

Factors Influencing Infant and Child Mortality: A Case Study of Rajshahi District, Bangladesh

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ABSTRACT The main purpose of this study is to observe the influencing factors on infant and child mortality of suburban and rural areas of Rajshahi District, Bangladesh. Primary data have been used to examine the differential patterns of infant and child mortality. A multivariate technique is employed to investigate the effects of those variables both socioeconomic and demographic on infant and child mortality. The study results reveal that several socioeconomic, demographic and health related variables affect on infant and child mortality. Multivariate analysis results indicate that the most significant predictors of neonatal, post-neonatal, and child mortality levels are immunization, ever breastfeeding, mother's age at birth and birth interval. Again, the risk of child mortality is 78.20% lower among the immunized child than never immunized child and also the risk of neonatal mortality is 57.70% lower after a birth interval of 36 months and above than under 18 months. Parents' education, toilet facilities and treatment places are significant predictors during neonatal and childhood period but father's occupation is significant at post-neonatal periods. For instance, risk of neonatal mortality is 31.40% lower among the women having primary education and 52.30% lower among the women having secondary and higher education than those having no education. It is observed that the risk of child mortality 32.00% lower among the household having hygienic toilet facility than those who have not such facilities. Similarly, risk of child mortality decreased with increased female education and wider access to safe treatment places. So, attention should be given to female education and expansion of public health system for reducing the risk of infant and child mortality.

1. INTRODUCTION

Bangladesh is a densely populated small country of 1, 47,570 square kilometers land area with limited resources (BBS, 2003). Her per capita income is US \$ 430 (WB, 2004) and the life expectancy at birth for both sexes is 60 (PRB 2004). Her vast manpower (141.3 millions) with 41.4% literacy rates (male 50.8%, female 32%) constitutes a potential resource for development (PRB 2004). Since independence 1971, the Government of Bangladesh (GOB) has been followed a policy of providing comprehensive health care particularly to rural people who contribute more than 80% of the total population. Afterwards, in 1985, with

the beginning of the third five-year plan, the government initiated institutionalization of maternal, and childcare and family planning activities through a phased program on maternal and child health, and family planning (MCH-FP) services. The overall goal of the MCH program is to improve the health condition of mother's and children. Regarding the alarming condition of child health, Bangladesh as a member of the World Health Organization (WHO) and as signatory of the Alma-Ata declaration in 1978 is executed to achieve the goal of health care as the key approach. In recent years, Bangladesh health and family planning program has successfully implemented in a wide array of fertility and mortality reduction interventions. The family planning and EPI program in Bangladesh are highly praised as a success story. In 1993, GOB started a phased implementation of the Acute Respiratory Infection (ARI) control program. However, despite all these efforts, health care facilities in Bangladesh remain limited and

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inadequate; besides a lack of health personnel, medicines and other facilities are not uniformly available. Mortality differentials clearly emerge according to the type of place of residence i.e. urban mortality is lower than rural mortality, which may be attributed to the differential accessibility and availability of health services. In addition, social and economic factors such as the mother's education, the father's occupation and the family's economic condition have strong impact on infant and child mortality. Infant and child mortality is one of the main problems of this country. Children in Bangladesh continue to lack basic amenities and opportunities of life. One third of the babies are born with low birth weight, about 70% of all children under-five years of age are malnourished and 11% are severely malnourished. One in every 7 children born in Bangladesh dies before their fifth birthday. Although, sanitation coverage has increased significantly only 40% of the children have access to sanitary latrines (FFYP 1997-2002). These days' situations have already been much changed and even in medical facilities have much increased and there is sufficient control over mortality. Nevertheless, infant and child mortality rate is still very high as infant mortality rate (IMR) 71 per 1000 live birth (BBS, 2003). Though, there has been a substantial decline in child mortality in Bangladesh since 1960s, particularly in the last two decades. Still now, infant mortality rate is 63 per 1000 live birth and mortality rate under age five is 86 per 1000 live birth (ESCAP 2003). So, child mortality is still a burning problem in Bangladesh. To develop interventions in reducing infant and child mortality, it is important to know the factors which are responsible for the mortality decline and working as obstacles to its further decline.

