

ORIGINAL ARTICLE

INFANT AND CHILD MORTALITY IN ETHIOPIA: A STATISTICAL ANALYSIS APPROACH

Dr. P. Prashanth Kumar* and Gemechis File**

Abstract:

This study uses data from the Ethiopia Demographic and Health Survey [2005 EDHS] conducted in 2005 to investigate the predictors of child [0-5 years] mortality in developing country like Ethiopia. The specific objectives of this study are to identify the factors which are affecting child mortality and to suggest viable strategies to increase health service and reduce child mortality in Ethiopia. The cross-tabulation technique has been used to estimate the predictors of child mortality. The cross-tabulation analysis shows that Birth Interval with Previous child and mother standard of living index is the vital factor associated with child mortality. Furthermore, Mother's education, birth order has substantial impact on child mortality in Ethiopia. Finally these findings specified that an increase in Mothers' education, improve health care services which should in turn raise child survival and should decrease child mortality in Ethiopia.

Key Words: Fertility, Mortality and Cross-Tabulation Method.

INTRODUCTION:

Improvements in child survival have been one of the major targets of development programs during the past three decades, and child mortality rates have shown substantial and consistent declines in all regions of the world since 1960 [13].

A century later, out of the 187 countries, only nineteen countries- all in Africa- had an infant mortality rate of above ten percent. Ethiopia, through the progressive implementation of the Health Sector Development Program in the last seven

* Mathematics Dept. JU. Indian Expatriate

** Mathematics Dept. JU

years, has made great strides to improve maternal and child survival. The levels of mortality are worsened particularly by poverty, inadequate maternal education. The study of child mortality becomes one of the most important researches of the developing countries including Ethiopia. There are two major reasons behind this: (i) high level of infant & child mortality and (ii) its relationship with fertility. The reduction of infant and child mortality indirectly helps in reducing fertility by decreasing the desired number of children to be born due to increased probability of survival of a child. The child mortality is a composite index reflecting environmental, social, economic, health care services and delivery situation on the one hand and maternal as well as family and community norms and practices on the other [11].

Maternal education has been observed to be strong predictor of child mortality in developing countries [3, 15]. The education of the mother is emerged as one of the strongest predictors of child mortality though other factors like women's income, working status, standard of living index, place of residence. Few studies have focused on the health and survival of children who migrate from rural areas or who are born to migrants in urban areas of developing countries [11].

In developing countries including Ethiopia, mother's age at birth played an important role in child mortality. A number of studies deal with mother's age at the birth of the child [2, 8] and the optimal ages of child bearing is confined of 20 to 34. It will help to reduce maternal mortality and childhood mortality [16]. Birth interval played significant role on infant and child

mortality [5], and the interval between births is short, the probability of dying becomes very high. The probability of dying before age five for children born less than two years after a previous birth is more than double than for those children born four or more years after a previous birth [6]. There are three mechanisms about short birth interval such as (i) Short birth intervals can relate fetal growth resulting in low birth weight and increased death risks due to endogenous causes. (ii) They may impair the potential milk production for the child whose birth closed the intervals. (iii) Too closely spaced birth on the distribution of resources increasing maternal care among children in the household [14]. Children throughout the developing countries are much more likely to die if they are born less than two years after the mother's previous birth than their birth interval is longer [5]. Another study observed that in first pregnancies the childhood mortality is highest, in 2nd and 3rd pregnancies that are lowest [12].

Sex discrimination in infant and child mortality was studied by many researchers [1]. The rural areas of western south Asia, stretching across Pakistan and the northern states of India to Bangladesh, female child death rates are often very much higher in early ages [4].

Objective of the Study:

This study examines the predictors of child mortality in Ethiopia. The objective of this study was to identify the factors which are affecting child mortality and to suggest viable strategies to increase health service and reduce child mortality in Ethiopia.

METHODS AND MATERIALS:

This study uses secondary data from the Ethiopia Demographic and Health Survey [2005 EDHS] conducted in 2005 is part of the worldwide MEASURE DHS project which is funded by the United States Agency for International Development [USAID]. Information was taken from the birth history section of the Women's Questionnaire. A total of 14,717 eligible women were identified and interviews were completed for 14,070 women, yielding a response rate of 96 percent. Women in the age group 15-49 were asked whether they had ever given birth, and if they had, they were asked to report the number of sons and daughters who live with them, the number who live elsewhere, and the number who have died. In addition, they were asked to provide a detailed birth history of their children in chronological order starting with the first child. Women were asked whether a birth was single or multiple; the sex of the child; the date of birth [month and year]; survival status; age of the child on the date of the interview if alive; and if not alive, the age at death of each live birth. The sample has been taken from 2005 EDHS survey and the total of 9861 live births observed during the survey has been taken as the sample of the study.

