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Original Research Article

Incidence and characteristics of maternal mortality: a retrospective study in Dhaka medical college

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ABSTRACT

Background: Maternal mortality remains a significant public health challenge globally, particularly in low-resource settings like Bangladesh. This study aims to analyze the incidence and characteristics of maternal mortality at Dhaka Medical College Hospital, a major tertiary care center in Bangladesh.
Methods: This retrospective observational study was conducted, reviewing 10,592 birth records from July 2009 to June 2010. The study focused on maternal deaths during this period, identifying 189 cases. Data on age, socioeconomic status, parity, antenatal care practices, and causes of mortality were analyzed
Results: The maternal mortality rate was found to be 1.78%. The majority of deaths occurred in younger women, with 25.40% in the 16-20 age group and 36.51% in the 21-25 age group. A significant majority (80.95%) of the deaths occurred among women from low socioeconomic backgrounds. Regarding parity, the highest mortality was observed in women with 1-2 children (39.68%). Antenatal care was notably deficient, with 75.66% of participants not receiving any. The leading causes of maternal mortality were eclampsia (31.75%) and obstetric haemorrhage (30.16%).
Conclusions: The study highlights a high incidence of maternal mortality among younger women and those from low socioeconomic backgrounds, with eclampsia and obstetric haemorrhage being the predominant causes. The lack of antenatal care is a critical concern. These findings underscore the need for improved antenatal care services, emergency obstetric care, and targeted interventions to address socioeconomic disparities in maternal health.

Keywords: Maternal mortality, Eclampsia, Obstetric haemorrhage, Antenatal care

INTRODUCTION

Maternal mortality, a critical public health issue, extends its impact far beyond the immediate loss of life, profoundly affecting the sociological and psychological fabric of families and communities. The death of a mother not only represents a tragic health failure but also triggers a cascade of social and emotional consequences. In many societies, mothers are central figures in family stability and child upbringing. Their loss can lead to disintegration of family structures, increased vulnerability of children to poverty, and disruption of education, particularly for girls.[1] The psychological impact on families is profound, often resulting in long-term emotional distress and mental health issues among surviving family members, especially children who lose their primary caregiver.[2] Globally, approximately 295,000 women died during and following pregnancy and childbirth in 2017.[3,4] These deaths, predominantly occurring in low-resource settings, reflect stark inequalities in access to healthcare and highlight the

urgency of addressing maternal mortality as a global health priority.[5] The transition from global to regional statistics reveals a concerning trend in South Asia, including Bangladesh, which bears a substantial proportion of the global maternal mortality burden.[6] In Bangladesh, the maternal mortality ratio (MMR) has shown fluctuations over the years. Despite progress, the country still faces challenges in reducing maternal deaths to meet the Sustainable Development Goals.[7] This situation underscores why maternal mortality in Bangladesh is a critical area of study, particularly in understanding the underlying causes and implementing effective interventions. Globally, factors contributing to maternal mortality include limited access to quality healthcare, socioeconomic disparities, and medical complications during pregnancy and childbirth.[8] In Bangladesh, these factors are compounded by specific challenges such as high adolescent pregnancy rates and low utilization of maternal newborn and child health (MNCH) services.[6] Socioeconomic determinants, such as a woman's educational level, income, and access to media, significantly influence the utilization of antenatal care services in Bangladesh.[9] Additionally, the COVID-19 pandemic has further exacerbated these challenges, leading to a reduction in essential MNCH services and an increase in maternal mortality.[9] National policies and programs in Bangladesh, such as the Health, Population and Nutrition Sector Development Program (HPNSDP), have been implemented to reduce maternal mortality. These programs focus on improving healthcare infrastructure, enhancing the quality of maternal health services, and increasing access to reproductive health services.[10] However, the outcomes of these interventions have been mixed, with persistent gaps in healthcare access and quality. Statistical analysis plays a crucial role in understanding maternal mortality. It helps in identifying trends, risk factors, and the impact of interventions, thereby guiding policy and programmatic decisions.[11] For instance, the use of regression models and demographic health surveys in Bangladesh has provided insights into the socioeconomic factors affecting maternal healthcare utilization.[9] Existing literature, particularly in the context of Bangladesh, highlights several findings. Studies have shown that factors such as healthcare expenditure per capita, government commitment to health, female literacy, and healthcare infrastructure significantly impact maternal mortality.[12] The COVID-19 pandemic has further highlighted the fragility of healthcare systems and the need for resilient and responsive health services to protect maternal health.[9] However, there remains a gap in the literature, particularly in the context of Bangladesh. While there is substantial research on the determinants of maternal mortality, there is a need for more in-depth studies that explore the interplay of these factors in the specific context of Bangladesh. Additionally, there is a lack of comprehensive data on the long-term outcomes of national policies and programs aimed at reducing maternal mortality.[13] This gap underscores the need for continued research and data collection to inform effective strategies and interventions.

