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Original Research Article

Perinatal outcome in preeclampsia at tertiary care center

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ABSTRACT

Background: In India, preeclampsia and other hypertensive disorders of pregnancy are still one of the leading causes of adverse perinatal outcome.

Methods: The observation descriptive study of preeclampsia with predetermined sample size of 195 was conducted at department of obstetrics and gynaecology at Government Medical College of Latur, over a time period of six month from March 2021 to August 2021. Findings are compared in frequency percentage values with the perinatal outcome of normotensive group from other study.

Results: The prevalence of preeclampsia in our study was 4.1%. LBW found in preeclampsia group 32.3% versus 15% in normotensive group. Prematurity accounts for preeclampsia group 18.4% vs. 9% in normotensive group. Perinatal mortality rate is found to be 8.7 % vs. 2% in preeclampsia group vs. normotensive group respectively. Low APGAR score and NICU admission rate account for 14.8% vs. 13% and 16.4% vs. 11% respectively in preeclampsia and normotensive group. Both FGR and oligohydroamnious accounts for 15.8% in preeclampsia group. Important predictors of unfavourable perinatal outcome with p value significant ($p < 0.05$), found in our study are severe and early onset of preeclampsia, severity of proteinuria and low birth weight.

Conclusions: Adverse perinatal outcome in form of low birth weight, prematurity, fetal growth restriction and mortality is still high in preeclampsia patients than normotensive. So early diagnosis and treatment of preeclampsia is very crucial along with screening in high-risk patients to prevent unfavourable perinatal outcome.

Keywords: Preeclampsia, Adverse perinatal outcome, Low birth weight, FGR, Prematurity, Severity and early onset of preeclampsia

INTRODUCTION

Globally, hypertensive disorder in pregnancy (HDP) is a significant public health threat both in developed and developing countries contributing to high perinatal death.¹⁻³ Preeclampsia complicates 2-8% of pregnancies in the Western world.⁴ However, the magnitude of preeclampsia in developing countries reaches up to 16.7%.⁵ Preeclampsia is the new onset of hypertension and proteinuria after 20 weeks of gestation in a

previously normotensive woman.⁶ Perinatal complications are related to the severity of preeclampsia, duration of the disease and degree of proteinuria.^{5,6} Spasm of the uteroplacental circulation leads to fetal distress, accidental haemorrhage, FGR, IUD, low birth weight, low APGAR score, NICU admissions and early neonatal death.⁷ Perinatal morbidity is increased due to spontaneous preterm labour or iatrogenic preterm induction.⁸ Different studies documented high perinatal mortality rate among women with hypertensive disorders

of pregnancy. Therefore, it was very important to assess fetal and neonatal outcome of pregnant mothers in order to devise different strategies to reduce fetal and neonatal morbidity and mortality.

METHODS

Study type, study place and study period

The observation descriptive study of preeclampsia with predetermined sample size of 195 was conducted at setting of tertiary care center, department of obstetrics and gynaecology at Government Medical College of Latur over a time period of six month from March 2021 to August 2021 till the sample size of 195 was achieved.

Inclusion criteria

Preeclampsia patients with blood pressure of >140/90 mmHg of two occasions 6 hrs apart with urine albumin 2+ on dipstick method admitted and delivered in labour room in emergency were included.

Exclusion criteria

Patients with other hypertensive disorders including eclampsia, other medical disorders like diabetes, heart disease were excluded.

Sample size and sampling method

Sample size is calculated using formula,

$$\text{sample size} = \frac{4PQ}{L^2},$$

where prevalence (P) of 8% with L is error upto 20% was considered. Sampling method used was simple random sampling.

Statistical analysis

Data were collected using a semi-structured, pre-tested and interview based questionnaire adapted from the literatures. Descriptive statistics like frequencies and percentage was performed. Fischer test was applied to find out the association of variables with outcome. Variables having p value less than 0.05 in analysis were considered to be statistically significant.

Operational definitions

Preeclampsia is a new onset hypertension that appears at 20 weeks or more gestational age of pregnancy defined as a sustained systolic BP \geq 140 mmHg and diastolic BP \geq 90 mmHg based on the average of at least two measurements, using the same arm.⁶ Depending on severity of disease, preeclampsia is categorized as mild and severe. Severe preeclampsia in our study included cases with blood pressure reading of >160/110 mmHg on

admission irrespective of severity of proteinuria and other symptoms.