Findings of different studies in these issues are not identical. In analyzing infant and child mortality, Mosley and Chen (1984) have grouped the dominant variables into five categories: i) maternal factors in the reproduction process, ii) environmental contaminations, iii) nutritional deficiency, iv) injuries to the child, and v) practices in the health care of the child. It is mentioned that all these are influenced by socio-economic factors. Pandey et al. (1998) examined that babies born to young mothers were more likely to be premature, have low birth weights and suffering from complication at the time of delivery. Study in Bangladesh by Howlader et al. (2000) showed that infant and child mortality would increase as

birth order increased. Caldwell (1979) argued that maternal education of women plays an important role in determining child survival even after controlling for a number of socioeconomic factors. Kishore and Parasuraman (1998) showed in cross-national studies of developing countries that there was negative relationship between maternal work and infant and child survival. The study by Zacharia et al. (1994) have shown that medical attention at the time of delivery and antenatal care are significant factors in the survival chance of the new born. So, an attempt has been made to investigate the levels of differentials patterns of infant and child in Rajshahi district of Bangladesh. Confidently, this study will enable them to become more aware of their own situations and problems. We hope that this research would be helpful to researcher as well as policy maker to take necessary steps to reduce infant and child mortality in Bangladesh. Therefore, the main objectives of this study are as follows:

- i. to investigate the differential patterns of infant and child mortality with respect to socioeconomic, demographic and health related characteristics, and
- ii. to identify the factors which are associated with infant and child mortality in this district.

2. DATA AND METHODOLOGY

2.1 Sources of Data: The data of this study were collected under the financial support of UNFPA with a project entitled "Strengthening the Department of Population Science and Human Resource Development". The patterns of data were collected in three sections namely: fertility, mortality and migration along with socio-economic characteristics of the respondents and their babies. These data were collected from three residential areas, which were rural, urban and suburban areas of Rajshahi district. From these areas have been collected 6000 ever-married women reproductive information as well as socioeconomic conditions through interview method. All these information were taken by purposive sampling technique. The present study has been chosen 3750 data out of the total collected information rely on suburban and rural based. Since this study discusses the mortality situation, so respondents are those who have at least one child death experienced. Hence, getting 319 and 202 respondents out of 2250 and 1500 collected information of rural and sub-urban areas

respectively, who have at least one child lost experienced. The fieldwork was commenced on 20th June 2004 and was completed 1st July 2004.

2.2 Methodology: The analysis of this paper is based on the ever-married women of reproductive age (15-49 years) who have at least one live birth. Since the objective here is to examine the effect of predictor variables on the level of infant and child mortality thereby the dependent variable is the number of children who had died. Cross-classification percentage distribution is used to explain the differential patterns of infant and child mortality. Moreover, logistic regression model is applied to identify the net and interaction effects of covariates on infant and child mortality.

3. RESULT AND DISCUSSION

3.1 Differential Patterns of Infant and Child Mortality: The estimates of neonatal, post-neonatal and child mortality by various socioeconomic, demographic and health related characteristics are shown in Table 1. Socioeconomic condition of people in the community has strong impact on infant and child mortality. It is circular relation that socioeconomic development affects the mortality level and in turns mortality level affects socioeconomic and demographic structure of the country. In the developing countries, several socioeconomic factors have been identified with having strong relationship with infant and child mortality differentials.

The type of place of residence is also an important determinant of child survival. Kabir and Chowdhury (1993) explained that urban-rural differentials may be attributed to different health care services including higher coverage with immunization, safe delivery of births and access to health care services. Table 1 show that in the rural area neonatal, post-neonatal and child mortality levels are higher than suburban areas. Neonatal, post-neonatal and child mortality in rural areas is already 63.6%, 57.5% and 60.9% respectively whereas; in suburban areas it is found to be 36.4%, 42.5% and 39.1%, respectively.

Education is the most influenced factor in differentiating the infant and child mortality levels within all the socioeconomic factors. Mother's education seems to be directly related with the health of a child. There is no doubt that an educated mother can provide better care of child

than the mother with no education or a lower level of education. Education makes a mother socially advanced, free from traditional values and changes her pattern of behaving and attitude. Caldwell (1979) argued that other things being equal, children of educated mothers experienced lower mortality than the children of uneducated mothers. Table 1 confirms that higher level of educational attainment of mother, lower level of infant and child mortality. That is, 47.2% neonatal, 47.3% post-neonatal and 51.1 % child deaths occurred for illiterate mothers whereas, 21.5%, 18.5% and 11.3% deaths with mothers education secondary and higher levels respectively.

