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Regular Antenatal Checkup Can Reduce the Complications Related Preeclampsia and Eclampsia

Sharmin Afroz[1*], Sehereen F. Siddiqua[2], Sharmin Sultana[3], Waliza Rukshana Haque[3]

[1]Assistant Professor, Department of Obstetrics & Gynecology, Anwer Khan Modern Medical College Hospital, Dhaka, Bangladesh
[2]Head of Department, Obstetrics and Gynecology Department, Anwer Khan Modern Medical College Hospital, Dhaka, Bangladesh
[3]Register, Obstetrics and Gynecology Department, Anwer Khan Modern Medical College Hospital, Dhaka, Bangladesh

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***Corresponding author:** Sharmin Afroz
Assistant Professor, Department of Obstetrics & Gynecology, Anwer Khan Modern Medical College Hospital, Dhaka, Bangladesh

Abstract **Original Research Article**

Introduction: Hypertensive disorders of pregnancy, particularly preeclampsia and eclampsia, are major contributors to maternal and perinatal morbidity and mortality worldwide, with heightened impact in low- and middle-income countries like Bangladesh. Early detection through regular antenatal care (ANC) is crucial for preventing severe maternal and fetal complications. However, ANC utilization remains suboptimal, especially in rural areas, increasing the risk of adverse outcomes such as preterm delivery, intrauterine growth restriction, and maternal mortality. ***Objective:*** This study aims to evaluate the association between regular antenatal checkups and the occurrence of maternal and fetal complications among women with preeclampsia and eclampsia. ***Patients and Methods:*** A cross-sectional study of 145 women diagnosed with preeclampsia or eclampsia was conducted. Socio demographic data and ANC attendance history was collected. ≥4 ANC visits were considered regular. Associations between ANC patterns and maternal/fetal complications were evaluated. ***Results:*** The mean age was 26.8±5.2 years; 62.8% resided in urban areas; 70.3% were housewives; 55.2% had secondary or higher education. Regular ANC attendance was noted in 63.4% of participants. Complication rates were significantly higher among women with <4 ANC visits: preterm delivery (64.2% vs 28.3%, p<0.001), IUGR (45.3% vs 19.6%, p=0.002), ICU admission (30.2% vs 9.8%, p=0.001), HELLP syndrome (17.0% vs 4.3%, p=0.014), and perinatal death (13.2% vs 3.3%, p=0.045). ***Conclusion:*** Regular ANC attendance (≥4 visits) significantly mitigates the risks of maternal and fetal complications associated with preeclampsia and eclampsia. Strengthening community-based ANC outreach and accessibility is essential to improve outcomes in vulnerable groups.
Keywords: Antenatal Care, Preeclampsia, Eclampsia, Maternal Complications, Perinatal Outcomes, Pregnancy, Bangladesh.

INTRODUCTION

Hypertensive disorders of pregnancy, particularly preeclampsia and eclampsia, remain a leading cause of maternal and perinatal morbidity and mortality worldwide, especially in low- and middle-income countries like Bangladesh. Preeclampsia is characterized by new-onset hypertension and proteinuria after 20 weeks of gestation, while eclampsia is defined by the occurrence of seizures in a woman with preeclampsia [1, 2]. Globally, preeclampsia affects approximately 5–8% of all pregnancies and contributes significantly to adverse maternal and neonatal outcomes such as preterm delivery, intrauterine growth restriction (IUGR), HELLP syndrome, and even maternal death [3].

In South Asia, including Bangladesh, delayed recognition of hypertensive disorders during pregnancy often leads to severe complications due to limited access to quality antenatal care (ANC), poor health-seeking behavior, and inadequate health system responses [4, 5]. Regular ANC plays a critical role in the early detection and timely management of preeclampsia and eclampsia. According to the World Health Organization (WHO), a minimum of four ANC visits can help detect complications early, educate pregnant women about danger signs, and allow for prompt intervention [6].

Despite improvements in maternal health services in recent decades, the utilization of ANC in many parts of Bangladesh remains suboptimal, particularly among rural and underserved populations [7]. Several studies have demonstrated that inadequate ANC is associated with increased risks of maternal and neonatal complications related to hypertensive disorders [8, 9]. Therefore, strengthening ANC coverage and

adherence is essential for reducing the burden of complications from preeclampsia and eclampsia.

