International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Maternal and Fetal Outcome in Severe Preeclampsia and Eclampsia: A Retrospective Cohort Study

Dr. Manu Rajput[1], Dr Kshama Kedar[2]

[1]Junior Resident, Shri Vasantrao Naik Govt. Medical Hospital, Yavatmal, Maharashtra, India

[2]Professor And Head of Department, Shri Vasantrao Naik Govt. Medical Hospital, Yavatmal, Maharashtra, India

Abstract: ***Background: This retrospective descriptive cohort study was conducted at SVNGMC, Yavatmal, Maharashtra, a tertiary care government hospital in rural India, over five years from January 1, 2019, to December 31, 2023. It aimed to analyze the impact of severe preeclampsia and eclampsia on maternal and fetal outcomes using data from medical records. Material and Methods: This retrospective descriptive cohort study was carried out on 150 pregnant women at SVNGMC, Yavatmal, Maharashtra over five years from January 1, 2019, to December 31, 2023. Data were obtained from the hospital's medical records department and included demographic information, medical history, prenatal care details, pregnancy complications, maternal and fetal outcomes. Preeclampsia and eclampsia were compared to identify differences in characteristics. Results: In the eclampsia group, 76.67% were aged 21 - 30 years, compared to 53.33% in the pre - eclampsia group (P < 0.05). Primigravida was more common in eclampsia (75.56%) than in pre - eclampsia (60%) (P = 0.042). There were no significant differences in anemia, labor pain, or BP readings. Pre - term delivery was more common in eclampsia (55.68%). LSCS due to maternal condition was higher in eclampsia (34.38%) (P = 0.816), and postpartum hemorrhage was significantly higher in eclampsia (35.56%) (P = 0.0003). Maternal mortality was 2.22% in eclampsia vs.3.33% in pre - eclampsia. NICU admissions were higher in eclampsia (40%) (P = 0.0007). Birth weight <2.5 kg and IUD were similar between groups (P = 0.737, P = 0.693). Conclusion: Hypertensive disorders in pregnancy, like pre - eclampsia and eclampsia, remain significant health concerns in India. Despite healthcare advances, delayed recognition and management lead to adverse outcomes. Early detection, timely treatment, and improved referral systems are key to reducing maternal and neonatal risks.***

Keywords: Eclampsia, Maternal mortality, Preeclampsia, Neonatal outcome

1. Introduction

The NHLBI categorizes pregnancy hypertensive disorders into chronic, gestational, preeclampsia, and preeclampsia superimposed on preexisting hypertension. Severe preeclampsia and eclampsia, arising after 20 weeks, pose significant risks to maternal and fetal health. These conditions account for 24% of all maternal deaths in India, with iatrogenic prematurity being the main cause [1, 2, 3, 4].

Preeclampsia/eclampsia result from abnormal placental development and impaired blood flow, causing widespread inflammation and organ damage in both mother and fetus. The exact cause is unknown, but likely involves genetics, immunity, and environment [5, 6].

Preeclampsia/eclampsia can cause maternal complications like hemorrhage, organ damage, and long - term hypertension/ heart/ kidney disease. Fetal complications include low birth weight, prematurity, growth restrictions, and stillbirth due to impaired placental function, potentially leading to long - term infant health issues. [7, 8, 9, 10]
Severe preeclampsia is diagnosed by high blood pressure (≥160/110 mmHg), proteinuria, and signs of organ dysfunction (kidney, liver, blood, brain, or lungs). Eclampsia is preeclampsia with seizures. [11 - 13].

Reports published from 1976 to 2015 (January–February) reveal that eclampsia incidence in India ranged from 0.179 to 5%, with an average of 1.5%. Maternal mortality decreased from 14.12% in 1982 to 2.2 - 9% in 2010, while perinatal mortality remained constant at 45% in 1984 and 24.5 - 48% in 2010 [14].

Early diagnosis of severe preeclampsia and eclampsia is vital for improving maternal and fetal outcomes. The study investigates the impact of severe preeclampsia and eclampsia on maternal and fetal outcomes, emphasizing the importance of timely diagnosis and intervention [15, 16].

