

Knowledge Brief

Health, Nutrition and Population Global Practice

EARLY CHILDBIRTH AND UNDER-FIVE MORTALITY IN MALI

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Child Marriage Series with Education Global Practice

KEY MESSAGES:

- In Mali, about one in eleven children die before the age of five; for children born of mothers younger than 18, the risk is higher.
- Controlling for socio-economic and other characteristics, being born of a mother younger than 18 increases the likelihood of dying before the age of five by seven percentage points in the baseline model, as compared to otherwise similar children born of older mothers.

Early childbirth is associated with health risks for children, including under-five mortality. This could be in part because young mothers often come from disadvantaged groups. But the age of the mothers may also play a role.

Children of young mothers are at higher risk of morbidity and under-five mortality.

Young mothers often come from disadvantaged socio-economic backgrounds and early childbirths are more common in poor areas where prenatal care is limited and access to health facilities may be an issue. Girls who have children early also tend to be less educated and may suffer from lack of agency within the household, further reducing access to care. In addition, some girls who give birth early may not yet be ready physiologically to give birth. The risk of obstetric fistula, for example, is higher for young mothers. These various factors lead to higher risks of under-five mortality for children born of young mothers. How large is the impact of early childbirth on under-five mortality? Does early childbirth accounts for a large share of under-five deaths? These are the questions asked in this brief for Mali.

Box 1: Brief and Series Primer

How is early childbirth defined? Early childbirth is defined in this brief as a child being born of a mother younger than 18. Early childbearing is related to the practice of child marriage.

Why a series on child marriage? Child marriage has significant negative impacts – not only for girls, but also for a range of development outcomes. Demonstrating these impacts will assist governments and others to make the case for intervening to reduce the practice.

What are the topics discussed in the series? The series looks at the impacts of child marriage on health, population, education, employment, agency, and violence, among other outcomes. The welfare, budget, and non-monetary costs of child marriage are estimated. Legal/institutional aspects and options to reduce the practice are also discussed.

What is the question asked in this brief? The question is: How large is the impact of early childbirth on under-five mortality and does it account for a large share of under-five deaths?

How is the question answered? Econometric analysis of Demographic and Health Survey data is used to estimate the impact of early childbirth on under-five mortality.

Statistically, children from young mothers are five percentage points more likely to die before five.

The analysis is based on data from the 2012-2013 Demographic and Health Survey for Mali. According to the survey, the under-five mortality remains high with one in eleven children dying before the age of five (95 %). But there has also been some progress over time, since the rate observed with the 2006 DHS was 191 % and the rate with the 2001 DHS was 229 %. (Cellule de Planification et de Statistique (CPS/SSDSPF), Institut National de la Statistique (INSTAT/MPATP), INFO-STAT et ICF International, 2014).

In this brief we focus on whether all children identified in the survey have died or not before reaching five years of age, and the factors that affect that outcome. This implies relying on statistics computed in a different way from the official under-five mortality rate, but the idea and orders of magnitude are similar (to avoid a risk of confusion, we will use below the term “under-five mortality” but not the term “under-five mortality rate”). As shown in table 1, 11.58 percent of children born of mothers younger than 18 die before reaching five years of age. The proportion, which we refer to as under-five mortality, is 6.52 percent for children born of mothers 18 to 34 years of age. The difference in under-five mortality between the two age groups is statistically significant. For children of older mothers (35 and older), the under-five mortality is at 7.87 percent.

Table 1: Under-five Mortality by Age of the Mother

Age of the mother	Under-five Mortality (%)
Mother younger than 18	11.58
Mother in 18-34 age bracket	6.52
Mother older than 35	7.87

Source: Authors.

Controlling for other factors, early childbirth increases the likelihood of under-five mortality.

The difference in under-five mortality between children of young and older mothers does not necessarily imply a causal effect of the age at delivery, but it does suggest that early childbirth may contribute to under-five mortality. To check whether controlling for other factors early childbirth is indeed associated at the margin with higher under-five mortality, regression analysis is used (see the annex for details on the methodology).

