International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Priyamvadha PM et al. Int J Reprod Contracept Obstet Gynecol. 2022 Jun;11(6):1691-1697
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20221441

Original Research Article

Maternal and perinatal outcome in pregnancies complicated by preeclampsia: a hospital based prospective study

P. Meenakshi Priyamvadha[1]*, R. Kala[1], A. Kumar[2]

[1]Department of Obstetrics and Gynaecology, [2]Department of Paediatrics, Government Head Quarters Hospital, Cuddalore, Tamil Nadu, India

Received: 30 March 2022
Revised: 03 May 2022
Accepted: 04 May 2022

***Correspondence:**
Dr. P. Meenakshi Priyamvadha,
E-mail: priyamvadhameenakshi@gmail.com

ABSTRACT

Background: The aim was to study maternal and fetal outcomes in pre-eclamptic mothers and to study sociodemographic distribution, severity of preeclampsia.
Methods: This was a prospective observational study conducted in the department of obstetrics and gynaecology at Government head quarters hospital, Cuddalore, Tamil Nadu, for 12 months (October 2019 to September 2020). 108 preeclamptic mothers between 32-39 weeks of gestational age who met the inclusion and exclusion criteria were studied consecutively.
Results: Among 108 participants, 52.7% were primi, 69.4% belonged to SE class-IV, 45.4% were between 21-25 years, 44.4% were referral cases, 60.1% had BMI >25 kg/m^2, 79.6% had late onset preeclampsia, 11.1% had preterm delivery. LSCS rate was 81.5% with most common indication fetal distress 22.7% then oligohydraminos 18.2%. Recurrent preeclampsia among patients with previous childbirth was 48.6%. Maternal complications were 17.6% severe preeclampsia, 13% PPH, 3.7% abruption, 3.7% antepartum eclampsia, 1.9% postpartum eclampsia. 25.9% patients got admitted in maternal ICU. 68.4% of the severe preeclamptic patients were treated with $MgSO_4$ regimen. 6.48% of patients had imminent symptoms. 11.1% neonates had APGAR score 4-6. Neonatal complications 30.5% LBW, 33.3% SGA, 14.8% FGR, 1.9% still birth and 0.9% IUFD. 48.6% neonates were admitted in NICU. There was no maternal mortality in this study.
Conclusions: Fetomaternal morbidities of preeclampsia is reduced by emphasising early registration and admission, providing adequate nutrition through existing government schemes, educating women on significance of routine antenatal check up at PHCs with BP monitoring, albuminuria evaluation and clinical evaluation of fundal height at each visit. Screening Doppler and growth scan done for timely intervention.

Keywords: Preeclampsia, Eclampsia, $MgSO_4$, Maternal outcome and fetal outcome

INTRODUCTION

Hypertensive disorders of pregnancy was caused due to multiple factors. It's evident from previous studies that hypertensive disorders of pregnancy is one of the highest prevalent obstetric complications. Prevalence of hypertensive disorders of pregnancy may range from 5% of all pregnancies up to 10% according to the region of the study.[1] The burden of hypertensive disorders of pregnancy is not only limited to maternal morbidity and mortality but also significant number of fetal complications. Hypertensive disorders of pregnancy is divided into four groups: gestational hypertension, preeclampsia and eclampsia, chronic hypertension, preeclampsia superimposed on chronic hypertension.[2]

Preeclampsia is a multisystem disorder. Preeclampsia is development of hypertension: blood pressure (BP)

≥140/90 mmHg after 20 weeks of gestational age with significant proteinuria in previously normotensive and non proteinuric women.[3] Severe preeclampsia is a type of preeclampsia with BP ≥160/110 mmHg or any of the following features, eclampsia, recurrent seizure, placental abruption, hepatic failure, AKI, thrombocytopenia, hemolysis elevated liver enzymes and elevated platelets (HELLP), disseminated intravascular coagulation (DIC), severe epigastric pain, pulmonary edema, stroke and cerebral or visual disturbances.[4,5] Following theories have been proposed to explain mechanism of hypertensive disorders of pregnancy-abnormal trophoblastic invasion of uterine blood vessels, inflammatory changes, genetic causes, immunological intolerance between maternal and fetoplacental tissues, dietary deficiency.