The adverse perinatal outcome was defined as a newborn with the occurrence of any of the these outcomes low birth weight (LBW), birth asphyxia, prematurity, FGR, admission to neonatal intensive care unit (NICU), low APGAR score and perinatal death. Birth asphyxia was defined as a baby with trouble in breathing (gasping or breathing very irregularly or no breathing). Stillbirth was defined as a baby born with no signs of life at or after 28 weeks gestation.⁹ FGR defined as a birth weight of newborn below the tenth percentile of weight distribution at the specified gestational age of a pregnancy.¹⁰ LBW was defined as a baby with a birth weight less than 2500 g.¹¹ Preterm delivery was defined as the delivery of the baby below 37 weeks gestation¹¹. Low Apgar score defined as a newborn baby with an Apgar score of less than 7 at 1 and 5 min.¹¹ Unfavourable perinatal outcome includes either one of the adverse perinatal outcome.¹² In our study, we have counted unfavourable outcome as still birth and NICU admission. Favourable outcome include without any adverse perinatal outcome.¹³ In our study it was live at birth and NICU admission was not required.

RESULTS

The prevalence of preeclampsia in our study was found to be 4.1% with total number of deliveries 4655 during period of 6 months. Sociodemographic characters are depicted in Table 1.

Table 1: Demographic characteristics (n=195).

Characteristics	N	%
Age (years)		
16-20	47	24.1
21-25	113	57.9
26-30	33	16.9
31-35	2	1.02
>35	0	0
Parity		
Primipara	113	57.9
Multipara	82	42
Booking status		
Booked	183	93.8
Unbooked	12	6.1
Referral status		
Yes	141	72.3
No	54	27.6
Residence		
Rural	141	72.3
Urban	54	27.6
Gestation age (weeks) at delivery		
Preterm	36	18.4
28-34	13	6.6
>34-36.6	23	11.7
Term (>37)	159	81.5

In our study, preeclampsia most commonly found in the age group of 21-25 years, 57% followed by 24% in teenager group 16-20 years, 16% in 25-30 years, 1% in 31-35 years. None preeclampsia case noted in >35 age group in our study. Parity wise, most cases, 57.9% found in primipara and 42% in multipara. As per booking status, 93% cases were booked while only 6% cases were unbooked. Referrals status showed 72% cases were referred from rural hospital and primary health care center while 27% cases were registered at study setting OPD. Distribution of cases as per gestational age includes, 81% cases as term and 18% preterm. Clinical profile of preeclampsia cases in our study as seen in Table 2.

Table 2: Obstetric profile (n=195).

BP level on admission (mmHg)	N	%
Mild preeclampsia (>140/90 to <160/110)	156	80
Severe preeclampsia (>160/110)	39	20
Onset of preeclampsia		
Early onset <34 weeks	13	6.6
Late onset >34 weeks	182	93.3
Proteinuria on admission (dipstick method)		
2+	181	92.8
>2+	14	7.1
Mode of delivery		
Vaginal	66	33.8
Cesarean	129	66.1
Indication of cesarean (n=129)		
Fetal indication	100	77.5
Maternal indication	29	22.4
USG parameters		
Oligohydroamnious		
Present	36	18.4
Absent	159	81.5
Doppler study		
Done	129	66.1
Not done	66	33.8
Doppler changes (n=129)		
Absent	99	50.7
Present	30	15.3
Timing of diagnosis of preeclampsia		
At time of admission	152	77.9
Before admission	43	22
Inj. MgSO₄ required		
Yes	51	26.1
No	144	73.8

According to severity, most of the cases, 80% were mild preeclampsia and 20% were of severe type. As per time of onset, most cases were late onset, 93% were and 6.6% cases were early onset. Proteinuria on admission, by dipstick method shows 2+ in most of the cases, 92% and in 7% cases >2+. According to mode of delivery, cesarean section route is found to be more common, 66% than vaginal delivery which was in 33% cases only. Indication for cesarean were mostly for fetal cause found

in 77% cases while in 22% cases for maternal reason. Oligohydroamnious was found in 18% cases. Doppler studies were done in 129 cases only out of which abnormal Doppler changes were found in 30 cases, 15%.

Table 3: Perinatal outcome (n=195).

