

Educate a Woman and Save a Nation: the Relationship Between Maternal Education and
Infant Mortality in sub-Saharan Africa.

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Abstract

Two decades ago, Caldwell's paper on routes to low mortality in poor countries identified female education as the distinguishing feature of those countries who were 'superior health achievers' relative to their per capita income. Since then, evidence of a positive link between infant mortality and female education has grown significantly, yet investments to improve female education remain woefully inadequate in Africa. In this paper we re-emphasise the importance of female education for improving child survival and achievement of the health-related Millennium Development Goals. We demonstrate, using data from 18 African countries that female education, especially secondary level or higher, has positive benefits for child survival and that this effect operates through socio-economic advantage, use of health-care services, and better reproductive behaviour. We also demonstrate with macro-level data that tackling gender inequality by raising the ratio of female-to-male literacy will have positive impacts for child health.

Introduction

Two decades ago, Caldwell's paper on routes to low mortality in poor countries identified female education as the distinguishing feature of those countries who were 'superior health achievers' relative to their per capita income (Caldwell, 1986). Over the past two decades, evidence showing the positive link between infant mortality and female education has grown significantly, yet investments and efforts to improve female education remain woefully inadequate in sub-Saharan Africa. In this paper we argue that improvements in female education will result in significant reductions in infant and child mortality and will thus contribute to progress in achieving the health-related Millennium Development Goals.

We argue, using evidence from demographic and health surveys data from 18 African countries, that female education, apart from its socio-economic effect, has additional positive benefits for child survival that operate through use of health-care services and better reproductive behaviour (longer birth intervals). We demonstrate that the strongest positive impacts of female education on child health are observed for women with secondary education or higher. We also demonstrate using macro-levels analyses that the level of infant mortality of a country in Africa is linked to the ratio of female-to-male literacy, demonstrating the importance of tackling gender inequalities. We conclude that female education will lead to reduction in child deaths in Africa and that tackling gender inequality in literacy will have positive impacts for child health.

Data and Methods

Micro-level and macro-level data are used in this paper. The micro-level data are from 18 countries from sub-Saharan Africa participating in the DHS program between 1995 and 2003. Surveys conducted under the DHS programme contain birth histories from nationally representative samples of at least 4,000 women of childbearing age, thus, they are adequate for measuring infant mortality and identifying the determinants associated with it. Macro-level data are from the Human

Development Report produced by the United Nations Development Program under the following aspects of socio-economic wellbeing: development and economic welfare; health; social welfare; and gender equity (UNDP, 1999)

Three types of analyses are undertaken to understand the following: the association between maternal education and infant mortality; the link between maternal education and health-seeking behaviour (skilled birth attendants) and reproductive behaviour (preceding birth interval); and macro-level analyses of female education and the level of infant mortality.

Association between Maternal Education and Infant Mortality

The data structure for DHS surveys is hierarchical in that births are nested within families, and families within communities. In this study ‘communities’ are defined from the clusters used during the surveys’ sampling processes. These clusters are often derived from census enumeration areas. To account for this hierarchy in the data, multilevel discrete-time hazard models are used with five exposure periods: 0, 1-4, 5-8, 9-11, and 12-13 months.¹ The explanatory variable of interest is maternal education, defined as ‘none’; ‘primary’; and ‘secondary or higher’. The control variables that were used in the analysis are: sex, birth cohort (born 0-4 years or 5-10 years before), birth order, the length of the preceding birth interval, and the mother’s age at birth of the child, paternal education, and wealth status (measured using Filmer and Pritchett’s methodology of using household assets to derive quintiles), and rural or urban residence. Multiple births are excluded from the analysis since these are known to have increased mortality risks.

Maternal Education, and Health-seeking and Reproductive Behaviour

These analyses use linear regression to show the association between the length of the preceding birth interval and the level of maternal education, after taking into account of maternal age. We also

¹ We include deaths to children aged 12 and 13 in the definition of Infant mortality, to get round the bias of age-heaping. Thus strictly speaking, our infant mortality includes some deaths in the childhood period.

fit logistic regression to show the link between maternal education and use of skilled attendants for delivery. These analyses demonstrate the strong association between education and positive health-seeking and reproductive behaviour.

Macro- levels Analysis of Infant Mortality Rate

Further evidence of the female education-child health link is demonstrated using macro-level linear regression where the unit of analysis is the country. The infant mortality rate of the 18 African countries is the outcome variable. The explanatory macro-level variables include gross national income, male literacy, female literacy, and the ratio of male-to-female literacy.

Results

The micro-level analyses show that maternal education is significant in 10 of the 18 African countries and that the strongest differences in the probability of dying are observed between children of mothers with no education and those of mothers with secondary or higher education. Significant differences in mortality risks between primary and 'no' education are observed in Niger, Togo, and Zambia only, where the primary group has about 8-10 per cent lower risks than the 'no' education group. The mortality risks of Mozambican infants born to women who had primary education were about 17 percent higher than those of infants whose mothers had no education showing that primary education only may not be enough to benefit these children. Infants of mothers with secondary or higher education have about 26-28 per cent lower risks of dying compared with infants whose mothers had no formal education.

Models which did not control for current wealth status showed stronger association between maternal education and infant mortality. Maternal education was significant in 13 out of 18 models. The association showed relative risks for the secondary education group being about 40% lower than the 'no' education group. The implication of this weakening of the association is that part of link between maternal education and infant mortality is explained by wealth status.

Preliminary results of the association between maternal education and health-seeking and reproductive behaviour are strong and significant. Mothers with secondary or higher education have longer birth intervals, on average, compared with those without education. The analyses of the link between maternal education and health-seeking behaviour are expected to show similar strong positive association even after accounting for urban/rural residence.

The results of the macro-level linear regression show that the infant mortality rate of a country is more strongly related to the ratio of female -to-male literacy than to the level of female literacy, demonstrating that addressing gender inequality is important to achieve the child health Millennium Development targets.