Hypertensive disorders of pregnancy causes uteroplacental insufficiency which in turn results in fetal hypoxia, oligohydraminos, low birth weight (LBW), birth asphyxia, small for gestational age (SGA), fetal growth restriction (FGR), preterm delivery, admission to neonatal ICU, fetal death in utero and perinatal death.[6,7]

Recurrent preeclampsia is associated with increased rates of preterm birth, SGA and perinatal death.[8,9] Perinatal mortality is three to five times increased in women with preeclampsia than those without the disorders.[10]

The absolute treatment for preeclampsia is termination of pregnancy and delivery of the baby.[11] In this study, trend of preeclampsia and various sociodemographic factors associated with preeclampsia are determined. This research was done, as there was less evidence based demonstration for fetomaternal outcomes in preeclampsia was available in the vicinity of the population under study.

METHODS

This was a prospective observational study. The study place was the department of obstetrics and gynaecology in Government district headquarters hospital, Cuddalore. The study duration was 12 months from October 2019 to September 2020.

Inclusion criteria

All pregnant women with BP ≥140/90 mmHg which developed after 20 weeks of gestation associated with proteinuria admitted for delivery between 32+0 to 39+6 weeks of gestation in department of OBG in Government headquarters hospital, Cuddalore were included.

Exclusion criteria

Antenatal mothers with chronic hypertension, multiple gestation, fetal anomalies, diseases like anemia, renal disease, thyrotoxicosis, diabetes mellitus, Cushing syndrome, coarctation of aorta, connective tissue disorder, pheochromocytoma, primary aldosteronism and not consenting for study were excluded.

Considering the preterm delivery among preeclampsia mothers as 78% in Gawde et al, relative precision as 10%, alpha error as 5%, the sample size was calculated using the formula,

$$n=\frac{z^2\times p\times(1-p)}{e^2},$$

where,

z=1.96 for a confidence level(α) of 95%,

p=proportion preterm delivery among preeclampsia mothers (expressed as a decimal),

e=relative precision (e=10% of 78%=7.8%),

z=1.96, p=0.78, e=0.078

$$n=\frac{(1.96)^2\times 0.78\times(1-0.78)}{(0.078)^2},$$

n≈108.

Sampling method

Consecutive sampling method was used. All the eligible samples were taken till the desired sample size was achieved.

Data collection and methodology

Data collection was done as per proforma after explaining purpose of the study and taking informed written consent from the patient in own language. BP was measured in right arm in sitting position with proper size cuff with arm at the level of heart. Urine albumin was estimated by dipstick method. Fetal state was assessed using ultrasonography and non-stress test whenever required. After birth of the baby Apgar score was calculated, weight was measured and plotted in Fenton's chart to sort out as SGA, FGR and AGA babies.

Ethical consideration

The study design was submitted to institutional ethical committee and clearance obtained. The study had no risk or whatsoever on whom the study was carried on. The study involved no medications or invasive procedures or no financial constrainment.

Statistical study

Data was entered in MS excel and analysis was done using SPSS version 20.

RESULTS

The study was done among 108 preeclamptic antenatal mothers admitted in Government headquarters hospital,

Cuddalore. Detailed history taking, necessary investigations done and appropriate treatment given.

A total of 17.6% of study participants were having severe pre-eclampsia. 82.4% had non severe preeclampsia.

Higher number of study participants were primi gravida 57 (52.7%). As gravida increases incidence of preeclampsia decreases.

A total of 14 (13%) of study participants had PPH as complication of pre-eclampsia followed by abruption in 4 (3.7%).

Among the 108 study participants, 36 (33.3%) had SGA babies, 16 (14.8%) had FGR babies, 2 (1.9%) had still birth and 1 (0.9%) had intra uterine fetal demise. Almost 48.6% (51) of the study participant's child required NICU admission for various reasons.

Table 1: Severity of preeclampsia among the study participants.

