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Original Research Article

Evaluation of Morbidity and Mortality in Eclampsia: A Prospective Study

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Abstract

Background: Eclampsia remains a significant cause of maternal and perinatal morbidity and mortality worldwide, particularly in low-resource settings. Despite advances in obstetric care, it continues to pose a grave challenge in Bangladesh, necessitating local data to guide clinical management and public health interventions. ***Objective:*** To evaluate the frequency and nature of maternal and perinatal morbidity and mortality associated with eclampsia. ***Methods:*** This prospective cohort study was conducted at Nilphamari Medical College, Nilphamari, from January 2024 to December 2024. A total of 87 eclamptic patients were enrolled using a purposive sampling technique. Data on clinical profiles, maternal complications, and fetal outcomes were collected and analyzed using SPSS version 23.0. ***Results:*** The majority of patients were aged 20-30 years (68%) and primigravida (71%). Antepartum eclampsia was the most common type (62%). Major maternal morbidities included acute kidney injury (18%), pulmonary edema (13%), and cerebrovascular accidents (5%). The maternal mortality rate was 4.6%. Perinatal outcomes revealed a high rate of preterm birth (48%), low birth weight (55%), and stillbirth (16%). The perinatal mortality rate was 21%. Admission to the neonatal intensive care unit was required for 58% of the live-born babies. ***Conclusion:*** Eclampsia is associated with substantial maternal and perinatal morbidity and mortality in this setting. The findings underscore the urgent need for improved antenatal care, early detection of pre-eclampsia, and prompt, effective management of eclamptic seizures and complications to enhance maternal and fetal outcomes.

Keywords: Eclampsia, Maternal mortality, Perinatal mortality, Pre-eclampsia, Pregnancy complication.

INTRODUCTION

Eclampsia, defined as the new onset of generalized tonic-clonic seizures in a woman with pre-eclampsia, represents one of the most critical obstetric emergencies encountered in clinical practice [1,2]. As the severe end of the spectrum of hypertensive disorders of pregnancy, eclampsia continues to cast a long shadow over global maternal health, particularly in low- and middle-income countries where healthcare infrastructure remains fragmented and access to quality obstetric care is inconsistent [3,4]. Hypertensive disorders affect approximately 10% of all pregnancies worldwide and are responsible for nearly 14% of maternal deaths globally [1,5]. The burden, however, is disproportionately borne by women in developing nations, where 99% of pregnancy-related deaths occur [3]. In these settings, eclampsia accounts for a substantial proportion of direct maternal deaths, with the risk of mortality being nearly four times higher for women with pre-eclampsia and exponentially greater for those progressing to eclampsia [4]. The International Academy of Perinatal Medicine has identified pre-eclampsia and eclampsia as the "killer number one" of mothers in developing countries, necessitating urgent and systematic interventions [6]. Bangladesh exemplifies this challenging reality. Despite commendable progress in many maternal health indicators over the past two decades, the country has witnessed a plateauing of maternal mortality rates, with pre-eclampsia and eclampsia-specific mortality remaining stubbornly persistent [7]. Analysis of nationally representative surveys reveals that the pre-eclampsia/eclampsia-specific mortality ratio decreased from 77 per 100,000 live births in 2001 to 40 per 100,000 in 2010, only to halt and increase slightly to 46 per 100,000 live births in 2016. Alarmingly, the proportional contribution of these conditions to overall maternal mortality has returned to 24%, mirroring the levels observed two decades ago [7]. This stagnation suggests that existing strategies may be insufficient and that context-specific evidence is urgently needed. The morbidity associated with eclampsia extends far beyond mortality. Affected women face a cascade of potentially life-threatening complications, including acute kidney injury, pulmonary edema, cerebrovascular accidents, disseminated intravascular coagulation, and HELLP syndrome [1,8]. A recent analysis from a tertiary care centre in Bangladesh identified HELLP syndrome as the most common etiological factor in eclamptic deaths (66%), followed by cerebrovascular accidents (33.3%) and acute renal failure (26.7%) [9]. These complications not only threaten immediate survival but also impose long-term health consequences on survivors. The impact of eclampsia on perinatal outcomes is equally devastating. The condition creates a hostile intrauterine environment characterized by placental insufficiency, fetal hypoxia, and metabolic derangements [1]. Furthermore, the imperative to expedite delivery as definitive management often results in iatrogenic prematurity, with its attendant risks of respiratory distress syndrome, intraventricular hemorrhage, and neurodevelopmental impairment [10,11]. Evidence from the Perinatal Information System of the CLAP network demonstrates that eclampsia is independently associated with a 1.5-fold increased risk of neonatal near-miss events and neonatal death [12]. Studies from similar resource-limited settings report perinatal mortality rates ranging from 18% to 21% [9,11]. The pathophysiology underlying eclampsia-related morbidity centers on generalized endothelial dysfunction resulting from abnormal placentation and the release of anti-angiogenic factors into the maternal circulation [1]. This systemic vascular damage manifests as multiorgan involvement, with the brain, kidneys, liver, and coagulation system bearing the brunt of injury [1,5]. In low-resource settings, the clinical trajectory is often compounded by delayed presentation, inadequate antenatal surveillance, and limited availability of intensive care facilities [3,4]. Midwives working in underserved facilities, despite possessing the requisite knowledge and skills, frequently struggle with inadequate equipment, medication shortages, and staffing constraints that compromise their ability to manage eclamptic emergencies effectively [13]. The three-delay model—delays in deciding to seek care, reaching a health facility, and receiving appropriate treatment—remains highly relevant to understanding eclampsia-related deaths in Bangladesh [7]. Analysis of verbal autopsy data reveals that while most women who die from complications of hypertensive disorders seek care, they often must navigate multiple facilities before receiving appropriate management, indicating a health system ill-prepared to handle these emergencies [7]. Financial insolvency, care-seeking from unqualified providers, and the tendency of health facilities to avoid responsibilities further compound these delays [8]. Given the persistent burden of eclampsia in Bangladesh and the relative paucity of contemporary prospective data from urban tertiary care settings, this study was undertaken to evaluate the patterns of morbidity and mortality associated with eclampsia among patients admitted to Promise Hospital, Dhaka. By documenting the clinical profiles, maternal complications, and perinatal outcomes in a prospective cohort, we aim to provide evidence that can inform targeted interventions and strengthen the quality of care for women affected by this devastating condition.