Parameters	N	%
Birth weight (kg)		
≥2.5	136	69.7
<2.5 (LBW)	59	30.2
<2.5 -1.5	46	77.9
<1.5-1	9	15.2
<1-500 gm	4	6.7
Fetal outcome		
Livebirth	182	93.3
IUD	13	6.6
Gestational age at birth		
Term	159	81.5
Preterm (prematurity)	36	18.4
APGAR score of livebirth at 5 min (n=182)		
≥7	155	85.1
<7	27	14.8
NICU admission required for live birth (n=182)		
No	152	83.5
Yes	30	16.4
Causes of NICU admission (n=30)		
FGR	17	56.6
Prematurity	9	30
Birth asphyxia	4	13.3
Outcome of NICU admission (n=30)		
Live	26	86.6
Neonatal death (within 7 days)	4	13.3
Perinatal status at time discharge		
Alive at discharge	178	91.2
Dead at discharge	17	8.7

We also observed that diagnosis of preeclampsia was done first time in most of cases, 77%, after admission to our department at tertiary care center and not before at previous health centers where antenatal care was sought throughout duration of pregnancy.

Table 4: Adverse (unfavourable) perinatal outcome (n=195)

Outcome	N	%
Oligohydroamnious	36	18.4
LBW	59	30.2
Prematurity	36	18.4
FGR	31	15.8
Birth asphyxia	4	2
Perinatal mortality	17	8.7

Diagnosis was done only in 22% cases, before referral to our center. Injection Magnesium sulphate was required in 26% cases with premonitory symptoms of impending eclampsia, adding to morbidity of preeclampsia patients. Perinatal outcome in our study >2.5 kg birth weight was

noted in 69.9% cases while low birth weight (LBW) was found in 30% cases as shown in Table 3. Out of LBW cases, most cases i.e., 77% were in <2.5-1.5 kg group, 15.6% in <1.5-1 kg and 6.7% in <1 kg-500 gm group. Prematurity was found in 18.4% cases. NICU admission required in 16.4% newborns and cause was FGR, prematurity and birth asphyxia in 56%, 30% and 13% cases respectively. Most common cause for NICU admission is FGR in our study. There were 4 neonatal

death in NICU and all were preterm cases. Overall perinatal status at time of discharge was, 91% cases live and 8.7% dead. Adverse perinatal outcome in our study which include oligohydroamnios in 18.4% cases is shown in Table 4. Prematurity, LBW and FGR was seen in 32.3%, 18.4% and 15.8% respectively. Birth asphyxia and perinatal mortality account for 2% and 8.7% cases. Factors affecting perinatal outcome in our study are shown in Table 5.

Table 5: Factors affecting perinatal outcome.

Factors	Favourable outcome	Unfavourable outcome	X ² value	P value	Significance
	N (%)	N (%)			
Parity					
Primi	90 (79)	23 (20.3)	0.45	0.5	Not significant
Multi	62 (75)	20 (24.3)			
Severity of HT					
Mild	142 (91)	14 (8.9)	77.60	0.0001	Significant
Severe	10 (25.6)	29 (74.3)			
Onset of preeclampsia (weeks)					
Early <34	0	13 (100)	-	0.0001	Significant*
Late ≥34	153 (84)	29 (15.9)			
Proteinuria severity					
2+	146 (80.6)	35 (19.3)	10.81	0.001	Significant
3+ to 4+	6 (42.8)	8 (57.1)			
Mode of delivery					
Vaginal	49 (74)	17 (25)	0.8	0.37	Not significant
Cesarean section	103 (79)	26 (20)			
Birth weight (Kg)					
≥2.5	132 (97)	4 (2.9)	95.5	0.0001	Significant
<2.5	20 (33.8)	39 (66.1)			
Inj. MgSO ₄	28 (54)	23 (45)	-	0.9	Not significant

* Fischer's Exact test.

It is found that unfavourable outcome was seen mainly in severe (74%) and early onset preeclampsia (100%), severe proteinuria and low birth weight (66.1%) cases with significant $p < 0.05$. While parity, mode of delivery and injection MgSO₄ given to mother were not affecting perinatal outcome as p value was not significant i.e., > 0.05 .

