

## Mortality Experience Trends in Bangladesh: Present and Past Facts

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**Abstract:** The concept of mortality is very important for development planning in a country. This paper studies the present and past trends in mortality experience of Bangladesh. In doing so various literatures were reviewed and secondary data were generated mostly from Bangladesh Bureau of Statistics, Bangladesh Demographic and Health Survey, Gender statistics of Bangladesh etc., which are the major source of demographic data for Bangladesh. From the mortality experience in Bangladesh, the study finds that several categories of mortality occur such as age specific mortality, sex and residence differentials in mortality. Based on these categories of mortality, this study examines the trends in mortality in Bangladesh. The paper makes an unpretentious effort to examine the levels, patterns and trends of mortality in Bangladesh from a comparative standpoint with a hope to make the findings of the study effective in providing reasonable guidelines of the present situation of mortality for the country as a whole. The study also finds that the mortality declined than the before in Bangladesh and the rate varies from one area to another.

**Key words:** Crude Death Rate • Childhood Mortality • Maternal Mortality • Perinatal Mortality

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### INTRODUCTION

Bangladesh has the highest population density in the world as per recent demographic data its current population is about 156.8 million [1]. Mortality is the state of being mortal, or susceptible to death; the opposite of immortality [2, 3]. We know that mortality means death and death is defined as the permanent disappearance of all evidence of life at any time after birth has taken place [4]. Mortality rate is a measure of the number of deaths in a given population [3]. The probability of dying within the first month of life is called neo natal mortality [4]. Post neonatal mortality is the difference between infant and neonatal mortality [5]. Infant mortality is also called the probability of dying before the first birthday [5]. Child mortality is also called the probability of dying between the first and fifth birthday [4]. Under-five mortality is the probability of dying between birth and the fifth birthday [4]. All rates are also expressed by per one thousand live births except child mortality, which is expressed per one thousand children surviving to their first birthday. Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental causes [3].

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The Government of Bangladesh has invested in a maternal health program with support from a number of development partners. Bangladesh has achieved remarkable reductions in maternal mortality female education, achieving reductions in fertility and increasing the availability of facilities. Bangladesh's targets are to reduce the maternal mortality ratio (MMR) to 143 per 100, 000 live births by 2015 and to increase skilled attendance at birth to 50 percent by 2016 [6]. The Bangladesh Maternal Mortality and Health Care Survey was conducted in 2010 [7] with the major objectives being to provide a maternal mortality estimate for the period 2008-2010, to determine whether MMR has significantly declined from 1998-2001 and to ascertain the causes of maternal death [7]. In the last decade, the health, nutrition and population sector program of Bangladesh has adopted a national strategy for maternal health focusing on Emergency Obstetric Care (EmOC) for reducing maternal mortality, focusing appropriate referral of complications and improvement of quality of care. If we found the previous studies, it will clear to us that mortality has already decreased than the past due to take several programs to reduce mortality. Several government and non-government organization works continuously about creating awareness among the women, children and also the overall people in Bangladesh. People are now conscious about their health, nutrition and diseases thus reduces mortality rate. Infant and child mortality rates reflect a country's level of socioeconomic development and quality of life. They are used to monitor and evaluate population and health programs and policies. The rates are also useful in identifying promising directions for health and nutrition programs in Bangladesh. This provides information on levels, trends and differentials in neonatal, post neonatal mortality, infant mortality and child mortality in Bangladesh. Mortality estimates are disaggregated by socioeconomic characteristics, such as urban-rural residence, geographic division, mother's level of education and household wealth, as well as selected demographic characteristics, which may be used to identify segments of the population requiring special attention. The Bangladesh Demographic and Health Survey asked all ever-married women aged 15-49 to provide a complete history of their live births, including the sex and year of each birth, survival status and age at the time of the survey or age at death [8]. Age at death was recorded in days for children dying in the first month of life, in months for children dying before their second birthday and in years for children dying at later ages [3]. The overall objective of this study is to examine the levels, patterns and trends of mortality in Bangladesh from which we can easily understand and gain all information that are related to mortality facts. The specific objectives of this study are: to find levels and trends in mortality experience in Bangladesh and to investigate the different patterns of mortality in Bangladesh.