S. no.	BP (mmHg)	Frequency	Percent
1.	Non severe pre-eclampsia	89	82.4
2.	Severe pre-eclampsia	19	17.6
3.	Total	108	100.0

Table 2: Distribution of study participants according to gravida.

S. no.	Gravida	Frequency
		N (%)
1.	1	57 (52.7)
2.	2	43 (39.8)
3.	3	7 (6.5)
4.	4	1 (0.9)
5.	Total	108 (100.0)

Table 3: Maternal complications among the pre-eclamptic mothers.

S. no.	Maternal complications	Frequency	Percent
1.	Abruption	4	3.7
2.	PPH	14	13.0
3.	None	90	83.3
4.	Total	108	100.0

Table 4: Distribution of fetal complications among pre-eclamptic mothers.

S. no.	Fetal complications	Frequency	Percent
1.	IUD	1	0.9
2.	Still birth	2	1.9
3.	FGR	16	14.8
4.	SGA	36	33.3
5.	None	53	49.1
6.	Total	108	100.0

Table 5: NICU admission among the neonates of study participants.

S. no.	NICU	Frequency
		N (%)
1.	No	54 (51.4)
2.	Yes	51 (48.6)
3.	Total	105 (100.0)

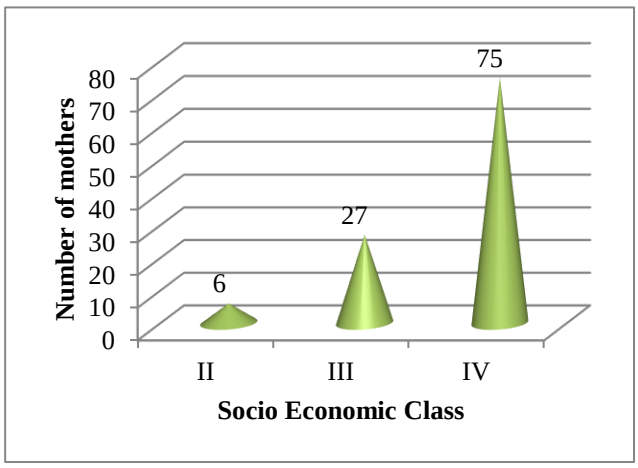

Figure 1: Distribution of study participants among different socio-economic status.

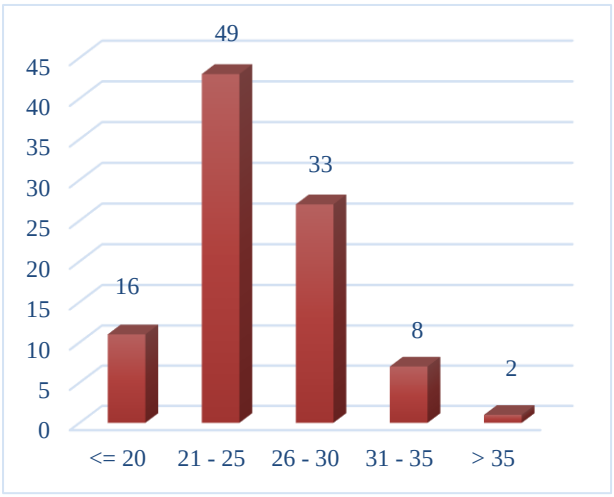

Figure 2: Distribution of study participants among different age groups.

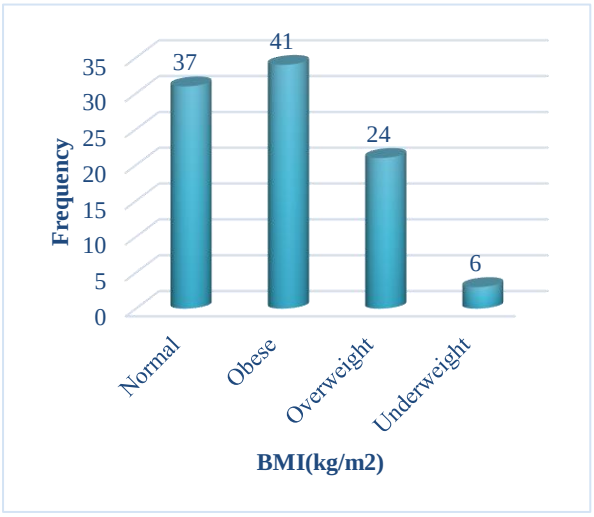

Figure 3: Distribution of pre-eclampsia based on BMI.

