Factors Affecting on Child Survival in Bangladesh: Cox Proportional Hazards Model Analysis

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Abstract

This paper focuses mainly on the impact of utilization of heath care services on child mortality, using data from the 2004 Bangladesh Demographic and Health survey (BDHS, 2004). The study elucidate that 1 in 11 children born in Bangladesh dies before reaching the fifth birthday, while 1 in 15 children dies before reaching the first birthday. A child's risk of dying is highest during the first month of life. From relative hazards we found that child mortality is higher among mothers who do not take sufficient ANC and also not receive assistance from medically trained personnel. Mothers whose place of delivery is any hospital were reported less child mortality as against their opposite counterparts. The result suggests that certain socioeconomic factors like mothers and father's education are related to reduce the child mortality risks. An increase of one moth in the duration of breastfeeding by mothers decreases the hazard risks of child mortality. The household infrastructure variables like household electricity and household assets index seems to have little insight relationship with child mortality. The mortality hazard is 1.32 times higher if there is no provision of electricity in the household. Child mortality was reported 0.72 and 0.53 times less among mothers whose household's assets position is medium and higher than lower index.

INTRODUCTION

Infant and child mortality that is the mortality during the first year of life and the mortality during 1-4 years of life respectively has traditionally been considered an important indicator for describing mortality conditions, health progress and indeed the overall social and economic well-being of a country1. The rate of loss in the first year and in the 1-4 years of life has attracted particular attention because: i) mortality ifs relatively high in these periods, the contribution of the probability of dying in the 0-4 years of human life is substantial, ii) it has a considerable impact on the average expectation of life and the arte of population growth, iii) it is sensitive to environmental and sanitary conditions and iv) the level of infant and child mortality is a useful indicator of the state of health and standard of a society or a country. Child mortality is therefore needed to be investigated in addition to infant mortality.

Infant and child mortality in Bangladesh has long been a topic of interest to population and health researchers because of its apparent relationship with fertility and indirectly with acceptance of modern contraception2. The children of Bangladesh are particularly more victimized than those in other parts of the world. Because of poverty, neither mothers have access to medical facilities available in the country nor do their children. Moreover, the nutritional status of mother and children are very poor, about a quarter of infants in Bangladesh had low birth weights 3. According to BDHS Report 2004 the infant mortality rate is about 65 deaths per 1000 live births and a child mortality rate is 24 per1000. Though the infant and child mortality rate has decreased but it is still a burning problem in Bangladesh. Despite or recent decline in infant and child mortality the level is one of the highest in the world. Again the situation of mother's aggregated than the health condition of the total population. It is also noted that maternal mortality and morbidity is also highest in Bangladesh4.

The children who constitute a large proportion of the total population of Bangladesh are a vulnerable or special risk group, deserving special health care as the child mortality and morbidity risks are much higher then at older ages. Child mortality is determined by an enormous no. of complex and interrelated factors5. This paper focuses mainly on the impact of utilization of heath care services on child mortality. Availability and utilization of health personnel and facilities directly affect the mortality and morbidity of the children through standard biological treatment of diseases and injury and making available the most important immunizations as well as other antenatal and intra-natal care

to both pregnant mothers and their children.

DATA SOURCES AND METHODOLOGY

This study utilizes the data extracted from 2004 Bangladesh Demographic and Health Survey (BDHS), which were conducted under the authority of the National Institute of Population Research and Training of the Ministry of Health and Family Welfare in Bangladesh. The study considered only the child for the last five years preceding the survey. In order to fulfill our objectives during the time span 2000-2004, 4873 sample has identified considering the women who have at least one child (live or dead).Considering the fact that among multivariate techniques the Cox's proportional hazards model is algebraically simple, computationally straightforward and efficient with acceptable degree of precision for analyzing survival data, this study applied Cox's proportional hazards model6 for multivariate analysis.

RESULTS

TRENDS IN CHILDHOOD MORTALITY IN BANGLADESH

Mortality rates for children under five years of age are presented in Table 1 for the five-year period preceding surveys. The under-five mortality rate for the most recent five-year period (which roughly corresponds to the period 1999-2003) is 88 deaths per 1,000 live births, and infant mortality is 65 deaths per 1,000 life births. This means that 1 in 11 children born in Bangladesh dies before reaching the fifth birthday, while 1 in 15 children dies before reaching the first birthday. A child's risk of dying is highest during the first month of life. Almost half of all under-five deaths occur during the neonatal period about a quarter occurs during the post neonatal period, and another quarter occurs between ages 1 and 4 years.

Figure 1

Table 1 Trend in early childhood mortality rates

Data source	Approximate reference period	Neonatal mortality (NN)	Post neonatal mortality (PNN)	Infant mortality (1q0)	Child mortality (4q1)	Under-five mortality (5q0)
BDHS 2004	1999-2003	41	24	65	24	88
BDHS 1999-2000	1995-1999	42	24	66	30	94
BDHS 1996-1997	1992-1996	48	34	82	37	116
BDHS 1993-1994	1989-1993	52	35	87	50	133

The trend analysis shows that mortality estimates show continued declines in child (age 1-4 years) and under-five

mortality (Table 1). Between the two most recent five-year periods, there was 20 percent decline in child mortality and 6 percent decline in under-five mortality. Infant mortality seems to have leveled off during recent years. In order to reduce infant mortality in Bangladesh, program may need to focus on reducing neonatal deaths since most infant deaths occur during the first month of life

EFFECTS OF MATERNITY CARE ON CHILD SURVIVAL

Proportion hazard model indicates that the covariates such as mothers education, sources of antenatal care, assistance during delivery, place of delivery, duration of breastfeeding, father's education, sources of drinking water, electricity in the household and household assets index have potential significant effect on the child survival of mothers. Child mortality is 2.15 times and 3.09 times higher among the mothers with receiving insufficient antenatal care and avoids any care as compared to the mothers who were taking sufficient antenatal care from doctors, nurses or other government medically trained persons.

