Poverty and Childhood Survival Rates in Sub-Saharan Africa

Dr. Amon O. Okpala, Economics, Fayetteville State University
Dr. O. Felix Ayadi, Finance, Fayetteville State University
Dr. Pender Gbenedio, Accounting, Fayetteville State University

Abstract

Life-expectancy at birth is an important indicator of well-being. Most of the nations with very high life expectancy rates are among the economically advanced nations of the world. This fact leads one to infer that mortality differences exist partly due to economic status. The poverty of women and children remain a major developing challenge for all societies, especially the developing nations. Women in Sub-Saharan Africa play a very important role in food production, bearing and raising children, the prevention/treatment of childhood diseases and malnutrition. As such, the education of mothers and household income could help improve family health, and sanitation. The findings here do show that childhood mortality is significantly influenced by female education, household income, and the feeding practices of mothers.

Introduction

The economic and social consequences of rapid population growth is very devastating especially in less developed economies.. In most of Africa's traditional economic system, high fertility is encouraged by the economic gains from child labor, especially male children. Secondly, children provide income to their parents during old age. The preference for male children and the economic and social expectations from children do contribute to the fertility behavior of African parents. Recent demographic data do reveal that Africa ranks among the highest in fertility and childhood mortality rates in the world.

Policies that accelerate income growth and alleviate poverty make it possible for people to afford better diet, healthier living conditions, and better health care. Increased income levels of women can therefore be beneficial for the health of children. In their role as mothers, women bear the responsibility for family health. McGuire and Popkin (1990), in their study of health-seeking behavior in 16 developing nations, found that most women often make the initial decisions about health care use, except in crisis situations involving large sums of money that the husband becomes involved.[1]

Life-expectancy at birth is a very important indicator of economic well-being. Most of the nations with very high life expectancy rates are among the economically advanced nations of the world. This fact leads one to infer that mortality differences exist partly due to economic status. As Paul Menchik (1993) explains, "if economic status is important for longevity, the well-known fact that whites live longer than non-whites may be just another way of saying that poverty shortens life."[2]

1

Several studies, including Caldwell (1980) using Nigerian data, have demonstrated a strong association between household education and child mortality.[3] The influence of household income on child mortality has so far not been fully researched, partly due to the scarcity of household survey data that contain information on both child survival and income, and for the lack of a conclusive evidence from previous research results.[4]

Given the inadequate research, it is difficult to be conclusive on the effect of household income on infant/childhood mortality. As a result of the mixed results from previous studies,[5] this paper will re-examine the importance of household income and education in explaining childhood mortality rate in Sub-Saharan Africa. This study will also analyze the role of breast-feeding of mothers in explaining survival rates in Nigeria.

Demographic Transition Theory

Fertility and mortality rates in industrialized nations followed a specific pattern. The premise is that there is a general pattern of transition from a state of high birth and death rates to a state of low birth and death rates. The is assumed that during the initial stage of economic growth and development, nations were characterized by high birth and death rates, resulting in a relatively stable population size. As industrialization and urbanization occurred, changes in fertility and mortality occurred. During the transitional stage of industrialization, the death rates declined while the fertility rates remained high, resulting in rapid population growth. When these nations achieved complete industrialization and urbanization, birth rates declined to the level corresponding to death rates, resulting finally in a stable slow population growth rate.

Caldwell (1976) points out that the criteria employed in the demographic transition theory are quite foreign to the less developed nations - the theory is argued on a rationality that is based solely on western social ends and economic reasoning.[6] Furthermore, Caldwell believes that decline in fertility and mortality in Sub-Saharan Africa is not dependent on the spread of industrialization or the rate of economic growth; rather, on such development in which modernization provides more money for schools, hospital beds, etc.[7]

Trends in Childhood Mortality

Information on childhood mortality is not quite adequate due to lack of registration facilities. Even where registration facilities exist, death registration is generally less complete than birth registration, because African parents are sometimes reluctant to register a death except in situations where death certificates are legally required for burial. Compounding the problem is a common reluctance in most African societies to speak about the dead, especially infant and child death.

The inadequacy of mortality data on Sub-Saharan Africa will continue to present a serious problem to researchers. Sembajwe (1981) rightly explains that patience and probing on the part of the interviewer as well as good specification of the questionnaire will aid in securing good mortality data from surveys.[8] More specific survey questionnaires may be able to overcome some of the problems associated with under-reporting. Accuracy of childhood mortality information will increase as a result of the combination of a well constructed questionnaire and the utilization of enumerators that are familiar with the customs and shared beliefs of the survey areas.

