



Original Article



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

Faraz Bakht¹, Rabeea Shahid¹, Munawar Afzal¹, Kainat Ashraf¹, Aqsa Khalid¹, Anum Hayat¹ and Sajid Hameed²¹Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan²Department of Public Health, Green International University, Lahore, Pakistan

ARTICLE INFO

Keywords:

Early Onset Preeclampsia, Late Onset Preeclampsia, Gestational Diabetes Mellitus, Prevalence

How to Cite:Bakht, F., Shahid, R., Afzal, M., Ashraf, K., Khalid, A., Hayat, A., & Hameed, S. (2025). Prevalence and Characteristics of Early vs. Late-Onset Preeclampsia: A Cross-Sectional Descriptive Study: Prevalence and Characteristics of Early vs. Late-Onset Preeclampsia. *Pakistan Journal of Health Sciences*, 6(6), 227-231. <https://doi.org/10.54393/pjhs.v6i6.2987>***Corresponding Author:**

Faraz Bakht

Department of Obstetrics and Gynecology, Sughra Shafi Medical Complex, Narowal, Pakistan
faraz01@gmail.comReceived Date: 18th March, 2025Revised Date: 10th June, 2025Acceptance Date: 18th June, 2025Published Date: 30th June, 2025

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 ≥ 20 weeks of gestation and diagnosed with preeclampsia were categorized as early onset (≤ 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 ± 5.3 years, the mean gestational age was 34.4 ± 2.4 weeks, and the mean BMI was 26.9 ± 3.5 kg/m². 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/m², 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 ± 2.4 weeks. The parity of the patients ranged from 1–4 with a mean of 2.2 ± 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/m² with a mean of 26.9 ± 3.5 Kg/m². 24 (25.3%) women were obese (Table 1).

Table 1: Baseline Characteristics (n=95)

Characteristics	n (%)
Age	
Years	26.2 ± 5.3
18-26	50 (52.6%)
27-35	45 (47.4%)
Weeks	
Gestational Age	34.4 ± 2.4
28-34	27 (28.4%)
35-37	68 (71.6%)
Parity (2.2 ± 1.1)	
Primiparas	29 (30.5%)
Multiparas	66 (69.5%)
BMI	
(Kg/m ²)	26.9 ± 3.5
20-25	25 (26.3%)
25-30	46 (48.4%)
30-35	24 (25.3%)
Pre-Existing Hypertension	
Yes	16 (16.8%)
No	79 (83.2%)
Gestational Diabetes Mellitus	
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 ²	25	6 (24.0%)	19 (76.0%)	0.513
25-30 Kg/m ²	46	12 (26.1%)	34 (73.9%)	
30-35 Kg/m ²	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 ($p > 0.005$ 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 ± 5.3 years, consistent with findings from Khan et al., who reported a mean age of 26.87 ± 5.22 years among women [10]. Tesfa et al., noted a slightly higher mean age of 28 ± 4.49 years, whereas Radon et al., reported a comparatively lower mean age of 23.25 ± 1.25 years [11, 12]. Siddiqui et al., reported a slightly higher obesity rate of 31.3 ± 5.1 kg/m² and

a comparable GDM frequency of 23.1% [13]. Emanuel M and Butt S observed a mean BMI of 26.9 ± 3.5 kg/m² 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.

Despite a reasonable sample size, the study was limited by its single-center design and lack of longitudinal follow-up, which may restrict generalizability and outcome assessment. Additionally, potential confounding factors may not have been fully controlled. 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 and Drafting: FB, RS, MA, KA, AK, AH

