UNVEILING THE CULPRITS: FREQUENCY AND FACTORS BEHIND EARLY SEVERE PREECLAMPSIA AT A TERTIARY CARE HOSPITAL IN NOWSHERA

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ABSTRACT

Objective: To determine the frequency of factors leading to early severe preeclampsia in Qazi Hussain Ahmad Medical Complex Nowshera.

Methodology: A cross-sectional observational study was conducted at the Department of Obstetrics and Gynecology, Qazi Hussain Ahmad Medical Complex, Nowshera, from November 2022 to May 2023. A total of 145 women aged 18–45 years with singleton pregnancies and gestational age <36 weeks were included. Data on demographic details (age, gestational age, parity) and risk factors, including primiparity, chronic hypertension, chronic renal disease, maternal age ≥40 years, and obesity, were recorded using a structured proforma.

Results: The mean age of participants was 31.1 ± 6.75 years, mean gestational age was 30.85 ± 2.71 weeks, and mean parity was 2.62 ± 2.16. Primiparity was observed in 28.3% of cases, chronic hypertension in 12.4%, chronic renal disease in 7.6%, maternal age ≥40 years in 15.9%, and obesity in 18.6%.

Conclusion: Early severe preeclampsia is significantly associated with primiparity, chronic hypertension, chronic renal disease, advanced maternal age, and obesity.

Keywords: Early severe preeclampsia, Primiparity, Chronic hypertension, Chronic renal disease, Maternal obesity

INTRODUCTION

Early severe preeclampsia is a pregnancy-induced hypertensive disorder characterized by new-onset hypertension ≥140/90 mmHg and proteinuria ≥300 mg/24 hours or significant end-organ dysfunction occurring before 34 weeks of gestation.[1] This condition results from abnormal placental development and systemic endothelial dysfunction, leading to serious maternal and fetal complications.[2] Primiparity is one maternal factor that raises vulnerability because of immunological maladaptation. Comorbid chronic states, including hypertension, diabetes mellitus, and renal diseases, all increasing vascular impassability and decreasing placental perfusion.[3] Besides, extreme maternal age-both under the age of 20 or above the age of 35 years-is an influencing factor in abnormal maternal body weights described in a range between over or low weight conditions: obesity, underweight conditions are some prominent ones.[4]

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Genetic and immunological predispositions further increase the risk of early severe preeclampsia.[5] A family history of preeclampsia points to a genetic etiology, while autoimmune disorders such as antiphospholipid syndrome or systemic lupus erythematosus compromise placental vascularization.[6] These conditions increase systemic inflammation and placental ischemia, key components of preeclampsia pathogenesis.[5,6] Racial and socioeconomic inequities in risk are intensified, with Black women and those in low-resource environments disproportionately impacted due to a higher frequency of chronic diseases and restricted access to healthcare..[7] Both the foetus and the placenta play essential roles in its pathophysiology.. The excess placental demand by a multiple gestation increases the risk of early severe preeclampsia.[8] Molar pregnancies or fetal chromosomal abnormalities disturb the normal invasion and function of the placenta.[9] The inadequate remodeling of maternal spiral arteries by the trophoblasts reduces uteroplacental blood flow, leading to the triggering cascade of antiangiogenic factors release.[10] This process contributes to systemic endothelial dysfunction, the hallmark of the severe form of preeclampsia.[10]

In a study by Catov JM, et al. has shown that frequency of obesity was 7.9% in patient with early severe preeclampsia.[11] In another study

by Wójtowicz A, et al. has shown that frequency of primiparity was 73.4%, chronic hypertension 17.7%, chronic renal disease 3.5%, maternal age ≥40 years 8% and obesity was 11.5% in patient with early severe preeclampsia.[12]

Studying early severe preeclampsia is essential due to its significant maternal and fetal health risks, including eclampsia and preterm birth. It aids in identifying at-risk populations, developing targeted interventions, and addressing disparities in care. Research also supports improved screening and management strategies, ultimately reducing global morbidity and mortality.

METHODOLOGY

This cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Qazi Hussain Ahmad Medical Complex Nowshera from November 2022 to May 2023. Non probability consecutive sampling was used. The inclusion criteria includes 145 women aged 18 to 45 years with singleton pregnancies, a gestational age of fewer than 36 weeks and preeclampsia. The sample size was calculated with the WHO sample size calculator, incorporating a 95% confidence interval, a 3% margin of error, and an anticipated prevalence of chronic kidney disease of 3.5% among patients with early severe preeclampsia..[12] Exclusion criteria included a history of epilepsy and critically ill patients like in sepsis . Baseline demographic details including age, gestational age, and parity were collected. Informed consent was obtained, ensuring patient confidentiality and no associated risk. Factors contributing to early severe preeclampsia such as primiparity, chronic hypertension, chronic renal disease, maternal age ≥40 years, and obesity were recorded on a specially designed proforma by the researcher. Operational definitions were applied as follows: Early severe pre-eclampsia was defined as systolic blood pressure ≥160 mmHg (measured twice at least 6 hours apart while the patient was on bed rest) and proteinuria ≥300 mg/24 hours (on two random urine samples collected at least 4 hours apart) before <36 weeks gestation. Primiparity was defined as a woman experiencing her first pregnancy. Chronic hypertension was defined by a mean SBP ≥140 mmHg or DBP ≥90 mmHg, or self-report of antihypertensive medication use in the past year. Chronic renal disease was categorized into stages based on GFR from laboratory tests over the last 6 months: Stage 2 (GFR = 60-89 mL/min), Stage 3 (GFR = 30-59 mL/min), Stage 4 (GFR = 15-29 mL/min), and Stage 5 (GFR <15 mL/min). Maternal age ≥40 years was self-reported, and obesity was defined as BMI between 30 to 39.9 kg/m².

