MATERNAL EDUCATION AND CHILD SURVIVAL
IN ADDIS ABABA

Yohanne. Kinfu**

ABSTRACT: Maternal education is found to be positively associated with child survival and its impact was generally more critical in the step from primary to secondary schooling than from the illiterate to literate group. Although once income/wealth is controlled, differences in maternal education resulted relatively little variation on child survival. The result also demonstrated that given the level of maternal education its proportionate effect on child survival improved as one ascends from the lowest to the highest income/wealth category. The findings have important implications for policy and further research.

INTRODUCTION

Developing countries in general and African states in particular have been experiencing a very high mortality rate. The persistence of high mortality rate in these countries has been a subject of thought to researchers who have been searching for the possible causes of high mortality while governments have been striving to allocate their meagre resources to implement policies geared towards reducing mortality to a "reasonable level". Nonetheless, after World War II significant decline in mortality have been observed in all parts of the world, but have occurred at different rates in different areas. The sheer value of life aside, reducing infant mortality or enhancing child survival has high priority for developing countries because children are major sources for both poor families and the nation, and because decrease in infant mortality or enhancing child survival usually lead to reductions in fertility. Consequently, third world governments would like to find means of reducing infant mortality even more. To do so, they need to know exactly what changes have contributed to this decline and what factors are more important.

A number of factors attributed to child survival, ranging from an exogenous technological diffusion, particularly of medical, technology to an endogenously induced factor like socio-economic development. However, there is a growing consensus that mortality levels and particularly of infant and childhood mortality are highly and significantly related to socio-economic status of the child's parent, which forms the immediate environment to the child.

In line with this, several studies on determinants of infant and child survival underscored that child survival in the less developed countries in highly and positively associated with maternal education, more than with any other socio-economic variables. Data from Latin America Behm, 1976-78; Haines and Avery, 1978, Africa Caldwell, 1979 Fara and Preston 1982 and Asia Cochrane, et al. 1980; Caldwell and McDonald, 1981 all show a positive and significant relationship between the extent of maternal education and the chances of child survival, although the magnitude and nature of its effect varies in different settings.

It is with this background that the study seeks to examine the association between the mother's years of schooling and child survival in Addis Ababa. In order to shed light on the mechanisms through which education operates, the discussion considers whether the strength of the maternal

education -child survival relationship is altered by variations in household income/wealth level which is measured in the study in terms of house-ownership and rent level paid.

SOURCE AND NATURE OF DATA

The major source of data for the study was the Population and Housing Census of Addis Ababa which W3S carried out in May 1984 as part of the National Population and Housing Census.

Considering the advantage of sampling and limited available time for the study during the preparation of the original thesis, it was decided to take probability sample of persons rather than work on the entire data set in the area. Thus, a systematic sampling procedure with a random start was adopted to select the units of sampling in this case, the enumeration areas.

The sample drawn consisted of 36 enumeration areas with a total population of 34,618 of which 9,201 are females in reproductive age group. The analysis, therefore, is based on these 9,201 women whose age is between 15 and 49 inclusive.

In the 1984 census, data on education was collected in two ways. One was for those who were still attending up to the census night and the other was about the highest level or grade completed. The latter information is used for the purpose of this study. For analysis purpose three sub-groups, namely; Never been to school, 1 to
6 years of schooling and 7 years and over were identified among which child survival differences are compared.

Although the census did not collect information on direct measurements of income and wealth in a household, in an attempt t) uncover the relationship between income and child survival and also to take the maximum advantage of the relatively available little information, two variables are selected and assumed to measure the economic status of a household. These include type of house-tenure and rent level paid by the respondent.

In the 1984 census, the type of house tenure was categorized in to self-owned, rented from Kebele office, rented from agency for the Administration of Rented Houses, those who are paying difference in rents and rent free houses.

Due to smallness of the cases in the sample the category of those who are paying differences in rents is omitted from the analysis. Thus, for analysis purpose house-tenure system was sub-grouped in to the following three sub-groups - self-owned, rented (includes rented from Kebele office and from the Agency for the Administration of Rented Houses) and rent free households.

In this study the assumption is made that those households who live in self-owned flats were likely to be better off in terms of their income than those households who live in rented premises who in turn are assumed to he living in comfort more than those who do not pay rents.

Such assumptions are likely to he thought with problems, since there were no clear standards to be followed in putting up houses in the city. However, on the average the study feels that the assumption might not be violated and also reflect income differentials among the stipulated groups.

The census also collected information on the monthly rent paid by residents who lived in rented premises. This information is also used to reflect the income differentials among households. For our purpose the rent level is divided into two broad sub-groups. Those who pay monthly rent of

less than 50 birr and those who pay more than 50 birr. Once again it is assumed that those households who pay a monthly rent more than 50 birr are likely to be better off in terms of their economic status (i.e. income/ wealth level) and their housing facilities which in fact has a more direct impact on chances of child survival.