Table 2 provides key results with baseline and extended models. The interpretation of the coefficients is in terms of marginal impacts in percentage terms. For example, a statistically significant coefficient of 0.05 for a mother younger than 18 would indicate that children of very young mothers have a likelihood of under-five mortality five percentage points higher than children of older mothers, controlling for other characteristics. With the

baseline specification, table 2 suggests that deliveries at a young age increase the likelihood of under-five mortality for the children by 6.9 percentage points in comparison to a delivery at 18 to 34 years of age (coefficient statistically significant at the one percent level). The difference in risk of under-five mortality between mothers ages 18-34 and mothers above 35 is not statistically significant.

Deliveries at a young age increase the likelihood of under-five mortality for the children by 6.9 percentage points in comparison to a delivery at 18 to 34 years of age.

Marginal effects do not change much when additional controls are used (extended model). There is thus some evidence that in the case of Mali, after controlling for a wide range of other variables, early childbirth may contribute to under-five mortality, but prudence remains needed when interpreting the results given the risk of omitted variable bias (box 2).

Table 2: Impact of Early Childbirth on Under-five Mortality

Age at first marriage	Baseline model	Extended model
Mother younger than 18	0.0693***	0.0668***
Mother in 18-34 age bracket	Reference	Reference
Mother older than 35	0.00867	0.00972

Source: Authors.

Levels of statistical significance: *** 1%, ** 5%, * 10%.

Box 2: Risk of Omitted Variable Bias

In many countries, early childbirth appears to be positively correlated with the risk of under-five mortality after controlling for other factors that may also contribute to mortality. This could indicate a causal effect. However, other variables correlated with both early childbirth and under-five mortality not included in the analysis could be at the source of the correlation between early childbirth and under-five mortality. Because of the risk of omitted variable bias, the results cannot be considered as fully conclusive regarding a causal effect of early childbirth on under-five mortality.

A number of results from the regression analysis not shown in table 2 are worth mentioning. The marginal impact of a mother having a primary education is statistically significant and decreases the likelihood of under-five mortality by two percentage points. This marginal effect is in comparison to mothers with an education below the primary level. For secondary or higher schooling, the effect is small and not statistically significant. The impact of wealth on the likelihood of under-five mortality is statistically significant in the fourth and fifth wealth quintiles. A few other effects are statistically significant, as discussed in the more detailed study on which the brief is based.

The evidence in table 2 suggests that early childbirth increases the likelihood of under-five mortality. This is a

direct impact controlling for other independent variables included in the models. Could early pregnancy and delivery also have an indirect impact on under-five mortality through the effect of early pregnancy or delivery on some of the other variables that are used as controls in the regression? For example, for some of the girls delivering a baby at a young age, early pregnancy has a negative effect on education enrollment and attainment. Early deliveries, by increasing the number of children that women have, may also contribute to lower labor force participation for women and thereby lower household wealth. There could be such effects, but in terms of magnitude, indirect effects are likely to be small in comparison to the direct effects in table 2.

Early childbirth may also affect under-five mortality indirectly, for example through lower education attainment for mothers, but these effects are likely to be smaller.

Simulations suggest that about nine in 100 deaths for children under five are directly due to early childbirth.

The last step in the analysis of the impact of early pregnancy and delivery on under-five mortality consists in assessing the potential reduction in under-five mortality that could arise from eliminating early pregnancies and deliveries. This can be done by predicting (i.e. simulating) the likelihood that children who were born of mothers younger than 18 would have remained alive if they had been born of older mothers. In other words, we are considering the direct effects of the age of the mother on under-five mortality, shifting in the data deliveries by young mothers to deliveries at a later age, and observing the difference that this makes for under-five mortality nationally.

The simulations suggest that without early pregnancies and deliveries, the share of children dying before five could decrease by 0.61 percentage point. This essentially corresponds to the product of the marginal effect of early deliveries on under-five mortality (0.0693 in table 2) times the share of children born of mothers younger than 18 (nine percent of children). Given the estimate of under-five mortality nationally, nine in every 100 children dying before the age of five can be considered as dying due to the direct effect of early pregnancies and deliveries on the likelihood of under-five mortality. This is a substantial share of the total number of children who die by age five.