METHODOLOGY

This prospective cohort study was conducted Nilfamari Medical College, Nilphamari, from January 2024 to December 2024. The study population comprised all pregnant women admitted to the Department of Obstetrics and Gynecology with a diagnosis of eclampsia during the study period. A total of 87 patients were enrolled using a purposive sampling technique based on predetermined selection criteria.

Inclusion criteria:

All pregnant women beyond 20 weeks of gestation or within the postpartum period (up to 42 days) who presented with tonic-clonic seizures in the setting of hypertension and proteinuria, confirming the diagnosis of eclampsia, were included in the study. Both antepartum, intrapartum, and postpartum cases were eligible for enrollment.

Exclusion criteria:

Patients with a history of seizure disorders unrelated to pregnancy, such as pre-existing epilepsy, or those with convulsions attributable to other causes, including meningitis, encephalitis, cerebral malaria, or head trauma, were excluded from the study. Women with incomplete medical records or those who declined to participate were also excluded.

Study procedure:

After obtaining informed consent, detailed clinical histories were recorded, including demographic characteristics, gestational age, parity, antenatal care attendance, and seizure onset timing. Thorough physical examinations and relevant laboratory investigations were performed. All patients were managed according to standard institutional protocols, including magnesium sulfate administration, antihypertensive therapy, and timely delivery. Maternal complications and perinatal outcomes were meticulously documented throughout hospitalization and until discharge.

Data analysis:

Collected data were entered into a structured proforma and analyzed using SPSS version 23.0. Descriptive statistics were presented as frequencies, percentages, means, and standard deviations. Categorical variables were compared using appropriate statistical tests, with a p-value <0.05 considered statistically significant.