## **MATERIALS AND METHODS**

Secondary data were used which were collected by surveying published and unpublished reports of several government and non-government organizations such as Bangladesh Bureau of Statistics, Bangladesh Demographic and Health Survey, Gender statistics of Bangladesh, Journals and Articles etc. Tabular and Graphical analyses were done with the collected data in order to achieve the objectives of the study. The concepts that are related to the mortality are:

**Neonatal mortality:** When the probability of dying within the first month of life is occurred, then we call it neonatal mortality [3].

**Infant Mortality:** Infant mortality is called the probability of dying before the first birthday [3].

**Post-Neonatal Mortality:** When we found a difference between infant and neonatal mortality, it is also called post neonatal mortality [5].

**Child Mortality:** The probability of dying between the first and fifth birthday is called child mortality [4]. Under-5 mortality: Under-5 mortality is called the probability of dying between birth and the fifth birthday [4].

All rates are expressed in per 1, 000 live births except for child mortality, which is expressed in per 1, 000 children surviving to their first birthday (12 months of age).

## **RESULTS AND DISCUSSION**

**Current Mortality Facts of Bangladesh:** Population estimates about Bangladesh can be found from a variety of sources. Table 1 shows various indicators of Bangladesh population according to two sources: [1, 9]. According to BDHS (Bangladesh Demographic Health Survey, 2014), national Child death rate per 1000 children of ages 1-4 is 7.3. According to SVRS, 2014, Crude Death Rate (per 1000 population) is 5.2 whereas in rural area it is 5.6 and in urban area it is 4.1 and Maternal Mortality Ratio (per 1000 live births) is 1.93 whereas in rural area it is 1.96 and in urban area it is 1.82 [1].

**Crude Death Rate:** Crude Death Rate is the total number of deaths to residents in a specified geographic area (country, state, county, etc.) divided by the total population for the same geographic area (for a specified time period, usually a calendar year) and multiplied by 100,000 [3]. We can also say that; this entry gives the average annual number of deaths during a year per 1,000 populations at midyear; also known as crude death rate. The death rate, while only a rough indicator of the mortality situation in a country, accurately indicates the current mortality impact on population growth. This indicator is significantly affected by age distribution and most countries will eventually show a rise in the overall death rate, in spite of continued decline in mortality at all ages, as declining fertility results in an aging population. The crude death rates estimated by BBS through their SVRS program are presented in Table 2. The crude death rate declined from 2005 in 5.8 to 5.6 in 2006 and it from declined 5.2 in 2014 (Figure 1).

Crude death rates were higher in the primitive stage but in recent years it is declined due to lack of several programs. Now people know that how to lead a better way of life, how to control all complex situations and also how to implement the policies to reduce death rates.

**Age Specific Death Rate:** It is advisable to classify people under different categories according to their age groups. The deaths rate in case of infant and old aged people are high and that of young people are low. The age specific death rate is the no. of deaths in a calendar year at ages x divided by the mid-year population aged x per one thousand population.

Age-Specific Death Rate [10, 11] by sex and area are shown in Table 2. Death rates have declined up to ages 40-44 years for both men and women but appear to have increased for older ages. It is observed from the table that ASDR was higher for women as compared to men in the age group 5-9, 15-19 and 20-24 in 2010. The higher mortality rate in the age groups 15-19 and 20-24 for the women may be due to early marriage and maternal mortality. From the age specific death rate, we can understand about how many people dies various ages and it will helpful for us to take initial steps to prevent such type of deaths. The person whose age is below the 15 and over 65 has the higher mortality rate.

**Principal Causes of Death:** The information of principal causes of death for women and men are shown in Table 3. It is evident from the Table 3 that death due to blood pressure, heart diseases and tumor/cancer has been increased over time. In case of blood pressure, it was higher for men as compared to women.