METHODS

This retrospective observational study was conducted at Dhaka Medical College Hospital, a major tertiary care center in Bangladesh, from July 2009 to June 2010. The study focused on the obstetric units of the hospital, examining all recorded maternal deaths during this period. From the initial 10,592 birth records reviewed, 189 cases of maternal mortality were identified and analyzed. Data collection involved reviewing hospital records, including patient files and death registries, to gather information on demographic details, medical history, pregnancy and delivery specifics, causes of death, and complications. The study aimed to identify patterns and trends in maternal mortality, with an emphasis on demographic characteristics, causes of death, and underlying health conditions. Statistical analysis was primarily descriptive, focusing on identifying commonalities and potential risk factors among the maternal mortality cases.

RESULTS

Among the study population, 10,403 women, accounting for 98.22% of the total, survived childbirth. In contrast, there were 189 cases of maternal deaths, representing 1.78% of the participants. 48 women (25.40%) were aged 16-20 years, the largest group of 69 women (36.51%) fell within the 21-25 age range, 30 women (15.87%) were in the 26-30 age group, another 30 women (15.87%) were aged 31-35 years, 9 women (4.76%) were in the 36-40 age bracket, and the smallest group comprised 3 women (1.59%) aged 41-45 years.

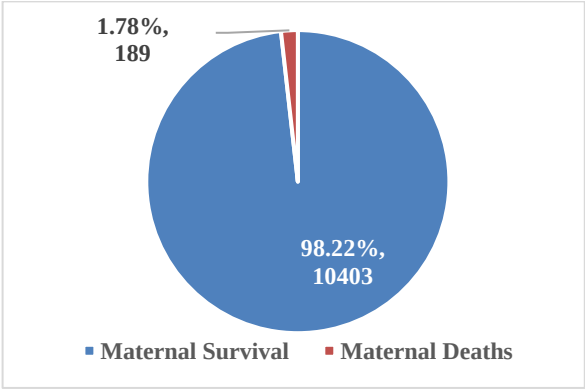

Figure 1: Incidence of maternal mortality among the participants (n=10592).

Regarding socioeconomic status, a significant majority of the participants, 153 women (80.95%), were from low socioeconomic backgrounds. The middle socioeconomic group included 36 women (19.05%), while there were no participants from high socioeconomic backgrounds. The distribution of participants by parity showed that 57 women (30.16%) had no previous births. The largest proportion, 75 women (39.68%), had a parity of 1-2 children.

Table 1: Distribution of participants by age group (n=189).

Age group (years)	N	%
16-20	48	25.40
21-25	69	36.51
26-30	30	15.87
31-35	30	15.87
36-40	9	4.76
41-45	3	1.59

Table 2: Distribution of socioeconomic status among the participants (n=189).

Socio-economic status	N	%
Low	153	80.95
Middle	36	19.05
High	0	0.00

Table 3: Distribution of parity among the participants (n=189).

Parity	N	%
0	57	30.16
1-2	75	39.68
3-4	30	15.87
>4	27	14.29

Those with a parity of 3-4 children accounted for 30 women (15.87%), and 27 women (14.29%) had more than four children. A substantial portion of the participants, 143 women (75.66%), did not receive any antenatal care. Meanwhile, 63 women (33.33%) had irregular antenatal care. Only a small fraction, 3 women (1.59%), reported having regular antenatal care.

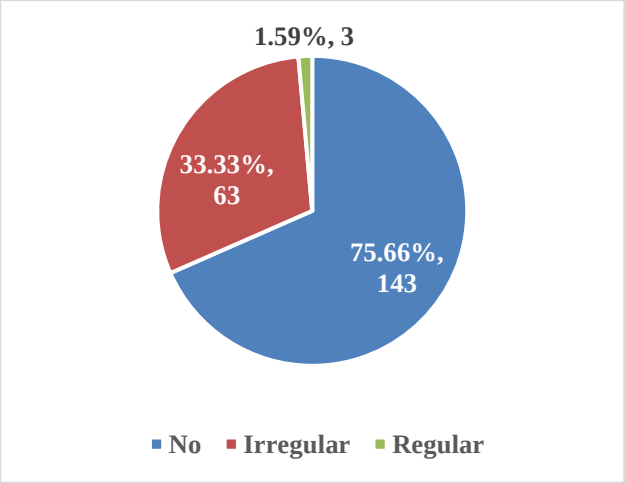

Figure 2: Distribution of antenatal care practice among the participants (n=189).

