

## **Maternal Schooling and Child Mortality in Nigeria: The importance of the actual curriculum**

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Over the last several decades, considerable progress has been made to lower child mortality rates throughout the world. Despite impressive achievements, each year approximately 9.7 million of the world's children die under the age of five from largely preventable diseases (UNICEF, 2007). Approximately one half of these child deaths take place in sub-Saharan Africa (SSA) despite the region having only one fifth of the world's children.

A United Nations Millennium Development Goals set for 2015 is to decrease child mortality by two-thirds from 1990 (United Nations, 2008). To progress towards this goal, SSA must experience a dramatic reduction in child mortality. Of the 836 million people who live in the subcontinent, 153 million reside in Nigeria, Africa's most populous nation (Population Reference Bureau, 2009). Plagued with one of the highest child mortality rates in the world, approximately 189 child deaths occur per 1,000 live births in Nigeria (UNICEF, 2009). For SSA to meaningfully progress towards the UN Millennium Development Goals, child mortality must be drastically reduced in Nigeria.

For decades, demographic research has pointed to the mass schooling of women as an important factor in widespread fertility and mortality trends (Davis & Blake, 1956; Notestein, 1945). Until the 1970s, it remained unclear whether schooling was a proxy for other dimensions of socioeconomic status or was independently related to child mortality. Caldwell's (1979) seminal work in Nigerian slums showed maternal schooling to be negatively associated with child mortality even after controlling for other dimensions of socioeconomic status. Caldwell's (1979) research led to the widely shared conclusion that maternal education is a "classical determinant" of child health and the most significant social determinant of child mortality. Since Caldwell's (1979) study, a large body of literature shows that maternal education, net of socioeconomic status, decreases the odds of child mortality by an estimated two to five percent per additional year of schooling (Cochrane, O'Hara, & Leslie 1982; Cochrane, 1979; Cochrane, O'Hara, & Leslie, 1982; Barrera, 1990; Buchmann, 1996). Further research indicates the effect of maternal education on child mortality is consistent across both time and space (Bicego & Ahmad, 1996; Cleland & van Ginneken, 1988; Ware, 1984; Cochrane, 1980; United Nations, 1985; Doepke, 2003).

In spite of the overwhelming evidence highlighting the importance of mothers' education in determining child mortality, questions about the nature of the relationship remain (Soares, 2007). How does schooling influence a woman's later ability to decrease the odds of her child's death? For several decades, researchers have theorized and hypothesized a number of pathways from maternal schooling to child mortality. Perhaps the most conceivable is the increase in socioeconomic status that education provides individuals. Research shows that some of the association between maternal education and child mortality is attenuated when SES is considered. However, even after controlling for socioeconomic status the relationship remains significant (Soares, 2007).

Much of the literature that seeks to answer the question of how mothers' minimal school attendance during youth decreases her child's risk of mortality focuses on institutional aspects of schools as fundamentally transforming young girls' values and ideals. Schooling is viewed as an

institutional experience that modernizes and indoctrinates the target population (Caldwell 1986; Riley 2005). The institutional experience introduces Western values through a ‘hidden curriculum’ embedded within the school day which is thought to permanently alters girls’ self-identities; suggesting what is *learned* through the institution of school is equally or more important than the curriculum overtly *taught* (Basu & Stephenson, 2005).

Hobcraft (1993) shows that education enhances women’s use of medical facilities, increases their likelihood of receiving prenatal care, and results in a higher probability that they will have their deliveries attended by trained personnel. Cleland (1990) also shows that education in increasing mothers’ utilization of health services for children. Education results in women have a “closer social identification with the modern world” and greater confidence in “handling bureaucracies” (Cleland, 1990: 412). Another pathway that has received considerable attention and is best referred to the empowerment of women through schooling. Cleland identifies empowerment as having three components: instrumentality, social identification, and confidence (1990). Instrumentality is a feeling over control over the world, social identification is concerned with engagement in modern institutions, and greater confidence permits interaction with officials. Caldwell (1986) also speaks to this when he discussed women’s education altering household dynamics of the family. However, there is little direct evidence for this hypothesized pathway.

There is a growing body of research that considers how specific educational skills learned in schools, such as literacy and numeracy, may mediate the relationship between maternal schooling and child mortality. Recent research based on Latin American, Asian, and African samples indicates that literacy improves women’s ability to comprehend radio health messages which are shown to improve health behaviors (LeVine, LeVine, & Schnell, 2001). In South Africa, Thomas (1999) finds women’s reading comprehension significantly decreases the number of children ever born, which has been well-documented to decrease the risk of child mortality (Kaufmann, 1991; Kauffman & Cleland, 1994). LeVine et al (2004) illustrate literacy among Nepalese women, regardless of years of formal schooling, is also predictive of improved ability to understand medical instructions. Despite increasing evidence that educational skills influence behavioral factors that are related to child mortality, there is conflicting evidence of whether educational abilities are endogenous to the relationship. A nationally representative study in Morocco (Glewwe, 1999) found no direct relationship between literacy and the odds of child mortality, regardless of whether the variable was specified as endogenous or exogenous.