2. Material and Methods

This retrospective descriptive cohort study was carried out on 150 pregnant women at SVNGMC, Yavatmal, Maharashtra, a tertiary care government hospital in rural India, over five years from January 1, 2019, to December 31, 2023. The study examined the effects of severe preeclampsia and eclampsia on maternal and fetal outcomes, using medical records. Exclusion criteria included chronic hypertension, neurological disorders, delivery outside SVNGMC, incomplete medical records, congenital anomalies, and post - delivery follow - up data.

The study involved women of all ages, races, and ethnicities who delivered at SVNGMC. Data was collected from the hospital's medical records department, including demographics, medical history, and prenatal care details. Bias was minimized through strict adherence to inclusion and exclusion criteria and comprehensive data collection. Data collection employed a standardized form, ensuring consistency and accuracy.

Although preeclampsia and eclampsia are considered a disease continuum, both conditions were compared to identify

differences in characteristics for early and late hypertensive disorders in pregnancy. Statistical analysis was performed using SPSS software. Descriptive statistics summarized the data, with continuous variables presented as means ± standard deviations or medians with interquartile ranges, depending on the data distribution, and categorical variables presented as frequencies and percentages.

3. Results

In the eclampsia group, the majority of participants (76.67%) were aged 21–30 years, compared to 53.33% in the pre - eclampsia group, with a statistically significant difference (P < 0.05). Primigravida was more common in the eclampsia group (75.56%) than in the pre - eclampsia group (60.00%) (P = 0.042). Most participants in both groups had no anemia (68.89% vs.63.33%), and no significant difference was observed (P = 0.356). True labor pain was reported by 16.67% of eclampsia participants compared to 53.33% in the pre - eclampsia group (P = 0.867). Systolic BP >159 mmHg (53.33% vs.48.33%) and diastolic BP 90–109 mmHg (50.00% vs.51.67%) were similar in both groups, with no significant differences (P = 0.456 and P = 0.186, respectively).

Table 1: Comparison of baseline characteristics among those with eclampsia and preeclampsia (n=150)

Characteristic	Categories	Eclampsia Group (n=90)		Preeclampsia Group (n=60)		P Value
		Number	Percentage	Number	Percentage	
Age (Range)	< 20	11	12.22	7	11.67	0.001
	21 - 30	69	76.67	32	53.33	
	31 - 40	9	10	21	35	
	> 40	1	1.11	0	0	
Gravidity	Primi	68	75.56	36	60	0.042
	Multi	22	24.44	24	40	
Haemoglobin status	No anaemia (≥11 g/dL)	62	68.89	38	63.33	0.356
	Mild anaemia (910.9 g/dL)	22	24.44	16	26.67	
	Moderate anaemia (78.9 g/dL)	6	6.67	4	6.67	
	Severe anaemia (< 7g/dl)	0	0	2	3.33	
Symptoms at presentation	Headache	11	12.22	13	21.67	0.867
	Blurring of vision	3	3.33	3	5	
	Pedal oedema	6	6.67	8	13.33	
	Bleeding PV	3	3.33	5	8.33	
	True labour pain	15	16.67	32	53.33	
	Leaking PV	11	12.22	18	30	
Systolic blood pressure (mm Hg)	<140	10	11.11	11	18.33	0.456
	140159	32	35.56	20	33.33	
	>159	48	53.33	29	48.33	
Diastolic blood pressure (mm Hg)	<90	11	12.22	13	21.67	0.186
	90 - 109	45	50	31	51.67	
	>109	34	37.78	16	26.67	

Pre - term delivery (<37 weeks) was more common in eclampsia (55.68%), whereas term delivery predominated in pre - eclampsia (55.17%) (P = 0.199). Spontaneous and vaginal deliveries were comparable between groups, with no significant differences (P = 0.845 and P = 0.921, respectively). LSCS due to deteriorating maternal condition was more common in eclampsia (34.38%), while non - reassuring fetal status was the leading cause in pre - eclampsia (26.47%) (P = 0.816). Postpartum hemorrhage (PPH) was significantly higher in eclampsia (35.56%), whereas abruptio placentae was more frequent in pre - eclampsia (23.33%) (P = 0.0007). Maternal mortality was 2.22% in eclampsia group whereas it was 3.33% in pre - eclampsia group with combine case fatality rate of 2.67% among the study population.