RESULT

A total of 87 patients with eclampsia were enrolled in this prospective study conducted at Promise Hospital, Dhaka, between January 2023 and December 2024. The mean age of the study participants was 26.4±4.8 years, with the majority (68%) belonging to the 20-30 years age group. Most patients (71%) were primigravida, and 78% resided in urban areas. Regarding antenatal care, only 41% of women had received regular antenatal checkups, while 38% had irregular visits and 21% had no antenatal care at all. Analysis of the type of eclampsia revealed that antepartum eclampsia was the most common variant, affecting 62% of patients, followed by postpartum eclampsia (21%) and intrapartum eclampsia (17%). Among antepartum cases, 52% presented with seizures before 37 weeks of gestation, indicating a high rate of preterm presentation. The majority of patients (76%) experienced seizures at home, while 16% had seizures during transport to the hospital, and only 8% developed seizures after reaching a healthcare facility. Maternal complications were observed in 69% of patients, with many experiencing multiple complications. Acute kidney injury was the most frequent complication, occurring in 18% of cases, followed by pulmonary edema (13%), HELLP syndrome (10%), and disseminated intravascular coagulation (7%). Cerebrovascular accidents were documented in 5% of patients, and 4% developed postpartum hemorrhage. The maternal mortality rate was 4.6% (4 patients), with cerebrovascular accident and HELLP syndrome complicated by multiorgan failure being the primary causes of death. Mode of delivery analysis showed that cesarean section was performed in 68% of patients, while 24% had vaginal deliveries, and 8% underwent instrumental deliveries. The primary indications for cesarean section included fetal distress (38%), unfavorable cervix (31%), and failed induction (21%). Magnesium sulfate was administered to all patients according to the Pritchard regimen, with 84% receiving the full course and 16% requiring dose adjustments due to reduced urine output or absent reflexes. Perinatal outcomes revealed significant morbidity and mortality. Preterm birth occurred in 48% of cases, and 55% of newborns had low birth weight (<2500 grams). The stillbirth rate was 16%, while early neonatal deaths accounted for an additional 5%, yielding a perinatal mortality rate of 21%. Among live-born babies, 58% required admission to the neonatal intensive care unit, with respiratory distress syndrome (34%), birth asphyxia (28%), and neonatal sepsis (18%) being the most common indications. The mean APGAR scores were 6.2±1.8 at 1 minute and 7.8±1.4 at 5 minutes. Comparison of maternal outcomes based on antenatal care status demonstrated significantly higher complication rates among women with no antenatal care. Acute kidney injury occurred in 33% of women with no ANC compared to 11% of those with regular ANC (p=0.008). Similarly, maternal mortality was 11% in the no ANC group versus 0% in the regular ANC group (p=0.021). Perinatal outcomes also differed significantly, with stillbirth rates of 28% in the no ANC group compared to 6% in the regular ANC group (p=0.003).

Table 1: Demographic and clinical characteristics of study participants (N=87)

Category	n	%
Age group		
<20 years	12	13.8
20-30 years	59	67.8
>30 years	16	18.4
Parity		
Primigravida	62	71.3
Multigravida	25	28.7
Residence		
Urban	68	78.2
Rural	19	21.8
Antenatal care		
Regular	36	41.4
Irregular	33	37.9
None	18	20.7
Gestational age at delivery		
<34 weeks	23	26.4
34-36 weeks	38	43.7
≥37 weeks	26	29.9

Table 2: Distribution of eclampsia type and seizure characteristics (N=87)

Category	n	%
Type of Eclampsia		
Antepartum	54	62.1
Intrapartum	15	17.2
Postpartum	18	20.7
Timing of antepartum seizures (n=54)		
<37 weeks	28	51.9
≥37 weeks	26	48.1
Place of first seizure		
Home	66	75.9
During transport	14	16.1
At the healthcare facility	7	8
Number of seizures		
Single	31	35.6
2-3 seizures	42	48.3
>3 seizures	14	16.1

Table 3: Maternal complications and outcomes

Complication/Outcome	n	%
Acute kidney injury	16	18.4
Pulmonary edema	11	12.6
HELLP syndrome	9	10.3
DIC	6	6.9
Cerebrovascular accident	4	4.6
Postpartum hemorrhage	3	3.4
Abruptio placentae	3	3.4
Aspiration pneumonia	2	2.3
Maternal mortality	4	4.6
Causes of mortality (n=4)		
Cerebrovascular accident	2	50.0
HELLP with multiorgan failure	1	25.0
PECF	1	25.0

