) and results are shown per 1,000 mothers. We restrict the analysis to educational groups with at least 10 mothers in each survey, as smaller groups could lead to sensitive results. To explore how disparities by level of education persist over time, we compute the range (maximum minus minimum prevalence) among education levels per year.

In the second stage of the analysis, we aim to obtain a comprehensive understanding of the composition of maternal bereavement experiences by the maternal educational level. In other words, we aim to understand how maternal levels of education, as proxy for a socioeconomic level, associates with the time until the first loss, and the number of losses. For the analysis of the timing, we employ a Cox Proportional Hazard Model using time from first birth (entry into motherhood) to first child loss (transition to first bereavement), with age as underlying time scale. The birth histories provide information on the age at death of each deceased child, along with the child's birth date and the mother's birth date. In this sense, it is possible to construct full even history data, with the exact time of losses in a mother's life course.

The information on each live birth was retrieved from birth histories, along with the socioeconomic and demographic characteristics of the mother. As results can be context specific, to understand the results with a greater dept, we focus this part of the analysis in Kenya and Peru. Among the reasons to study these two countries is its latest developments in terms of health and mortality, recent experience of educational expansion and to represent both regions in the analysis.

We use data from Kenya DHS 2022, and Peru DHS 2012, the last available DHS surveys in each country. We control in our model for the maternal ethnicity, religion, birth cohort, type of residence (urban or rural), and corrected educational attainment at age of loss (no education, primary, secondary, tertiary). Given that the maternal level of education is recorded at the time of survey, and the child losses might have occurred at earlier life stages, it is possible that mothers had different educational levels when became bereaved. In this sense, the correction took into account the maximum completed educational level a mother could have at the age of first loss using the Kenyan and Peruvian education systems. Age structure is approximately i) 10-13 years on primary, 14-17 secondary, and 18-21 tertiary in Kenya, Kenya National Bureau of Statistics (2019a), and ii) 6-12 years on primary, 12-17 secondary, and 17-20 tertiary in Peru. We then computed the educational attainment at loss as the minimum between the education recorded at survey and the maximum education possible at that age.

RESULTS

Prevalence of Child Loss by Maternal Educational Level

We first present results on the prevalence of child loss by maternal education in Figure 1. For each year and country we divide the number of mothers who have experienced at least one child death in each educational category by the number of mothers with that educational level. Results are expressed per 1,000 mothers. To explore how disparities by level of education persist over time, we also present in dashed light gray a range, calculated by the difference between the highest and lowest prevalence among educational levels per year.

Our estimates indicate a clear evidence of a negative gradient in education, with mothers with no educational level exhibiting higher prevalence of child losses, followed by primary, secondary and tertiary educated mothers. This pattern was observed in all countries, with particularly high discrepancies in Uganda, Bolivia, Mali, Haiti, Nigeria, and Zimbabwe. In those countries, the range estimated between the highest and lowest most prevalent educational groups in the last survey year is close to, or above, 400 mothers per 1,000.

Figure 1: Prevalence of child loss by maternal educational level among mothers aged 15 to 49 in 15 sub-Saharan African countries and 5 Latin American countries between 1985 and 2025. Expressed per 1,000 mothers.

Comparisons between regions show lower levels of prevalence in Latin America. Nevertheless, countries within

regions exhibit distinct trajectories. Overall, the prevalence of maternal bereavement seems to have decreased over time. In countries such as Burkina Faso, Kenya, Senegal, Colombia, and Peru, this change seems to be driven primarily by reductions in prevalence among women with lower levels of education. In those countries, there seems to be happening a process of convergence between educational levels, with the distance between the most and the least prevalent groups decreasing over time. Among countries such as Nigeria, Uganda, Zambia, Zimbabwe, Bolivia, and Haiti, the disparities between educational groups seem to have maintained over time.

Transition to Being Bereaved

To further explore the relationship between the timing until the first child losses and various maternal characteristics, we employed a Cox Proportional Hazard Model using time from first birth (entry into motherhood) to first child loss (transition to first bereavement). We focused results on Kenya and Peru.

