

Gender Differentials in Infant and Child Mortality in Bangladesh: Evidence from the Demographic and Health Surveys (1993-2004)

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Introduction

Great progress in reducing infant and child mortality rates is marked in South Asian countries in the past few decades. However, worrying trends in the sex ratio among child population, particularly at births remain unfavorable towards girls in those societies known for a strong son preference. The negative impact of gender on female children survival has drawn increased attention from the international community over the past 10 years. For instance, to promote child health and survival, with particular attention to eliminating excess and preventable death among female infants and children is identified as one of the key priorities by the 'Programme of Action' adopted at the International Conference on Population and Development (ICPD), held in Cairo, on 5-13 September 1994 (United Nations, 1995). Moreover, the fourth goal of the Millennium Development Goals (MDGs) has been committed to reduce child mortality by two-thirds between 1990 and 2015 where under five and infant mortality rates are the important indicators. This indicates that under-five mortality rates must be reduced from 151 deaths per thousand live births in 1990 to 50 in 2015 at global level (GOB and UN:27). Simultaneously, the third goal of the Millennium Development Goals is committed to-'promote gender equality and empower women'. The initiatives advocated by the UN system have increasingly followed a rights-based, gender sensitive and life cycle approach.

The differentials in mortality by gender, with subsequent shorter survival rates for females, are typical for the countries in South Asia where gender bias in mortality and missing women remain a key concern. Despite the biological advantage enjoyed by women, discrimination on the grounds of sex in terms of better nutrition, health care, and education affects survival of girls and women. Strong preference for sons in South Asia is well documented, but evidence on female disadvantage in

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childhood feeding, health care, and nutritional status is inconclusive (Mishra, Roy and Ratherfiord, 2004). A study indicates that missing women in Bangladesh were 3.8 million (8.9 percent of the female population) around 1980, and 3.7 million (or 6.9 percent) around 1990 as compared to 39.1 million (7.9%) in India in 2001 and 4.9 million (7.8%) in 1998 (Klasen and Wink, 2002). In South Asia, Nepal and Sri Lanka have made dramatic progress, Bangladesh and Pakistan improved substantially, and India improved moderately. Mortality studies in these countries suggest that female experiences higher mortality than males, especially during the childhood and throughout the childbearing years, with the exception of the perinatal and early neonatal periods where male mortality exceeds that of female mortality. This means that female mortality exceeds male mortality shortly after birth and the pattern is often sustained throughout women's child bearing ages. The differential is particularly striking in the 1-4 year age group and during the reproductive years. The marked reversal of sex differential in mortality during childhood and adolescence is apparently indicative of the sex-biased behavior which indicates discrimination against female children. It can be noted that an estimated 11 million children in developing countries die each year before reaching their fifth birthday (Westley, 2003). Many of these deaths could be prevented where gender can be important concern.

This paper examines gender differentials in infant and child mortality in Bangladesh as a case in South Asia as well as in other developing countries. Although there is remarkable progress, the existing rates are still high for which gender plays an important role. It is apparent from the *Sample Vital Registration System* (1981-2003) of the Bureau of Statistics (BBS) of Government of Bangladesh that the death rate of female child (1-4 years) compared to that of male child was higher over the years at national, rural and urban levels, respectively (BBS, 2000). But according to *Matlab Demographic Surveillance 2004* (International Centre for Diarrhoeal Disease Research, Bangladesh, ICDDR, B thereafter), male mortality is more pronounced than that of female both during infancy (less than 1 year) and childhood (1-4 years of age) cases (ICDDR, B, 2006). Here it can be noted that the data of Matlab, ICDDR, B is only valid for a particular area (Matlab) but not at national level although the quality of data are very good. However, in the case of under-five child mortality rate in Bangladesh, there was marked progress in 2005 as it stood at 72 per 1,000 live births for both male and female from previous year's 85 for male and 90 for female (UNFPA, 2005). Although the data from different sources indicates the distinct feature, data of *Bangladesh Demographic and Health Survey (BDHS, 1993-2004)* by the National

Institute of Population Research and Training (NIPORT), Mitra and Associates, and ORC Macro is an important source of evidence as this survey has occurred at a regular interval since 1993 at the national scale.