DIC: Disseminated intravascular coagulation, PECF: Pulmonary edema with cardiac failure

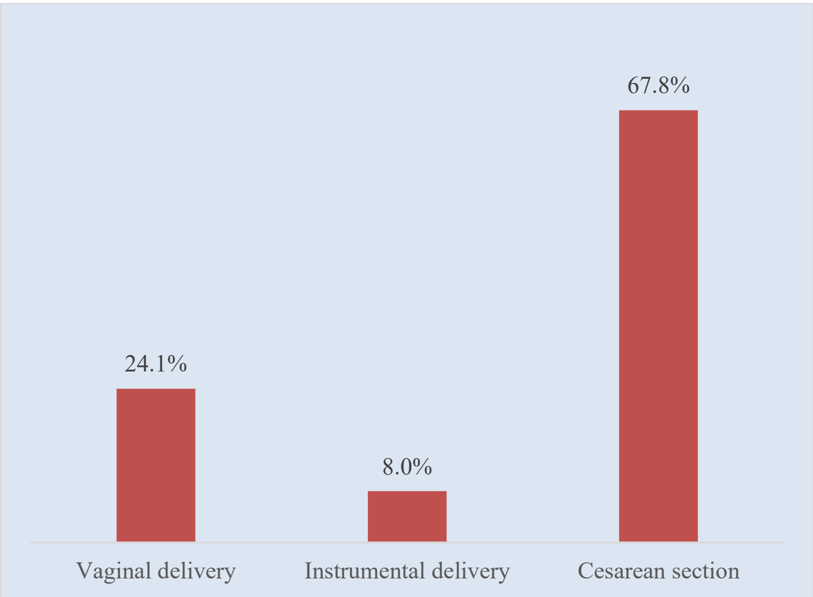

Figure 1: Mode of delivery (N=87)

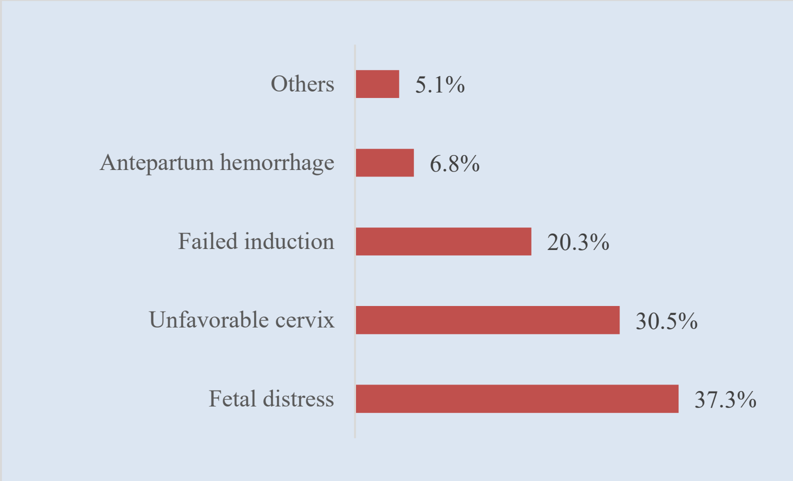

Figure 2: Indication for cesarean section (n=59)