Among the reasons to focus on Kenya, located in Sub-Saharan Africa, is its latest developments in terms of health and mortality and educational levels. Life expectancy at birth was estimated to increase from 46.9 and 51.2 for males and females in 1969 to 60.6 and 66.5 in 2019 (Kenya National Bureau of Statistics, 2009, 2019b). Alongside, the country has experienced an education expansion since 1970s with the implementation of diverse programs aiming to incentivize education and training, such as the Free Primary Education (FPE) rolled in 2003 which provides free basic education to all children in the country (Lucas and Mbiti, 2012).

On the other hand, Peru, located in Latin America, experienced an even faster process of mortality and health improvement. Life expectancy at birth increased from an estimated 53.5 years in 1970 to 75.1 years in 2016 (Organisation for Economic Co-operation and Development (OECD), 2017). Peru has also undergone substantial changes in its educational system over the past century, including important reforms such as the civil reform of 1920, which increased primary education, and the General Education Law of 1982 (Miranda, 2011).

The analysis controlled for maternal ethnicity, religion, birth cohort, and a corrected educational attainment at age of loss. Figure 2 presents exponentiated coefficients of the model. Among the 23,343 mothers aged 15-49 in Kenya in 2022, 14,2% experienced the loss of at least one child (3,325). In Peru in 2012, among the 16,620 mothers, 12,5% experienced the loss of at least one child (2,080).

Preliminary results reveal a strong association between child loss and factors such as maternal ethnicity, type of residence, birth cohort, and the corrected educational attainment. Whereas no effect was observed for religion. Overall, living in an urban place reduces the risk of experiencing a child loss compared to a rural places (by around 10% in Kenya and 17% in Peru). Additionally, more recent birth cohorts are associated with reduced risks of child loss in both countries. This result can reflect the improvements in health and mortality observed in both countries over time, with more recent cohorts of mothers and children exposed to lower mortality risks.

Lastly, results for the variable education indicate that having some level of education reduces the risk of a child loss. In Kenya, having a primary education reduces the risk of a child losses by 20% compared to no education. Having a secondary education reduces by 43%, and having a tertiary education reduces by 57%. In Peru, results are even more striking. Having a primary education in the country reduces the risk of a child losses by 17% compared to no education. Having a secondary education reduces by 53%, and having a tertiary education reduces by 73%.