The interlink age between child mortality and socio-economic, bio-demographic and maternal health care variables have been tested by applying cross-tabulation analysis. The data analyzed by the software, Statistical Package for Social Science [SPSS] for windows [version 16.0].

Variables:

Education of mother, standard of living index, place of residence, birth order, sex of child, birth interval with previous child, mother age at birth of child.

RESULT AND DISCUSSION:

In this section, we examine the predictors of child mortality. Child mortality reflects a country's level of socio-economic development and quality of life. Ethiopia has witnessed a large decline in child mortality during the last two decades. The child mortality varies according to socio-economic, health care and bio-demographic characteristics of the population concerned. There are many predictors of child mortality in a particular group of variables and it is necessary to analyze them separately in order to get the idea about the insight variation of that particular type of variables.

Table 1: The distribution of child mortality by socio-economic, bio-demographic, and maternal health care variables.

Variables	Number of Children		Percent of Death	Chi-square
	Alive	Dead		
Education of Mother				
Illiterate	6895(76.59)	714(83.11)	9.4%	22.90**
Primary	1436(15.95)	112(13.03)	7.2%	
Secondary & above	671(7.45)	33(3.84)	4.7%	
Standard of living Index				
Low	2310(25.66)	219(25.49)	8.7%	34.95**
Second	1672(18.57)	174(20.25)	9.4%	
Medium	1642(18.24)	195(22.70)	10.6%	
Fourth	1512(16.79)	160(18.62)	9.6%	
High	1866(20.72)	111(12.92)	5.6%	
Birth Interval with Previous Child				
<2 Years	1469(20.16)	259(39.60)	15.0%	147.79**
2	2477(34.00)	201(30.73)	7.5%	
3	1737(23.84)	123(18.80)	6.6%	
4+	1601(21.97)	71(10.85)	4.2%	
Birth Order				
First	1713(19.02)	204(23.74)	10.6%	20.75**
2-3	2850(31.65)	223(25.96)	7.3%	
4-6	2839(31.53)	257(29.91)	8.3%	
7+	1600(17.77)	175(20.35)	9.9%	
Sex of Child				
Male	4539(50.42)	488(56.81)	9.7%	12.80**
Female	4463(49.57)	371(43.18)	7.7%	
Mothers' age at birth				
<20	469(5.21)	64(7.45)	12.0%	12.30**
20-29	4510(50.10)	397(46.21)	8.1%	
30-39	3188(35.41)	303(35.27)	8.7%	
40-49	835(9.27)	95(11.05)	10.2%	
50+	127(1.39)	16(1.88)	1.3%	
Place of Residence				
Urban	1275(14.16)	83(9.67)	6.1%	13.37**
Rural	7727(85.84)	776(90.33)	9.1%	
Total	9002	859		

Source: Data from the Ethiopian Demographic and Health Survey [2005 EDHS]. *Figures within the parenthesis indicate the percent of column. **Significant at 5% level.

Among socio-economic variables, Birth interval with previous child and maternal education has a strong relationship with child mortality and child survival. Various studies have supported a direct causal relationship between mother's education and child mortality [7, 9, 10]. The result indicates that the child death rate was highest (15.0%) for the children of less than 2 years of birth interval with previous child and lowest (4.2%) for the children whose birth interval was 4+ years. It is clear that the child death rate decreases with the increasing of birth interval with previous child. This implies that birth interval with previous child plays significant role on child mortality. Standard of living index [SLI] is another important differential factor of child mortality. Children born in households with second and medium wealth quintiles standard of living index experienced highest number of deaths. The death rate has been observed (9.4%) and (10.6%) for the children whose mothers belong to second and medium SLI group respectively. The lowest (5.6%) child death rate was found among the children whose mothers belong to high SLI group. And the next lowest (8.7%) child death rate was found among the children to low SLI group, But the death rate is not more on low level of SLI because of the free medical care provided by the government as well as NGOs, but finally, it is clear that the mother's SLI plays significant role on child mortality. Also the result indicates that the child death rate was highest (9.4%) for the children of illiterate mothers and lowest (4.7%) for the children whose mother's educational level is secondary and above. It is clear that the child death rate decreases with the increase of mother's education. It is likely

that people with higher education belong to higher economic classes. An investigation of the Table reflects that among the total deaths, highest number of deaths (83.11%) is observed for the illiterate mother and the lowest number of deaths (3.84%) is observed for the mother whose educational level is secondary and above. This implies that mothers' education plays significant role on child mortality. Some of the factors which have an effect on child mortality but not as significant as birth interval with previous child and education of mother are sex of child and mothers' age at birth and from the previous research papers [11] religion, family size and exposure to mass media had no significant effect.

