A Retrospective Study on Maternal Mortality in Rangpur Medical College Hospital

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Abstract

Background:
Bangladesh's maternal mortality ratio (MMR: 156/100,000 live births, 2022), despite global declines, faces challenges from socioeconomic disparities, healthcare access gaps, and COVID-19. Despite national programs, achieving SDG-3 (MMR <70 by 2030) requires strengthened ANC, emergency obstetric services, and addressing systemic inequities.

Objective:
The study aimed to summarize the frequencies of sociodemographic characteristics, parity distribution, antenatal care patterns, and causes of death among maternal mortality.

Methods:
This retrospective study analysed maternal mortality at Rangpur Medical College Hospital, Bangladesh, in 2024, reviewing 4,741 birth records with 83 maternal deaths.

Results:
Among 83 maternal death, majority of deaths occurred among women aged 16–25 (41%) and those from low socioeconomic backgrounds (72.2%). Parity distribution showed 49.39% had 1–2 children, while 73.4% received no antenatal care (ANC), highlighting gaps in healthcare access. Eclampsia (37.35%) and obstetric hemorrhage (26.50%) were the predominant cause of death.

Conclusion:
The findings underscore persistent challenges in achieving Bangladesh's SDG-3 target, particularly among socioeconomically disadvantaged and younger populations. Urgent priorities: strengthen ANC, emergency obstetric care, and address systemic inequities to improve healthcare infrastructure and reduce maternal mortality.

Keyword: Maternal Mortality, Rangpur Medical College

Introduction:

Maternal mortality is defined as the death of a woman during pregnancy or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.[1] Globally, the maternal mortality ratio (MMR) has declined by 34% from 339 deaths per 100,000 live births in 2000 to 223 deaths per 100,000 live births in 2020, according to UN inter-agency estimates.[2] In Bangladesh, the health system lacked a comprehensive maternal death review system until 2010, and proper registration and notification of deaths were also inadequate. To address these gaps, Bangladesh adopted the Maternal and Perinatal Death Review (MPDR) approach from the WHO's "Beyond the Numbers" initiative. According to the Bangladesh Sample Vital Statistics 2022, the MMR in Bangladesh was estimated to be 156 per 100,000 live births.[3]

The Sustainable Development Goal-3 (SDG-3) has set ambitious targets, requiring Bangladesh to reduce the MMR to less than 70 per 100,000 live births by 2030. In Bangladesh, the journey of a woman through pregnancy and childbirth is often fraught with challenges. When a mother dies during childbirth, she is unable to witness the beauty of the world or share her own story. However, her tragic experience leaves critical information that could save countless lives. Understanding where, when, how, and why a

mother or newborn died can unlock the key to preventing future deaths. By utilizing such vital information, targeted interventions can be designed and implemented to alleviate the burden of maternal mortality.[3]

In Bangladesh, the MMR has fluctuated over time. Although progress has been made, significant challenges remain in reducing maternal deaths to achieve the SDGs.[4] This highlights the importance of studying maternal mortality in Bangladesh, particularly to understand its root causes and develop effective interventions.Globally, maternal mortality is influenced by factors such as limited access to quality healthcare, socioeconomic disparities, and medical complications during pregnancy and childbirth.[5] In Bangladesh, these challenges are further intensified by issues like high adolescent pregnancy rates and low utilization of maternal, newborn, and child health (MNCH) services. Socioeconomic factors, including woman's education, income level, and media exposure, play a crucial role in determining access to antenatal care services.[6] The COVID-19 pandemic has further worsened this situation by disrupting essential MNCH services and contributing to an increase in maternal mortality. To address these challenges, Bangladesh has implemented national programs like the Health, Population, and Nutrition Sector Development Program (HPNSDP). These initiatives aim to improve healthcare infrastructure, enhance maternal health services, and expand access to reproductive healthcare.[7] However, the effectiveness of these programs has been mixed, with persistent gaps in healthcare accessibility and quality. Statistical analysis is essential in understanding maternal mortality trends, identifying risk factors, and assessing the impact of interventions. Research methods such as regression models and demographic health surveys in Bangladesh have provided valuable insights into the socioeconomic determinants affecting maternal healthcare utilization. Studies indicate that factors such as healthcare expenditure per capita, government commitment to health, female literacy, and healthcare infrastructure significantly impact maternal mortality rates.[8] The COVID-19 pandemic has further exposed vulnerabilities in the healthcare system, reinforcing the need for stronger, more resilient maternal health services. However, gaps still exist in the literature, particularly regarding the long-term effectiveness of national policies and programs aimed at reducing maternal mortality. While much research has been conducted on the broader determinants of maternal mortality, more in-depth studies are needed to examine how these factors interact in the specific context of Bangladesh. Additionally, comprehensive data on the long-term impact of maternal health interventions remains scarce. Addressing these gaps through continued research and data collection is essential for developing more effective strategies to reduce maternal mortality and improve maternal healthcare in Bangladesh. Our study aimed to analyze maternal deaths at Rangpur Medical College Hospital in Bangladesh