Viewed as a group, Sub-Saharan Africa shows a general continued decline in childhood mortality during the 1970s and 1980s.[9] This decline occurred both in nations that experienced some economic prosperity during the specified years and in nations with poor or negative economic growth. The exceptions occurred in Ghana and Nigeria - countries where childhood mortality stagnated or increased over the past 20 years. The possible explanation could be the persistent and serious civil conflicts that afflicted the two nations over that period.

Although childhood mortality levels appear to have come closer together among Sub-Saharan African nations, as table 1 illustrates, Hill (1993) further explains that there still remains a

2

Table 1
Summary Trends in Childhood Mortality in Some
Sub-Saharan African Countries with 1980's Data Set.

Countries	Dates	Estimated Probability of dying before age 5.	Countries	Dates	Estimated Probability of dying before age 5
Botswana	1980	0.0775	Zimbabwe	1980	0.0925
	1982	0.0589		1982	0.0810
	1984	0.0665		1984	0.0965
	1986	0.0537		1986	0.0867
Mozambique	1979	0.1257	Angola	1977	0.2083
	1981	0.1206		1981	0.2018
	1983	0.1235		1983	0.2314
	1984	0.1013		1986	0.2861
Zaire	1976	0.2037	Uganda	1980	0.1651
	1978	0.1996		1982	0.1828
	1980	0.1984		1984	0.1922
	1982	0.2093		1986	0.2228
Kenya	1980	0.0969	Senegal	1977	0.2438
	1983	0.1039		1979	0.2107
	1985	0.0888		1982	0.2172
	1986	0.1131		1983	0.2170
Mali	1978	0.3008	Ghana	1979	0.1499
	1980	0.2981		1982	0.1613
	1982	0.2892		1984	0.1613
	1984	0.2980		1985	0.1751
Nigeria	1982	0.1979	Liberia	1977	0.2344
	1984	0.1862		1979	0.2194
	1986	0.1937		1981	0.2486
	1987	0.2228		1983	0.2501

Source: *World Development Report, 1988 - 1990;* New York: Oxford University Press, Inc.

clear distinction between the highest-mortality group of nations which exist almost throughout the western and central Africa, and the lowest-mortality group, most of which are found in the eastern and southern Africa.[10]

Data

The study is based on a cross-sectional analysis of some demographic and economic data from some Sub-Saharan Africa; and in sharper focus - the Eastern Nigeria. The primary data used in the study is based on a sample of 227 households surveyed during the summer of 1992 in Enugu, Nigeria. Households interviewed were within the age group of 15-59. Majority of the demographic and economic information on these households were obtained from personal interviews. The other data source is from the World Development Report, 1994. This is also a cross-

3

sectional demographic and economic data from most Sub-Saharan Africa.

The sample used in this study was stratified by measures of household monthly income and household physical location. Blocks were selected within an area and buildings were chosen randomly from each of the blocks. The first part of the questionnaire allowed us to obtain economic variables, information about female educational level and household income. The second part of the questionnaire deals with demographic issues - such as, fertility, mortality, and infant feeding practices.

Theoretical Considerations

Several studies have examined the role of female education and household income in determining mortality outcomes using cross-country data.[11] Households with more education and higher income usually enjoy better health.

The poverty of women and children remain a major development challenge for all societies, especially for the developing nations. Women in third world nations play a central role in producing food, child-care activities. They play a very important role in promoting family welfare and are the key force in the prevention and treatment of childhood diseases and malnutrition. Women are the crucial link between the family, the traditional and modern health systems. Education of women is very essential in the development process because it could help improve health, decrease the birth rate, reduce illiteracy, and improve sanitation.

This study will incorporate these factors - household income, household education, especially female education and breast-feeding practices in analyzing of the mortality levels in Sub-Saharan Africa. It is well known that female education which contributes to lower fertility will also lower infant and child mortality rate. In developing countries, better-educated women often marry and start families later, thereby diminishing the risk to child health associated with early pregnancies.[12] Educated women also tend to make greater use of modern prenatal care and delivery assistance, and are more willing to pay for improved water sup-

plies than other households. Because of the vital role women play - particularly as mothers and their responsibility for family health, one will expect a negative relationship between female education and childhood mortality.

Poverty has a powerful influence on health. People with low income or nations with low per capita income generally consume more cheap goods and less fresh fruits and vegetables than those on higher incomes. As household incomes and national income increase, nutrition improves, leading to a reduction in mortality rates, especially childhood mortality.