Given this context, the present study aims to assess the association between regular antenatal checkups and the incidence of maternal and fetal complications among women diagnosed with preeclampsia and eclampsia at a tertiary care hospital in Bangladesh.

PATIENTS AND METHODS

Study Design and Setting

A hospital-based cross-sectional study was conducted at Anwer Khan Modern Medical College Hospital, Dhaka, Bangladesh, over a 12-month period from January 2024 to December 2024. The study aimed to evaluate the impact of regular antenatal checkups on complications related to preeclampsia and eclampsia.

Study Population and Eligibility Criteria

The study population comprised pregnant women aged 18–40 years who were admitted to the Department of Obstetrics and Gynecology with a clinical and laboratory-confirmed diagnosis of preeclampsia or eclampsia. Inclusion criteria included willingness to participate and provision of informed written consent. Exclusion criteria were pre-existing chronic hypertension, renal disease, incomplete medical records, or refusal to participate.

Sample Size and Sampling Technique

A total of 145 participants were enrolled using purposive sampling based on predefined eligibility criteria.

Data Collection Tools and Procedures

Data were collected using a semi-structured, interviewer-administered questionnaire along with a review of hospital records. The questionnaire gathered information on socio-demographic characteristics (e.g., age, education, residence, occupation), obstetric history, frequency and timing of antenatal care (ANC) visits, and details of clinical complications associated with preeclampsia and eclampsia. Data were collected by trained research assistants and verified against patient medical records for accuracy and completeness.

Operational Definitions

- **Regular ANC** was defined as attending at least four antenatal visits during pregnancy, in accordance with WHO recommendations.
- Complications included any maternal or fetal adverse outcomes such as eclampsia, HELLP syndrome, preterm delivery, intrauterine growth restriction (IUGR), perinatal death, and maternal ICU admission.

Data Analysis

Data were entered into and analyzed using SPSS software (version 26.0). Descriptive statistics such as means, standard deviations, frequencies, and percentages were calculated for socio-demographic and clinical variables. The association between ANC attendance and the occurrence of complications was evaluated using Chi-square tests. Logistic regression analysis was performed to adjust for potential confounding variables. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of Anwer Khan Modern Medical College. Informed written consent was obtained from all participants prior to data collection. Confidentiality and anonymity were ensured throughout the research process.

RESULTS

Socio-demographic Characteristics of the Study Participants

A total of 145 pregnant women diagnosed with preeclampsia or eclampsia were included in the study. The mean age of the participants was 26.8 ± 5.2 years, ranging from 18 to 40 years. The majority (62.8%) were from urban areas, and 70.3% were housewives. About 55.2% of the participants had completed secondary level education or higher (Table-1).

Table 1: Socio-Demographic Characteristics of the Study Participants (n = 145)

Variable	Frequency (n=145)	Percentage (%)
Age group (years)		
18–24	48	33.1
25–30	63	43.4
>30	34	23.5
Residence		
Urban	91	62.8
Rural	54	37.2
Occupation		
Housewife	102	70.3
Service holder	26	17.9
Others	17	11.8

Variable	Frequency (n=145)	Percentage (%)
Education level		
No formal education	19	13.1
Primary	46	31.7
Secondary or higher	80	55.2

Antenatal Care (ANC) Utilization

Among the 145 pregnant women diagnosed with preeclampsia or eclampsia, 63.4% (n = 92) attended regular antenatal care (≥4 visits), while 36.6% (n = 53) had irregular or no antenatal visits (<4) (Table 2).

Table 2: Distribution of Antenatal Care (ANC) Visit Patterns Among the Study Participants (n=145)

ANC Visit Pattern	Frequency	Percentage (%)
Regular ANC (≥4)	92	63.4
Irregular/None (<4)	53	36.6