DISCUSSION

The aim of this study was to assess the effect of preeclampsia on perinatal outcomes. We found that women with preeclampsia had a higher rate of adverse perinatal outcomes such as low birth weight, birth asphyxia, FGR, preterm delivery, stillbirth, admission to NICU and perinatal death. Preeclampsia was common in young (<25 years) and teenager primipara. So unfavourable perinatal outcome was seen more in young⁸ and teenager primiparous women. So public awareness about prevention of pregnancy in teenagers (<20 years) patients is very important. Though 93% cases were booked, still preeclampsia was not detected earlier in these cases which indicate quality of antenatal care required to be improved. Also most of the cases were

referred and diagnosed first time on admission to tertiary center. This suggest necessity of early detection and initiating treatment before referral, at health care centers where antenatal care was taken primarily.

Table 6: Perinatal outcome in normotensive group*(N=100) and preeclampsia group (N=195).

Parameters	Normotensive	Preeclampsia
	N (%)	N (%)
Live birth	98 (98)	182 (93)
IUD	2 (2)	13 (6.6)
LBW	15 (15)	59 (30.2)
Prematurity	9(9)	36 (18.4)
FGR	6 (6)	31 (15.8)
NICU Admission	11 (11.2)	30 (16.4)
APGAR <7	13 (13.2)	27 (14.8)
Early neonatal death	0	4 (2.1)
Perinatal mortality	2 (2)	17(8.7)

*Normotensive group findings taken from other study.²

Strengthening quality of antenatal care at primary and rural health centers, also at private hospitals is required, so as to improve both maternal and perinatal outcome in preeclampsia. Most of the cases were mild preeclampsia

cases (80%) and with late onset (93%), found to had favourable perinatal outcome while severe type and early onset preeclampsia had unfavourable outcome ($p < 0.05$, significant).

Table 7: Comparison of findings of our study with similar other study.

Parameters	Our study 2022, %	Doddamani et al. ¹⁴ 2014, %	Vats et al. ² 2016, %	Thakur et al. ¹⁵ 2019, %	Patel et al. ¹⁶ 2021, %	Behre et al. ¹⁷ 2020, %
Country	India	India	India	Nepal	India	Ethiopia
Prematurity	18.4	53.4	26.6	62	68	40
LBW	30.2	60	31.6	50	63	37
FGR	15.8	-	-	-	14.16	-
NICU admission	16.4	26	25.5	56	70	28
PMR	8.7	17.3	10	18.7	5.8	15
APGAR <7	14.8	38.6	24.5	43	-	40

So prevention and strict monitoring of early onset and severe preeclampsia is very important. In our study proteinuria of >2+ was found to be adversely affecting fetal outcome ($p < 0.05$, significant). So monitoring degree of proteinuria and preventing further progression by controlling blood pressure with medications is required. High rates of abnormal antenatal ultrasonography parameters i.e. oligohydramnios and Doppler changes in preeclampsia patients, mainly influenced the mode of delivery. So cesarean route was more common i.e., 66 % than vaginal route which include only 33% cases. And maximum indication i.e., 77% of cesarean were for fetal cause. In spite of cesarean delivery mode was more common than vaginal, it did not affected perinatal outcome. Significantly ($p > 0.05$). So unnecessary operative intervention need to be avoided to prevent postoperative maternal morbidity.

Comparison with other studies

Comparison of perinatal outcome between normotensive and preeclampsia group is depicted in (Table 6). It is found that perinatal morbidity in form of LBW, FGR, prematurity and mortality is more common in preeclampsia group than normotensive group.² Comparison of findings of our study with other studies on preeclampsia. Doddamani et al, Vats et al, Thakur et al, Patel et al and Behre et al also found similar higher rates of adverse perinatal outcome in preeclampsia patients in their studies like ours.^{2,14-17} This again implies necessary of blood pressure control in preeclampsia patients throughout pregnancy for favourable perinatal outcome. So public awareness programme, preventive strategies like screening of preeclampsia in first trimester are equally important as early diagnosis and treatment.⁶

Limitations

It is descriptive study and not the randomized one. Also, effects of antenatal care quality and maternal

complication on perinatal outcome could not be studied out.

CONCLUSION

Preeclampsia is largely responsible for high perinatal morbidity and mortality which increases as the severity of preeclampsia increases. The causes for high perinatal mortality are mainly prematurity, fetal growth restriction and low birth weight. Health care providers should strengthen the primary and secondary prevention i.e., screening, early diagnosis and prompt management of preeclampsia to reduce the incidence of adverse perinatal outcomes. Public health awareness, education of primary health care workers and improvement of socio-economic circumstances can help to improve neonatal prognosis.

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