In our societies, father is the main income earner and decision maker of a family. So, father's education plays an important role in earning income, which in turn ensures nutrition, clothing and housing etc. In other words, there may be direct relationship between father's education and access to child health facilities. It is apparent from Table 1 that the highest father's educational attainment, lower neonatal, post-neonatal and child mortality level. The percentage of neonatal, post-neonatal and child deaths for illiterate fathers are 44.6%, 45.2% and 45.9% respectively while father's with primary education have lower mortality (i.e. 34.7% neonatal, 30.8% post-neonatal and 30.8 % child) and also shows that father's with secondary and higher educational level is the lowest percent of deaths than that of father's who are illiterate and primary educational level.

Mother's occupation is also associated with nutritional status of their children. The incidence of infant and child mortality is higher among not working women including regular household activities than that of working women. Possibly it is because of the fact that majority of women as family helpers on fields and hence they do not have cash at hand to provide better health care to their sick children. The study results indicate that neonatal (94.6%), post-neonatal (95.2%) and child (97.7%) mortality level is high among not working women than self-employed women (5.4%, 4.9% and 2.3%, respectively).

Father's occupation is an important predictor of infant and child mortality. One's occupation is the reflection of "the physical environment, his social milieu, his education background, his income and his life style." For this reason, occupation is taken as an index of socioeconomic status. Father's occupation determines the

economic status, nutrition and housing condition, access to health care facilities and clothing of a family. In other words, it is related with health and life style of a child in a family. So father's occupation may be counted as an important determinant of infant and child mortality in a population. Table 1 indicates that neonatal mortality is high among farmers (44.6%) and also child mortality level (46.6%) while post-neonatal mortality level is high service/business man (44.5%).

Infant and child mortality is also affected by sanitary facility. A better sanitation facility is a primary health care practice and also reduces morbidity. Table 1 presents that household having hygienic latrines considerably lower neonatal (24.8%), post-neonatal (30.8%) and child (30.1%) mortality level than those without such facilities i.e.; unhygienic latrines have higher neonatal (75.2%), post-neonatal (69.2%) and child mortality level (69.9%). It is believed that both infant child mortality increases when sanitary condition decreases.

Television (TV) is at present the most powerful media and basic amenities of life. It plays a very strong role for mass media; it broadcasts some programs concerning public health awareness. If even an illiterate man watches these health-based programs, he will realize the importance of role of health and cleanliness. Table 1 indicates that percentage of neonatal death is 29.8% whose family having television than those family having no TV (70.2%). Similarly for child mortality level is lower having TV (27.8%) than no TV (72.2%).

BFS (1989) data showed that infant mortality is higher for boys than for girls, but child mortality is lower for boys (Kabir and Chowdhury 1993). D'Souza and Bhuiya (1982) and Chen et al. (1981) showed from data obtained by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B) that during neonatal period, male mortality exceeds female mortality as a sex differential consistent with higher biological risks faced by male children. The post-neonatal period and childhood (1-4 years), the pattern is reversed, with female death rates exceeding those for males. In Bangladesh mortality levels are generally favourable for male. A preference for sons over daughter is seem to be stronger. Sons always get better care in terms of food, clothing and medical care than female children. These differentials remain unchanged throughout their life. As regarding to the sex of

child (Table 1), it is seen that during neonatal period male mortality is higher than female (60.7% versus 39.3%), while child mortality level (48.1%) is lower than female child mortality level (51.9%).

The age of the mother at the time of the child's birth is an important factor for infant and child survival. Infants born to mother's who are less than 19 years of age, or 35 or more years of age are also at higher risk of dying while infants (Galway et al. 1987). Table 1 represents the neonatal, post-neonatal, infant and child mortality pattern by age of mother at the time of birth that all the stages of mortality levels are higher for mothers who are under 20 years of age. Infant and child mortality levels are lower for children whose mothers aged between 20-29. Neonatal mortality of the children whose mothers aged below 20 years at the time of the child's birth is 9.9 % higher than the children whose mothers are in the age range 20-29 years at the time of giving birth. This supports the earlier findings that chances of neonatal mortality are always higher for teenage mother due to complication in pregnancy and delivery, premature birth and other related causes.