Conclusion

Early pregnancy and delivery may contribute to the risk of under-five mortality for children, directly, or indirectly. This brief has provided estimates of the direct impact of early childbirth on under-five mortality in Mali using the latest DHS survey. About one in eleven children under the age of five die; but for children born of mothers younger than

18, the risk of under-five mortality is higher by 5.1 percentage points than the risk for children of older mothers.

Because only a small share of deliveries are by mothers younger than 18, nine in 100 children deaths before five can be said to be directly due to early childbirth.

Controlling for socio-economic and other characteristics, being born of a mother younger than 18 increases the likelihood of under-five mortality for children by seven percentage points, as compared to otherwise similar children born of older mothers. Given the share of children born of young mothers, nationally for every 100 children who die before the age of five, nine may die directly because of an early childbirth. This is a substantial share of the children who die by age five.

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Annex: Methodological Note

There is an existing literature on the relationship between early pregnancy (as well as child marriage) and the risks of infant, child, and under-five mortality. Much of the literature focuses on South Asia (e.g., Bicego, 1996; Adhikari, 2003; Raj, 2010; Raj et al., 2013; Raj and Boehmer, 2013; Prakash et al., 2011; Nasrullah et al., 2014). The results suggest that children born of young mothers are indeed at higher risk of under-five mortality.

Statistics comparing under-five mortality according to the age of the mother may hint at the relationship between the two. But for assessing marginal impacts, regression analysis is needed. Part of the literature relies on survival models, which provide information on how long children survive given their characteristics. The models are censored, in that if a child has survived beyond five years of age, s/he is considered as having avoided under-five mortality. One may also rely on simpler logit or probit models to analyze under-five mortality. In this case, the focus is on whether the child has survived, or not, as opposed to how long the child has survived. Given the focus in this brief on the contribution of early pregnancies and deliveries to under-five mortality, results from the probit regressions will be presented, as they provide a simple way to provide those estimates.

Different specifications are estimated to assess the robustness of the results to changes in the econometric models. Overall, the main results are robust to different specifications. For the baseline model, the independent variables are: (1) the age of the mother at the time of delivery by categories; (2) the child's gender; (3) whether the child had siblings born at the same time (multiple birth); (4) the birth order of the child and the child's birth weight by categories; (5) the length of time between the child's birth and a previous birth for the mother; (6) whether the delivery took place in a health facility; (7) the location of the child by region and by urban-rural category; (8) the education of the mother; (9) whether the household has access to an improved water source and improved sanitation; (10) the wealth quintile of the household; (11) whether the household practices polygyny; and finally (12) indicators of decision-making power for the mother in the household.

It is worth noting that the specifications used for modeling the correlates of under-five mortality are more parsimonious in terms of the independent variables included than the specifications used in a separate analysis by the authors for malnutrition using stunting as the main measure of interest. In principle, given that malnutrition is a key factor leading to premature death for children, one could argue that all correlates of under-five malnutrition should also be used as correlates of under-five mortality. The issue however is that the rate of under-five mortality in countries is much smaller than the rate of stunting. The models used tend to perform less well when very few of the observations take on a positive value for the dependent variable (i.e., dying before the age of five). In addition, when many more variables are used, there is also a much higher risk of perfect correlation (prediction) between some of the variables and the dependent variable, in which case the independent variable will be dropped from the model as well as the observations for which the outcome was perfectly predicted. This calls for being somewhat parsimonious in the specifications.

In addition to what is often done in the literature, this brief also assesses the potential reduction in under-five mortality that could arise from eliminating early pregnancies and deliveries, or, said differently, the share of deaths for children under five that can be attributed to early childbirth according to the results. Finally, in term of interpretation, it is important to mention the risk of omitted variables bias, as noted in Box 3 of the brief.

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