Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

Comprehensive analysis of eclampsia: Risk factors, complications, interventions, and feto-maternal outcomes

Diya Shah[1], Ashwini Nayak U[1], Rajini Uday[1], Syed Ali Munavar[2]*, K B Yuktha[2], Nikhita B M[2]

[1]*Dept. of Obstetrics and Gynaecology, Sapthagiri Institute of Medical Science and Research Center, Bangalore, Karnataka, India*
[2]*Sapthagiri Institute of Medical Science and Research Center, Bangalore, Karnataka, India*

ARTICLE INFO

Article history:
Received 28-08-2024
Accepted 03-10-2024
Available online 15-02-2025

Keywords:
Eclampsia
Hypertensive disorders of pregnancy
Maternal complications
Fetal outcomes

ABSTRACT

Background: Eclampsia, a severe complication of preeclampsia, remains a significant cause of maternal and perinatal mortality, especially in low-resource settings. Characterized by convulsive seizures, eclampsia can lead to severe maternal complications such as HELLP syndrome, placental abruption, and postpartum hemorrhage, as well as adverse neonatal outcomes like prematurity, low birth weight, and neonatal death. This study aimed to assess the risk factors, treatment strategies, and maternal-fetal outcomes associated with eclampsia in a tertiary care setting.

Materials and Methods: A retrospective study was conducted at Sapthagiri Hospital in Bengaluru, India, covering cases from January 2021 to June 2024. Data were collected from medical records of pregnant women diagnosed with eclampsia. Variables analyzed included maternal age, BMI, parity, gestational age, blood pressure, proteinuria, and seizure activity. Outcomes were analyzed using SPSS, focusing on maternal complications and neonatal outcomes.

Results: Among 5,403 deliveries, 34 (0.62%) cases of eclampsia were identified. The majority of patients were aged 24-29 years (52.9%) and had a normal BMI (70.6%). Primiparous women constituted 64.7% of the cases. Severe maternal complications included postpartum hemorrhage (70.6%), partial HELLP syndrome (32.4%), and placental abruption (47.1%), with a maternal mortality rate of 2.9%. Neonatal outcomes were concerning, with 62.9% of infants born preterm, 64.9% with low birth weight, and a perinatal mortality rate of 10.8%. Cesarean sections were performed in 85.3% of cases, highlighting the need for rapid intervention.

Conclusion: Eclampsia predominantly affected young, primiparous women with normal BMI, leading to significant maternal and neonatal morbidity and mortality. The findings underscore the importance of early identification and management of eclampsia to improve maternal and neonatal outcomes. Vigilant monitoring and timely intervention, including the use of magnesium sulfate and antihypertensives, are critical in mitigating the severe impacts of this condition.

1. Introduction

Hypertension during pregnancy is a leading cause of maternal mortality and disability worldwide.[1] About 10% of women experience high blood pressure during pregnancy, with preeclampsia affecting 2% to 8% of pregnancies.[2] Preeclampsia can progress to eclampsia, characterized by seizures without a clear cause, which can occur before, during, or after childbirth.[3] Eclampsia is a significant contributor to maternal and perinatal mortality, affecting

* *Corresponding author*.
E-mail address: syedalimunaver@gmail.com (S. A. Munavar).

https://doi.org/10.18231/j.ijogr.2025.011

around 1.56% of pregnancies in India.[4] Risk factors include age extremes, a history of hypertension or diabetes, and multifetal pregnancy.[5] Eclampsia can lead to severe complications for mothers, such as cardiovascular and cerebrovascular diseases, liver issues, placental abruption, and HELLP syndrome.[6] For fetuses and neonates, it can result in problems like preterm birth, low birth weight, stillbirth, and intrapartum death.[6] Treatment typically involves magnesium sulfate for convulsions, antihypertensives like labetalol or nifedipine for blood pressure control, and delivery of the baby to stabilize the mother.[7]

This study aimed to evaluate the risk factors, treatment strategies, and maternal-fetal complications associated with eclampsia, providing insights into how this severe condition impacts both mothers and their infants.

2. Materials and Methods

2.1. Study area

Sapthagiri Hospital, a tertiary care center located in the city of Bengaluru, Karnataka, India.