Many studies have showed that multiple births have many times higher infant mortality rate than single birth. Babies of multiple births usually become physically weak when they are born. From Table 1, we see that neonatal mortality level for second and third order births experienced higher than first order births (46.7 % versus 43.4 %), while post-neonatal mortality level is higher for first birth order than second and third order births (43.2 % versus 40.4 %) and we also observed that neonatal and post-neonatal mortality level is the lowest for 4th and above order of births than first, second and third order of births. During child mortality level, it is seen from Table 1 that 4th and above order of births experienced highest mortality level (44.4 %) than first, second and third order of births (18.8 % and 36.8 %).

Most of the studies in the developing countries, which consider birth spacing, show that the length of preceding birth interval is the prime factors that influence mortality during infancy as well as other childhood ages of life. Maternal depletion is often cited as the primary mechanism responsible for the adverse effects of short birth intervals. Women with short intervals between two pregnancies have insufficient time to restore their nutritional reserves, a situation

Table 1: Neonatal, post-neonatal and child mortality by selected socioeconomic, demographic, immunization and health related characteristics, suburban and rural areas in Rajshahi district of Bangladesh.

Characteristics	Covariates	Percentage of children death		
		Neonatal	Post-neonatal	Child
Residence	Suburban	36.4	42.5	39.1
	Rural	63.6	57.5	60.1
Mother's education	No education	47.1	47.3	51.1
	Primary	31.4	34.2	37.6
	Secondary +	21.5	18.5	11.3
Father's education	No education	44.6	45.2	45.9
	Primary	34.7	30.8	30.8
	Secondary +	20.7	24.0	23.3
Mother's occupation	Not working	94.6	95.2	97.7
	Working	5.4	4.9	2.3
Father's occupation	Farmer	44.6	34.2	46.6
	Service/business	32.2	44.5	33.0
	Labor and others	23.1	21.3	20.3
Sanitation facility	Unhygienic toilet	75.2	69.2	69.9
	Hygienic toilet	24.8	30.8	30.1
Television	No	70.2	63.0	72.2
	Yes	29.8	37.0	27.8
Sex of child	Male	60.7	59.6	48.1
	Female	39.3	40.4	51.9
Mother's age at birth	<20 years	53.7	51.4	51.4
	20-29 years	43.8	39.0	43.2
	30-49 years	2.5	9.6	5.4
Birth order	1	43.4	43.2	18.8
	3-Feb	46.7	40.4	36.8
	4+	9.9	16.4	44.4
Birth interval	<18 months	49.2	34.9	15.8
	18-36 months	31.4	50.7	58.6
	36+ months	19.4	14.4	25.6
Immunization	Full	7.9	15.1	27.8
	Partial	11.6	32.9	38.3
	Not at all	80.6	52.0	33.8
Treatment place	Traditional	58.3	58.9	57.1
	Doctor/nurse	31.7	31.1	32.9
Place of delivery	Hospital/clinic	7.9	6.2	1.5
	Home/others	92.1	93.8	98.5
Ever breastfed	No	63.7	59.6	65.4
	Yes	36.7	40.4	34.6
Visit by family worker	No	55.8	52.0	44.4
	Yes	44.2	48.0	55.6

which is thought to adversely affect fetal growth. Table 1 shows that a neonatal born less than 18 months of the birth of its preceding siblings experienced higher mortality level (49.2%) in comparison to the neonatal born 18-36 months (31.4%) and 36+ months (19.4%), while during post-neonatal period, intervals of 18-36 months have experienced higher mortality level (50.7%) than those of less than 18 months (34.9%) and 36+ months (14.4%). The information provided here indicates that short birth intervals significantly reduced infant probability of survival. It is also observed that the child mortality level is higher for birth intervals of 18-

36 months (58.6%) than birth intervals of less than 18 months (15.8%) and 36+ months (25.6%).

Infant feeding has an impact on both the child and mother. Feeding practices are important determinants of children's nutritional status and many studies have shown the beneficial effects of breastfeeding on the nutritional status, morbidity and mortality of infants (Hobcraft et al. 1984). The information presented in Table 1 show that children who are breastfed are more likely to survive than those who are not breastfed.