From gender perspective, this paper aims to comprehend and explore the gender differentials in infant and childhood mortality in Bangladesh over times based on the BDHS data (1993-2004) for better policy options to ensure the gender equality and women's empowerment in this new millennium. Additionally this paper seeks to explore the gender determinants of the infants and Childs. By establishing the nature and extent of national patterns and trends of the differentials in infant and child mortality by gender, this paper also seeks to identify the contributory mechanism underlying the gender mortality differentials and changes therein through. Moreover, attempt has also been made to explore and elaborate upon possible intervention strategies aimed at improving in survival of female child in Bangladesh.

The Determinants of Gender Differentials in Infant and Child Mortality in Bangladesh

The gender differentials in infant and child mortality during infancy and childhood have been of considerable interest to demographers as well as sociologists. Fertility decline, strong son preference and others have been identified to provide the major impetus for sex selection. The female deficit is associated with discrimination in favor of boys via practices such as sex-selective abortion, infanticide and neglect leading to excessive female foetal, infant and child mortality. It can be noted that the risk of death appears to be greater for males at all ages (Peters and Larkin, 1997). The fundamental genetic endowment contributes to sex differences in mortality in several different ways. In addition, interaction between genetic and environmental factors also contributes the differences (Waldron, 1983). Factors causing mortality can be divided into two categories: endogenous, biological or developmental, and exogenous, environmental or socio-economic. A constant interplay between these two groups of factors can be explain many of the differentiations in mortality among countries and also been sexes, particularly if strong gender biases exist. Both the social and biological differences probably contribute to observed gender or sex differentials.

Several studies in Bangladesh reflect that various factors especially demographic and socio-economic factors influence the levels of infant and child mortality which are revealed in several studies in the past. For example, childhood mortality rates are much higher in the poorer strata of population. Illiteracy of mothers, culturally determined attitudes with

respect to health and medical care, lack of basic knowledge and awareness of health problems, poverty and the inaccessibility of health facilities, all contribute to these high rates (Kabir and Amin, 1993). Children of educated mothers had a lower risk of dying. A study (Bairagi, 1980) indicates that the level of the mother's education shows a distinct influence on infant and child mortality, the rates being lower for mothers with some schooling. This phenomenon may be attributed to children of educated mothers enjoying better diets and better overall care than the children of non-educated mothers. Positive effect of mother's education was also revealed in another study (Bhuiya and Streetfield, 1991).

Infant and child mortality are also affected by sex-specific birth order, and length of interval between births. It was found that infant mortality was higher for boys than for girls, but child mortality was lower for boys (Huq and Cleland, 1990; Kabir and Chowdhury, 1992). However, variations are also reflected. Data obtained by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) that, in the neonatal period (the probability of dying in the first month of life), male mortality exceeds female mortality, a sex differential consistent with the higher biological risks faced by male children. During the post-neonatal period (the probability of dying after the first month of life but before the first birthday) and childhood (1-4 years), the pattern is reversed, with female death rates exceeding those of males, especially at the ages between 1-5 months, 6-11 months and 1 year age group (ICDDR'B, 2006, Chen et al, 1981). This indicates that gender differentials in infant (the probability of dying before the first birth day) and child mortality (the probability of dying between the first and fifth birth day) are associated with cultural values. The lower mortality among boys has been attributed to the better care they receive compared with girls in terms of the distribution of food and preference for health care when they become ill (Chen, Huq and D'Souza, 1981).

Infant and child mortality levels may show substantial differences according to the social and economic characteristics of the population. It can be noted that mortality studies in Bangladesh especially in focus to infant and Child mortality are mostly based on the data set of Matlab, ICCDDR,B (International Centre for Diarrhoeal Disease Research, Bangladesh) where continuous data have been recorded since 1966 under the Health and Demographic Surveillance System (HDSS). Although this is a very good source of demographic data on births, deaths, migration, marriages and divorces this does not reflect the sceneries of the overall nation with both urban and rural context. In this respect BDHS data reflect the overall nation even the data are retrospective and different in nature. Investigating gender differentials in infant and childhood

mortality from BDHS data provides a unique outlook to comprehend the existing and changing situation with space dimensions. Moreover, analysis of BDHS data is necessary to carry out such analysis and provide in-depth knowledge to guide the future direction and effective implementation relate to gender and mortality to reach the desired goals, especially the MDGs by 2015.