Methods:

This descriptive retrospective study was conducted at the Department of Gynaecology and Obstetrics, Rangpur Medical College, Rangpur, Bangladesh between January 2024 to December 2024 reviewing medical records after approval from Ethical Committee of the Institution. Of 4,741 birth records, 83 cases of maternal mortality was found. Data of sociodemographic characteristics, parity distribution, antenatal care patterns, and causes of death were collected from patient files and death registries, analyzed by using simple statistics (frequency and percentage) and presented by visual tools.

Results:

The study found that, out of 4,741 participants 98.24% women survived and gave childbirth, while 1.75% (83) experienced maternal deaths. The largest group of 26 women (31.32%) fell within the 21-25 age range followed by 18 women (21.68%) were in the 26-30 age group, another 17 women (20.48%) were aged 31-35 years, 15 women (18.06%) were aged 16-20 years, 6 women (7.22%) were in the 36-40 age bracket, and the smallest group comprised 1 woman (1.20%) aged 41-45 years. It was notable that majority of the death occurred in younger age between 16-25 years (41%). Regarding socioeconomic status, a significant majority of the participants, 60 women (72.2%), were from low socioeconomic backgrounds. The middle socioeconomic group included 21 women (25.30%), while there were 2 participants (2.40%) from high socioeconomic backgrounds (Table-I).

Table-I: Distribution of cases by age and socio-economic status (n=83)

| Socio-demographic characteristics	no. (%)
Age group (years)	
16-20	15 (18.06)
21-25	26 (31.32)
26-30	18 (21.68)
31-35	17 (20.48)
36-40	06 (7.22)
41-45	01 (1.20)
Socio-economic status	
Low	60 (72.2)
Middle	21 (25.30)
High	02 (2.40)

The distribution of participants by parity showed that 21 women (25.30%) had no previous births. The largest proportion, 41 women (49.39%), had a parity of 1-2 children. Those with a parity of 3-4 children accounted for 18 women (21.68%), and 3 women (3.61%) had more than four children (Figure-1).
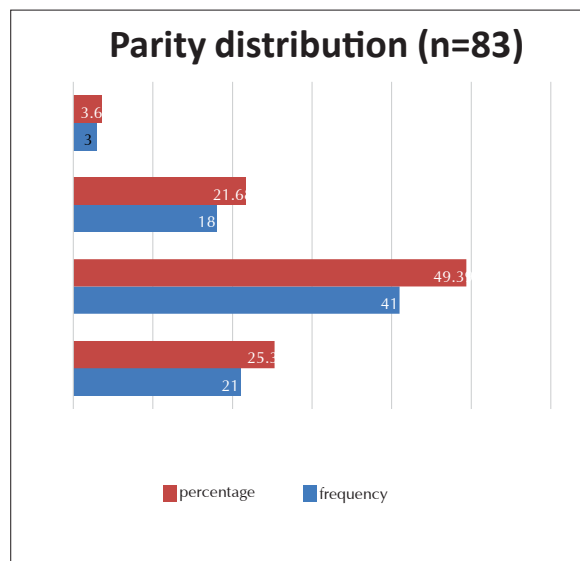
Figure-1: Distribution of participants by parity (n=83)