2.2. Study design and period

A retrospective study was conducted in 2024 to assess maternal outcomes of eclampsia. It involved a three-year chart review from January 2021 to June 2024 at Sapthagiri Hospital, Bengaluru, Karnataka, India.

2.3. Study population

Pregnant women with convulsions admitted to the hospital from Jan 2021 to June 2024.

2.4. Inclusion criteria

Patients suffering from eclampsia.

2.5. Exclusion criteria

Patients with seizure disorder or hypoglycemia and patients with incomplete data.

2.6. Dependent variables

Maternal and fetal outcomes.

2.7. Independent variables

Maternal age, parity, gestational age, blood pressure (BP) at admission, proteinuria (as detected by urine dipstick), seizure activity, and mode of delivery. Key lab values included the complete blood count (CBC), proteinuria, and BP readings from antenatal visits.

2.8. Operational definitions

Hypertension in pregnancy continues to be defined as a clinic sBP ≥ 140 mmHg and/or a dBP ≥ 90 mmHg, with sBP ≥ 160 mmHg and/or a dBP ≥ 110 mmHg defined as severe hypertension.

Gestational hypertension: Hypertension arising de novo at ≥ 20 weeks' gestation in the absence of proteinuria or other findings suggestive of pre-eclampsia.

Pre-eclampsia is gestational hypertension accompanied by one or more of the following new onset conditions at ≥20 weeks' gestation:

1. Proteinuria
2. Maternal end-organ dysfunction,
3. Uteroplacental dysfunction

Eclampsia is the occurrence of convulsions in association with the signs and symptoms of pre-eclampsia.[8]

2.9. Data collection

Data was collected and reviewed from medical and labor records to confirm the diagnosis. These included baseline characteristics, obstetric details, diagnostic information, management strategies, and perinatal outcomes.

2.10. Data analysis

After the data was collected, they were initially checked for completeness, edited, and coded. The extracted data were cleaned, verified for accuracy and consistency, and then entered into Microsoft Excel for analysis. Statistical analysis was conducted using SPSS version 21, employing both descriptive and analytical procedures.

2.11. Ethical consideration

Ethical clearance was taken from the institutional ethical committee of Sapthagiri NPS University.

3. Results

During the study period, 5,403 mothers delivered, with 34 (0.62%) suffering from eclampsia. Most participants (52.9%) were aged 24–29, and a significant proportion (70.6%) had a normal BMI of 18.5-24.9. The majority were primiparous (64.7%). Regarding gestational age, 61.8% delivered between 28-37 weeks, with only 2.9% having preterm deliveries before 28 weeks. These findings offer valuable insights into the demographic and obstetric characteristics of the study population (Table 1).

In this study, 41.18% of patients experienced anemia, with 26% having mild anemia and 15% moderate anemia; no cases of severe anemia were recorded. IVF was reported in 2.9% of participants, and more than half (55.9%) had hypothyroidism. Twin pregnancies were present in 8.8% of

Table 1: Demographic and obstetric details

	Categories	Frequency	Percentage
Age	<24	12	35.3%
	24–29	18	52.9%
	30–34	3	8.8%
	>34	1	2.9%
BMI	<18.5	1	2.9%
	18.5-24.9	24	70.6%
	>25	9	26.5%
Parity	Primi	22	64.7%
	Multi	12	35.3%
Number of children	No children	22	64.7%
	One	8	23.5%
	Two	4	11.8%
Abortion	Zero	30	88.2%
	One	3	8.8%
	Two	1	2.9%
Gestational age	<28	1	2.9%
	28-37	21	61.8%
	>37	12	35.3%

Table 2: Risk factors

	Group	Frequency	Percentage
Anemia	Mild	9	26%
	Moderate	5	15%
	Severe	0	0%
IVF	Yes	1	2.9%
Hypothyroidism	Yes	19	55.9%
Twin	Yes	3	8.8%
	No	32	94.1%
GDM	Yes	9	26.5%
MAP> 85	At admission	100	294.1%
Number of convulsions	1	31	91.2%
	2	2	5.9%
	>3	1	2.9%
GCS	>9	29	85.3%
	<9	5	14.7%
Time between pregnancy	< 5 years	2	66.7%
	> 5 years	1	33.3%

participants, and 26.5% had gestational diabetes mellitus (GDM). The entire group had a mean arterial pressure (MAP) > 85 at admission. Most participants (91.2%) experienced only one convulsion, and 85.3% had a Glasgow Coma Scale (GCS) score of > 9. A short interpregnancy interval of less than 5 years was observed in 66.7% of cases (Table 2).