Review and Editing: FB, RS, MA, KA, AK, AH

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Ananth CV, Brandt JS, Hill J, Graham HL, Grover S, Schuster M et al. Historical and recent changes in maternal mortality due to hypertensive disorders in the United States, 1979 to 2018. *Hypertension*. 2021 Nov; 78(5): 1414-22. doi: 10.1161/HYPERTENSIONAHA.121.17661.
- [2] Khedagi AM and Bello NA. Hypertensive disorders of pregnancy. *Cardiology Clinics*. 2021 Feb; 39(1): 77-90. doi: 10.1016/j.ccl.2020.09.005.
- [3] Duhig K, Vandermolen B, Shennan A. Recent advances in the diagnosis and management of pre-eclampsia. *F1000Research*. 2018 Feb; 7: 242. doi: 10.12688/f1000research.12249.1.
- [4] Tesfa E, Nibret E, Gizaw ST, Zenebe Y, Mekonnen Z, Assefa S et al. Prevalence and determinants of hypertensive disorders of pregnancy in Ethiopia: A systematic review and meta-analysis. *PLOS One*. 2020 Sep; 15(9): e0239048. doi: 10.1371/journal.pone.0239048.
- [5] Elawad T, Scott G, Bone JN, Elwell H, Lopez CE, Filippi V et al. Risk factors for pre-eclampsia in clinical practice guidelines: comparison with the evidence. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2024 Jan; 131(1): 46-62. doi: 10.1111/1471-0528.17320.
- [6] Chaiworapongsa T, Chaemsaitong P, Yeo L, Romero R. Pre-Eclampsia Part 1: Current Understanding of Its Pathophysiology. *Nature Reviews Nephrology*. 2014 Aug; 10(8): 466-80. doi: 10.1038/nrneph.2014.102.
- [7] Nirupama R, Divyashree S, Janhavi P, Muthukumar SP, Ravindra PV. Preeclampsia: Pathophysiology and management. *Journal of Gynecology Obstetrics and Human Reproduction*. 2021 Feb; 50(2): 101975. doi: 10.1016/j.jogoh.2020.101975.
- [8] Stanek J. Histological features of shallow placental implantation unify early-onset and late-onset preeclampsia. *Pediatric and Developmental Pathology*. 2019 Mar; 22(2): 112-22. doi: 10.1177/1093526618803759.
- [9] Li X, Kang F, Li X, Du X, Yang Y. Comparison of characteristics between early-onset and late-onset severe preeclampsia: A retrospective cohort study from a Tertiary Hospital in China. *Reproductive Sciences*. 2025 Jan; 32(1): 139-49. doi: 10.1007/s43032-024-01674-w.
- [10] Teka H, Yemane A, Abraha HE, Berhe E, Tadesse H, Gebru F et al. Clinical presentation, maternal-fetal, and neonatal outcomes of early-onset versus late onset preeclampsia-eclampsia syndrome in a teaching hospital in a low-resource setting: A retrospective cohort study. *PLOS ONE*. 2023 Feb; 18(2): e0281952. doi: 10.1371/journal.pone.0281952.
- [11] Tesfa E, Nibret E, Munsha A. Maternal lipid profile and risk of pre-eclampsia in African pregnant women: A systematic review and meta-analysis. *PLOS One*. 2020 Dec; 15(12): e0243538. doi: 10.1371/journal.pone.0243538.
- [12] Radoń-Pokracka M, Adrianowicz B, Płonka M, Danił P, Nowak M, Huras H. Evaluation of pregnancy outcomes at advanced maternal age. *Open Access Macedonian Journal of Medical Sciences*. 2019 Jun; 7(12): 1951. doi: 10.3889/oamjms.2019.587.
- [13] Siddiqui A, Deneux-Tharoux C, Luton D, Schmitz T, Mandelbrot L, Estellat C et al. Maternal obesity and severe pre-eclampsia among immigrant women: a mediation analysis. *Scientific Reports*. 2020 Mar; 10(1): 5215. doi: 10.1038/s41598-020-62032-9.
- [14] Emanuel M and Butt S. Frequency and factors leading to recurrent pre-eclampsia. *The Journal of the Pakistan Medical Association*. 2015 Nov; 65(11): 1173-7.
- [15] Soomro S, Kumar R, Lakhan H, Shaukat F. Risk factors for pre-eclampsia and eclampsia disorders in tertiary care center in Sukkur, Pakistan. *Cureus*. 2019 Nov; 11(11). doi: 10.7759/cureus.6115.
- [16] Wojtowicz A, Zembala-Szczerba M, Babczyk D, Kołodziejczyk-Pietruszka M, Lewaczyńska O, Huras H. Early- and late-onset preeclampsia: a comprehensive cohort study of laboratory and clinical findings according to the new ISHHP criteria. *International Journal of Hypertension*. 2019; 2019(1): 4108271. doi: 10.1155/2019/4108271.
- [17] Gomathy E, Akurati L, Radhika K. Early onset and late onset preeclampsia-maternal and perinatal outcomes in a rural tertiary health center. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2018 May; 7(6): 2266. doi: 10.18203/2320-1770.ijrcog20182333.
- [18] Damayanti S, Sulistyowati S, Probandari AN. Maternal characteristics and the effects of early and late-onset types of preeclampsia on maternal and perinatal complications. *Indonesian Journal of Medicine*. 2019 Oct; 4(4): 329-38. doi: 10.26911/theijmed.v4i4.221.
- [19] Hegazy A, Eid FA, Ennab F, Sverrisdóttir YB, Atiomo W, Azar AJ. Prevalence of pre-eclampsia in women in the Middle East: a scoping review. *Frontiers in Public Health*.

Health. 2024 Aug; 12: 1384964. doi: 10.3389/fpubh.2024.1384964.

- [20] Li XL, Guo PL, Xue Y, Gou WL, Tong M, Chen Q. An analysis of the differences between early and late preeclampsia with severe hypertension. *Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health*. 2016 Jan; 6(1): 47-52. doi: 10.1016/j.preghy.2015.12.003.