A substantial portion of the participants, 61 women (73.4%), did not receive any antenatal care. Meanwhile, 19 women (22.89%) had irregular antenatal care. Only a small fraction, 3 women (3.61%), reported having regular antenatal care (Figure-2).
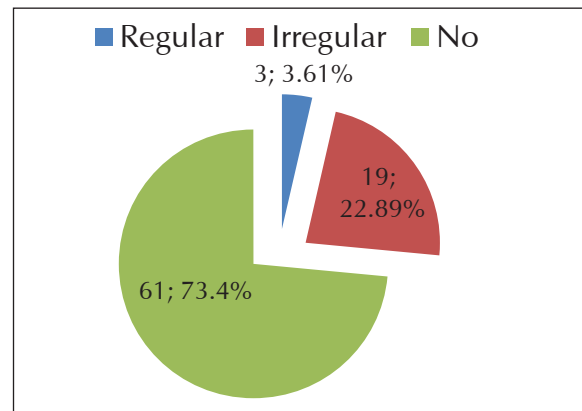
Figure-2: Patients taking Antenatal Care (N=83)

In the analysis of the causes of maternal deaths among the 83 participants, the distribution was categorized into direct and indirect causes. Among the direct causes, eclampsia was the most common, accounting for 31 cases (37.35%). Obstetric haemorrhage followed closely with 22 cases (26.50%), ruptured uterus in 07 cases (8.43%), abortion related death in 06 cases (7.22%), obstructed labor in 1 case (1.20%), other direct cause included rupture ectopic, molar pregnancy, haemoperitoneum following LUCS contributed 11 cases accounting for 13.25% (Figure-3).
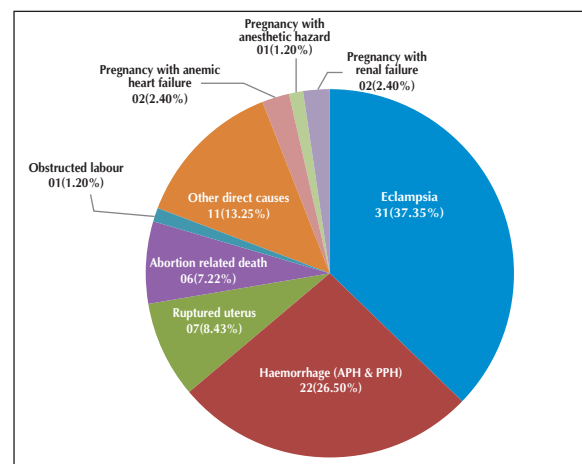
Figure-3: Causes of maternal death (n=83)

Discussion:
This study found that the maternal mortality rate among 4,741 participants was 1.75%, which is significantly higher than the global average, reported by the World Health Organization (WHO) in 2022 (223 maternal deaths per 100,000 live births).[9] This elevated rate may be attributed to the hospital's role as a tertiary care center, which

likely receives a larger proportion of high-risk cases.The study found that the majority of maternal mortality occurs among younger mothers, with 31.32% of deaths occurring in the 21-25 age group and 18.06% in the 16-20 age group, resulting in 41% of maternal deaths in the age group of 16-25 years.This aligns with global patterns that associate younger maternal age with increased risks.[10] However, the proportion of maternal deaths among the younger age group in this study appears notably higher than international trends, possibly due to sociocultural factors like early marriage, childbearing and lack of antenatal care which are still prevalent in Bangladesh.

It is well known that low-income individuals are at greater risk for maternal death than is the higher-income segment of the population.[11-13] Income is a key risk factor for maternal death, as it is highly associated with three delays (decision to seek care, access to care, and timeliness and quality of care).[14] Hossain AT et al also noted that poorer women had higher maternal mortality than wealthier ones.[15] WHO has reported similar findings in its factsheet on maternal mortality.[16] In our study, socioeconomic factors played a crucial role in maternal mortality, as 72.20% of deaths were recorded among women from lower-income backgrounds. This reflects global findings, which indicate that women with lower socioeconomic status face a higher risk of maternal death due to inadequate access to quality healthcare and poor nutrition. Such disparities highlight the urgent need for targeted measures to improve healthcare accessibility and quality for underprivileged groups.