A note is needed that since the goal of this analysis is to examine factors impinging on the survival of children, it is assumed that the proxy measures (i.e. house ownership and rent level paid) serve as indicators of children's consumption of goods and services that affect their health and hence their survival status including, among others calories and nutrient intake, clothing and shelter, sanitary facilities, and use of medical systems. It is obviously reasonable to expect that, ceteris paribus, a higher income household should experience higher chances of child survival. This expectation presumes that children in higher income capita will consume more health enhancing goods and services per capita than children in lower income households.

CONCEPTUAL HYPOTHESIS
The factors that are related to child survival are multi-dimensional in their nature (social, economic, demographic, biomedical and environmental). It also requires a multi-disciplinary approach in its research strategy (socio-economic, demographic and epidemiological research). This is why several analytical/conceptual framework have been developed by researchers of all kind concerned to this particular problem. Most of these frameworks give due emphasis to what they refer to as the intervening variables that are more proximate to the event of death. Unfortunately, the available data provide no information on these intervening variables; the data available relate mainly to socio-economic variables. Therefore, due to this problem and also since our prime survival and maternal education, one factor from the list of child survival determinants, we are unable to use these elaborated frameworks. Consequently, we have framed a conceptual hypothesis which is expected to show how maternal education and increased income affect child survival.

In the framework outlined in Fig. I the effect of maternal education on child survival is expected to operate in two directions, namely; through awareness creation and increased opportunity. In the model it is also assumed that education promotes participation in the modern sector that higher education enables a woman to
acquire better occupation and hence a higher income/wealth level.

The basic hypothesis of this framework and the study in general is that higher maternal education and/or higher household income/-
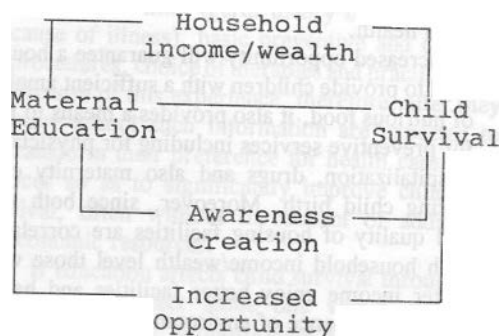
Fig.1 Simplified schematic representation of the effect of maternal education and income/wealth on child survival

of maternal education and income/wealth on child survival wealth level enhances child survival through the
mechanisms stated below. It is hypothesized that maternal education through its " Awareness creation" effect influences the attitudes of mother's towards traditional norms and beliefs including traditional child raising practices, fatalism about illness and ritualistic disease prevention practices which have an impact on the child's health and survival. An educated mother is most probably less fatalistic, better able to deal with modern medical facilities and all available resources and also more aware of simple hygienic measures. More impontantly because of her responsibility of her own care during pregnancy and the care of her child through the most vulnerable stages of its life, her educational level can affect child survival by influencing her reproductive behaviour and also increasing her skills in health care practices related to contraception use, nutrition, hygiene, preventive care and disease treatment. On the other hand, it may be hypothesized that higher education leads to better occupation with a higher income or it may also increase chance of marrying a man in a higher occupation group and/or with a higher income, which guarantee increased opportunity or greater capability to provide a variety of goods, services and assets at the household level which in turn enhances child health and survival. Below are some major ways in which income influences child health.
Increased opportunity will guarantee a household to provide children with a sufficient amount of nutrious food, it also provides a means to pay for preventive services including for physicians, hospitalization, drugs and also maternity care during child birth. Moreover, since both size and quality of housing facilities are correlated with household income/wealth level those with, better income enjoy better facilities and hence reduce the chance of environmental exposure of their children to infectious agents.

Generally, it is believed that those households with a better economic status have the opportunity to provide more health enhancing goods and services that affect child health and survival through increasing per capita calories and nutrients, clothing and shelter, sanitary facilities, use of medical facilities and adult supervision than the lower income households. This hypothesis assumes that children in a higher economic group will consume more health enhancing goods and services per capita than their counterparts.

METHOD OF ANALYSIS
The procedure used for studying the differentials in infant and child survival among the different educational sub-groups is adapted from a method originally developed and tested by Trussell and Preston in 1982 used in analyzing mortality differentials among different socio- economic groups of which education is one.

The basis of the method was to construct an index of infant and child mortality for women of a certain socio-economic category in this case education and proxy measures of income/wealth and compare the values of the index among different sub-groups of women in the same category. The group who had a lower index among the category is the one who has a better enhance of child survival. Simply put, the higher the index the heavier the mortality of the group and vise versa.