The other two variables, Birth order and place of residence also have effect on the child mortality rate. The result indicates that the first births (10.6%) and births of order 7 and higher (9.9%) also suffer significantly higher rates of mortality than births of orders 2 to 3 (7.3%) and 4 to 6 (8.3%). Among the total deaths, 9.67% deaths were found for the urban place of births and 90.33% deaths were found for the rural place of births. This implies that birth place plays significant role on child mortality.

CONCLUSION AND RECOMMENDATIONS:

This study investigates the predictors of child mortality in Ethiopia. It utilized the nationally representative data from the Ethiopian Demographic and Health Survey [2005 EDHS]. The cross-tabulation technique has been applied to identify the important predictors of child mortality. From these analyses several interesting observation can be made, although the analysis itself was subject to various types of problem. Sometimes, it is observed that logical or theoretical hypothesis is supported by the results of crude analysis [like cross-tabulation].

The findings suggest that Mothers' education has been identified to be the most important socio-economic predictors of child mortality; that means mortality rate decreases with increase in mothers' education level.

The study indicates that birth interval with previous child has played significant role in reducing the risk of child mortality. Some other characteristics that have effect on child mortality are place of residence [urban/rural] and mothers' age at birth.

The association between child mortality and mothers' standard of living index was found to have a significant effect for child mortality. So, attention should be given to mother education, birth interval with previous child and standard of living index factors in order to reduce the risk of child mortality in Ethiopia.

REFERENCES:

- Bhuiya A. et al. [1991]: Mothers Education and survival of Female Children in a Rural Area of Bangladesh, *Popul. Stud.*, 45, 253-264.
- Chowdhury R. and Jayaswal O.N. [1989]: Infant and early childhood mortality in urban slums under ICDS- Scheme- A Prospective study, *Indian J. Pediatr.* 26 (6), 544-549.
- Cleland J. [1991]: Socio-economic inequalities in childhood mortality: The 1970s compared with 1980s in "Demographic and Health Surveys World Conference Proceedings", Washington DC, 135-151.
- Dyson T. and Moor M. [1982]: On Kinship structure, female autonomy and demographic balance, *Popul. Dev. Rev.*, 9, 35-60.
- Gubhaju B.B. [1986]: The effect of previous child death on infant and child mortality in rural Nepal, *Stud. Fam. Plann.*, 16 (4), 231-236.

- Hobcraft J.N. et al. [1983]: Child-spacing effects on infant and early child mortality, *Popul. Index*, 49 (4), 545-618.
- Hobcraft J.N. et al. [1984]: Socio-economic factors in child mortality, a cross-national comparison, *Popul. Stud.*, 38, 193-223.
- Hobcraft J.N. et al. [1986]: Demographic Determinants of Infant and Early Child Mortality: A Comparative Analysis, *Popul. Stud.*, 39 (3), 363-385.
- Hossain M.Z. et al. [2002]: Determinants of Infant and Child Mortality in Bangladesh, *J. Stat. Stud.*, 22, 1-12.
- Howlader A.A. and Bhuiyan M.U. [1999]: Mother's Health-Checking Behavior and infant and Child mortality in Bangladesh, *Asia Pac. Popul. J.*, 4 (1), 59-75.
- Jamal Uddin M.D. et al. [2009]: Child Mortality in a Developing Country: A Statistical Analysis, *Journal of Applied Quantitative Methods*, 4 (3), 270-283.
- Miller J.E. [1993]: Birth outcome by mother's age at first birth in the Philippines, *International Fam. Plann. Persp.*, 19, 98-102.
- NeffWalker et al. [2002]: Meeting International Goals in Child Survival and HIV/AIDS, *The Lancet*, <http://image.thelancet.com/extras/01art9188web.pdf>.
- Plloni A. and Millman S. [1985]: Effects of inter-birth intervals and breastfeeding on infant and early childhood mortality, *Popul. Stud.*, 40 (2), 215-236.
- Preston S.H. [1982]: Determinants of infant mortality in underdeveloped countries, *Popul. Stud.*, 36, 441-458.
- Tiwari H. [1989]: Estimation of Decline in the Infant Mortality Rate in India Due to Fertility Reduction, *J. Fam. Welf.*, 35 (5), 57.