This study extends past work by empirically assessing multiple theoretical pathways from maternal schooling to child mortality with a nationally representative sample. First, the study examines the relationship between maternal schooling and child mortality. Five specific individual-level pathways are examined as mediators: female empowerment, female autonomy within the household, interaction with a modern doctor during childbirth, giving labor at a modern facility, and reading ability. Second, the robustness of the individual-level relationship is clarified net of community-level influences. Using fixed-effects for conditional logistic regression, all community-level characteristics that may influence child mortality are held constant and only between group differences are measured.

#### *Data/Sample*

The data for this study are derived from the 2003 Nigerian Demographic and Health Survey (NDHS), a cross-sectional nationally representative household survey. The DHS is a USAID funded project that measures population trends throughout the developing world with a

particular focus on tracking the health of women and children (Macro International, 2003). The NDHS sample is drawn from a multistage probability frame. I use the cluster-sampling procedure to account for community-level factors, and estimate a series of seven conditional fixed effects logistic regression equations.

The analysis specifically uses the 2003 NDHS child-oriented data file. This recode file includes a sample of all children born in the previous five years whose mother's participated in the survey (n=6029). Less than five percent of the sample is missing values on variables of interest therefore cases with missing data are excluded from the analysis. The final analytical sample consists of 5,742 children.

#### *Discussion of Preliminary Results*

The results indicate that even when statistically controlling for aggregate effects, indicators of socioeconomic resources, and biosocial behaviors, maternal schooling still independently decreases the odds of child mortality. The results further confirm the large body of research that shows a negative relationship between maternal education and child mortality. Contrary to Desai and Alva (1998), the results suggest that maternal education independently decreases the odds of child mortality beyond controlling for environmental conditions at the community-level. The results indicate investment in the education of women is simultaneously an important investment in children's health, and increasing school attendance among girls should not only be of interest to the Nigerian education minister, but also the minister of health.

Beyond illustrating the importance of maternal schooling on child mortality, the results provide valuable insight to the pathways through which education decreases child mortality. There is no evidence that a 'hidden curriculum' of increased empowerment and decision-making autonomy are the dominant pathways through which maternal schooling decreases child mortality. In contrast to previous work which cites transformed gender ideals as a primary mechanism (Caldwell, 1979; Shin, 2007; Mosley & Cowley, 1991; Hobcraft 1993; Soares, 2007), the results suggest such values are not endogenous to the effect of maternal schooling on child mortality in Nigeria. While education may indeed increase women's decision-making autonomy within the household and empower them in important ways, this does not appear to decrease child mortality in the Nigerian context. Though empowerment is not a dominant pathway linking maternal schooling and child mortality, the results support previous research that indicates empowerment influences child mortality. Similar to findings from Kovsted, Portner, and Tarp (2003), the results indicate empowerment importantly decreases the odds of child mortality, even though the effect is independent from years of schooling.

Furthermore, the results indicate there is not a 'hidden curriculum' of medical modernization driving the maternal schooling effect on child mortality in Nigeria. Giving birth at a modern medical facility decreases the odds of child mortality, supporting research that shows mother's increased reliance on modern medicine positively influences their children's health (Basu & Stephenson, 2005). Consideration of modern health facilities conveys the importance of continued efforts to increase women's access to health practitioners and facilities, however the results do not indicate this is a mechanism through which maternal schooling decreases child mortality.

While the results are contrary to many widely held theoretical perspectives on the pathways through which maternal schooling influences child mortality, the results give credence to the increasing interest in educational skills, such as literacy and numeracy, as potential mechanisms (LeVine, LeVine, & Schnell, 2001; Thomas, 1999; Glewwe 1999). Once maternal

literacy is included in the analysis, the effect of maternal schooling is no longer significant. This finding indicates specific educational skills and abilities are an important pathway by which mother's formal school attendance improves the odds of her child's survival.

It appears that it is not the 'hidden curriculum' that improves child survival, but the skills acquired through the explicit curriculum. This suggests researchers and policymakers should take specific interest in the quality of school. To ensure investments in schooling provide the social and individual returns it is capable of, it is important to ensure children are indeed acquiring valuable skills that will remain with them throughout the entirety of the life-course. In refocusing research and education policy on what is indeed *learned* in schools, we can better progress towards equipping individuals with the education that so powerfully improves the health and wellbeing of entire populations.

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