Neonatal tetanus, whooping cough, polio and measles all of which contribute significantly to the high childhood mortality and these can be

prevented through immunization practice. Thus immunization of the children is an important factor that contributes to the child's chances of survival. Table 1 show that the immunization status of children is a factor in their survival status. During neonatal and post-neonatal mortality levels that have not immunized at all are higher than those of children who have been immunized with fully and partially (i.e.; 80.6% neonatal mortality versus 19.5% and 52.0% post-neonatal mortality versus 48.0%). The effect of immunization on child mortality is much higher. From the results, we observed that child mortality is lowest who have been fully immunized (27.8%) while who have been partially immunized is the highest child mortality (38.3%) and those children who are not immunized is 33.8% mortality level.

Death due to Pneumonia, fever, asthma, diarrhoeal and respiratory etc. diseases can be greatly reduced by timely treatment of infant and children. Therefore, treatment place is also an important for children survival status. It is seen from the Table 1 that neonatal, post-neonatal and child mortality level differences experienced due to their treatment places. The result shows that both infant and child mortality is higher whose treatment places are traditional than doctor/nurse.

Place of delivery is also an important determinant of child survival. In Bangladesh, many children die owing to the lack of safe delivery facilities, untrained dais, relatives and neighbours attend most of the deliveries, a practice that presents risk to both the mother and the newborn baby. It is evident from the result (Table 1) that survival is higher among children born in proper health facilities and attended by professional doctors than those born at home attended by untrained dais. It is clearly shown that neonatal, post-neonatal and child mortality is higher whose delivery places are home (92.1% neonatal, 93.8% post-neonatal and 98.5% child mortality levels at home) than those delivery places are Hospital/Clinic (7.9%, 6.2 and 1.5% respectively). These results may imply that more and better antenatal care services during pregnancy may increase the children's chances of survival. The Table 1 also shows that the percentage of neonatal, post-neonatal and child mortality levels are lower with visitation of health worker than none visitation of health worker.

3.2 Determinant of Affecting Factors on Infant and Child Mortality: The results obtained from logistic regression model analysis are

presented in Table 2 using neonatal, post-neonatal and child mortality level as the dependent variables and socioeconomic, demographic and health related variables as the independent variables. The results are shown in terms of odds ratios obtained by taking the exponential function of estimated regression coefficients. In the bivariate analysis, we have documented certain relationships between various components of under-five mortality and various socio-economic, demographic and health related factors. The logistic regression analysis is aimed at identifying the important contribution of variables that have an influence on the different components of under-five mortality. In the logistic regression analysis, our dependent variable is the survival status of the child: if the child is death, the value is 1, if it is not occur, the value is 0. Considering all the variables in one model, it is difficult to determine the relative importance of social, demographic and health related variables.

The odds ratio for the place of residence suggests that the risk of dying as neonatal, post-neonatal and child is lower in the suburban area than in rural area. For instance, the suburban areas experienced have 25.60% lower child mortality than the rural areas. It is believed that suburban areas are associated not only with better health services but also with better education and employment opportunities for women, suggesting a low risk experiencing infant and child death in the area.

It has been frequently argued that mother's education is an important factor in explaining risk of infant and child mortality. The results indicate that risk of neonatal and child mortality are 31.40% and 24.10% lower among the women having secondary and higher education respectively than those having no education. Several hypotheses have been adverted to explain this association, it is postulated that maternal education inculcates modern health knowledge, beliefs and practices; improves the effectiveness of health behavior (feeding practices, child care etc.); and changes the mother's role within the family, enabling her to take the necessary measures to prompt child health, including effective use of modern health services (Cleland and Van Ginneken 1990). The risk of neonatal death is 37.90% lower among mothers who are working than those who are not working. A lower risk of infant mortality among the working mothers may be due to the fact that they might be well

Table 2: Relative risk from logistic regression estimates for the effects of infant and child mortality according to some socioeconomic, demographic and health related characteristics of the respondents.