In the analysis of the causes of maternal deaths among the 189 participants, the distribution was categorized into direct and indirect causes. Among the direct causes, eclampsia was the most common, accounting for 60 cases (31.75%). Obstetric haemorrhage followed closely with 57 cases (30.16%). Other direct causes included ruptured uterus in 33 cases (17.46%), unsafe abortion in 39 cases (20.63%), obstructed labor in 18 cases (9.52%), postpartum haemorrhage in 15 cases (7.94%), antepartum haemorrhage in 9 cases (4.76%), and puerperal sepsis in 6 cases (3.17%).

Table 4: Distribution of cause of primary among the participants (n=189).

Variables	N	%
Direct cause		
Eclampsia	60	31.75
Obstetric haemorrhage	57	30.16
Antepartum haemorrhage	9	4.76
Postpartum haemorrhage	15	7.94
Ruptured uterus	33	17.46
Unsafe abortion	39	20.63
Obstructed labour	18	9.52
Puerperal sepsis	6	3.17
Indirect cause		
Pregnancy with anemic heart failure	3	1.59
Pregnancy with anesthetic hazard	3	1.59
Pregnancy with renal failure	3	1.59

DISCUSSION

In the current study conducted at Dhaka Medical College Hospital, the incidence of maternal mortality was found to be 1.78% among 10,592 participants. This rate is notably higher than the global average reported by the World Health Organization, which estimated 211 maternal deaths per 100,000 live births in 2017.[14] The higher incidence in this study could be attributed to the hospital being a tertiary care center, potentially receiving more high-risk cases. The age distribution of maternal mortality in this study reveals a significant concentration in younger age groups, with 25.40% in the 16-20 age group and 36.51% in the 21-25 age group. This finding is consistent with global trends, where younger maternal age is associated with higher risks, as reported in studies from various regions.[15] However, the proportion in the youngest age group is notably higher in this study, which may reflect sociocultural factors such as early marriage and childbearing prevalent in Bangladesh.[16] Socioeconomic status played a crucial role in maternal mortality, with 80.95% of deaths occurring among women from low socioeconomic backgrounds. This aligns with global evidence indicating that lower socioeconomic status is a significant risk factor for maternal mortality due to factors like limited access to quality healthcare and poor nutritional status.[17] The stark disparity in maternal health outcomes based on socioeconomic status underscores the need for targeted interventions to improve access and

quality of care for underprivileged groups. Regarding parity, the highest proportion of maternal deaths was observed in women who had 1-2 children (39.68%), followed by those with no previous births (30.16%). This distribution differs slightly from global patterns, where higher parity is generally associated with increased risks of maternal mortality.[18] The relatively high mortality rate among women with lower parity in this study could indicate issues related to the quality of obstetric care or access to family planning services. The practice of antenatal care was notably deficient, with 75.66% of participants not receiving any antenatal care. This is significantly higher than the global average, where approximately 86% of pregnant women access antenatal care at least once.[19] The lack of antenatal care is a critical concern, as it is a key factor in preventing maternal deaths by identifying and managing risks early. The leading direct causes of maternal mortality in this study were eclampsia (31.75%) and obstetric haemorrhage (30.16%), aligning with global trends where these conditions are among the top causes of maternal deaths.[2] However, the proportion of deaths due to eclampsia is notably higher in this study, which may reflect regional differences in prevalence or challenges in managing this condition. Unsafe abortion, another significant cause of death in this study (20.63%), highlights the need for safe abortion services and comprehensive reproductive health education, as unsafe abortion is a preventable cause of maternal mortality.[20] In conclusion, this study's findings on maternal mortality at Dhaka Medical College Hospital indicate higher risks among younger women, those from low socioeconomic backgrounds, and those with lower parity. The high incidence of eclampsia and the lack of antenatal care are particularly concerning. These findings suggest the need for targeted interventions to improve maternal health outcomes, especially for vulnerable populations.

Limitations

Limitation was the study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

In conclusion, this retrospective study at Dhaka Medical College Hospital provides critical insights into the patterns and determinants of maternal mortality in a tertiary care setting in Bangladesh. The findings reveal a maternal mortality rate of 1.78%, with a significant concentration among younger women, particularly in the 16-25 age group, and predominantly among those from low socioeconomic backgrounds. The high incidence of maternal deaths associated with conditions like eclampsia and obstetric haemorrhage, coupled with the notable lack of adequate antenatal care, underscores the urgent need for targeted healthcare interventions. These interventions should focus on improving access to and quality of antenatal care, enhancing emergency obstetric services, and addressing socioeconomic barriers to healthcare. Furthermore, the study highlights the critical role of comprehensive reproductive health education and the provision of safe abortion services in reducing preventable maternal deaths. By addressing these key areas, significant strides can be made towards improving maternal health outcomes and reducing maternal mortality in Bangladesh.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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