Figure 2

Table-2. Relative hazards of mortality between ages 2000-2004 years associated with explanatory variables

Characteristics	Coefficient β	Odds ratio
Antenatal care received		
Sufficient ®	---------	1.000
Insufficient	0.61	2.158*
No care	0.98	2.79***
Assistance during delivery		
Medically trained person ®	--------	1.000
TBA	0.815	1.492**
Other's	1.069	2.937**
Place of delivery		
Respondent's/others home ®	-0.399	1.000
Govt./Private hospital	0.586	0.861***
others		1.172*
Mother's education		
No education ®	--------	1.000
Primary	0.108	1.251
Secondary	-0.115	0.448***
higher	-0.450	0.185**
Father's education		
No education ®	-----------	1.000
Primary	-0.259	0.664
Secondary	-0.513	0.603*
Higher	-0.461	0.213***
Duration of breastfeeding		
Never breastfeed	--------	1.000
<11 months	-0.785	0.733*
11-23 months	-0.506	0.451***
23+ months	-0.279	0.390**
Sources of drinking water		
Piped water ®	--------	1.000
Well water	0.387	1.462*
Others sources	0.519	1.738**
Household has Electricity		
Yes ®	------	1.000
No	1.041	1.328***
Household assets Index		
Lower ®	-----------	1.000
Middle	-0.493	0.726**
Upper	-0.506	0.538*

*Note: ® represents reference category. Significance level: * = < 0.05; ** = p < 0.01; *** = p < 0.001.*

Delivery assistance has positive significant effect on child mortality. Mothers who received assistance during delivery from TBA and other persons, child death rate is 1.4 times and 2.93 times higher than mothers taking assistance from medically trained personnel. Mother's place of delivery has also strong positive effects on their child mortality. Child death rate is 0.8 times lower among mothers whose place of delivery was government or private hospitals than respondent's whose place of delivery was in others home. On the other hand this rate is higher among mothers whose place of delivery was in others sides such as public place than mother's delivery place in their homes or other relative or friends home.

It is observed from the analysis that even after controlling demographic factors, the utilization of antenatal care (ANC), and assistance during delivery provides moderate significance effect upon child mortality. Mothers' higher education has strong positive effects on child mortality. Women's with primary education are reported 1.25 times more child death rate compared with women who have no formal schooling. But mothers who are secondary and higher educated are 0.44 times and 0.185 times less reported child death rate compared than mothers with no education. Fathers' with higher education, secondary education and primary education are 0.66 times, 0.60 times and 0.213 times less reported their children deaths compared who has no formal schooling. The results suggest that certain socioeconomic factors like mothers' and father' education related to child mortality risks

An increase of one month in the duration of breastfeeding by mothers decreases the hazards risk of child mortality. Mothers who breastfed their child in 11 to 23 months and more than 23 months are reported less child mortality in 0.45 times and 0.39 times than mothers whose children were never breastfed. Safe drinking water is one of the most important factors for leading a safe life. Child who was using well water for drinking purposes among mothers are reported 1.46 times more mortality rate than the mothers whose children were using piped water. This rate is also increasing for others sources of drinking water.

The household infrastructure variables like, household has electricity and household assets index seems to have little insight relationship with child mortality. The mortality hazard is 1.32 times higher if there is no provision of electricity in the household. Child mortality was reported 0.72 times and 0.53 times less in whose households' assets position is medium and higher than lower index.

DISCUSSIONS

From the trend analysis we observed that 1 in 11 children born in Bangladesh dies before reaching the fifth birthday, while 1 in 15 children dies before reaching the first birthday. A child's risk of dying is highest during the first month of life. Almost half of all under-five deaths occur during the neonatal period about a quarter occurs during the post neonatal period, and another quarter occurs between ages 1 and 4 years. From relative hazards we found that child mortality is higher among mothers who do not take sufficient ANC and also not receive assistance from medically trained personnel. Mothers whose place of delivery is any hospital were reported less child mortality as against their opposite counterparts. Mother's higher education has strong positive effects on child mortality. Women with primary education are reported 1.25 times more child death rate compared with women who have no formal schooling. But mothers who are secondary and higher educated are 0.44 and 0.185 times less reported child death rate compared than mothers with no education. Fathers' with higher education, secondary and primary education are 0.66, 0.60 and 0.213 times less reported their children deaths compared who have no formal schooling. The result suggests that certain socioeconomic factors like mothers and father's education are related to reduce the child mortality risks.

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Based on the discussion of this study some policy implications, comment and recommendations have been suggested that would help the government to take initiative to promote child health care and child survival.

Improving the household sanitation, provision of pure water i.e., clean water can help to prevent diarrhea. Water supply and health programme should give emphasis on hygiene education to encourage the use of safe water for hygiene. Hygiene sanitation facility can reduce morbidity to a great extent. So, initial steps should be taken with this regard for survival of the children.

Toilet facility should be developed and encourage people to build hygiene toilet at their home.

Female education should be encouraged particularly in the rural areas and working facility should make available to them. Education gives mothers more decision making power and increase the knowledge about the health facility for better survival of their child.

Mass media promotion programme should be taken to understand morbidity and encourage taking treatment.

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