From the Table 3, in case of women at the national level in 2010, old age complication was the principal cause of death (102.8) per 100,000 populations followed by asthma and respiratory problem (41.24) and blood pressure and heart disease (76.76). In case of men, asthma respiratory disease (66.0) was the principal cause of death followed by blood pressure, heart diseases (130.1) and old age complication (102.7). Whereas at the national level in 2007, the women's old age complication was the principal cause of death (122.4) per 100,000 population followed by asthma and respiratory problem (77.9) and blood pressure and heart disease (61.9). In case of men, asthma respiratory disease (129.9) was the principal cause of death followed by blood pressure, heart diseases (122.0) and old age complication (102.2). From the study we can easily identify in which type of disease causes more deaths and who suffer the most. It will help us to take all necessary steps to prevent such type of disease. As population increases day by day thus disease also increases and people also affected by these diseases. And also, from the study it will clear to us about such factors that are responsible for the death such as suicide, depression etc. From these surveys we can now identify about how many people die in our country and which type of disease is responsible for this and who is more affected by this.

Table 1: Current Mortality Facts of Bangladesh, 2014

INDICATORS	SOURCE (BDHS, 2014)
Child death rate per 1000 children of ages 1-4	
National	7.3
Urban	4.8
Rural	8.6
Childhood Mortality (Per 1000 live birth)	
Neonatal	28
Post neonatal	10
Child (per Infant 1000 children)	38
Under-five	8
	46
	SOURCE (SVRS, 2014)
Crude Death Rate (per 1000 population)	
Total	5.2
Rural	5.6
Urban	4.1
Total	
Both sexes	30
Male	31
Female	28
Rural	
Both sexes	31
Male	32
Female	29
Urban	
Both sexes	26
Male	29
Female	22
Maternal Mortality Ratio (per 1000 live births)	
Total	1.93
Rural	1.96
Urban	1.82

Source: SVRS, 2014 and BDHS, 2014.

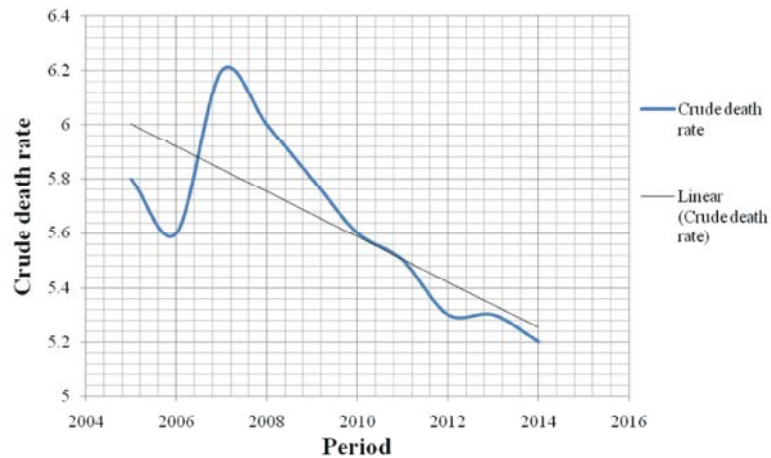


Fig. 1: Trends in crude death rates for Bangladesh, SVRS 2005-2014

Table 2: Age Specific Death Rate (ASDR) per 1000 Population by Sex and Residence, 2008 & 2010

Age group	National (2010)		National (2008)	
	Women	Men	Women	Men
1-4	2.13	2.44	3.55	3.94
5-9	1.05	0.87	1.44	1.66
10-14	0.92	1.29	0.70	1.04
15-19	1.07	1.00	1.19	1.31
20-24	1.39	1.10	1.18	1.28
25-29	1.41	1.66	1.45	1.04
30-34	1.00	1.74	2.06	1.74
35-39	1.80	1.87	2.92	2.46
40-44	2.80	2.89	3.10	3.75
45-49	4.05	5.19	3.76	4.81
50-54	9.94	10.14	6.41	9.16
55-59	12.79	14.00	8.71	13.52
60-64	21.39	24.26	17.83	23.95
65-69	30.96	37.54	29.86	35.54
70-74	46.60	51.02	46.57	58.77
75-79	86.73	88.14	62.20	83.10
80+	127.68	141.17	126.98	130.00

Source: Report on SVRS, 2010, BBS

Table 3: Principal Causes of Death per 100, 000 Populations by Sex and Residence, 2007&2010