Note that the index as it stands is not a measure of child survival or mortality level rather it is an index of comparison of chances of child survival or mortality level among the groups.

The index of infant and child mortality for women of a certain sub-group of a given socio-economic category is constructed as a ratio of the actual number of children who have died to the expected number of an "average" women in the population of the same age group. This latter quantity is derived by multiplying children ever born (CEB) by the expected proportion of children dead. This expected proportion dead in turn is based upon general mortality conditions in the population as well as upon the distribution of exposure times of their children to the risk of mortality, as measures by the mother's age.

For each sub-group, I, of a certain socioeconomic category the index is formed as follows.

$$M(1) = \frac{CDJ(i)}{CEBJ(i) \; SPD(i)} = \frac{Observed\ dead}{Expected\ dead}$$

Where: M (1) is the index of child survival of sub-group I (where 1=3 in the case of maternal education, 1=3 in the case of house ownership and 1=2 in the case of tent level paid). CDJ (i) is the actual number of dead children to women of age group i (where i=15-19, 20-24, ...45-49) in the Jth sub-group of a certain socio-economic category.

CEB^J (i) is the total number of children ever born to women of age group i (where i= 15-19, 20-24, ...45-59) in the Jtb sub-group ofa certain socio-economic category. SPD (i) is a standard expected proportion dead to an average women of age group i (where i= 15-29, 20-24, ...45-59) in the population. This standard expected proportion is based on the relationship between proportions dead and qj (probabilities of dying between exact age 0 and j) originally established by Brass (For a detailed exposition of the technique, the original papers may be consulted). The "standard" values chosen for this purpose was Coale-Demeny "East" model life table at level 17.5, which is the estimated level for all Addis Ababa.

RESULTS
There is abundant evidence both from the developed and the developing countries of the world that maternal education exerts a very significant and independent positive impact on the levels of child survival, although the mechanism through which it operates still remains inconclusive. In this study maternal education is used to test the common hypothesis that the higher the level of maternal education, the higher the chance of child survival. The following table presents the child survival variations among the sub-groups of educational category.

Table 1. Effect of maternal education on child survival, Addis Ababa, 1984

Variable of analysis	Index of child survival
Maternal education	
Never been to school	1.520
1-6 years of schooling	0.024
7 years or more	0.630

An examination of the index by maternal education in Table 1 reveal that the expected pattern also hold in the area. Clearly, child survival of those mothers who had higher educa-tion (7 years or more) is higher than those mothers who had lower education (I to 6 years of schooling and never been to school). Once again a note is needed that the group who had a lower index among the sub-group is the one who has a better chance of child survival. Consequently, children whose mothers had 7 years or more of schooling experienced 141 % higher chance of survival than their counterparts born to illiterate mothers.

As outlined in the conceptual hypothesis this variation might be due to the "teaching" or "awareness creation" effect of the subjects taught in the schools. Most teaching materials in the country include lessons on topic like nutrition, primary health care, hygiene and sanitation, etc. which are expected to have a positive influence on student's attitude towards personal hygiene, disease causation (germ theory of disease as a cause of illness), basic preventive and curative procedures, choice of therapies and practitioners. Because of this experience, therefore, after they leave school such information are expected to transform their preference for health care practices so as to significantly improve child survival, often without investment of additional economic resources.

If education affects child survival through the "teaching" effect alone one would expect a comparable or proportionate improvement in child survival status when one moves from the illiterate to primary and from primary to 7 years or more group. However, unlike the expectation the data from the same table revealed that the move from primary to 7 years or above exert somewhat more influence on child survival than the step from no education to primary education (1-6 years of schooling). For instance, a step from I to 6 years of schooling to 7 years or more enhance child survival by 63% as compared to 48% by a move from no education to 1 to 6 years of schooling. This finding suggests that the observed difference could be attributed
to the "increased opportunity" effect of education which favours those in a higher educational category. In other words, those who have longer years of schooling (7 years or more). have increased opportunities to move in to more modern and better occupations and to earn more money. Thus, higher income will enable those in a higher educational category to buy more health enhancing goods and services which in fact has an enhancing effect on status of child survival.

Therefore, in order to see the behaviour of maternal education in the presence of proxy measures for income/wealth the index is cross tabulated by maternal education against house ownership and rent level paid by the household. A glance at the observed relationship in Table 2 depicts that within each category of income/wealth, child survival situation has increased as education of mother increased. For instance, for the same level of income/wealth, say those who reside in "self-owned" flats, those with 7 years or more of schooling still continue to experience higher chance of child survival than the illiterates and those with 1 to 6 years of

Table 2. Cross tabulation of the index of child survival by maternal education, house ownership and
rent level, Addis Ababa, 1984

Background variables	Maternal Education		
	Never been to school	1 to 6 years	7 yrs. or more
House ownership			
Rent-free	1.620	1.146	0.792
Rented	1.575	1.104	0.749
Self-owned	1.426	0.900	0.523
Rent-level			
Up to 50 Birr	1.608	1.156	0.915
over 50 Birr	1.334	0.900	-

schooling, although the magnitude of difference became lesser once income/wealth level is controlled. A similar observation can be made for all proxy measures. This is due to the reason that more highly educated women, other things being equal, are more aware of the importance of investment and tend to spend a higher share of their income on health-related activities.

