



## Original Article



# Prevalence and Characteristics of Early vs. Late-Onset Preeclampsia: A Cross-Sectional Descriptive Study

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## ABSTRACT

Preeclampsia is the most frequent medical complication of pregnancy and a leading contributor to maternal morbidity and mortality. However, there is a lack of data on the outcomes of pre-eclamptic women, making the current study necessary. **Objectives:** To determine the prevalence and compare the clinical characteristics of early-onset and late-onset preeclampsia among pregnant women. **Methods:** It was a descriptive cross-sectional study conducted for 6 months at the Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal. It involved 95 pregnant women. Patients were selected using non-probability and consecutive sampling. Women at  $\geq 20$  weeks of gestation and diagnosed with preeclampsia were categorized as early onset ( $\leq 34$  weeks) and late onset ( $> 34$  weeks) of preeclampsia, and their outcomes were compared based on age, parity, BMI and history of GDM and pre-existing hypertension. Data were analyzed using SPSS version 25.0. **Results:** The mean age of the patients was  $26.2 \pm 5.3$  years, the mean gestational age was  $34.4 \pm 2.4$  weeks, and the mean BMI was  $26.9 \pm 3.5$  kg/m<sup>2</sup>. There were 29 (30.5%) primiparas and 66 (69.5%) multiparas. Obesity was observed in 24 (25.3%) women, while 16 (16.8%) had pre-existing hypertension, and 23 (24.2%) had GDM. Early-onset preeclampsia was found in 27 (28.4%) women, while 68 (71.6%) had late-onset preeclampsia. **Conclusions:** It was concluded that a considerable proportion of women had early-onset preeclampsia. Both early and late onset preeclampsia warrant routine screening in pregnant women to allow timely identification and management, which may improve fetomaternal outcomes.

## INTRODUCTION

Over 60,000 fatalities globally are attributed to preeclampsia, making it one of the primary causes of maternal death. It is among the most common complications of pregnancy, affecting an estimated 4-5% of pregnancies worldwide [1]. Preeclampsia is typically classified based on the timing of onset, with early-onset occurring before 34 weeks of gestation and late-onset after 34 weeks. The condition is characterized by new-onset hypertension, proteinuria, or signs of end-organ dysfunction, most commonly presenting after 20 weeks of gestation [2]. Pregnancy-induced hypertension is a heterogeneous syndrome responsible for more than 10% of all maternal deaths in the subcontinent, with nearly half of

these deaths being preventable. In Pakistan, hypertensive disorders during pregnancy rank among the top three contributing factors to maternal mortality [3]. Each year, between 5.8% and 18.8% of pregnancies are complicated by hypertensive disorders [4, 5]. A woman's risk of developing preeclampsia is influenced by various factors including family history, genetic predisposition, duration of sexual cohabitation, smoking, parity and maternal age, use of in vitro fertilization (IVF), and pre-existing medical conditions such as hypertension, diabetes, chronic kidney disease (CKD), and obesity [6]. Despite extensive research, the pathophysiology of preeclampsia remains unclear, and early diagnosis continues to be a clinical challenge. Known



contributors to its pathogenesis include late first pregnancy, hypertension, obesity, family history of preeclampsia, long inter-pregnancy intervals, multiple pregnancies, urinary tract infections, diabetes, and autoimmune disorders [7]. Hallmark features of preeclampsia include increased uterine artery resistance index, intrauterine fetal growth restriction, immune activation, elevated cytokine levels, maternal endothelial dysfunction, and reduced vasodilator production. Delivery of the placenta remains the only definitive cure, making preeclampsia a leading cause of preterm birth [8]. Early and late-onset preeclampsia are considered distinct in their pathophysiology, yet both contribute to the clinical syndrome of preeclampsia. According to the International Society for the Study of Hypertension in Pregnancy (ISSHP), early-onset preeclampsia is defined as occurring before 34 weeks of gestation, while late-onset preeclampsia occurs after 34 weeks. Outcomes tend to vary significantly, with early-onset cases typically presenting more severe clinical manifestations and higher risks [9]. The rationale for this study stems from the existing scarcity of data regarding the prevalence and characteristics of early versus late-onset preeclampsia. Preeclampsia continues to pose a serious challenge for obstetricians due to its contribution to maternal morbidity and mortality.