Residence	Sex	Causes of Death						
		Fever	Blood pressure, Heart disease	Old age complication	Asthma respiratory disease	Others disease	Tumor cancer	Suicide, poisoning
2007								
National	Women	36.2	61.9	122.4	77.9	17.3	34.5	36.7
	Men	42.0	122.0	102.2	129.1	21.1	54.2	52.3
Rural	Women	41.1	61.7	126.8	83.8	18.9	36.2	40.1
	Men	48.4	124.3	102.5	143.8	25.4	55.7	57.2
Urban	Women	21.5	62.5	109.2	60.2	12.2	29.4	26.5
	Men	22.3	145.7	100.2	84.2	8.2	49.9	37.1
2010								
National	Women	24.7	76.76	102.8	41.24	60.5	42.9	29.6
	Men	27.1	130.1	102.7	66.0	78.9	48.8	47.6
Rural	Women	29.8	75.3	108.0	49.4	65.4	42.9	31.8
	Men	33.6	105.5	113.6	77.5	85.1	47.4	54.4
Urban	Women	7.8	39.6	46.9	13.4	26.0	21.4	12.9
	Men	15.6	174.1	83.3	45.4	67.6	51.5	35.3

Source: Report on SVRS, 2010, BBS

### Different Pattern/Levels of Childhood Mortality

**Trends in Childhood Mortality:** Since 2002-2006, the DHES surveys in Bangladesh have obtained childhood mortality rates for the five-year preceding the survey. The data confirms a steady downward trend in childhood mortality (Table 4). Between 2007 and 2014 neonatal mortality declined from 37 to 28, post neonatal mortality declined from 15 to 10, Infant mortality declined from 52 to 38, child mortality declined from 14 to 8 and also under-5 mortality declined from 72 to 46.

Table 4: Trend of Childhood Mortality

Data Source	Approximate Reference period	Neonatal Mortality (per 1000 live births)	Post neonatal Mortality (per 1000 live births)	Infant Mortality (per 1000 live births)	Child Mortality (per 1000 children)	Under-5 mortality (per 1000 live births)
BDHS 2007	2002-2006	37	15	52	14	72
BDHS 2011	2007-2011	32	10	43	11	61
BDHS 2014	2010-2014	28	10	38	8	46

Source: BDHS, 2014.

### Perinatal mortality (deaths per 1000 pregnancies)

■ BDHS, 2007 ■ BDHS, 2011

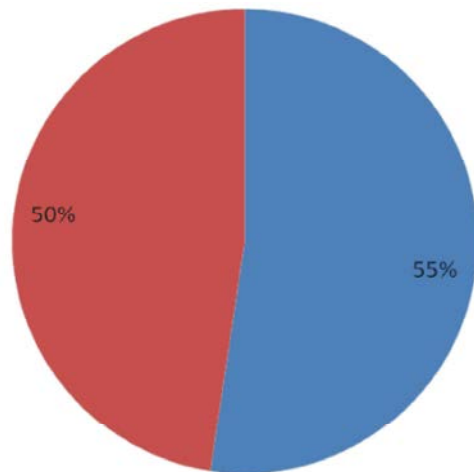


Fig. 2: Depiction of Perinatal mortality (Source: BDHS, 2014)

Neonatal, post neonatal, Infant, Child and Under-five mortality rates for five year periods preceding the BDHS survey Early childhood mortality was high in the past but in recent years it tends to decline due to several reasons. Child malnutrition in Bangladesh is amongst the highest in the world. The World Bank estimates that Bangladesh is ranked 1st in the world of the number of children suffering from malnutrition. Women also suffer most from malnutrition. To provide their family with quality food which are essential for their nutrition? Children under the age of five are under-nourished and about 60% of children under age six are stunted. More than 45 percent of rural families and 76 percent of urban families were below the acceptable caloric intake level [8]. Malnutrition is passed on through generations as malnourished mothers give birth to malnourished children. About one-third of babies in Bangladesh are born with low birth weight, increasing infant mortality rate and leads to increasing risk of diabetes etc. One neonate dies in Bangladesh every three to four minutes; 120 000 neonates die every year [8].