The economic models of individual decision making process rely heavily on rational choice. It is generally assumed that individuals make choices that maximize their expected outcomes and minimize their expected loss. The benefit of parenthood is in the children or the utility derived from having children. This benefit depends on the customs and beliefs of the society. In developing societies, children are not only considered as a consumption good but also a production good since they contribute to family income in regimes of subsistence agriculture, and they provide income security to their parents during retirement.

Assuming that a household consists of only the husband, wife and children, the household's aim is that of maximizing the utility from child services. To illustrate our reasoning, we specify the following utility function:

$$U = U(n, q, c, y) \qquad (1)$$

where "n" - is the number of children, "q" - their quality which is assumed to be the same for all the children, "c" - the rate of consumption of all other commodities, and "y" - the expected financial contributions from the children.

Parents have a notion of what their desired fertility and sex ratios will be. Achieving the desired fertility requires being able to produce that number and hoping that they will survive. This is extremely important in societies with high childhood mortality, and a preference for a male child

4

over a female child. The preference for a male child is further heightened by the fact that a male child serves as an insurance for the parents. In an economy that has little or no structured retirement programs, parents expect their children, especially male children to aid them financially during old age. Given this, any family will like to maximize the expected child outcomes. The outcomes include the continuation of the family name after the parents are deceased, and maximizing the financial contributions they expect from their children - whether from child labor in subsistence agriculture or in the form of financial assistance during their retirement years.

As such, we express the expected financial contributions from the children as:

$$EY = f(P_m, M) \qquad (2)$$

where "P_m" is the probability of having the desired number of male children and "M" - denotes childhood mortality rate.

Childhood mortality rate is modeled as:

$$M = f(HI, WE, HE, BF, BC) \qquad (3)$$

where: "HI" - denotes household income, "WE" - represents the number of years the wife has spent in formal education, "HE" - is the number of years the husband has spent in formal education, "BF" - is a dummy variable denoting the breast-feeding practice of mothers, and "BC" - is a dummy variable denoting birth-control usage.

Results

Two regression models were used in this study. The first model analyzes impact these variables - income per capita, illiteracy level and the population per nurse - have on childhood mortality rates in Sub-Saharan Africa. The regression model used in the analysis is:

$$CFMR_i = b_0 + b_1 FILL_i - b_2 IPC_i + b_3 PNR_i + e_i \qquad (4)$$

where "CFMR" is child/infant mortality rate, "FILL" is female illiteracy rate; and "IPC" is in-come per capita, and "PNR" is population per nurse.

The regression results are shown in Table 2. Female illiteracy rate is significant in explaining infant mortality in Sub-Saharan Africa. A decrease in female illiteracy level significantly decreased the child/infant mortality rates. Income per capita is insignificant in explaining child/infant mortality in the cross-sectional analysis in Sub-Saharan Africa. Although income per capita is expected to have a powerful influence on mortality, the distribution of income and the number of people in poverty are much more important in explaining infant mortality rates. Income growth by itself is not quite important in increasing life-expectancy and also in reducing childhood mortality, except if it leads to the reduction in poverty and also helps in making public health services more readily available. According to the UN study on Household and Health, "in industrialized countries life expectancy depends much more on income distribution than on income per capita...In developing countries, the number of people in poverty is an especially important reason for differences in health."[13] As expected, a decrease in the population per nurse significantly decreased the child/infant mortality, thereby supporting the notion that nurses are the primary health-care providers in Sub-Saharan Africa.

The second regression model used in this study analyzes the impact of breast-feeding, household income, wife's education husband's education (both measured in years), and birth-control usage on childhood mortality rates in Eastern Nigeria. The regression model used is shown below with the explanatory variables and their expected signs;

$$M_i = a_0 - a_1 BF_i - a_2 HI_i - a_3 WE_i - a_4 HE_i - a_5 BC_i + e_i \qquad (5)$$

BF and BC for individual 'i' are assumed to follow:

$$BF = \begin{cases} 1 & \text{Breast-Fed Her Children} \\ 0 & \text{Otherwise} \end{cases}$$

$$BC = \begin{cases} 1 & \text{Birth-Control Usage} \\ 0 & \text{Otherwise} \end{cases}$$

5

Table 2
Regression Results: Infant Mortality, Female Illiteracy and Income Per Capita in Sub-Saharan Africa, 1994[a]

	Coefficient	t-ratio	p
Constant	-12.862	-0.270	
FILL	0.503	3.456	0.002
IPC	-0.055	-0.380	0.706
PNR	0.325	2.242	0.032
R^2	55.59%		
Adj. R^2	51.15%		
F	12.52.		