This study aims to quantify the risk and prevalence of early and late-onset preeclampsia but also to serve as a foundation for improving evidence-based management practices. Furthermore, the findings of this study are expected to contribute to future research and ultimately lead to enhanced clinical outcomes for affected patients.

## METHODS

This study was designed as a descriptive cross-sectional. The research was conducted at Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal. The study duration was six months, from September 4th, 2023, to March 11th, 2024, following the ethical approval of the study from Green International University IRC-GIU-157-02-2025. A sample size of 95 cases was determined using a 95% confidence interval and a 9.0% margin of error. Patients were selected using non-probability and consecutive sampling. The study included pregnant women aged 18 to 40 years with a BMI of 20–35 kg/m<sup>2</sup>, booked singleton pregnancies, and diagnosed cases of pre-eclampsia. Exclusion criteria included twin or molar pregnancies, un-booked cases, congenital malformations on ultrasound, and a history of eclampsia in a previous pregnancy. After taking written informed consent, data were recorded on a pre-designed proforma. A thorough history and detailed examination were conducted, including demographic details such as maternal age,

gestational age, parity, and BMI. The history of pre-existing hypertension and gestational diabetes mellitus (GDM) was also recorded. Blood pressure was checked twice, six hours apart, and a 24-hour urine sample was tested for proteinuria in hypertensive patients. Data were analyzed using SPSS version 25.0.

## RESULTS

Patients ranged from 28–37 weeks with a mean of  $34.4 \pm 2.4$  weeks. The parity of the patients ranged from 1–4 with a mean of  $2.2 \pm 1.1$ . There were 29 (30.5%) primiparas and 66 (69.5%) multiparas. 16 (16.8%) women had pre-existing hypertension, while 23 (24.2%) women had GDM. BMI ranged from 21.2–34.6 Kg/m<sup>2</sup> with a mean of  $26.9 \pm 3.5$  Kg/m<sup>2</sup>. 24 (25.3%) women were obese (Table 1).

**Table 1:** Baseline Characteristics (n=95)

Characteristics	n (%)
<b>Age</b>	
Years	$26.2 \pm 5.3$
18-26	50 (52.6%)
27-35	45 (47.4%)
<b>Weeks</b>	
Gestational Age	$34.4 \pm 2.4$
28-34	27 (28.4%)
35-37	68 (71.6%)
<b>Parity (<math>2.2 \pm 1.1</math>)</b>	
Primiparas	29 (30.5%)
Multiparas	66 (69.5%)
<b>BMI</b>	
(Kg/m <sup>2</sup> )	$26.9 \pm 3.5$
20-25	25 (26.3%)
25-30	46 (48.4%)
30-35	24 (25.3%)
<b>Pre-Existing Hypertension</b>	
Yes	16 (16.8%)
No	79 (83.2%)
<b>Gestational Diabetes Mellitus</b>	
Yes	23 (24.2%)
No	72 (75.8%)

27 (28.4%) women had early onset pre-eclampsia, while 68 (71.6%) women had late onset preeclampsia (Table 2).

**Table 2:** Frequency of Early and Late Onset Pre-eclampsia (n=95)

Pre-eclampsia	n (%)
Early Onset	27 (28.4%)
Late Onset	68 (71.6%)
Total	95 (100.0%)

No statistically significant difference in the distribution of early and late onset preeclampsia across various subgroups of women based on age, parity, BMI and history of GDM and pre-existing hypertension (Table 3).

**Table 3:** Comparison of Frequency of Early and Late Onset Preeclampsia across Various Subgroups (n=95)

Subgroups	n	Early-Onset (n=27)	Late-Onset (n=68)	p-Value
Age				
18-26 years	50	14 (28.0%)	36 (72.0%)	0.924
27-35 years	45	13 (28.9%)	32 (71.1%)	
Parity				
Primiparas	29	8 (27.6%)	21 (72.4%)	0.905
Multiparas	66	19 (28.8%)	47 (71.2%)	
BMI				
20-25 Kg/m <sup>2</sup>	25	6 (24.0%)	19 (76.0%)	0.513
25-30 Kg/m <sup>2</sup>	46	12 (26.1%)	34 (73.9%)	
30-35 Kg/m <sup>2</sup>	24	9 (37.5%)	15 (62.5%)	
Pre-Existing Hypertension				
Yes	16	5 (31.3%)	11 (68.8%)	0.783
No	79	22 (27.8%)	57 (72.2%)	
Gestational Diabetes Mellitus				
Yes	23	7 (30.4%)	16 (69.6%)	0.806
No	72	20 (27.8%)	52 (72.2%)	

**Note:** No statistically significant differences were observed between early and late onset preeclampsia across subgroups of age, parity, BMI, pre-existing hypertension, and gestational diabetes ( $p > .05$  for all comparisons).