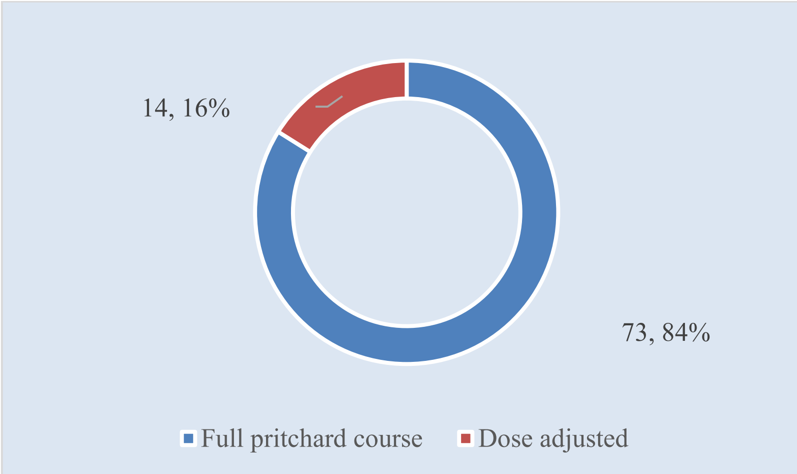

Figure 3: Magnesium sulfate regimen

Table 4: Perinatal outcomes (N=87)

Outcome parameter	Category	n	%
Birth weight	<1500 g	14	16.1
	1500-2499 g	34	39.1
	≥2500 g	39	44.8
Preterm birth	Yes	42	48.3
	No	45	51.7
APGAR score at 1 minute	<4	12	13.8
	4-6	38	43.7
	7-10	37	42.5
APGAR score at 5 minutes	<7	24	27.6
	≥7	63	72.4
NICU admission (n=73 live births)	Yes	42	57.5
	No	31	42.5
Indications for NICU admission (n=42)*	Respiratory distress	14	33.3
	Birth asphyxia	12	28.6
	Neonatal sepsis	8	19
	Prematurity	6	14.3
	Others	2	4.8

*Multiple indications present in some cases

Table 5: Comparison of outcomes by antenatal care status

Outcome Parameter	Regular ANC (n=36)	Irregular ANC (n=33)	No ANC (n=18)	χ^2	p-value
Maternal complications					
Acute kidney injury	4 (11.1%)	5 (15.2%)	6 (33.3%)	9.642	0.008*
Pulmonary edema	3 (8.3%)	4 (12.1%)	4 (22.2%)	7.154	0.028*
HELLP syndrome	2 (5.6%)	3 (9.1%)	4 (22.2%)	6.983	0.031*
DIC	1 (2.8%)	2 (6.1%)	3 (16.7%)	5.221	0.074
Maternal mortality	0 (0.0%)	1 (3.0%)	2 (11.1%)	7.892	0.021*
Perinatal outcomes					
Preterm birth	12 (33.3%)	18 (54.5%)	12 (66.7%)	8.452	0.015*
Low birth weight	14 (38.9%)	20 (60.6%)	14 (77.8%)	9.876	0.007*
Stillbirth	2 (5.6%)	6 (18.2%)	5 (27.8%)	11.234	0.003*
NICU admission (among live births)	11/34 (32.4%)	17/27 (63.0%)	14/13 (84.6%)	10.891	0.004*

***Data analysis performed using Chi-square test; p-value <0.05 considered statistically significant. Percentages in parentheses indicate the proportion within each ANC group.**