[a] The dependent variable is CFMR, which is the child/infant mortality rate per 1000 live birth (under 5 years. FILL denotes the female illiteracy rate, IPC denotes the income per capita, and PNR denotes population per nurse. A sample of 34 countries was used in this anaylsis.

Table 3
Regression Results: Childhood Mortality, Household Income, Wife's Education, Husband's Education, and Breast-Feeding In Eastern Nigeria, 1992[b]

	Coefficient	t-ratio	p
Constant	0.315	8.323	0.000
BF	-0.351	-5.873	0.000
HI	-0.279	-4.456	0.000
WE	-0.216	-3.138	0.002
HE	0.207	2.983	0.003
BC	-0.099	-1.589	0.114
R^2	30.59%		
Adjusted R^2	28.89%		
F	17.98.		

[b] The dependent variable is M which measures the childhood mortality, BF, HI, WE, HE, and BC are the explanatory variables. R^2, Adj. R^2, and F are the usual regression statistics. The asmple os 227 households from Enugu, Eastern Nigeria was used in the empirical model.

The results are shown in Table 3. All the variables were significant in explaining childhood mortality with the exception of BC (birth-control usage). Female that breast-fed their children show a reduction in childhood mortality. Female education also contributes to the reduction of childhood mortality rates. This supports the findings in the literature that female education is very essential in improving family health, and subsequently reduce childhood mortality rates.

Breast-feeding significantly contributes in the reduction of childhood mortality. The implication is that breast-feeding helps in reducing childhood mortality rates in Sub-Saharan Africa. This is not a surprising finding because breast-feeding does not require an elaborate sanitation guidelines. It is the most natural form of child-nursing method and has minimal set of application rules: it basically requires a good personal hygiene - such as, washing the breast thoroughly before nursing the baby. Whereas, the use of infant formulae require an elaborate sanitation guidelines that may be unachievable for rural mothers, especially when a household has no electricity for refrigeration.

Educational level that fathers have acquired did play a sizable role in explaining childhood mortality, but the positive effect is inconsistent with our expectations. The only conclusion that one can draw from the result is that women have the main responsibility for children. In traditional African society, fathers are not directly involved in child-rearing activities; as such, have no significant role to play that may effect childhood mortality re gardless their years of schooling.

Conclusion

Household income and education do impact the health of household members, especially children. "What people do with their lives and those of their children affects their health for more than anything that governments do. But what they can do is determined, to a great extent, by their income and knowledge. In every society, moreover, the capabilities, income, and status of women exert a powerful influence on health."[14]

This paper has shown that childhood mortality is significantly influenced by female education, household income, and breast-feeding of mothers. Given these findings, government actions, through their impacts on the conditions facing households can be important. Especially policies that expand educational opportunities, particularly for girls. These government policies must ensure effective and accessible health services for all. Policies that accelerate income growth and alleviate poverty should be pursued by the policy makers of the less developed nations to enable the citizenry afford better diet, healthier living conditions and better health cares.

Suggestions for Future Research

The distribution of income in the economy and within households do affect childhood mortality rates. Studies using aggregate variables should examine the role of the distribution of income and the number of people in poverty in explaining childhood mortality rates in Sub-Saharan Africa. Increasing women's access to income can be especially beneficial for the health of children, given the role women play as health providers and the empirical fact that income correlates with health. Childhood studies on specific nations that use household survey data should consider the affects of the distribution of income within the household in explaining childhood mortality rates. Such papers should address the impact of increased income in the hands of mothers will have on childhood mortality rates in any Sub-Saharan African country.▢