Data analysis was performed using SPSS version 25. Categorical variables such as primiparity, chronic hypertension, chronic renal disease, maternal age ≥40 years, and obesity were expressed as frequencies and percentages. Quantitative variables including age, gestational age, and parity were summarized using means and standard deviations. Stratification was done for age, gestational age, and parity for factors.

RESULTS

Age range in this study was from 18 to 45 years with mean age of 31.097±6.75 years, mean gestational age 30.848±2.71 weeks and mean parity was 2.620±2.16 as shown in Table-I.

Table- I: Mean±SD of patients according to age, gestational age and parity. n=145

Demographics		**Mean±SD**
1	Age(years)	31.097±6.75
2	Gestational age (weeks)	30.848±2.71
3	Parity	2.620±2.16

Primiparity was observed in 28.3% patients, chronic hypertension 12.4%, chronic renal disease 7.6%, maternal age ≥40 years 15.9% and obesity was 18.6% as shown in Table-II.

Table- II: Frequency and %age of patients according to primiparity.

Factors	Frequency	%age
Primiparity	41	28.3%
Chronic hypertension	18	12.4%
Chronic renal disease	11	7.6%
Maternal age ≥40 years	23	15.9%
Obesity	27	18.6%

Stratification of Factors with respect to age and parity are shown in Table-III.

Table- III: Stratification of Factors with respect to age and parity

	Age of the patients			Gestational age			Parity		
Factors	**18-30 Years**	**>30 Years**	**P value**	**≤30 weeks**	**>30 weeks**	**P value**	**Parity 0-2**	**Parity >2**	**P value**
Primiparity	53.90%	0%	0.000	36.4%	21.5%	0.048	60.30%	0%	0.000
Chronic Hypertension	0%	26.10%	0.000	9.1 %	15.2 %	0.267	0%	23.40%	0.000
Chronic Renal Disease	2.60%	13%	0.026	7.6 %	7.6 %	1.000	0%	14.30%	0.001
Maternal Age ≥40 Years	0%	33.30%	0.000	16.7 %	15.2 %	0.808	0%	29.90%	0.000
Obesity	7.90%	30.40%	0.000	13.6 %	22.8 %	0.159	5.90%	29.90%	0.000

DISCUSSION

Early severe preeclampsia emerges as a critical pregnancy complication characterized by high blood pressure and systemic organ damage, typically occurring before 34 weeks of gestation. This complex disorder represents a significant maternal and fetal health challenge. The study reveals a nuanced risk profile across multiple demographic and clinical factors. With a mean maternal age of 31.097 years and gestational age of 30.848 weeks, the research uncovered critical insights into preeclampsia's underlying mechanisms. Primiparity, representing 28.3% of cases, stands out as a primary risk factor. The immunological naivety of first-time pregnancies appears to trigger inflammatory responses, with the highest prevalence observed in younger women (53.9% in 18-30 years) and lower parity groups. Chronic conditions demonstrate a progressive risk gradient. Chronic hypertension (12.4%), chronic renal disease (7.6%), and advanced maternal age (15.9%) all show increased vulnerability in women over 30, suggesting cumulative physiological stress and reduced adaptive capabilities. Obesity emerges as another significant risk factor, affecting 18.6% of participants. The inflammatory environment associated with adiposity directly correlates with endothelial dysfunction, with risk increasing dramatically from 7.9% in younger women to 30.4% in older age groups. The most striking finding is the clear correlation between advanced maternal age (>30 years) and higher parity (>2), which significantly amplifies multiple risk factors. This suggests a compounding effect of physiological changes and systemic stress that progressively increases preeclampsia vulnerability.

Catov JM, et al. [11] reported an obesity frequency of 7.9% in early severe preeclampsia, while Wójtowicz A, et al. [12] found higher rates with obesity at 11.5%, primiparity at 73.4%, chronic hypertension at 17.7%, chronic renal disease at 3.5%, and maternal age ≥40 years at 8%. Pujiyani et al. [13] highlighted hypertensions as a dominant risk factor in preeclampsia development, supporting our findings of complex risk interactions. Primiparity (28.3%) and obesity (18.6%) showed pronounced age-related variations, with higher prevalence in younger women for primiparity (53.9% in 18-30 years) and

increasing risk with age for obesity (from 7.9% to 30.4%).

Complementing these clinical insights, Fondjo et al. [14] emphasized the importance of knowledge and awareness, revealing that 88.6% of pregnant women had inadequate understanding of preeclampsia. This underscores the critical need for comprehensive patient education and screening. Egan et al. [15] further contextualized pregnancy risks by exploring sleep disturbances, suggesting that sleep quality could be a modifiable factor in preventing adverse pregnancy outcomes. Their findings align with the complex, multifactorial nature of preeclampsia risk.

CONCLUSION

Our study has concluded that early severe preeclampsia is associated with various factors including primiparity, chronic hypertension, chronic renal disease, advanced maternal age, and obesity. These findings highlight the importance of early identification and management of these risk factors to potentially reduce the incidence and severity of preeclampsia.

Conflict of interest: No

Disclaimer: No

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