**Perinatal Mortality:** Perinatal deaths are composed of pregnancy losses occurring after seven completed months of gestation (stillbirths) and deaths within the first seven days of life (early neonatal deaths) [3]. The perinatal mortality rate is calculated by dividing the total number of perinatal deaths by the total number of pregnancies reaching seven months of gestation [3]. The distinction between a stillbirth and an early neonatal death is a delicate one, often depending on the observed presence or absence of some signs of life after delivery. The causes of stillbirths and early neonatal deaths overlap and examining just one or the other can understate the true level of mortality around delivery. For these reasons, it is

suggested that both events be combined and examined together. In the 2011 BDHS, information on stillbirths is available for the five years preceding the survey and is collected using the calendar at the end of the Woman's Questionnaire. The perinatal mortality rate in Bangladesh is 50 deaths per 1,000 pregnancies, which is 9 percent lower than the level observed in the 2007 BDHS (55 deaths per 1,000 pregnancies) (Figure 2). Perinatal mortality is high among teenage mothers and mothers whose age 40-49 [12].

Rural areas have higher perinatal mortality than urban areas and Barisal has the highest perinatal mortality rate of all divisions. Perinatal mortality has a negative association with the mother's education and wealth status; it is lowest for women who have completed. Secondary or higher education and for women in the highest wealth quintile.

**Maternal Mortality Ratio:** Approximately 529,000 women die from pregnancy-related causes annually and almost all (99%) of these maternal deaths occur in developing nations. One of the United Nations' Millennium Development Goals is to reduce the maternal mortality rate by 75% by 2015 [6]. Causes of maternal mortality include postpartum hemorrhage, obstructed labor and sepsis. Many developing nations lack adequate health care and family planning and pregnant women have minimal access emergency care. Basic emergency obstetric interventions, such as antibiotics, oxytocics, anticonvulsants, manual removal of placenta and instrumented vaginal delivery, are vital to improve the chance of survival.

The MDG 4 target for Bangladesh has been set to reduce the under-5 mortality ratio from 146 per 1,000 live births in 1990 to 48 per 1,000 live births in 2015 [6]. Accordingly, the Ministry of Health and Family Welfare has developed various policies and strategies to improve maternal and newborn health. In a new Health Population and Nutrition Sector Development Programme (HPNSDP) for 2011-16, two operational plans have been implemented under the Directorate General of Health Services and the Directorate General of Family Planning. The new sector program strongly emphasizes improving access and equity in the utilization of essential maternal and neonatal health services [13].

The trends in MMR during the period 2005–2014 are shown in the accompanying figure (Figure 3). As the estimates presented in the table dictate, the MMR declined from 3.48 per 1000 live births in 2005 to 3.37 in 2006, 3.51 in 2007, 3.48 in 2008, 2.59 in 2009, 2.16 in 2010, 2.09 in 2011, 2.03 in 2012, 1.97 in 2013 and it continuously declined to 1.97 in 2013.

From the discussion we can say that maternal mortality also decreased due to improvement of medical facilities, awareness etc. The number of doctors and trained nurses has increased considerably. Besides the spread of government hospitals in urban countries and primary health centers in rural areas, private hospitals and nursing homes are fast coming up which provides the best of medical facilities thus reduces maternal mortality rate. As these types of opportunities were not available in the past thus maternal mortality rates were high. Besides doctors, the members of the family are now conscious about mother's health. They always try to safe their mother and want to see a newly healthy born baby. Mothers are now taking nutritious food, daily checking their health and taking suggestions from the health worker and also from experience persons and this helps to decline maternal mortality rates.

**Maternal Mortality Ratio by Residence:** We know that maternal mortality ratio is defined as the number of total deaths of women due to complications of pregnancy, childbirths and puerperal per 1000 live births during a year.

It is observed from the table that at the national level the maternal mortality ratio has decreased from 3.65 in 2004 to 2.16 in 2010 nationally, with relatively greater decline in the rural area that is from 3.87 in 2004 to 2.30 in 2010 and in urban area that is from 2.53 in 2004 to 1.78 in 2010. Whereas in Maternal Mortality Survey it was found that maternal mortality ratio has decline from 322/100,000 live births to 194/100,000 live birth between BMMS 2001 to BMMS 2010 respective [7].