Data Sources and Methodology

Here the data from *Bangladesh Demographic and Health Survey* (BDHS) conducted by National Institute of Population Research and Training (NIPORT), Mitra and associates, and ORC Macro (used as reference) will be widely used and complied for the analysis as BDHS has only such kind of data regarding national scale. Here it can be noted that 4(four) BDHS surveys were done in Bangladesh having representative sample from both rural and urban areas. By using the data from BDHS this paper shows a time series analysis regarding mortality based on gender and other associated variables.

This is a descriptive and explorative study in nature to comprehend the differentials between male and female childs. Here the data on mortality have been used from *Bangladesh Demographic and Health Survey (BDHS)* which is a nationally representative survey designed to obtain and provide information on the basic indicators of social progress including fertility, childhood mortality, reproductive and child health, nutritional status of mothers and children etc. It can be noted that 4(four) BDHS surveys were carried out in 1993-94,1996-97,1999-2000 and 2004 in Bangladesh as apart of the global Demographic and Health Surveys(DHS) program.

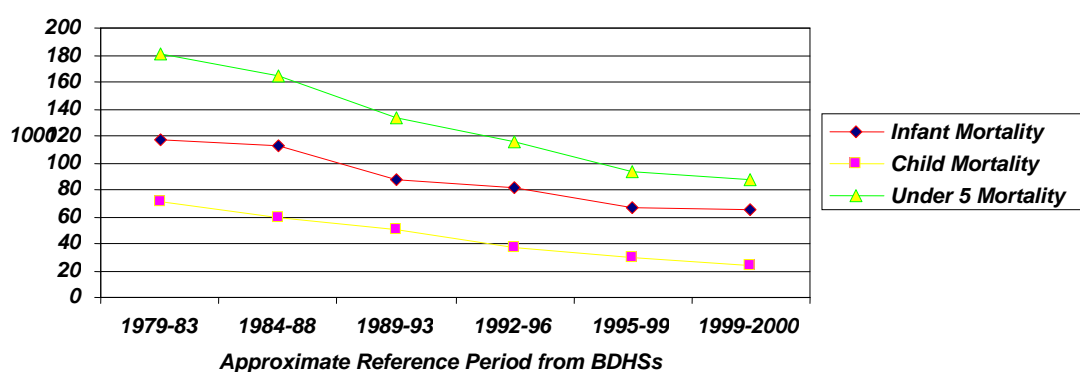
In the above mentioned surveys, the data for mortality estimates were collected in the birth history section of the women's questionnaire where women (aged 10-49) were asked to provide a complete history of their births including the sex of each live birth, months and the year of birth, survival status, and age at the time of the survey or age at death. Here it can be noted that this is only a descriptive and explorative activity in nature to comprehend the differentials between male and female childs mortality in Bangladesh following the evidences from BDHSs. Moreover in some cases data from the *Report on Sample Vital Registration System*, Bangladesh Bureau of Statistics also has been used to comprehend the nature along with comparisons.

Data Analysis and Findings

BDHS data from four nation wide surveys (1993-2004) indicate that infant (the probability of dying before the first birth day), child (the

probability of dying between the first and fifth birth day) and under-five aged mortality (the probability of dying before the fifth birthday) rate have declined significantly over times (Figure 1). Although the speed and space of declining is quite satisfactory, still the rates are high in nature. More specifically infant and under-five aged mortality markedly reduced. The surveys explore that the infant mortality was 116.5 per thousand live births in 1979-83 (approximately the reference period), 87.4 in 1989-93 (approximately the reference period), 82 in 1992-96, 66.3 in 1995-99 and 65 in 1999-2003 (BDHS, 1993-94, 1996-97, 1999-2000, 2004). The data indicate that the rate had declined sharply which continued up to 1999-2000. But last survey explores the rate become slower than previous incidences. A significant progress has happened regarding the under 5 aged mortality as the rate declined to just half within the time period of 20 years. BDHS surveys report that the rate was 180 in 1979-83 (survey 1993-94), 133.1 in 1989-93, 116 in 1992-96 (Survey 1996-97), 94 in 1996-99 (Survey 1999-2000), 88 in 1999-2003 (Survey 2004). But in respect of child mortality the progress are more meaningful than other stated mortality indicators as the rate declined more than half (33%) in last 20 (1979-83 to 1999-2003) years where the rate was 71.8 in 1979-83 (approximately the reference period), 50.1 in 1989-90 (approximate reference period), 37 in (approximate reference) and 24 in 1999-2003 (BDHS, 1993-2004).