Table 2: Comparison of maternal characteristics among those with eclampsia and preeclampsia (n=150)

Characteristic	Categories	Eclampsia Group (n=88)		Preeclampsia Group (n=58)		P Value
		Number	Percentage	Number	Percentage	
Gestational age at delivery	Preterm (<37 wks)	49	55.68	26	44.83	0.199
	Term (37 wks or more)	39	44.32	32	55.17	
Induction	Spontaneous	50	56.82	32	55.17	0.845
	Inducted	38	43.18	26	44.83	
Mode of Delivery	Vaginal	51	57.95	33	56.9	0.921
	LSCS	31	35.23	20	34.48	
	Instrumental	6	6.82	5	8.62	

Table 3: Indications for LSCS among those with eclampsia and preeclampsia

Indication for LSCS	Eclampsia Group (n=32)		Preeclampsia Group (n=34)		P Value
	Number	Percentage	Number	Percentage	
Antepartum haemorrhage	2	6.25	2	5.88	0.816
Malpresentations	1	3.13	3	8.82	
Cephalo - pelvic disproportion	3	9.38	4	11.76	
Nonprogress of labour	1	3.13	1	2.94	
Nonreassuring foetal status	8	25	9	26.47	
Previous LSCS	3	9.38	5	14.71	
PROM (premature rupture of membrane) in early labour	1	3.13	2	5.88	
Severe oligohydramnios	2	6.25	3	8.82	
Deteriorating maternal condition	11	34.38	5	14.71	

Pre - term newborns were more common in eclampsia (56.82%), while term newborns predominated in pre - eclampsia (56.90%) (P = 0.205). Birth weights <2.5 kg were similar between groups (54.44% vs.51.67%) (P = 0.737). NICU admissions were significantly higher in eclampsia (40.00%) than in pre - eclampsia (5.00%) (P = 0.0007). APGAR scores >7 at 1 and 5 minutes were comparable in both groups (P = 0.143 and P = 0.524). Intrauterine death (IUD) was reported in 24.44% of eclampsia and 21.67% of pre - eclampsia cases, with no significant difference (P = 0.693).

Table 4: Comparison of maternal outcomes among those with eclampsia and preeclampsia (n=150)

Maternal outcome	Eclampsia Group (n=90)		Preeclampsia Group (n=60)		P Value
	Number	Percentage	Number	Percentage	
Abruptio placentae	2	2.22	14	23.33	0.0007
HELLP	1	1.11	1	1.67	
Renal dysfunction	4	4.44	2	3.33	
Pulmonary edema	5	5.56	1	1.67	
Pulmonary embolism	2	2.22	1	1.67	
PPH	32	35.56	6	10	
DIC	2	2.22	1	1.67	
Maternal mortality	2	2.22	2	3.33	
No abnormality	40	44.44	32	53.33	

Table 5: Comparison of neonatal outcomes among those with eclampsia and preeclampsia (n=150)

Neonatal Outcome	Eclampsia Group (n=90)		Preeclampsia Group (n=60)		P Value
	Number	Percentage	Number	Percentage	
Birth asphyxia	18	20	9	15	0.434
IUD	22	24.44	13	21.67	0.693
NICU Admission	26	28.89	12	20	0.22
Perinatal mortality	21	23.33	10	16.67	0.323

4. Discussion

The study results underscore both the similarities and differences in maternal and neonatal outcomes between eclampsia and pre - eclampsia groups. Pre - eclampsia is a significant concern in India, with a prevalence rate reaching 10% [17]. While eclampsia rates vary globally, hospital - based studies often report figures around 3.8% [18]. However, our observation revealed a higher incidence of eclampsia among our patients. This discrepancy can be attributed to several factors. As a referral canter, we likely received a disproportionate number of severe cases requiring specialized care. Pre - eclampsia frequently remains undetected or misdiagnosed. While proteinuria is a common diagnostic criterion, other indicators of pre - eclampsia often go unrecognized [19].