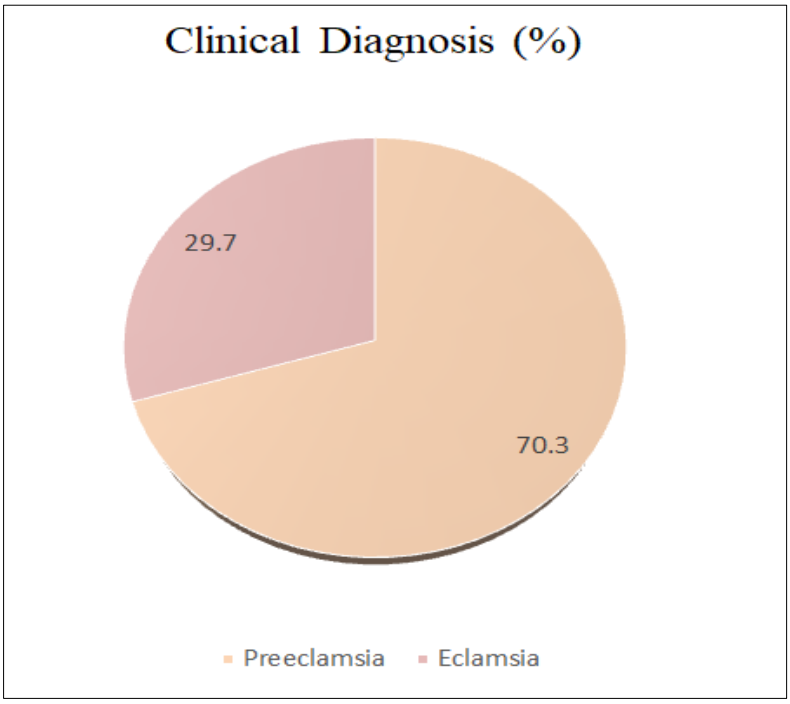

Figure: Distribution of clinical diagnosis of the patients (n=145)

Distribution of Clinical Diagnosis

Table 3: Distribution of Maternal and Fetal Complications among the Study Participants (n=145)

Complication	Frequency	Percentage (%)
Preterm delivery	60	41.4
IUGR	42	29.0
ICU admission	25	17.2
HELLP syndrome	13	9.0
Perinatal death	10	6.9

Association between ANC Visits and Complications

Table 4 demonstrates a statistically significant association between the frequency of antenatal care (ANC) visits and the occurrence of maternal and fetal complications. Women who received regular ANC (≥4 visits) had significantly lower rates of complications compared to those with irregular or no ANC (<4 visits): Preterm delivery was significantly higher in the irregular ANC group (64.2%) compared to the regular ANC group (28.3%) ($p < 0.001$). Intrauterine Growth Restriction (IUGR) occurred more frequently in the irregular ANC group (45.3%) than in the regular ANC group (19.6%) ($p = 0.002$). ICU admissions, HELLP syndrome, and perinatal deaths were also notably higher among women with irregular or no ANC visits, all showing statistically significant differences ($p < 0.05$).

Table 4: Association Between Antenatal Care (ANC) Visits and Complications among the Participants (n = 145)

Complication	Regular ANC (n=92)	Irregular/No ANC (n=53)	p-value
Preterm delivery	26 (28.3%)	34 (64.2%)	<0.001
IUGR	18 (19.6%)	24 (45.3%)	0.002
ICU admission	9 (9.8%)	16 (30.2%)	0.001
HELLP syndrome	4 (4.3%)	9 (17.0%)	0.014
Perinatal death	3 (3.3%)	7 (13.2%)	0.045

DISCUSSION

This study found that regular antenatal care (ANC, defined as ≥4 visits) is significantly associated with reduced risks of adverse outcomes—such as preterm delivery, IUGR, ICU admissions, HELLP syndrome, and perinatal death—among women with preeclampsia or eclampsia.

Socio Demographic Characteristics

In this study of women diagnosed with preeclampsia or eclampsia (Table 1), the majority were aged 25–30 years (43.4%), were housewives (70.3%), and had secondary education or higher (55.2%). Most participants were from urban areas (62.8%).

Maternal age is an important determinant of ANC utilization: women in the 20–34 age group are more likely to seek regular ANC and timely care for complications, as seen in studies from Kenya and Bangladesh [10, 11]. Occupation as housewife may limit autonomy and influence decision-making on seeking care, consistent with findings from Ethiopia and Nepal [12, 13]. Urban residence is strongly associated with better ANC uptake and quality due to greater accessibility, awareness, and facility density, as documented in Bangladesh and Ghana [11-14]. Education also plays a decisive role: women with secondary or higher education are significantly more likely to attend ≥4 ANC visits, recognize pregnancy risks, and adhere to clinical advice [11-15].