The study identified serious maternal complications related to eclampsia. Postpartum hemorrhage (PPH) was most common, affecting 70.6% of participants. Partial HELLP syndrome occurred in 32.4% of cases, full HELLP in 11.8%, and placental abruption in 47.1%. PRES was seen in 5.9%, and ICH in 2.9%. The maternal death rate was 2.9%, underscoring the life-threatening nature of these complications (Table 3).

The study assessed neonatal outcomes, revealing significant findings. Among 37 births, 2 were stillbirths, and 35 were live births. Prematurity affected 62.9% of the infants, and 22.9% of live births were asphyxiated at birth. Low birth weight was common, occurring in 64.9% of cases. Birth weights ranged from less than 1000 grams in 16.2% of infants to 2500-3500 grams in 35.1%, highlighting the need for specialized neonatal care (Table 4).

Additionally, 5.7% of babies died within the first week, with perinatal mortality at 10.8% (Chart 1).

All participants received magnesium sulfate and labetalol during their current pregnancy, with 41.2% also receiving nifedipine. In 85.3% of cases, pregnancies were ended by cesarean section.

Table 3: Maternal complications

Variables	Frequency	Percentage
Post partum hemorrhage	24	70.6%
Partial HELLP	11	32.4%
HELLP	4	11.8%
Abruption placenta	16	47.1%
PRES	2	5.9%
ICH	1	2.9%
Maternal death	1	2.9%

Table 4: Fetal outcomes

Variables	Group	Frequency	Percentage
Prematurity	Yes	22	62.9%
Fetal status	Asphyxiated	8	22.9%
	Low birth weight	24	64.9%
	Admission to nursery/ICU	24	68.6%
Birth weight	<1000gm	6	16.2%
	1000-1499gm	4	10.8%
	1500-1999gm	3	8.1%
	2000-2499gm	11	29.7%
	2500-3500gm	13	35.1%

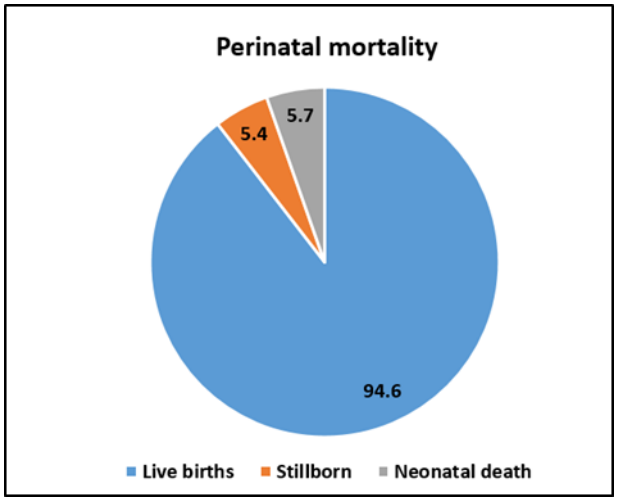

Chart 1: Fetal demise

4. Discussion

This study examines the risk factors, treatments, and maternal-fetal outcomes of eclampsia patients at Sapthagiri Hospital in Bengaluru from 2021 to 2024. In our study, 52.9% of participants were aged 24-29, consistent with Konnur et al., who reported a mean age of 26.5 years among their study participants.[9] A normal BMI (18.5–24.9) was observed in 70.6% of participants, aligning with general trends, although eclampsia is often linked to extreme BMI values, as noted by Maereg Wagnew Meazaw et al.[10]

Most participants (64.7%) in our study were primiparous, consistent with Sushma et al.'s findings, where 72.4% of participants were first-time mothers, suggesting a higher risk of eclampsia in primiparous women.[11]