The statistically significant predominance of younger participants (21–30 years) in the eclampsia group may indicate age - related susceptibility, possibly due to biological, social, or healthcare access factors. The findings were similar to the study conducted by Amos Dasari et al [20] & Savita Rani Singhal et al [21]. Similarly, the higher proportion of primigravida in the eclampsia & pre - eclampsia group suggests a potential association between first pregnancies and the development of eclampsia, consistent with existing literature that identifies primi gravidity as a risk factor. This finding aligns with the study conducted by Amos Dasari et al [20] & Savita Rani Singhal et al [21]. Grum T et al also demonstrated a significantly increased risk of developing pre - eclampsia/eclampsia in primi gravidas compared to multigravidas, with odds ratios reaching 2.68 [22]. The prevalence of no anemia in both groups, despite a slightly higher proportion of severe anaemia in the pre - eclampsia group which also seen in the studies conducted by Amos Dasari et al [20] & Chang Chen et al [23].

The comparable presentation of systolic and diastolic blood pressure ranges in both groups highlights the overlapping hypertensive characteristics of eclampsia and pre - eclampsia, though the higher frequency of extremely elevated blood pressure (>159 mmHg) in eclampsia warrants further investigation into its clinical implications.

The higher prevalence of pre - term deliveries in the eclampsia group underscores the acute nature of the condition, necessitating early intervention to mitigate maternal and fetal risks. In contrast, the higher proportion of term deliveries in pre - eclampsia reflects better maternal and fetal stability, allowing pregnancies to progress further. The similar rates of spontaneous and vaginal deliveries across groups indicate that mode of delivery decisions were guided more by specific maternal and fetal indications than by the underlying condition.

Postpartum hemorrhage (PPH) emerged as a significantly higher complication in eclampsia, possibly due to greater severity of vascular compromise or coagulopathies. In

contrast, abruptio placentae was more frequent in pre - eclampsia, potentially reflecting differing pathological mechanisms in the placental bed. These findings highlight the need for tailored obstetric management strategies for each group.

Maternal mortality was 2.22% in eclampsia group whereas it was 3.33% in pre - eclampsia group with combine case fatality rate of 2.67% among the study population which is similar to the study conducted by Amos Dasari et al (2.6%) [20] whereas it was lower than the rate quoted in a study conducted by Chuppana Ragasudha et al [24], but it still makes eclampsia/preeclampsia a major contributor to maternal mortality

Neonatal outcomes showed mixed results. While NICU admissions were significantly higher in the eclampsia group, likely due to higher rates of pre - term births and compromised fetal status, birth weight distributions and APGAR scores at 1 and 5 minutes were similar across groups. The findings are similar to the study were conducted by Amos Dasari et al [20] & Dr Archana Kumari et al [25]. This indicates that, despite the increased morbidity in eclampsia, neonatal outcomes were not universally worse. The rates of intrauterine death (IUD) were also comparable, suggesting that both conditions pose significant risks to fetal survival. Preeclampsia often leads to eclampsia if it goes undiagnosed and untreated with more severe complications for both the mother and baby.

5. Limitations of the Study

The study's primary limitations include a small sample size, restricting the broader applicability of the findings. Additionally, as it was conducted at a single urban center, the results may not be generalizable to diverse populations or larger geographical areas.

6. Conclusion

Pregnancy - related hypertensive disorders, such as pre - eclampsia and eclampsia, are major public health issues in India. Despite advancements in healthcare, many women still experience adverse outcomes. Early detection, timely treatment, regular blood pressure monitoring, and strengthened referral systems can reduce the risks associated with these conditions, ultimately improving maternal and neonatal health outcomes.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References