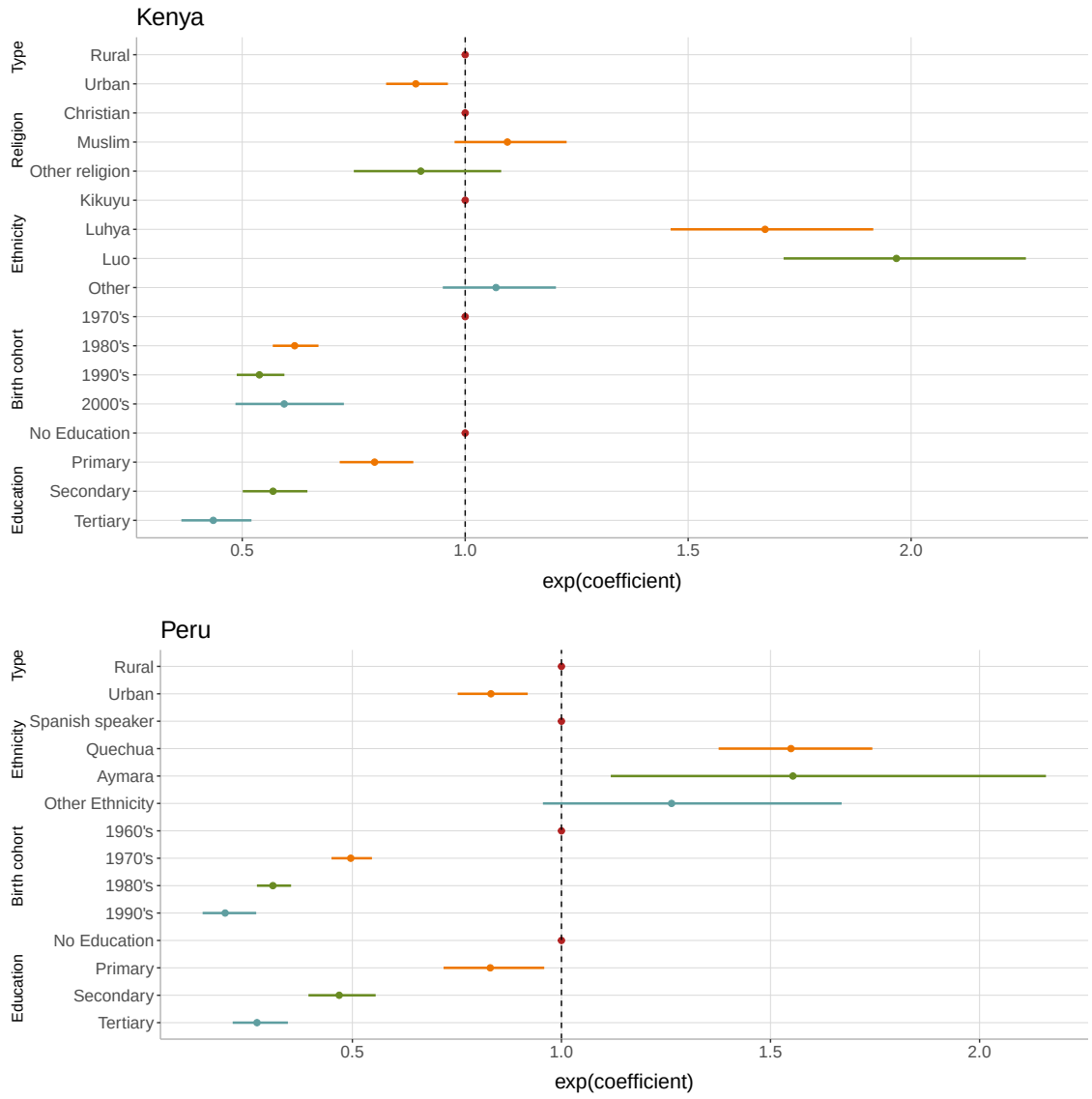

Figure 2: Exponentiated coefficients and 95% CIs for risk of experiencing child loss in Kenya and Peru.

CONCLUSIONS

This study aims to explore disparities in mothers' experiences of child loss. We present results for the prevalence of child loss by maternal educational level on 15 sub-Saharan African (SA) and 5 Latin American (LA) countries. Our results review a consistent educational gradient in bereavement experiences, with differences between countries in terms of the pace of prevalence decline over time, and convergence of educational levels.

We also explore the association of maternal educational level with the time from the first birth to the first child loss. We control in our models for the maternal ethnicity, religion, birth cohort, type of residence (urban or rural), and corrected educational attainment at age of loss (no education, primary, secondary, tertiary). Our preliminary results suggest strong associations with ethnicity, birth cohort, type of residence and educational level. Particularly, higher levels of education were associated with lower risks of experiencing child losses. These findings are consistent with previous research, which has demonstrated a link between socioeconomic factors and elevated levels of child mortality.

These results contribute to a deeper understanding of inequalities in maternal bereavement and the potential mechanisms underlying the experience of child loss, with implications for policy interventions aimed at mitigating the burden of parental bereavement in developing countries. By expanding this analysis to countries in sub-Saharan Africa and Latin America, the study provides a more comprehensive understanding of global

disparities in mothers' experiences of child loss and inform targeted interventions to mitigate its impact.

However, this study has certain limitations. First, birth histories are only recorded for women of reproductive age, meaning they do not account for the full lifespan of the mother. Child deaths occurring after the mother reaches age 49 are not captured in the data. Additionally, previous research has identified several biases in DHS birth history records, which may affect the accuracy of the findings.

The next steps of this research will involve the application of a negative binomial model to examine the effect of maternal socioeconomic characteristics on number of losses. As previously mentioned, the experience of losing a child can have profound consequences in a parent's life, and experiencing multiple losses may have compounded effects, with each additional loss potentially intensifying the overall impact. We also aim to control or Cox Proportional Hazard Model for other sociodemographic characteristics, such as region of residence, marital status, and the number of children ever born at the time of first loss, as having more children increases the exposure to bereavement experiences. Lastly, we aim to explore country differences on the prevalence of child loss, to understand contexts of demographic convergence and persistent inequalities in maternal bereavement.

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