The gestational age distribution, with 61.8% of deliveries occurring between 28-37 weeks, supports previous research by Emma et al., indicating a median gestational age at delivery of 36.6 weeks, reflecting eclampsia's tendency to result in preterm deliveries.[12]

Approximately 41.8% of the mothers in our study had mild to moderate anemia, which is close to the 51% prevalence reported by Johnson et al.[13] Hypothyroidism was present in 55% of our participants, aligning with Laboni et al.'s findings that hypothyroidism increases susceptibility to severe preeclampsia.[14]

A significant 91.2% of women experienced one convulsion, similar to the findings of Titus K et al., who reported a median of one seizure among their patients.[15]

Our study reported high rates of postpartum hemorrhage (70.6%), partial HELLP syndrome (32.4%), HELLP syndrome (11.8%), and placental abruption (47.1%). These rates are consistent with the literature, where Addisu Yeshambel Wassie et al. documented higher rates of placental abruption (96.2%), postpartum hemorrhage (89.2%), and HELLP syndrome (83.8%). The slightly lower rates in our study may be due to differences in sample size.[16] The maternal death rate of 2.9% is lower than the 7% mortality reported in developing countries by Michal Fishel Bartal et al.[17]

Significant neonatal complications included stillbirth (5.4%), prematurity (62.9%), birth asphyxia (22.9%), low birth weight (64.9%), and neonatal death (5.7%). These findings align with Sanatanu et al.'s study, which reported 9% stillbirth, 33% birth asphyxia, 60% low birth weight, and 5.5% neonatal deaths, with slight differences possibly due to sample size and geographical variations.[18] These outcomes highlight the need for comprehensive neonatal care to address the severe impact of eclampsia on neonatal health.

The use of magnesium sulfate and labetalol in all participants aligns with current eclampsia management guidelines (ACOG, 2020).[19] The high cesarean section rate (85.3%) in our study, compared to 71.9% reported by Tamalew Alemie et al., reflects the need for rapid delivery in severe eclampsia cases to minimize risks to both mother and baby.[20]

5. Conclusion

This study reveals eclampsia struck hardest among younger women aged 24-29, particularly first-time mothers, and was linked to both normal BMI levels.

Preterm deliveries were common, highlighting eclampsia's impact on gestational age. Comorbid conditions like anemia, hypothyroidism stressed the need for early intervention. Maternal complications, including PPH, HELLP syndrome, and placental abruption, were frequent, though maternal mortality was notably lower than in other studies.

Neonatal challenges, such as prematurity and low birth weight, underscored the necessity of comprehensive care. The high rate of cesarean sections reflected the urgency of rapid delivery in severe cases. This study reinforces the importance of vigilant monitoring and timely intervention to improve outcomes for both mothers and infants.

In a dramatic testament to modern obstetric practice, the study reaffirmed the necessity of swift, decisive action, with high rates of cesarean sections underscoring the life-or-death urgency in severe eclampsia cases. Ultimately, this study reinforces the vital importance of vigilant monitoring, rapid intervention, and unwavering commitment to improving outcomes for both mothers and their newborns in the face of this relentless condition.

6. Abbreviations

HELLP: Hemolysis, elevated liver enzyme levels, and low platelet levels, NICU neonatal intensive care unit; C/S, Cesarean-section. PRES: Posterior reversible encephalopathy syndrome, PPH: Postpartum hemorrhage,