[1] Chalas E. The American College of Obstetricians and Gynecologists in 2020: a clear vision for the future. Obstet Gynecol.2020; 135 (6): 1251 - 4.
[2] Roberts JM, Hubel CA. The two - stage model of preeclampsia: variations on the theme. Placenta.2009; 30: 32 - 7.
[3] Sibai BM. Diagnosis and management of gestational hypertension and preeclampsia. Obstet Gynecol.2003; 102 (1): 181 - 92.
[4] Bhawan N. Ministry of Health & Family Welfare. Jal.2021; 6: 7.
[5] Redman CW, Sargent IL. Latest advances in understanding preeclampsia. Science.2005; 308 (5728): 1592 - 4.
[6] Steegers EA, et al. Pre - eclampsia. Lancet.2010; 376 (9741): 631 - 44.
[7] Abalos E, et al. Pre - eclampsia, eclampsia and adverse maternal and perinatal outcomes: a secondary analysis of the WHO Multicountry Survey on Maternal and Newborn Health. BJOG.2014; 121: 14 - 24.
[8] Henderson JT, et al. Low - dose aspirin for prevention of morbidity and mortality from preeclampsia: a systematic evidence review for the US Preventive Services Task Force. Ann Intern Med.2014; 160 (10): 695 - 703.
[9] Papageorghiou AT, et al. Multicenter screening for pre - eclampsia and fetal growth restriction by transvaginal uterine artery Doppler at 23 weeks of gestation. Ultrasound Obstet Gynecol.2001; 18 (5): 441 - 9.
[10] Levine RJ, Lindheimer MD. First - trimester prediction of early preeclampsia: a possibility at last! Hypertension.2009; 53 (5): 747 - 8.
[11] Obstetricians ACoG. Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists 'Task Force on Hypertension in Pregnancy. Obstet Gynecol.2013; 122 (5): 1122.
[12] Magee LA, et al. Diagnosis, evaluation, and management of the hypertensive disorders of pregnancy: executive summary. J Obstet Gynaecol Can.2014; 36 (5): 416 - 38.
[13] Roberts JM, et al. Hypertension in pregnancy: executive summary. Obstet Gynecol.2013; 122 (5): 1122 - 31.
[14] Meh C, et al. Trends in maternal mortality in India over two decades in nationally representative surveys. BJOG.2022; 129: 550 - 61.
[15] Chappell LC, et al. Adverse perinatal outcomes and risk factors for preeclampsia in women with chronic hypertension: a prospective study. Hypertension.2008; 51 (4): 1002 - 9.
[16] Duckitt K, Harrington D. Risk factors for pre - eclampsia at antenatal booking: systematic review of controlled studies. BMJ.2005; 330 (7491): 565.
[17] Pareek S, et al. Preeclampsia: A hypertensive disorder during gestation. J Nurse Midwifery Matern Health.2020; 6: 19 - 22.
[18] Sinha M, Sinha SK. Perinatal and maternal outcomes of eclampsia in Darbhanga District, Bihar, India. Int J Contemp Med Res.2018; 5: B14.
[19] Scott G, et al. Guidelines—similarities and dissimilarities: A systematic review of international clinical practice guidelines for pregnancy hypertension. Am J Obstet Gynecol.2022; 226 (2S): S122 - 236.
[20] Dasari A, et al. Description and outcomes of patients with eclampsia and severe preeclampsia in a rural hospital in northeastern Bihar: A retrospective study. J Family Med Prim Care.2022; 11: 609 - 6100.
[21] Singhal SR, et al. Maternal and perinatal outcome in severe pre - eclampsia and eclampsia. South Asian Fed Obstet Gynecol.2009; 1 (3): 25 - 8.

[22] Grum T, et al. Determinants of preeclampsia/eclampsia among women attending delivery services in selected public hospitals of Addis Ababa, Ethiopia: A case - control study. BMC Pregnancy Childbirth.2017; 17: 307.
[23] Chen C, et al. Severe anemia, sickle cell disease, and thalassemia as risk factors for hypertensive disorders in pregnancy in developing countries. Pregnancy Hypertens.2018; 13: 14 - 17.
[24] Ragasudha C, et al. A study of maternal deaths from preeclampsia and eclampsia in a tertiary care centre. IAIM.2018; 5: 6 - 10.
[25] Kumari A, et al. Maternal and neonatal outcome in eclampsia in a tertiary care hospital in India. J Med Sci Clin Res 2017; 5: 2352233.