EARLY CHILDBIRTH AND UNDER-FIVE MORTALITY IN ETHIOPIA

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早产与儿童健康风险相关，包括五岁以下儿童死亡。这可能部分是因为年轻母亲往往来自不利群体。但母亲的年龄也可能起作用。

早产儿童的患病率和五岁以下儿童死亡率较高。年轻母亲往往来自社会经济背景不利的群体，并且早孕在贫困地区更为常见，那里孕产妇保健有限，健康设施的可及性可能也是一个问题。

早育的女孩也可能接受教育更少，家庭中的权力可能会受到限制，进一步限制了获得护理的机会。

此外，一些早产的女孩可能还未准备好生理上分娩。

早产的风险，例如产道裂伤，对年轻母亲来说更高。

这些因素导致五岁以下儿童死亡率的高风险，儿童由年轻母亲所生。

早期儿童死亡率的大小及其是否占五岁以下儿童死亡的大量，这些是本简报所问。

使用人口和健康调查数据的计量分析来估计早产对五岁以下儿童死亡的影响。

- 在埃塞俄比亚，每十一人中就有一人五岁以下死亡；对于五岁以下由母亲18岁以下出生的儿童，风险更高。
- 控制了社会经济和其他特征，出生时母亲小于18岁会增加五岁以下死亡的可能性，与其它条件相同，与较年长的母亲出生的儿童相比提高了4个百分点。

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

The analysis is based on data from the second Demographic and Health Survey for Ethiopia implemented in 2011. According to the survey, under-five mortality remains high with one in eleven children (88‰) dying before the age of five. But there has also been some progress over time, since the rate observed with the 2000 DHS was 166‰ and the rate with the 2005 DHS was 123‰. (Central Statistical Agency [Ethiopia] and ICF International (2012).

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, 9.49 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 6.82 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 7.01 percent.

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

<table>
<thead>
<tr>
<th>Age of the mother</th>
<th>Under-five Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother younger than 18</td>
<td>9.49</td>
</tr>
<tr>
<td>Mother in 18-34 age bracket</td>
<td>6.82</td>
</tr>
<tr>
<td>Mother older than 35</td>
<td>7.01</td>
</tr>
</tbody>
</table>

Source: Authors.

Controlling for other factors, early childbirth still increases the likelihood of stunting substantially.

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 3.8 percentage points in comparison to a delivery at 18 to 34 years of age (coefficient statistically significant at the five percent level). The difference in risk of under-five mortality between mothers ages 18-34 and mothers above 35 is not statistically significant.

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Marginal effects do not change much when additional controls are used (extended model). There is thus some evidence that 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

<table>
<thead>
<tr>
<th>Age at first marriage</th>
<th>Baseline model</th>
<th>Extended model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother younger than 18</td>
<td>0.0382**</td>
<td>0.0478**</td>
</tr>
<tr>
<td>Mother in 18-34 age bracket</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Mother older than 35</td>
<td>0.000854</td>
<td>-0.00558</td>
</tr>
</tbody>
</table>

Source: Authors.

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

Box 2: Risk of Omitted Variable Bias

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 related 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 secondary education or better is statistically significant and decreases the likelihood of under-five mortality. The impact of wealth on the likelihood of under-five mortality is statistically significant when measured through the wealth quintiles for the third and fourth quintiles, as expected (the lack of statistical significance in the top quintile may be due to a lower number of children in that quintile). A few other effects are also 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.

Simulations suggest that about three 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 0.20 percentage point. This essentially corresponds to the product of the marginal effect of early deliveries on under-five mortality (0.0382 in Table 2) times the share of children born of mothers younger than 18 (five percent of children). Given the estimate of under-five mortality nationally, three 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 may appear relatively low in comparison to the total number of children who die, but still represents a large number of children.

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 Ethiopia using the latest DHS survey. More than 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 2.7 percentage points than the risk for children of older mothers.

Because only a small share of deliveries are by mothers younger than 18, only three 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 close to five 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, three may die directly because of an early childbirth. This may appear low, but still represents a large number of children.

References


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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