Characteristics	Covariates	Relative risk (odds ratio)			Relative risk (% lower with respect to RC)		
		Neonatal	Post-neonatal	Child	Neonatal	Post-neonatal	Child
Residence	Rural ^a	1	1	1			
	Suburban	0.981	0.917	0.744***	1.9	8.3	25.6
Mother's Education	No education ^a	1	1	1			
	Primary	0.686***	0.991	0.759**	31.4	0.9	24.1
	Secondary +	0.477**	0.917	0.476**	52.3	8.3	52.4
Father's education	No education ^a	1	1	1			
	Primary	1.295	1.079	0.621	29.50+	7.90+	37.9
	Secondary +	0.674***	0.904	0.543***	32.6	9.6	45.7
Mother's occupation	Not working ^a	1	1	-			
	Working	0.621**	0.917	-	37.9	8.3	-
Father's occupation	Farmer ^a	1	1	1			
	Service/business	0.678***	1.24***	0.869	32.2	24.6 +	13.1
	Labour & others	0.866	0.739	1.242	13.4	26.1	24.2 +
Sanitation facility	Unhygienic toilet ^a	1	1	1			
	Hygienic toilet	0.701***	0.993	0.680**	29.9	0.7	32
Television	No ^a	1	1	1			
	Yes	0.866	0.696	0.218***	13.4	30.4	78.2
Sex of child	Male ^a	1	1	1			
	Female	0.849	0.782	1.559**	15.1	21.8	55.9 +
Mother's age at birth	<20 ^a	1	1	1			
	20-29	0.821	0.320**	0.865	17.9	68	13.5
	30-49	0.579***	0.276**	0.279**	42.1	72.4	72.1
Birth order	1 ^a	1	1	1			
	3-Feb	1.41	0.759	0.963	41.00+	24.1	3.7
	4 +	0.941	0.732	1.774***	5.9	26.8	77.4 +
Birth interval	<18 months ^a	1	1	1			
	18-36 months	1.002	1.219	2.336*	0.20 +	21.9 +	133.6+
	36+ months	0.423*	0.652	1.166	57.7	34.8	16.6
Immunization	No ^a	1	1	1			
	Yes	0.199*	0.79***	0.218*	88.1	20.7	78.2
Treatment place	Traditional ^a	1	1	1			
	Doctor/nurse	0.825***	0.858	0.725***	17.5	14.2	27.5
Place of delivery	Home/others ^a	1	1.000	-			
	Hospital/clinic	0.512***	0.898	-	48.8	10.2	-
Ever breastfed	No ^a	1	1.000	1			
	Yes	0.124*	0.275*	0.048*	87.6	72.5	95.2
Visitation family planning worker	No ^a	1	1.000	1			
	Yes	0.878	0.853	1.427	12.2	14.7	42.7 +
Constant		3.078	0.901	0.467			
-2 LL		548.353	578.529	472.846			
χ^2		171.276	39.555	119.072			
d.f.		22	22	20			

*p<0.01, **p<0.05, ***p<0.10, ^aReference category (RC), '+' Percent higher w.r.to (RC).

aware about immunization and care during pregnancy. These findings showed consistency with the results obtained by Gunasekran (1997).

So far as the relationship of father's education on infant and child mortality is concerned, it can be seen from Table 2 that it is a significant variable. It is true in the study areas that the educated father's experience a lower neonatal, post-neonatal and child mortality than the non-educated fathers. For example, primary, secondary

and higher educated fathers' exhibit 37.90% and 45.70% lower child mortality respectively than non-educated fathers. Similarly, the father's occupation is also a significant factor in explaining the risk of dying their infant and child.

It is assumed that type of toilet used by the children has a strong association with mother and child health behavior. In our study results (Table 2) indicate that both neonatal and child mortality is 29.90% and 32.00%, respectively lower among

the households with access to sanitary latrine than that of the households with no access to such facilities. The application of the United Nations methodology to developing countries namely, Costa-Rica, Jordan and Thailand also indicate that besides the socio-economic factors, the important determinants of child mortality were expansion of public health system, mainly as a result of implementing a program of primary health care; access to safe drinking water; the presence of sanitary facilities and good quality housing (UN 1996). Now a day's television is the most powerful media. People learn about childcare, proper hygienic, sanitation and they take proper care about health and also become more conscious about their child health consequently infant and child mortality will decline. This findings indicate that the risk of dying during neonatal (13.40%), post-neonatal (30.40%) and child (78.20%) lower mortality with household having television than household without TV.