ICH: intracranial hemorrhage, GDM: Gestational diabetes mellitus; GHTN: Gestational hypertension, BMI: Body mass index.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Magee LA, Sharma S, Nathan HL, Adetoro OO, Bellad MB, Goudar S, et al. The incidence of pregnancy hypertension in India, Pakistan, Mozambique, and Nigeria: A prospective population-level analysis. *PLoS Med*. 2019;16(4):e1002783.
2. Duley L. The global impact of pre-eclampsia and eclampsia. *Semin Perinatol*. 2009;33(3):130–7.
3. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, et al. Hypertensive disorders. In: Williams Obstetrics. New York: McGraw-Hill Education; 2014. p. 730.
4. Mathew R, Devanesan BP, Srijana, Sreedevi NS. Prevalence of hypertensive disorders of pregnancy, associated factors and pregnancy complications in a primigravida population. *Gynecol Obstet Clin Med*. 2023;3(2):119–23.
5. Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *BMJ*. 2005;330(7491):565.
6. Kongwattanakul K, Saksiriwuttho P, Chaiyarach S, Thepsuthammarat K. Incidence, characteristics, maternal complications, and perinatal outcomes associated with preeclampsia with severe features and HELLP syndrome. *Int J Womens Health*. 2018;10:371–7.
7. Akre S, Sharma K, Chakole S, Wanjari MB. Eclampsia and Its Treatment Modalities: A Review Article. *Cureus*. 2022;14(9):e29080.
8. Douglas KA, Redman CW. Eclampsia in the United Kingdom. *BMJ*. 1994;309(6966):1395–400.
9. Konnur H, Modi S. Maternal complications in eclampsia and pre-eclampsia: an institutional study. *Int J Reprod Contracept Obstet Gynecol*. 2018;7(12):4992–5.
10. Meazaw MW, Chojenta C, Muluneh MD, Loxton D. Systematic and meta-analysis of factors associated with preeclampsia and eclampsia in sub-Saharan Africa. *PLoS One*. 2020;15(8):e0237600.
11. Dev SV, Kadambi M, Nagaraj MD. A study on fetomaternal outcome in eclampsia in a tertiary care institute. *Int J Reprod Contracept Obstet Gynecol*. 2023;12(5):1227–31.
12. Lawrence ER, Beyuo TK, Kobernik EK, Moyer CA, Oppong SA. A comparative analysis of neonatal outcomes in pregnancies complicated by preeclampsia and eclampsia in Ghana. *AJOG Glob Rep*. 2022;2(3):100061.
13. Johnson A, Vaithilingan S, Avudaiappan SL. The Interplay of Hypertension and Anemia on Pregnancy Outcomes. *Cureus*. 2023;15(10):e46390.
14. Dey L, Zebunnesa M, Sen S, Begum M, Tabassum T, Akter F, et al. Association Between Thyroid Dysfunction and Pre-eclampsia with Severe Features. *J Chittagong Med Coll Teachers' Assoc*. 2023;34(1):100–5.
15. Beyuo TK, Lawrence ER, Kobernik EK, Oppong SA. Clinical presentation and predictors of eclampsia among women with hypertensive disorders of pregnancy in Ghana. *Pregnancy Hypertens*. 2022;30:171–6.
16. Wassie AY, Anmut W. Prevalence of Eclampsia and Its Maternal-Fetal Outcomes at Gandhi Memorial Hospital, Addis Ababa Ethiopia, 2019: Retrospective Study. *Int J Womens Health*. 2013;13:231–7.
17. Bartal MF, Sibai BM. Eclampsia in the 21st century. *Am J Obstet Gynecol*. 2022;226(2S):1237–53.
18. Bandyopadhyay S, Das R, Burman M, Datta AK. Neonatal outcomes of eclamptic mothers in a tertiary government rural teaching hospital of Eastern India. *Indian J Child Health*. 2019;6(12):665–8.
19. Gestational Hypertension and Preeclampsia: ACOG Practice Bulletin, Number 222. *Obstet Gynecol*. 2020;135(6):237–60.
20. Alemie T, Abebe A, Adal O, Azazh A, Endeshaw D. Clinical features and outcomes of patients with preeclampsia and eclampsia at Gondar University hospital, Amhara, Ethiopia 2021. *Eur J Obstet Gynecol Reprod Biol X*. 2023;20:100254.

Author's biography

Diya Shah, Junior Resident

Ashwini Nayak U, Professor https://orcid.org/0000-0002-6259-2086

Rajini Uday, HOD

Syed Ali Munavar, MBBS Student https://orcid.org/0009-0005-3647-8078

K B Yuktha, MBBS Student https://orcid.org/0009-0007-0633-1838

Nikhita B M, MBBS Student https://orcid.org/0009-0002-2433-3558

Cite this article: Shah D, Nayak U A, Uday R, Munavar SA, Yuktha KB, Nikhita B M. Comprehensive analysis of eclampsia: Risk factors, complications, interventions, and feto-maternal outcomes. *Indian J Obstet Gynecol Res* 2025;12(1):61-65.