Regarding parity, the highest maternal mortality was recorded among women with 1-2 children (49.39%), followed by those experiencing their first pregnancy (25.30%). This trend differs slightly from global patterns, where a higher number of childbirths is usually associated with increased maternal mortality. The relatively high mortality rate among women with lower parity in this study could point to deficiencies in obstetric care quality or limited access to family planning services. Findings from studies that have investigated historical cohorts as well as contemporary populations have been inconsistent. While most of these studies showed a positive association between parity and mortality,[17,18] others found the opposite association.[19,20]

Antenatal care was also found to be significantly lacking, with 73.40% of the participants not receiving any prenatal checkups. This is much higher than the global average, where about 86% of pregnant women receive at least one antenatal visit.[9] The absence of prenatal care is a major concern, as early detection and management of potential complications are essential in reducing maternal deaths.

The leading direct causes of maternal mortality in this study were eclampsia (37.35%) and hemorrhage (26.50%). Eclampsia remains one of major cause of maternal mortality throughout the world, accounting for about 50000 deaths globally[21] and 1600 deaths (23%) in Bangladesh reported in the study conducted by Hossain AT et al.[15] Low middle income countries (LMICs) often confront this health hazard because of illiteracy, lack of health awareness and education, poverty, and superstitious beliefs that prohibit women from seeking appropriate medical advice during pregnancy.[22]

Approximately 35% of maternal deaths in LMICs are due to haemorrhage, with some variations across countries[23] and 31% in Bangladesh observed by Hossain AT et al.[15] Postpartum haemorrhage (PPH), which refers to the loss of 500 ml or more of blood, is responsible for most of the haemmorhage-related maternal deaths.[24] This high rate of obstetric haemorrhagic deaths may be explained by the lack of appropriate birth preparedness and complication readiness, quality ANC to identify high-risk pregnancies, and facility readiness to manage haemorrhage-related complications.[25,26]

However, the proportion of deaths due to eclampsia was notably higher in this study, potentially due to regional variations in prevalence or challenges in managing this condition. Additionally, abortion-related death accounted for 7.22% of maternal deaths, emphasizing the urgent need for safe abortion services and improved reproductive health education to prevent avoidable maternal deaths. Hossain AT et al also found abortion as 5% cause of maternal mortality.[15]

In conclusion, the findings from this study highlight significant maternal health risks, particularly for younger mothers, women from lower

socioeconomic backgrounds, and those with lower parity. The high prevalence of eclampsia and the widespread lack of antenatal care are critical issues that require immediate attention. Addressing these concerns through targeted healthcare interventions and policy improvements is essential to improving maternal health outcomes, particularly for vulnerable populations.

Limitations:

The study was conducted in a single hospital with a relatively small sample size, which may limit the generalizability of the findings to the broader community.

Conclusion:

This retrospective study at Rangpur Medical College Hospital offers valuable insights into maternal mortality patterns and contributing factors in a tertiary care setting in Bangladesh. The results indicate a maternal mortality rate of 1.75%, with a notable concentration among younger women, particularly those aged 16-25, and a higher prevalence among individuals from low socioeconomic backgrounds. The significant number of maternal deaths caused by eclampsia and hemorrhage, along with the widespread lack of antenatal care, highlights the urgent need for targeted healthcare interventions. Efforts should prioritize expanding access to quality antenatal care, strengthening emergency obstetric services, and addressing financial and social barriers to healthcare. Additionally, the study emphasizes the importance of comprehensive reproductive health education and ensuring safe abortion services to prevent avoidable maternal deaths. Addressing these critical issues can lead to meaningful improvements in maternal health and a reduction in maternal mortality rate in Bangladesh.

Conflict of interest: None declared

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