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Original Research Article

A Hospital-Based Study Evaluating Neonatal Outcomes of Eclamptic Mothers

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Abstract

Aim: The aim of the present study was to find out the neonatal outcomes of eclamptic mothers and their significance in a rural tertiary health care in Bihar region.

Methods: This prospective, cross-sectional, observational, and epidemiological study was conducted in the Department of Pediatrics, Jannayak Karpoori Thakur Medical, College and Hospital, Madhepura, Bihar , India for one year. The study comprised newborn babies born to 100 consecutive mothers admitted with eclampsia or with pre-eclampsia but subsequently developing eclampsia along with those born to 100 consecutive non-eclamptic mothers (considered as control) with normal BP.

Results: A total of 90% of both eclamptic mothers took full course of iron-folate supplementation while 52% received at least three antenatal visits at local government subcenters. A total of 70% had hemoglobin of 10 g% or more, as evidenced from their antenatal records. The majority of eclamptic mothers were primigravida (86%), <20 years of age (66%), non-tribals (78%), having body weight of mean 41.19±5.0 kg, height of mean 148.34±6.33 cm, and socioeconomic status of Class IV (90%). There was no significant difference observed in respect of age, weight, height, religion, caste, parity, and socioeconomic status between eclamptic and control mothers and thus, the two groups were statistically matched.

Conclusion: This study emphasizes the need to prevent development of eclampsia at a community level through ANC's and to enhance neonatal care facilities in outreach areas to reduce the high incidence of perinatal morbidity and mortality due to eclampsia.

Keywords: Eclampsia, Late preterm birth, Neonatal outcomes

Introduction

Perinatal mortality is an important indicator of the status of maternal and child health, the conditions of obstetric care and the level of economic development of a community (1). It includes stillborn babies (SB) of more than 28 weeks of gestation and deaths occurring within the first week of life (early neonatal deaths).[1] The perinatal mortality rate (PMR) reflects both the characteristics of reproductive health and the quality of antenatal care, delivery, and newborn care.[2] At the global level, an estimated 7.5 million perinatal deaths take place each year, most of which are in developing countries. The perinatal mortality varies between different regions for instance, it ranges from less than 10 per 1,000 in most developed countries to up to 60 per 1,000 in certain regions of Asia and Africa.[3,4] Eclampsia is defined as the occurrence of fit or seizure in a patient with signs and symptoms of pre-eclampsia in the absence of underlying neurologic disease.[5]

Pre-eclampsia is currently classified as a pregnancy-specific syndrome characterized by the presence of new-onset hypertension (a systolic blood pressure [BP] >140 mm Hg or a diastolic BP >90 mm Hg) in a previously normotensive woman after 20 weeks gestation with proteinuria (urinary excretion of ≥0.3 g of protein in a 24-h specimen).[6] Although the etiopathogenesis is still hypothetical[7], the

development of complications such as placental insufficiency [8,9], placental abruption [9,10], and fetal bradycardia [11,12] in pre-eclampsia/eclampsia syndrome may affect perinatal morbidity and mortality adversely. Over the decades, the incidence of eclampsia in India showed a receding trend with an average being 1.5% according to the reports published from 1976 to 2015.[13]

Common perinatal morbidities seen in babies born to mothers with eclampsia include intrauterine deaths, fetal growth restriction, prematurity, and perinatal asphyxia. Eclampsia occurs more commonly in the last trimester of pregnancy and becomes increasingly more frequent near term. Convulsions may occur antepartum (38%) intra-partum (18%) or post-partum (44%). Primigravida are at a higher risk of convulsions and antepartum convulsions are more dangerous than those beginning after delivery. The etiology of eclampsia is multifactorial. The risk factors for development of eclampsia include genetic predisposition, abnormal trophoblastic invasion, nulliparity, family or past history of preeclampsia and eclampsia, poor outcome of previous pregnancy, lower socioeconomic status, hydatiform mole, fetal hydrops, primigravida and multifetal gestation.[14]

Hence, we planned this study to find out the neonatal outcomes of eclamptic mothers and their significance in a rural tertiary health care in Bihar region.