Figure 1: Trends and Patterns of Infant, Child and Under 5 Mortality in Bangladesh



Here the main concern is not to explore the trends and patterns of infant, child and under 5 aged mortality in Bangladesh but to find out the gender differentials or gap among the infant and child mortality. Although from demographic point of view we use the term ‘sex’ indicating male and female here we have used gender as it is socio-culturally constructed since the early lives of the birth. Biologically it is well accepted that regarding infant mortality male poses higher mortality than female everywhere in the world whether the place belongs to developed or developing regions.

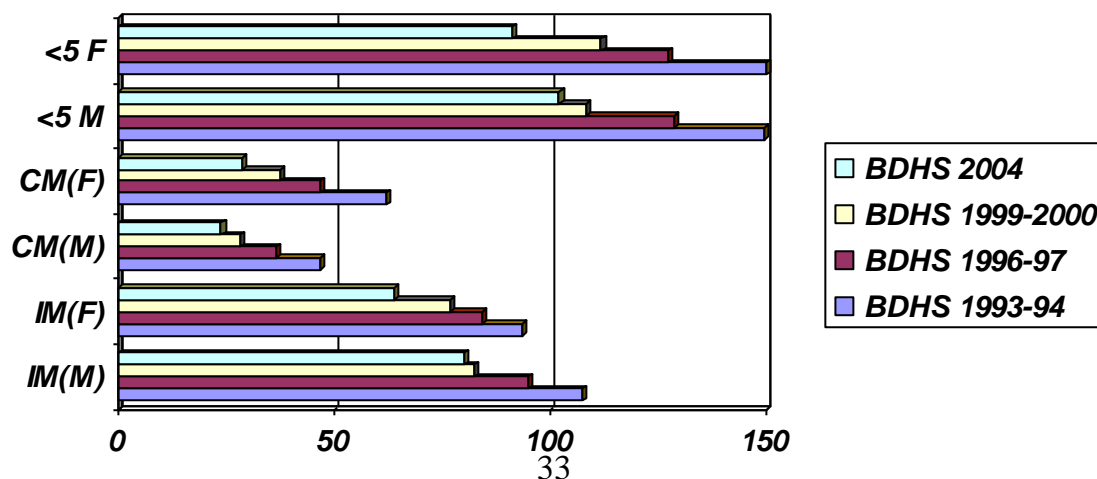
But as the time passed the variations regarding death are more clearly reflected where female poses higher mortality than male and this is the striking feature in developing countries, especially in South Asia where gender biased behavior is one of the major causes of high childhood mortality where female shares higher mortality than male except for infant mortality. In this respect Bangladesh can be an example where gender deferential regarding infant and childhood mortality are reflected. Data from BDHS (1993-2004) indicates that there is a clear feature regarding gender variation, especially in 1-4 years aged child mortality. Table 1 and Figure 2 report that in terms of infant mortality including neonatal and post neonatal mortality male mortality is always higher than female which is universal due to biological ingredients and other relevant factors but maintained to decline the inequality since 1984 up to 1999 but the space difference increased during the approximate reference period of 1994-2003 where male pose 80 and female only 64 per 1000 live births.