Furthermore, it seems reasonable to expert that education increases the efficiency of mbility spent on health due to better knowledge about effective health care measures. For both reasons the income elasticity of child survival could be expected to be greater among the better-educated. It seems that a proportionate increase in
income among the highly and lower educated group would bring better chance of survival among the highly educated than the latter group. On the other hand the same table shows that within each category of education, child survival increases as income/wealth increases. For example, considering only those who are living in rent-free houses, the step from never been to school to primary and then to 7 years or more reduced mortality by 41.4% and 44.7% respectively; while if we consider those who are residing in self-owned house the step from never been to school to primary and then to 7 years or more reduced mortality by 58% and 72.1% respectively. Similarly, taking same rent level say up to 50 birr, the move from never been to school to primary reduced mortality level by 39% while the same step reduced mortality by 48% in the case of rent level over 50 birr. The general conclusion that comes out of the income maternal education relationship is that the proportionate influence of income/wealth on child survival is much more higher in higher educational categories, although maternal education has relatively little effect on child survival differences within categories of income/wealth.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS
The objective of the study is to examine the relationship between child survival and maternal education. In an attempt to carry out its objective, a sample of 920 1 women is drawn from the 1984 census result of Addis Ababa. The sample design is a systematic sample without replacement. The unit of selection is an enumeration area.

Following the method developed by Trussell and Preston the chances of child survival of different educational categories are compared. The findings are that: mothers with higher education experienced better chance of child survival and the impact of maternal on child survival was more

critical in the step from primary to secondary schooling than from the illiterate to literate group. However, the proportionate influence of maternal education on child survival is much more higher in higher income group this implying that the effect of maternal education on child survival may operate indirectly through income.

The most relevant and obvious conclusion is the need to undertake specific studies designed to this particular end to allow a deeper analysis of relations between child survival and socio-economic, demographic and epidemiological factors.

From the study two clear policy implications and a number of silent policy issues have emerged.
-The finding that longer years of maternal education is strongly and positively associated with child survival obviously calls the attention of policy makers to encourage women to go to school for longer period of time. This of course can not be done in isolation without changes in the attitude of parents towards keeping females in school for longer number of years. In this regard, an inter-sectoral population information and education programme constitute a vital component to promote awareness and understanding of the broad field of population issues with the purpose of developing responsible attitudes and behaviour toward that issue.
 -Secondly, as it is observed the impact of maternal education on child survival would be much more effective with the enhancement of the economic-status of the mother suggesting policy makers to create opportunity for women in financially gainful activities. In sum, policy makers should give attention in promoting the role of women through removing institutional and cultural barriers which hinder women from access to education, employment, etc.

Scarcity of data is one of the hindrance for detailed analysis and restricts the domain of analytical tools. Therefore, efforts should be made to generate, collect, analyze and disseminate adequate and reliable population data on a continuous basis.

BIBLIOGRAPHY
I. Behm, H. Final report on the research project on infant and childhood mortality in the Third World. Infant and child Mortality in the Third World, Paris. 1983.
2. Behm, H. et al. Socio-economic detenninants of mortality in Latin America. Pop. Bull. U.N. New York. 1980; 13.
3. Caldwell, J.C. Education as a factor in mortality decline: An examinalionof Nigerian data. Population studies. 1979.
4. Caldwell, J.C. and McDonald, P. Influence of maternal education on infant and child mortality in International Population Conference Manila, Liege, International Union for the Scientific Study of Population. 1981; 2.
5. Cochrane, S.H., O'Hara, D.J. and Leslie, L. The effects of education on health. Working Bank Worlcing papers, Washington, D.C. 1980; 405.
6. Fara, A.A. and Peterson, S.A. Child mortality differentials in Sudan. African Demography program worlcing paper. August 1981; 7.
7. Haines, R. and Avery, R.C. Differential infant and child mortality in Costa Rica: 1968-1973. J. Pop. Stud.
December 1974; 31 (3).
8. United Nation. socio-economic deferential in child mortality in developing countries, Department of International Economic and Social Affairs, New York. 1985.

9. Kinfu, Yohannes. Correlates of infant and child mortality in Addis Ababa. Dissertation submitted for the Award of M.A. degree in population studies, University of Ghana, Legon. Septenlher 1990.