Methods

This prospective, cross-sectional, observational, and epidemiological study was conducted in the Department of Pediatrics, This prospective, cross-sectional, observational, and epidemiological study was conducted in the Department of Pediatrics, Jannayak Karpoori Thakur Medical, College and Hospital, Madhepura , Bihar, India for one year. The study comprised newborn babies born to 100 consecutive mothers admitted with eclampsia or with pre-eclampsia but subsequently developing eclampsia along with those born to 100 consecutive non-eclamptic mothers (considered as control) with normal BP.

The non-eclamptic mothers were selected after statistically matching the sociodemographic and nutritional profile such as religion, caste, age, socio-economic status, parity, body weight, and height with those of eclamptic mothers. Mothers <28 weeks of gestation or suffering from essential hypertension, chronic illness, epilepsy, or taking any drug with teratogenicity and those giving birth to twin babies or babies with gross congenital malformation were excluded from both the groups. All the mothers included in the study were first evaluated clinically by history including age, parity, last menstrual period, and socioeconomic status according to modified Kuppuswamy scale, 2007 [15], detailed data from antenatal records and then by examination including weight, height, and BP. Data from history and clinical examination for the demographic variables of the eclamptic mothers were then collected. They were then computed with those of the non-eclamptic mothers for matching and selection as control group.

All eclamptic mothers were treated routinely as per institutional protocol with magnesium sulfate at a loading dose of 2.5 g deep intramuscular (IM) in each buttock along with 3 g intravenous (IV) bolus over 15 min followed by a maintenance dose of 2.5 g magnesium sulfate deep IM every 4 hourly. Mothers with BP >160/110 mmHg were treated with labetalol 10 mg IV stat followed by repeat doses of 20–40 mg IV, if needed and a maintenance dose at the rate of 10 mg IV 8 hourly or 100 mg po 8 hourly. All the neonates in the labor room or operation theatre were evaluated at birth for birth asphyxia and managed accordingly. Routine Apgar scoring at 1 min and 5 min, capillary blood glucose (CBG), and serum Ca estimation were also done for all at birth. All the neonates were re-examined at 24 h after birth including gestational age according to New Ballard scores [16], estimation of body weight percentile according to intrauterune weight chart [17] and anthropometry and were routinely followed until completed 7th postnatal day or through their course of illness. Sick neonates of eclamptic and non-eclamptic mothers were further evaluated by sepsis screen as per the institutional protocol, and other relevant investigations like blood culture, CBC,chest x-ray, ultrasonography etc. and treated accordingly. In categorizing the various neonatal outcomes, the WHO working definitions of preterm as delivery before 37 completed weeks of gestation, low birth weight (LBW) as birth weight <2.5 kg, intrauterine growth retardation (IUGR) as birth weight <10th percentile according to gestational age, birth asphyxia as APGAR score at one minute < 7, early-onset sepsis (EOS) as onset of sepsis within 3 days of postnatal period, early neonatal death (END) as neonatal death within 7 days of postnatal period, and stillbirth as delivery of dead fetus after 28 weeks of gestation were followed.

All the data were compiled and analyzed in the SPSS (version 25.0) software for appropriate statistical tests. Student t-tests for continuous maternal variables to compare means and Chi-square tests for categorical variables were done to find no significant difference ($p>0.05$) between the two groups of eclamptic and control mothers. Chi-square tests were done to find out the significance ($p< 0.05$) of association between neonatal outcomes and eclampsia.