ANC Visit Patterns

As shown in Table 2, 63.4 % of participants had regular ANC (≥4 visits), while 36.6 % had irregular or no visits. Though over half of participants met the ≥4 visit threshold, this falls short of the WHO recommendation of eight contacts [16]. This rate aligns with findings from the Bangladesh 2017–18 DHS, where only 59 % of women in urban areas and 43 % in rural areas completed ≥4 ANC visits.11 Consistently, education, wealth, and urban residence were strong predictors of completing ≥4 visits in Bangladesh and multiple LMICs [11-17]. A community study in rural Bangladesh also found that delays in initiating first ANC and lack of resources limited timely attendance [13-17].

Complications and ANC Utilization

Regular ANC attendance (≥4 visits) was significantly associated with lower rates of preterm delivery, intrauterine growth restriction (IUGR), ICU admission, HELLP syndrome, and perinatal death.

- **Preterm Delivery** occurred in 28.3 % of the regular ANC group versus 64.2 % among those with <4 visits ($p < 0.001$). This finding echoes a cohort study in rural Bangladesh where women with ≤1 ANC visit had more than double the odds of preterm birth compared with those attending ≥3 visits [18]. Similarly, a population-based study in New South Wales found that early and frequent ANC significantly reduced preterm and low birth weight risks [19].
- **IUGR** was present in 19.6 % of regular ANC attendees versus 45.3 % in the irregular ANC group ($p = 0.002$). In the New South Wales study, inadequate ANC was strongly linked with low birth weight and fetal growth issues [19].
- **ICU Admission** was required by 9.8 % of the regular ANC group versus 30.2 % with inadequate visits ($p = 0.001$). A Ghanaian tertiary-hospital study similarly reported reduced severe maternal complications requiring critical care among women with ≥4 ANC visits and early booking [20].
- **HELLP Syndrome** occurred in 4.3 % of regular ANC attendees versus 17.0 % with fewer visits ($p = 0.014$). Hospital data from Ghana and other LMICs indicate that delayed or absent ANC increases the risk of severe hypertensive complications like HELLP [20].
- **Perinatal Death** affected 3.3 % of the regular ANC group compared to 13.2 % in those with <4 visits ($p = 0.045$). A recent meta-analysis in Nigeria estimated fetal mortality at 16.7 % among preeclamptic and eclamptic pregnancies—comparable to our irregular ANC subgroup [21]. An Ethiopian cohort study reported nearly threefold higher odds of perinatal death in preeclamptic pregnancies relative to normotensive ones [22].

Public Health Implications

The socio demographic analysis indicates that age, urban residence, education, and economic status are key drivers of ANC attendance. The strong link between ≥4 ANC visits and reduced maternal–fetal complications support global guidelines recommending early and frequent prenatal care [16]. Findings from Bangladesh, Ethiopia, Ghana, Australia, and Nigeria reinforce that regular ANC mitigates risks of preterm delivery, growth restriction, ICU admission, HELLP syndrome, and perinatal mortality [18–22].

This result reflects some progress but underscores ongoing gaps in ANC coverage, especially in rural and less-educated populations. In a 2022 study across South Asia, barriers to completing recommended ANC visits included lack of maternal education, limited autonomy, and logistical challenges like facility distance and transportation issues [23]. Women with formal education are significantly more likely to complete ANC schedules, recognize danger signs, and adhere to medical advice [24]. Strengthening community-based ANC outreach and awareness programs—especially targeting rural and low-literacy women—may help bridge this gap. Facility improvements to ensure accessibility and quality care are also crucial [14].

CONCLUSION

This study highlights that regular antenatal care (ANC) visits (≥4) are significantly associated with a reduction in maternal and fetal complications among women diagnosed with preeclampsia and eclampsia. Women who attended regular ANC experienced notably lower rates of preterm delivery, intrauterine growth restriction (IUGR), ICU admission, HELLP syndrome, and perinatal death. The findings reinforce the critical role of consistent ANC in early detection and management of hypertensive disorders during pregnancy. Strengthening ANC utilization—especially among at-risk populations—can substantially improve maternal and neonatal outcomes and reduce preventable morbidity and mortality.

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