**Causes of Maternal Death:** There are several causes of maternal death such as complicated pregnancy, complicated child birth/ Retained placenta/Prolonged labor/ prolapsed cord/Lacerations/Tear Convulsion/Eclampsia, hemorrhages after delivery, complicated abortion, Tetanus etc. These are very harmful during pregnancy period.

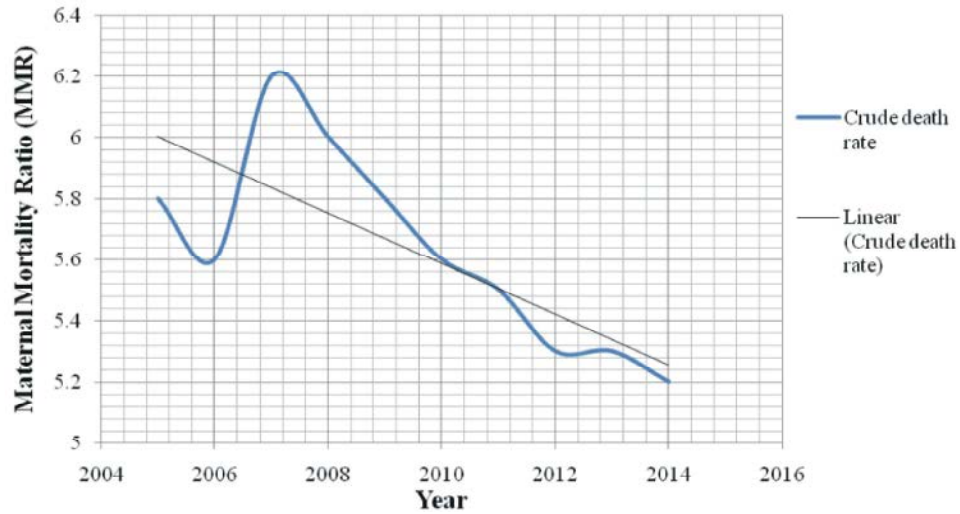


Fig. 3: Trends in Maternal Mortality Ratio (MMR) per 1000 live births, SVRS 2005–2014  
Source: BBS (2013, 2014), \*SVRS–2013 Key Indicators (BBS, 2015)

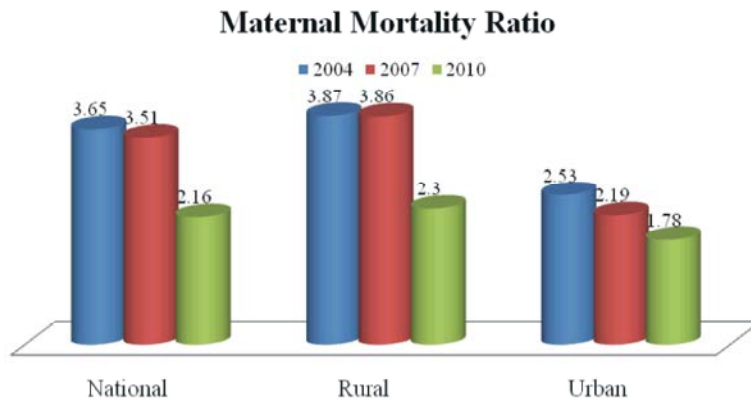


Fig. 4: Maternal Mortality Ratio by Residence  
Source: SVRS 2010, BBS

Table 5: Distribution of Causes of Maternal Mortality by Residence, 2009 and 2010

Causes	2009			2010		
	National	Rural	Urban	National	Rural	Urban
Complicated pregnancy/ Convulsion/ Eclampsia	6.8	6.3	8.3	11.7	13.1	6.3
Complicated child birth/ Retained placenta/Prolonged labour/ Prolapsed cord/Lacerations/Tear	20.7	25.00	8.3	19.5	19.7	18.8
hemorrhages after delivery	27.3	25.0	33.3	23.4	24.6	18.8
Complicated abortion	15.9	15.6	16.7	19.5	14.8	37.5
Hemorrhages during pregnancy	15.8	12.5	25.0	13.0	13.1	12.5
Tetanus	13.7	15.6	8.3	13.0	14.8	6.3
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Report on SVRS and BBS, 2010