Table 1: Infant, Child and Under 5 Age Mortality by Gender for the 10 Year period preceding the surveys, 1993-2004

BDHS	Sex	NN	PNN	IM	CM	<5M
1993-1994	M	70.9	36.5	107.3	46.7	149.1
	F	55.7	37.7	93.4	62.3	149.9
1996-1997	M	60.3	34.7	95.0	36.9	128.4
	F	49.0	35.2	84.2	47.0	127.2
1999-2000	M	54.7	27.5	82.2	28.4	108.3
	F	45.9	31.1	76.9	37.7	117.7
2004	M	52	28	80	24	102
	F	40	24	64	29	91

NN=Neonatal, PNN=Post Neonatal, IM=Infant, CH=Child, <5M= Under Five Aged Mortality

Figure 2: Gender Differentials in Infant, Child and Under 5 Mortality in Bangladesh, BDHS, 1993-2004 (For the 10-Year preceding the surveys)



But the scenario is completely different in case of child (1-4 aged) mortality where females shared the higher mortality than males all over the period of times although the trends are declining. Table 1 and Figure 1 clearly embrace the differential patterns of child mortality. It's good to state that positive sceneries are coming forward as the distance among child mortality (1-4 aged) rates by gender are becoming lower which tends to be equal in coming days if appropriate measures are taken. A number of factors might play the crucial roles in this respect. Evidence from Matlab Demographic Surveillance System, Bangladesh reflects that decreases in fertility and more care children received from parents especially among girls, expansion of child health services, and expansion of women development programs in general and particularly women's education in the past years contributed immensely to this decline (Alam, Ginneken and Bosch, 2005). Although the differences has declined markedly, it can not be concluded that discrimination against girls has removed as these differences still exists as shown in the BDHS surveys.

The table 2 indicates that the male to female child mortality ratio is increasing with the exception of the 1999-2000 survey which explore faster rate of the ratio resulting lower gender differentials. A considerable increase of ratio of the under-five mortality rate has occurred which also posses the same characteristic occurring the complete elimination of female disadvantages. In case of child mortality the increasing ratio is of positive nature but for neonatal mortality the increasing ratio over times explore male infants' vulnerability.

Table 2: Male/Female Ratio of Infant, Child and Under-Five Mortality Rates, BDHS, 1993-2004(Calculated)

Age-specific Probabilities of Dying	1993-94	1996-97	1999-2000	2004
Neonatal Mortality Rate	1.272	1.230	1.191	1.30
Postneonatal	0.968	0.985	0.884	1.16
Infant Mortality	1.148	1.128	1.068	1.25
Child Mortality	0.749	0.785	0.753	0.827
<5 Mortality	0.994	1.00	0.920	1.120

In reference to BDHS surveys the data of Sample Vital Registration System (SVR) of Bangladesh also indicates similar patterns and trends regarding infant, child and under 5 mortality rates over times where gender differentials are reflected with rural and urban variations (Table 3, 4 and 5). The data shows that for infants male mortality is higher than female where the rate fluctuated over times but after 1990s the differences are becoming lower and near to be equal which are varied by rural and urban location (Table 2). Here it can be noted that even the rates

over times differed from BDHS survey data, the indication especially the trend and patterns regarding gender differentials are almost the same where male shared higher mortality in cases of infant and under 5 aged mortality, but for child mortality female shared the higher mortality than male which needs to be explored to find out the reason.

Table 3: Infant Mortality Rate per 1000 Live Births by Sex and Locality, 1981-2003 (BBS, 2006)

Year	National			Rural			Urban		
	Both	Male	Female	Both	Male	Female	Both	Male	Female
1981	111	113	109	112	114	111	99	105	93
1983	117	119	116	121	121	121	99	107	91
1984	119	130	108	122	133	110	102	104	97
1985	112	114	109	113	115	112	99	109	87
1986	116	122	111	118	123	112	101	104	97
1987	113	120	105	115	122	107	95	102	87
1989	102	104	99	103	106	101	86	92	81
1990	94	98	91	97	101	93	71	73	68
1995	71	73	70	78	80	76	53	55	52
2000	58	59	57	62	63	62	44	45	43
2003	53	55	51	57	59	55	40	42	37

Table 4: Child Death Rate (1-4 years) per 1000 Live Births by Sex and Locality, 1981-2003(BBS, 2006)