Footnotes

1. Judith S. McGuire and Barry M. Popkin, "Helping women improve nutrition in the developing countries," World Bank Technical Paper No. 114 (Washington, DC, May 1990), p. 6.
2. Paul L. Menchik, "Economic Status as a Determinant of Mortality Among Black and White Older Men: Does Poverty Kill?" *Population Studies*, 47 (1993), p. 429.
3. See Caldwell, John C., "Education as a factor in Mortality Decline: An Examination of Nigerian data," *Population Studies*, 23: 395-413 and S. H. Cochrane, J. Leslie and D. J. O'Hara, "Parental Education and Child Health: Intracountry Evidence," *Health Policy & Education*, 2: 213-25.
4. John B. Casterline, E. C. Cooksey and A. F. E. Ismail, "Household Income and Child Survival in Egypt," *Demography*, Vol. 26, No. 1 (February 1989), p. 16.
5. Some studies considered survival through infancy only - see J. DaVanzo, W. P. Butz and J. P. Habicut, "How Biological and Behavioral Influences on Mortality in Malaysia vary during the first year of life," *Population Studies*, (1983), 37: 381-402. Other studies examined infant and early childhood mortality separately - K. C. Zachariah, and S. Pate, "Trends and Determinants of Infant and Child Mortality in Kerala," Population and Human Resources Division Discussion Paper (1982) 82-2 Washington, DC, World Bank.
6. John D. Caldwell, "A Restatement of Demographic Transition Theory," *Population & Development Review*, Vol. 2, #3 & 4, (September/December, 1976) p. 327.
7. Ibid., p. 358.
8. I. S. L. Sembajwe, *Fertility & Infant Mortality Among the Yoruba in Western Nigeria*, Canberra: The Australian National University Press, 1981, p. 31.
9. Althea Hill, "Trends in Childhood Mortal-

ity," in *Demographic Change in Sub-Saharan Africa*, Washington, DC: National Academy Press, 1993, p. 180.
10. Ibid., p. 180.
11. See S. H. Preston, "Causes and Consequences of Mortality in Less Developed Countries during the Twentieth Century," in *Population & Economic Change in Developing Countries*, ed. R. Easterlin (New York: National Bureau of Economic Research, 1980), pp. 289-360: S. Cochrane, D. O'Hara, and J. Leslie, "The Effects of Education on Health," World Bank Staff Working Papers no. 405 (World Bank, Washington, DC, 1980). K. Subbarao, and Laura Raney, "Social Gains from Female Education: A Cross-National Study," *Economic Development & Cultural Change*, and John B. Casterline, Elizabeth C. Cooksey, and Abdel E. Ismail, "Household Income and Child Survival in Egypt," *Demography*, Vol. 26, No. 1, (February 1989), pp. 15-35.
12. "Households and Health," *World Development Report, 1993,, 1993,* New York: Oxford University Press, Inc., p. 42.
13. Ibid., p. 40.
14. Ibid., p. 37.

References

1. Caldwell, John C., "Education as a Factor in Mortality Decline: An Examination of Nigerian Data," *Population Studies*, 23: 395 - 413.
2. _____, "A Restatement of Demographic Transition Theory," *Population & Development Review*, Vol 2, No. 3 & 4, p. 327, 1976.
3. Casterline, John B., Cooksey, E. C., & Ismail, A. F. E., "Household Income & Child Survival in Egypt," *Demography*, Vol. 26, No 1, p. 16, 1989
4. Cochrane, S. H., Leslie, J., & O'Hara, D. J., "Parental Education & Child Health: Intra-country Evidence," *Health Policy & Education*, 2: 213 - 225.
5. _____, "The Effects of Education on Health," *World Bank Working Papers* ,No. 405 World Bank, Washinston, DC. 1980.
6. DaVanzo, J. Butz, W. P. & Habicut, J. P., "How Diological & Behavioral Influences on Mortality in Malaysia vary During the First Years of Life?" *Population Studies*, 37: 381 - 402. 1983.
7. Hill, Althea, "Trends in Childhood Mortality, in *Demographic Change in Sub-Saharan Africa*, Washington, DC : National Academy Press, 1993.
8. "Household and Health," *World Development Report, 1993,* New York: Oxford University Press, Inc., 1993.
9. McGuire, Judith S. & B. M. Popkin, "Helping Women improve Nutrition in the Developing Countries," *World Bank Technical Paper # 114.*
10. Menchik, Paul L., "Economic Status as a Determinant of Mortality Among Black & White Older Men : Does Poverty Kill?" *Population Studies,* 47 (1993).
11. Preston, S. H., "Causes & Consequences of Mortality in Less Developed Countries during the Twentieth Century," *Population Change & Economic Change in Developing Countries*," ed. R. Easterlin, New York : National Bureau of Economic Research, 1980.
12. Sembajwe, I. S. L., *Fertility & Infant Mortality Among the Yoruba in Western Nigeria,* Canberra: The Australian National University Press, 1981.
13. Subbarao, K. & Laura Raney, "Social Gains from Female Education: A Cross-National Study," *Economic Development & Cultural Change,* 1993.
14. Zachariah, K. C. & S. Pate, "Trends & Determinants of Infant & Child Mortality in Kerala," *Population & Human Resources Division,* Washington, DC: World Bank, 1982.