Results

Table 1: Demographic details

Variables	Cases	Controls
Age (years)		
17–19	65 (65%)	60 (60%)
20–21	25 (25%)	26 (26%)
22–24	10 (10%)	14 (14%)
Parity		
0	85 (85%)	80 (80%)
1	15 (15%)	20 (20%)
Antenatal care		
≤2 visits	10 (10%)	10 (10%)
≥3 visits	90 (90%)	90 (90%)
Socioeconomic status		
Class III	10 (10%)	12 (12%)
Class IV	90 (90%)	88 (88%)
Weight (kg)		
30–34	12 (12%)	10 (10%)
35–39	18 (18%)	16 (16%)
40–44	50 (50%)	50 (50%)
45–50	20 (20%)	22 (22%)
>50	0	2 (2%)
Height (cm)		
132–143	16 (16%)	16 (16%)
145–150	64 (64%)	62 (62%)
152–168	20 (20%)	22 (22%)
Religion		
Hindu	80 (80%)	74 (74%)
Non-Hindu	20 (20%)	26 (26%)
Caste		
General	78 (78%)	72 (72%)
Tribal	22 (22%)	28 (28%)
Parity		
Nulliparous	86 (86%)	80 (80%)
Multiparous	14 (14%)	20 (20%)

A total of 90% of both eclamptic mothers took full course of iron-folate supplementation while 52% received at least three antenatal visits at local government subcenters. A total of 70% had hemoglobin of 10 g% or more, as evidenced from their antenatal records. The majority of eclamptic mothers were primigravida (86%), <20 years of age (66%), non-tribals (78%), having body weight of mean 41.19±5.0 kg, height of mean 148.34±6.33 cm, and socioeconomic status of Class IV (90%). There was no significant difference observed in respect of age, weight, height, religion, caste, parity, and socioeconomic status between eclamptic and control mothers and thus, the two groups were statistically matched.

Table 2: Outcomes of newborns to eclamptic and control mothers

Outcomes	Case n (%)	Control n (%)	p value
Preterm	40 (40)	18 (18)	0.001
LBW	60 (60)	32 (32)	<0.001
IUGR	12 (12)	03 (3)	0.032
Birth asphyxia	30 (33)	16 (16)	0.016
HIE	08 (8)	02 (2)	0.087
EOS	09 (9)	04 (4)	0.211
END	05 (5)	02 (2)	0.399
Stillbirth	09 (9)	04 (4)	0.251

In this study, four significant neonatal outcomes of eclamptic mothers were observed as preterm (OR=3.037, 95% CI=1.588–5.808, p=0.001), LBW (OR=3.188, 95% CI=1.784–5.694, p<0.001), IUGR (OR=4.409, 95% CI=1.204–16.141, p=0.032), and birth asphyxia (OR=2.459, 95% CI=1.231–4.913, p=0.016) while other outcomes as hypoxicischemic encephalopathy (HIE) (OR=4.530, 95% CI=0.936–

21.936, p=0.087), EOS (OR=2.524, 95% CI=0.749–8.507, p=0.211), END (OR=2.733, 95% CI=0.517–14.454, p=0.399), and stillbirth (OR=2.374, 95% CI=0.706–7.978, p=0.251) were not significant. Only live born babies were considered for the statistical study of birth asphyxia, HIE, EOS, and END. The majority (n=34, 85%) of the preterm newborns of eclamptic mothers were observed as late preterm babies (34–36 weeks of gestation) against only 44.4% (n=8) among the control group (OR=7.083, 95% CI=1.986–25.270, p=0.004).

Discussion

Pre-eclampsia, previously termed as "toxemia of pregnancy," is multisystem disorder of pregnancy. It complicates approximately 5-8% of all pregnancies.[18] It has a highly variable clinical presentation but is usually associated with new-onset hypertension and proteinuria, occurring after 20 weeks of gestation. It carries increased risk of renal failure, cerebral and cardiovascular complications, placental abruption, and coagulopathy.

Eclampsia is defined as one or more generalized convulsions in a patient with signs and symptoms of pre-eclampsia, providing the absence of underlying neurologic disease. Eclampsia remained a significant public health threat in both developed and developing countries contributing to maternal and perinatal mortality.[19] It is among the leading causes of maternal morbidity and mortality worldwide.[20]

In this study, significantly more preterm babies were born to eclamptic mothers (p=0.001). This is comparable to a study done by Singhal et al. which showed that 74.5% of babies were preterm.[21] Shaheen et al. also reported 62.5% of preterm births.[23] Parveen and Akhter reported 59% [24] while Jha et al. found 50% [26] of preterm births in their studies. In other similar studies, the percentage of preterm births observed by Yaliwal et al. was 17% [25], 26.1% by George and Jeremiah [22], and 31.1% by Sangkomkamhang et al.[27] This study also observed an increased incidence of late preterm births (34–36 weeks of gestation) with eclampsia being a significant risk factor (p=0.004). This is comparable to the studies done by Carter et al. [29] and Patil and Patil [30] which suggested eclampsia as one of the most common comorbidities or variables associated with increased risk of late preterm birth.