The risk of neonatal and post-neonatal mortality is significantly lower (15.10% and 21.80% respectively) for female infant as compared to male infant, while during the child mortality stage, female child death is higher (55.90%) than male child death. In most developing countries, male child mortality exceeds female mortality (Chen et al. 1981). In the neonatal period (less than one month), this is true among all population presumably because of biological factors affecting high risk of male. The risk of both infant and child mortality is significantly lower among the older mothers compared to the younger one's. For example, the risk of neonatal and post-neonatal mortality level is (17.90% and 68.00%, respectively) lower among the mothers in the age group 20-29 than those whose age is less than 20. The result confirms the findings of some other studies where it has been reported that children born to young mother had a significantly higher risk of child mortality than children born to mothers aged 20-34 (Mazumder et al. 1993). A higher infant and child deaths among children born to young mothers may be due to the biological complications, immaturity and babies born under weight. Table 2 also shows that, if the preceding birth interval is longer, then the risk of death is lower. For example, for mothers whose children are born after a birth interval of 36 months or longer, the risk of their children dying at neonatal and post-neonatal stage was about 57.70% and 34.80% respectively lower compared with the reference

category. Similarly, the higher the birth order, the higher the risk of child (77.40%) mortality.

Immunization practice is directly related with health status of children. It saves children from dangerous diseases. The children who do not doing immunization practice may have greater chance of being attacked by several diseases. In Table 2 indicates that the risk of neonatal, post-neonatal and child mortality is (88.10%, 20.70 and 78.20% respectively) lower who have immunized as compared to never immunized. The maternal and child healthcare factors like treatment place, place of delivery, ever breastfed practice and visitation by family planning worker has significant negative effect on neonatal, post-neonatal and childhood mortality. Treatment place of child with doctor/nurse have 27.50% lower risk of dying than traditional treatment place; it is surprising to notice that the mortality risk of neonates is low (48.80%) if the neonates is born government hospital/clinic as compared to the neonates born at home and also with the breastfeeding practices have significantly lower risk among neonatal (87.60%), post-neonatal (72.50%) and child (95.20%) mortality levels with compared to reference category.

Logistic regression model of neonatal, post-neonatal, and child mortality suggest that in order to lower infant and child mortality, it is essential to provide greater attention to increase immunization practice of the children, ever breastfed, and education of the lower educated women. Moreover, the reproductive health should continue to emphasize spacing between births through effective use of contraceptive. In connection with electricity use, it is important increase prevalence of television in rural areas, which is now low.

4. CONCLUSION AND POLICY IMPLICATION

Bangladesh has an accelerated population growth but the resources are not growing at the same rate. As a result, the major portion of population of the country is becoming poorer day by day. This poverty leads to illiteracy, child labor and sometimes other serious problems that causes the infant and child mortality. It is well established now from this findings that primarily the endogenous factors are playing significant role on neonatal mortality, whereas in the post-neonatal as well as in the childhood period,

primarily exogenous factors affect risk of mortality much. But the negative effects of maternal education, being exogenous seem to have a great impact on infant and child mortality irrespective of the age of the child. On the other hand, length of the preceding birth interval, being endogenous, also seems to have very strong impact on infant and child survival. Neonatal, post-neonatal and infant mortality levels are found to be higher for male than female children, but the child mortality level is higher for female than male children. The important findings that emerge from this analysis emphasized the importance of the mother's education, age at birth, birth interval, breastfeeding practice, immunization and sanitation facility, all of which are strongly correlated with infant and child mortality. From this survey, it is concluded that infant and child mortality levels are still considered to be high in Bangladesh despite the introduction of various health interventions.

So, policies expand to educational opportunities, particularly girls; births should be reduced to very young (<20 years) mothers; higher order births should be decreased; the government should take balanced program of family planning incorporating simultaneous practice of breastfeeding and use of modern contraception so that women have longer birth interval; the Government should ensure regular supply of immunization all over the areas of the country; toilet facility should be developed for everyone and encourage people to build hygienic toilet at their home. Finally, this study recommends that further detailed research needs and re-evaluation of the available evidence gained from engaging in policy advocacy.

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