Year	National			Rural			Urban		
	Both	Male	Female	Both	Male	Female	Both	Male	Female
1983	23.8	25.5	22.0	26.2	27.8	24.5	10.5	12.7	8.3
1984	17.1	14.1	19.8	17.8	15.0	20.8	10.5	9.4	11.7
1986	13.7	13.1	14.5	14.1	13.4	14.9	9.9	9.9	10.6
1987	13.5	11.9	15.1	13.9	12.3	15.8	8.9	8.9	8.9
1989	13.7	13.2	14.1	14.3	13.9	16.7	8.6	8.3	8.8
1990	14.2	13.4	14.8	15.0	14.2	15.7	8.3	8.5	8.2
1995	12.0	12.7	12.2	12.3	12.3	13.0	7.7	8.0	7.5
2000	4.2	4.0	4.7	4.5	4.2	5.0	3.8	3.6	4.4
2003	4.6	5.1	4.3	4.7	5.0	4.6	4.4	5.4	3.4

Table 5: Probability of Dying by Age 5 per 1000 Live Births by Sex and Locality, 1981-2003(BBS, 2006)

Year	National			Rural			Urban		
	Both	Male	Female	Both	Male	Female	Both	Male	Female

1983	220	229	211	232	240	225	147	166	128
1984	188	190	186	193	194	193	142	156	128
1986	169	173	165	174	178	170	124	129	123
1987	168	171	165	173	175	170	126	135	118
1989	151	154	149	168	160	155	100	103	96
1990	151	154	149	158	160	155	100	103	96
1995	125	128	121	150	133	128	83	85	81
2000	84	86	84	90	91	89	55	56	54
2003	78	82	74	81	84	78	55	58	52

For SVR data (Table 3, 4 and 5) it has been found that rural-urban location is one of the important determinants for the variation of the infant, child and under 5 age mortality based on gender in Bangladesh. BDHS data also reflects the variations of the mortality which are not only based on rural urban location but also on the level of education, wealth index and mother's age at birth which are shown here as Table 5,6,7 and Figure-3.

BDHS data in Table 6 clearly reflects that rural area mostly poses the higher mortality than urban area which is applicable for infant, Child and under-five aged mortality in Bangladesh. Only infant mortality is similar in rural and urban area, according to BDHS-2004 which indicates significant improvement. But for other cases the differentials are still existed although the trends are positively declining over times.

Table 7 explores BDHS data of 1993-94 and 2004 where the level of education of mother is positively related to the incidence of mortality in Bangladesh. The data shows that the occurrences of the higher mortality always prevailed among mother with no or lower level of education. It can be argued that to eliminate the gender differentials in mortality can be effective by improving appropriate education of parents so that they will be more concerned about and to be aware to care their kids at their childhood.

Table 6: Differentials in Infant, Child and Under 5 Mortality in Bangladesh by Rural-Urban location, BDHS (1993-2004)

BDHS Surveys	Rural					Urban				
	NN	PNN	IM	CH	<5	NN	PNN	IM	CH	<5
1993-94	65.5	37.1	102.6	56.4	153.2	43.7	37.2	80.9	36.3	114.3
1996-97	56.0	35.2	91.2	43.7	130.9	40.6	32.1	72.7	25.3	96.2
1999-2000	52.0	28.6	80.7	34.8	112.6	42.1	32.4	74.5	24.1	96.7
2004	47	26	72	27	98	44	28	72	21	92

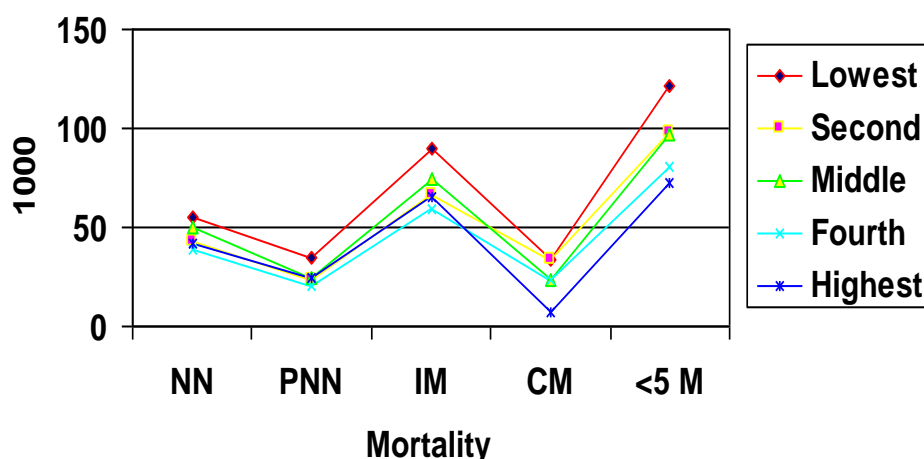
NN=Neonatal, PNN=Post Neonatal, IM=Infant, CH=Child, <5M= Under Five Aged Mortality