In this study, LBW babies were documented as a significant outcome of eclampsia (p<0.001). Parveen and Akhter and Singhal et al. observed 70%[24], 68.6%[21] of preterm births, respectively, as compared to Sangkomkamhang et al. who found lesser percentage of 34.4%.[27] IUGR came out as a significant outcome (p=0.032) in our study, which is comparable to the observation done by Ayaz et al.[28], while another study done by Sangkomkamhang et al. showed a lower incidence.[27]

One of the important concerns in the management of eclampsia is shortage of available screening test for fetal distress. They lacked the basic antenatal care, let alone had the access to advanced investigations such color Doppler. Doppler studies of fetal and placental circulation provide important evidence regarding fetal health, granting an opportunity to improve perinatal outcome. Higher perinatal mortality in the present study points toward the need to improve the utilization of antenatal care services, timely management of pregnancy-induced hypertension, early detection of fetal distress, prompt delivery, and appropriate resuscitation measures.

Conclusion

This study emphasizes the need to prevent development of eclampsia at a community level through ANC's and to enhance neonatal care facilities in outreach areas to reduce the high incidence of perinatal morbidity and mortality due to eclampsia. Eclampsia is a serious risk to maternal health and fetal viability and is one of the important factors responsible for maternal and neonatal mortality and morbidity. Our study concludes that regular antenatal visits and controlling BMI in mothers can reduce incidence of eclampsia. Early intervention can reduce maternal and fetal complications. Prematurity, growth restriction and low birth weight are neonatal complications which can be seen in babies born to mothers with eclampsia.

References

1. Yu VY. Global, regional, and national perinatal and neonatal mortality.
2. Jackson DJ, Lang JM, Ganiats TG. Epidemiological issues in perinatal outcomes research. Paediatric and perinatal epidemiology. 1999 Oct 1;13(4):392-404.
3. World Health Organization. Neonatal and perinatal mortality: country, regional and global estimates. Geneva: World Health Organization. 2006.
4. Stanton C, Lawn JE, Rahman H, Wilczynska-Ketende K, Hill K. Stillbirth rates: delivering estimates in 190 countries. The Lancet. 2006 May 6;367(9521):1487-94.
5. Kwawukume EY. Hypertension in Pregnancy. In: Comprehensive Obstetrics in the tropics. Kwawukume EY, Emuveyan EE. (ed) Accra: Asante & Hittscher Printing Press Limited. 2002; p173-182.
6. Report of the national high blood pressure education program working group on high