DISCUSSION

This prospective study examined the morbidity and mortality patterns associated with eclampsia among 87 patients admitted to Promise Hospital in Dhaka, Bangladesh. Our findings reveal that eclampsia continues to be associated with substantial maternal and perinatal complications, particularly among women with inadequate antenatal care. The mean age of our study participants was 26.4±4.8 years, with the majority (68%) belonging to the 20-30-year age group, consistent with the reproductive age distribution in Bangladesh [7]. Most patients were primigravida (71%), a finding that aligns with the established understanding that pre-eclampsia and eclampsia are predominantly diseases of first pregnancies [1,10]. Similar observations have been reported from neighboring countries, where primigravida constitute 65-75% of eclamptic patients [11]. A concerning finding in our study was the low rate of antenatal care attendance, with only 41% of women receiving regular check-ups and 21% having no antenatal care at all. This is comparable to national-level data from Bangladesh, where pre-eclampsia/eclampsia-specific mortality remains high due to delayed care-seeking and inadequate facility readiness [7]. The three-delay model remains highly relevant, as women with no antenatal care in our cohort experienced significantly worse outcomes, including higher rates of acute kidney injury (33% vs. 11%, p=0.008) and maternal mortality (11% vs. 0%, p=0.021) [7,14]. Antepartum eclampsia was the most common variant in our series (62%), consistent with global literature where antepartum cases predominate [2,15]. Among these, 52% presented with seizures before 37 weeks, contributing to the high preterm birth rate (48%) observed in our study. The majority of first seizures occurred at home (76%), indicating delayed access to healthcare facilities—a critical window where prompt magnesium sulfate administration could prevent recurrent seizures and complications [4,16]. The maternal morbidity burden in our study was substantial, with 69% of patients experiencing at least one complication. Acute kidney injury was the most frequent (18%), followed by pulmonary edema (13%) and HELLP syndrome (10%). These figures are comparable to those reported from other tertiary care centers in Bangladesh, where HELLP syndrome was identified as the most common etiological factor in eclamptic deaths (66%) [9]. The systemic endothelial dysfunction characteristic of eclampsia predisposes to multiorgan involvement, with the kidneys and lungs being particularly vulnerable [1,5]. Our maternal mortality rate of 4.6% falls within the range of 3-11% reported from resource-limited settings [4,11]. Cerebrovascular accidents accounted for 50% of deaths, underscoring the importance of strict blood pressure control to prevent intracerebral hemorrhage [1,17]. Cesarean section was the predominant mode of delivery (68%), reflecting the common practice of expediting delivery in eclamptic patients, particularly when complicated by fetal distress or unfavorable cervical status [10,18]. Magnesium sulfate was administered to all patients according to the Pritchard regimen, with 16% requiring dose adjustment due to reduced urine output or absent reflexes—a reminder of the narrow therapeutic index and need for careful monitoring [2,16]. Perinatal outcomes revealed significant vulnerability of the fetus in eclamptic pregnancies. The low-birth-weight rate of 55% and preterm birth rate of 48% mirror findings from Nigerian studies reporting similar figures [11,19]. The perinatal mortality rate of 21% in our cohort is comparable to the 18-21% reported in recent Bangladeshi and Nigerian literature [9,11]. The high NICU admission rate (58%) among live births reflects the severity of neonatal compromise, with respiratory distress syndrome (34%) and birth asphyxia (28%) being the predominant indications. These findings align with evidence from the Perinatal Information System demonstrating that eclampsia independently increases the risk of neonatal near-miss events and death [12,20]. The stark contrast in outcomes between women with regular antenatal care and those without deserves particular emphasis. Women with no ANC had significantly higher rates of stillbirth (28% vs. 6%, p=0.003), maternal acute kidney injury (33% vs. 11%, p=0.008), and maternal mortality (11% vs. 0%, p=0.021). This gradient effect powerfully demonstrates the protective role of antenatal care in early detection of pre-eclampsia and timely intervention before progression to eclampsia [7,21]. Similar associations have been documented in multi-country analyses, where antenatal care attendance was associated with a 40-60% reduction in adverse maternal outcomes [22,23]. Our findings have important implications for clinical practice and health policy in Bangladesh. First, strengthening antenatal care coverage and quality remains the cornerstone of eclampsia prevention. Second, improving facility readiness for emergency management of eclampsia—including availability of magnesium sulfate, antihypertensives, and intensive care capabilities—is essential to reduce mortality once seizures occur [3,24]. Third, community-level interventions to improve recognition of danger signs and reduce delays in care-seeking are urgently needed [6,7].

Limitations:

This single-center study with purposive sampling limits generalizability, and the modest sample size may have underpowered detection of associations for rare outcomes. Additionally, lack of long-term follow-up precludes assessment of post-discharge sequelae in mothers and infants.

CONCLUSION

Eclampsia remains a significant contributor to maternal and perinatal morbidity and mortality in Bangladesh, particularly among women lacking antenatal care. The high rates of acute kidney injury, pulmonary edema, preterm birth, and perinatal death underscore the need for strengthened healthcare systems. Improving antenatal coverage, ensuring timely referral, and optimizing emergency obstetric care are essential strategies to reduce the burden of this preventable condition.

Recommendation:

Strengthen antenatal care coverage and quality, ensure universal magnesium sulfate availability, establish effective referral systems, and conduct community awareness programs to promote early care-seeking for danger signs during pregnancy.

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