Table 7: Differentials in Infant, Child and Under 5 Mortality in Bangladesh by the level of Mother's Education

Education Levels	BDHS 1993-94					BDHS 2004				
	NN	PNN	IM	CH	<5	NN	PNN	IM	CH	<5
No Education	70.9	42.4	113.3	64.4	170.4	51	30	81	35	121
Primary Incomplete	56.0	36.6	92.6	45.5	133.9	44	26	70	18	98
Primary Complete	55.0	26.7	81.7	25.8	105.4	51	32	82	15	97
Secondary+	40.9	16.7	57.5	34.7	90.2	35	22	57	14	72

NN = Neonatal, PNN = Post Neonatal, IM = Infant, CH = Child, <5M = Under Five Aged Mortality

Figure 3: Differentials in Infant and Childhood Mortality in Bangladesh by Wealth Index, BDHS, 2004



In BDHS survey 2004 the wealth index for the first time had been used to measure the mortality occurrences in Bangladesh. The findings showed that the highest infant, child and under 5 aged mortality in Bangladesh belong to the lowest wealth index (Table 6). Moreover, mother's age at birth also an important determinants regarding mortality over times. The study reports that age at birth below 20 years and the age between 30-39 years are in the risk of higher infant, child and under 5 aged mortality (Table 8). Other factors are also can be related here. For example, child survival is closely linked to the timing, spacing and number of births and to the reproductive health of mothers. Early, late, numerous and closely spaced pregnancies are, major contributors to high infant and child mortality and morbidity rates, especially where health-care facilities are scarce (United Nations, 1995; Koeing et al, 1990).

Table 8: Differentials in Infant, Child and Under 5 Mortality in Bangladesh by Mother's Age at Birth

Mother's Age at Birth	BDHS1993-94					BDHS 2004				
	<i>NN</i>	<i>PNN</i>	<i>IM</i>	<i>CH</i>	<5	<i>NN</i>	<i>PNN</i>	<i>IM</i>	<i>CH</i>	<5
<20	81.3	38.5	119.9	50.6	164.4	58	28	86	22	106
20-29	55.7	33.5	39.2	55.9	140.2	37	23	60	25	84
30-39	57.0	43.2	100.2	56.1	150.6	48	34	83	35	115

NN=Neonatal, PNN=Post Neonatal, IM=Infant, CH=Child, <5M= Under Five Aged Mortality

However, studies report that Bangladesh is quite successful to reduce infant, child and under 5 aged mortality over times. In compare with neighboring countries as well as other regions it has been reflected that Bangladesh has successfully reduced infant and child mortality which are quite impressive while women are currently sharing higher life expectancy at birth than male which was just opposite a decade ago. It can be argued that socio-economic development as well as women's empowerment and better caring to female child played here the crucial role. It's also good to note that the sate of under-five aged mortality in Bangladesh is just equal for both male and female children where other South Asian countries like India, Pakistan and Nepal shared the variation posing higher female mortality (Table 9).

Table 9: Mortality Indicators in the South Central Asia in Reference to World and Other Regions, UNFPA, 2005

<i>Region/Country</i>	<i>Infant Mortality</i>	<i>Under 5 Mortality</i>		<i>Life Expectancy at Birth</i>	
		<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
World	55	83	81	63.7	68.2
More Developed Regions	8	10	9	72.2	79.6
Less Developed Regions	60	91	89	62.3	65.8
Least Developed Countries	94	160	149	50.8	52.7
Asia	51	68	71	66.1	70.0
South Central Asia	65	92	97	62.4	65.4
Bangladesh	54	72	72	62.8	64.6
India	64	90	95	62.4	65.7