## DISCUSSION

Preeclampsia is a pregnancy-related condition that affects approximately 4.6% of pregnancies and remains a significant global contributor to maternal and neonatal morbidity and mortality. A notable rise in perinatal complications is observed in severe forms of preeclampsia, which often present during mid-pregnancy [1, 2]. The pathophysiology of preeclampsia is complex and not yet fully understood, involving genetic, immunological, and environmental factors. The primary underlying factor is believed to be placental insufficiency, resulting from disrupted trophoblastic remodeling of uterine spiral arterioles. This leads to the release of circulating factors into the maternal bloodstream, triggering the clinical manifestations of preeclampsia [1]. Preeclampsia commonly emerges in the third trimester, characterized by new-onset hypertension and proteinuria, and may progress rapidly to life-threatening maternal and fetal complications [3]. The present study addresses a significant gap in the limited body of literature comparing early and late onset preeclampsia, which is vital for guiding timely clinical management and improving maternal-fetal outcomes. In this study, the mean age of patients was  $26.2 \pm 5.3$  years, consistent with findings from Khan et al., who reported a mean age of  $26.87 \pm 5.22$  years among women [10]. Tesfa et al., noted a slightly higher mean age of  $28 \pm 4.49$  years, whereas Radon et al., reported a comparatively lower mean age of  $23.25 \pm 1.25$  years [11, 12]. Siddiqui et al., reported a slightly higher obesity rate of  $31.3 \pm 5.1$  kg/m<sup>2</sup> and

a comparable GDM frequency of 23.1% [13]. Emanuel M and Butt S observed a mean BMI of  $26.9 \pm 3.5$  kg/m<sup>2</sup> among preeclamptic women, with 24 (25.3%) women categorized as obese. Additionally, 16 (16.8%) women had pre-existing hypertension, and 23 (24.2%) had gestational diabetes mellitus (GDM) [14]. Similarly, Soomro et al., reported a GDM rate of 25.9% and a higher prevalence of chronic hypertension (28.7%) among preeclamptic women in Sukkur, Pakistan [15]. Comparable rates of chronic hypertension have also been observed in Poland and Russia, with frequencies of 15.8% and 15.0%, respectively, as reported by Wojtowicz et al., [16]. In our study, 27 (28.4%) women had early-onset preeclampsia, while 68 (71.6%) had late-onset disease. These findings align closely with those of Gomathy et al., who observed 27.4% early and 72.6% late onset cases in India [17]. Similarly, Damayanti et al., reported 29.6% early and 70.4% late onset preeclampsia in Indonesia [18], while Hegazy et al., found 31.2% early and 68.8% late onset cases in Iraq. Li et al., also reported 35.5% early and 64.5% late onset preeclampsia in China [19, 20]. The strengths of the present study include a reasonably large sample size of 95 patients and the stratification of results to examine potential effect modifiers such as age, parity, BMI, GDM, and pre-existing hypertension. Future studies are warranted to evaluate the fetomaternal outcomes associated with early and late onset preeclampsia and to explore potential interventions that could improve prognoses in these patients. This further contributed to the clinical understanding and management of preeclampsia in diverse populations.

## CONCLUSIONS

It was concluded that a considerable proportion of women had early-onset pre-eclampsia, which warrants routine screening of pregnant women for preeclampsia so that timely identification and management may improve the fetomaternal outcome of such cases.

## Authors Contribution

Conceptualization: FB, RS

Methodology: FB, RS, KA

Formal analysis: FB, MA

Writing review and editing: FB, RS, MA, KA, AK, AH

All authors have read and agreed to the published version of the manuscript

## Conflicts of Interest

All the authors declare no conflict of interest.

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