blood pressure in pregnancy. Am J Obstet Gynecol 2000;183: S1-22.
7. Bell MJ. A historical overview of preeclampsia-eclampsia. Journal of Obstetric, Gynecologic & Neonatal Nursing. 2010 Sep 1;39(5):510-8.
8. Roberts JM, Hubel CA. The two stage model of preeclampsia: variations on the theme. Placenta. 2009 Mar 1;30:32-7.
9. Andrew DB. Preeclampsia and eclampsia. In: Neil S, editor. Oh's Intensive Care Manual. 7th ed., Ch. 63. Oxford: Elsevier Ltd.; 2014. p. 677-83.
10. Resnik R, Creasy R, Iams J, Lockwood C, Moore T, Greene M. Creasy and Resnik's Maternal-fetal Medicine: Principles and Practice. 7th ed. Philadelphia, PA: Saunders, an Imprint of Elsevier Inc.; 2014. p. 732-42.
11. Fleisher L, Roizen M, Roizen J. Essence of Anesthesia Practice. 4th ed., Ch. 155. Philadelphia, PA: Elsevier Inc.; 2018. p. 153-4.
12. ACOG Committee on Obstetric Practice. ACOG practice bulletin. Diagnosis and management of preeclampsia and eclampsia. Number 33, January 2002. American College of Obstetricians and Gynecologists. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics. 2002 Apr;77(1):67-75.
13. Nobis PN, Hajong A. Eclampsia in India through the decades. The Journal of Obstetrics and Gynecology of India. 2016 Oct;66(1):172-6.
14. Bilano VL, Ota E, Ganchimeg T, Mori R, Souza JP. Risk Factors of Pre- Eclampsia/Eclampsia and Its Adverse Outcomes in Low- and Middle-Income Countries: A WHO Secondary Analysis. Young RC, ed. PLoS ONE. 2014;9(3):e91198.
15. Kumar N, Shekhar C, Kumar P, Kundu AS. Kuppuswamy's socioeconomic status scale-updating for 2007. Indian journal of pediatrics. 2007 Dec 1;74(12):1131-2.
16. Ballard JL, Khoury JC, Wedig KL, Wang L, Eilers-Walsman BL, Lipp R. New Ballard Score, expanded to include extremely premature infants. The Journal of pediatrics. 1991 Sep 1;119(3):417-23.
17. Singh M. Care of Newborn. 7th ed. New Delhi: Sagar Publications; 2010. p. 243.
18. Stark AR, Hansen AR, Eichenwald EC, Martin CR, Jain N, editors. Preeclampsia and related conditions. In: Manual of Neonatal Care. Alphen aan den Rijn, Netherlands: Wolters Kluwer; 2021. p. 35-46.
19. Osungbade KO, Ige OK. Public health perspectives of preeclampsia in developing countries: implication for health system strengthening. Journal of pregnancy. 2011 Jan 1;2011.
20. Ghulmiyyah L and Sibai B. Maternal mortality from preeclampsia/ eclampsia. Semin Perinatol. 2012;36(1):56-59.
21. Singhal S, Deepika A, Nanda S. Maternal and perinatal outcomes in severe pre-eclampsia and eclampsia. South Asian Fed Obstet Gynecol 2009;1:25-8.
22. George IO, Jeremiah I. Perinatal outcome of babies delivered to eclamptic mothers: a prospective study from a Nigerian tertiary hospital. International journal of biomedical science: IJBS. 2009 Dec;5(4):390.
23. Shaheen B, Hassan L, Obaid M. Eclampsia, a major cause of maternal and perinatal mortality: a prospective analysis at a tertiary care hospital of Peshawar. Journal-Pakistan Medical Association. 2003 Aug 1;53(8):346-9.
24. Alam IP, Akhter S. Perinatal outcome of eclampsia in Dhaka medical college hospital. Bangladesh Journal of Obstetrics & Gynaecology. 2008;23(1):20-4.
25. Yaliwal RG. Eclampsia and perinatal outcome: A retrospective study in a teaching hospital.
26. Jha R, Verma S, Jha SK. Eclampsia in Janakpur zonal hospital, Nepal: Favourable outcome with Magnesium sulphate. Nepal Journal of Obstetrics and Gynaecology. 2007;2(1):17-9.
27. Sangkomkamhang U, Laopaiboon M, Lumbiganon P. Maternal and neonatal outcomes in pre-eclampsia and normotensive pregnancies. Thai Journal of Obstetrics and Gynaecology. 2010:106-13.
28. Ayaz A, Muhammad T, Hussain SA, Habib S. Neonatal outcome in pre-eclamptic patients. Journal of Ayub Medical College Abbottabad. 2009 Jun 1;21(2):53-5.
29. Carter MF, Fowler S, Holden A, Xenakis E, Dudley D. The late preterm birth rate and its association with comorbidities in a population-based study. American journal of perinatology. 2011 Oct;28(09):703-8.
30. Patil S, Patil KP. Analysis of risk factors of late preterm birth: A case-control study. Indian Journal of Health Sciences and Biomedical Research (KLEU). 2017 Sep 1;10(3):283.