Nepal	60	78	83	62.0	62.9
Pakistan	75	102	112	63.6	64.0

Source: UNFPA, The State of World Population 2005:107,108, 111-112

From the above discussion it's clear that Bangladesh has successfully reduced infant, child and under-five age mortality with compare to other developing countries, especially those in South Asia but the gender imbalances regarding mortality still exist which are showed in the Demographic and Health Surveys (1993-2004). There is no doubt that higher female child mortality is the evidence of wider economic and social realities that assign a higher value to boys rather than to girls. In this regard, state policy can assist to reduce gender bias or differentials in mortality. Free access to health care, nutrition and other facilities can help to improve girls' disadvantages girls. Similarly, acceleration of female education and employment can improve the situation of young women which will affect on infant and child mortality. There is considerable evidence that women's education and literacy tend to reduce the mortality rates of children. For example, a study(Hale et al,2006) indicates that infant and child mortality rates are significantly lower in the Maternal and Child Health-Family Planning (MCH-FP) area of Matlab, Bangladesh, than in a comparison to other area even though the two areas are similar in terms of socioeconomic characteristics, but the MCH-FP area provides better maternal and child health and family planning services, resulting in different reproductive patterns, including lower fertility rates and longer intervals between pregnancies. Changes in various reproductive behaviors (such as increased intervals between births, changes in the number of children born, and changes in women's age at childbearing) may be responsible for a portion of observed decreases in infant and child mortality rates. Although the government of Bangladesh is committed to eliminate all forms of discriminations against women and girl child a lot of efforts are needed to be done aiming to reach the millennium development goals by 2015. In this respect NGOs can contribute a great deal in partnership with the Government by implementing different programs to ensure gender equality on the occurrence of the infant and child mortality in Bangladesh. Acceleration of education, accessible and good quality of primary health care services can work as important tools to ensure the disappearance of the existing gender differentials. It's highly positive that Bangladesh is one of only two South Asian countries to have achieved parity in school enrollment for boys and girls. Consolidating and strengthening achievements in on-going interventions are required to accelerate the pace of reduction in mortality. Moreover, exploring interventions are also required to address the contemporary

causes of infant and childhood mortality. In a whole, changes in social, economic and political statuses of women are needed to eliminate inequalities at all levels and in all areas.

Conclusions

The infant and child mortality rate is a reflection of care, health and nutrition status of children below the age of five years which also indicate the social, cultural, and economic progress in the country. Various determinants are associated with infant and child mortality variation where gender is an important component. An understanding of the mechanisms including trends and patterns and identifications of the factors responsible for gender inequality are needed. In this regard the present study has made an attempt to find out the evidences by analyzing the data of Bangladesh Demographic and Health Surveys (1993-2004).

This study shows although infant and child mortality in Bangladesh is quite high it has significantly reduced over times where the gender differentials are still reflected as a distinct feature especially in female child mortality. The differential is particularly striking in the 1-4 year age group. This is an indicative of the gender-biased behavior which discriminates against female children.

This study also indicates that the male to female child mortality ratio is increasing with the exception of the 1999-2000 survey which explore faster rate of the ratio resulting lower gender differentials. A considerable increase of ratio of the under-five mortality rate has occurred which also posses the same characteristic occurring the complete elimination of female disadvantages.

It can be argued that excess female mortality in childhood is a reflection of wider economic and social realities that assign a higher value to boys than to girls. This indicates that gender differentials in infant and child mortality are associated with cultural values. However, the present study also explores that variations of infant, child and under-five age mortality are reflected on the basis of the variables of geographical location (rural-urban), education as well as income (wealth-index). Here it can be noted that the decrease in gender difference in child mortality may have been influenced by several factors like promotion of child health care services with special focus on girls, women's empowerment as well as better access to education, reducing fertility etc. In this respect, an examination of socio-cultural practices, particularly during the childhood will explain the mechanism through which excessive female mortality is brought about where the evidences based on socio-cultural as well as others can be more explored from the comprehensive analysis of BDHS data in future to adopt effective policy options.

Finally as the BDHS data are comprehensive in nature there is therefore a scope to investigate women's household autonomy and authority, which may be linked to longitudinal data on survival of their children as women are often the primary decision-makers regarding child health care, family health and nutrition. In this regard gender mainstreaming should be more focused at all levels where it involves ensuring gender perspectives and attention to the goal of gender equality.

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Evidence from the Demographic and Health Surveys

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