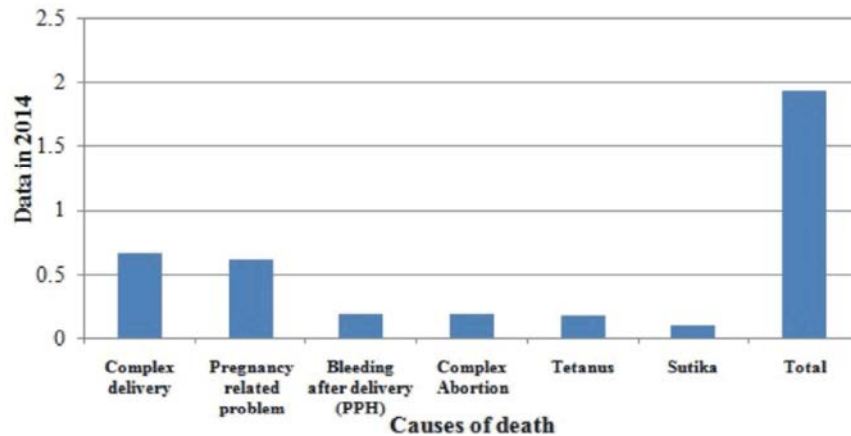


Fig. 5: Maternal Mortality Ratio by Causes per 1000 live Births, SVRS 2014

Source: BBS (2013, 2014), \*SVRS–2013 Key Indicators (BBS, 2015)

At the national level, hemorrhage after delivery was the leading cause of maternal mortality, which was 27.3 % of total maternal deaths in 2009 and 23.4 % in 2010. The second cause 20.7% in 2009 and 19.5% in 2010 occurred due to one of the reasons for prolonged labour/retained placenta/prolapsed cord/ lacerations/tear. The pattern of causes of maternal death varies by rural urban residence. In rural areas, complicated childbirth and tetanus are more important while in urban areas hemorrhages is more important. In 2009 at the national level, due to complicated pregnancy 6.8% total maternal deaths occur but it declined 11.7% in 2010 and due to tetanus 13.7% deaths occurs in 2009 but it declined 13.0% in 2010.

**Where Do Maternal Deaths Occur?:** The higher number of maternal deaths in some areas where reflects inequities in access to health services and highlights the gap between rich and poor. Almost all maternal deaths (99%) occur in developing countries [1]. The maternal mortality ratio in developing countries in 2015 is 239 per 100 000 live births versus 12 per 100 000 live births in developed countries [1]. There are large disparities between countries, but also within countries and between women with high and low income and those women living in rural and urban areas. The risk of maternal mortality is highest for adolescent girls under 15 years old and complications in pregnancy and childbirth is a leading cause of death among adolescent girls in developing countries [4]. Women in developing countries has on average many more pregnancies than women in developed countries and their lifetime risk of death due to pregnancy is higher. Maternal deaths mostly occurred in rural areas of our country because of lack of female education, lack of awareness about delivery, lack of adequate trained health workers, lack of opportunities during pregnancy period, lack of given support by husband etc. But in recent years several government and non-government organization also works for the raising awareness in the delivery period and given opportunity about delivery cases. Thus, the results declined about maternal mortality rate than the past. Women die as a result of complications during pregnancy and childbirth. Most of these complications develop during pregnancy and most are preventable or avoidable. Other complications may exist before pregnancy but are worsened during pregnancy, especially if not managed as part of the woman's care. The major complications that account for nearly maternal deaths are:

- Severe bleeding (mostly bleeding after childbirth)
- Infections (usually after childbirth)
- High blood pressure during pregnancy (pre-eclampsia and eclampsia)
- Complications of delivery
- Unsafe abortion.

The remainder are caused by or associated with diseases such as malaria and AIDS during pregnancy.

### **CONCLUSION**

Mortality rates and ratios are important indicators reflecting the health situation of the population of a country. We find several kinds of trends and patterns of mortality. And also, we find that Bangladesh has made significant progress about reducing mortality. Government has taken necessary initiatives and the people of our country help the government in many ways. It is not possible without the unity among the people of Bangladesh. So, it is our duty to make our country suitable for us, our children and also for the next generation.

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