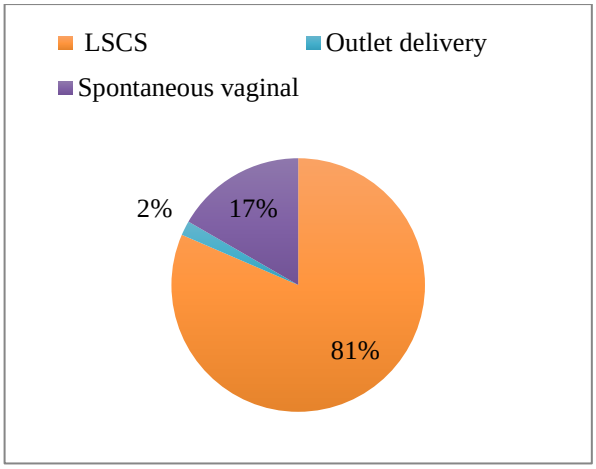

Figure 4: Distribution of participants based on mode of delivery.

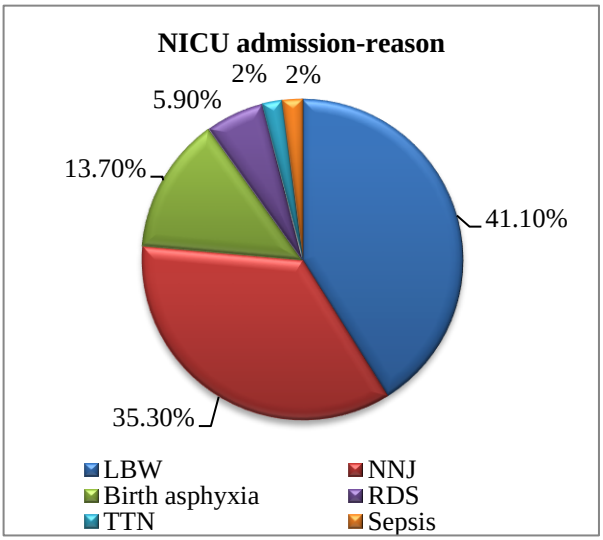

Figure 5: Reason for NICU admission.

DISCUSSION

In this study, all the necessary details were collected from 108 pre-eclamptic mothers who got admitted in Government district headquarters hospital for delivery between 32-39 weeks.

In this study, preeclampsia was more common in primi gravida (52.7%). As gravida increased incidence of pre-eclampsia decreased which was in accordance with following studies done by Gawde et al (48%), Singh et al (58.9%) and Ahmed et al (60%).[12-14] 69.4% pre-eclamptic mothers belongs to IV socio economic class according to modified Kuppusamy's scale in our study, which was almost twice the result in a study by Aabidha et al.[15] In Aabidha et al study, 30.10% patients were from socioeconomic class 4. This may be because our hospital was a secondary level CEmONC centre where referrals were high from nearby rural areas.

In our study, 45.4% of pre-eclampsia patients were in the age group of 21-25 years which was similar to the results of the following studies. 50% in Gawde et al, 43% in Ahmed et al and 46.23% in Aabidha et al belonged to age group 21-25 years.[12,14,15] In our society, most of the women complete their family before 30 years of age. This can be the reason for less number of pre-eclamptic women in elderly age group in our study.

Aabidha et al study included 51.51% referral patients while in our study 44.4% were referred from primary health centres.[15] Due to COVID pandemic also referral patients were higher. Among 2 unbooked patients, 1 patient underwent LSCS in view of CPD, while other had vaginal delivery. Both the patients had non severe preeclampsia with no maternal complication. One of the unbooked patient had SGA baby.

Table 6: Preterm delivery: present study verses other studies.

Studies	Preterm (%)
Present study	11.1
Tolu et al	18.18
Aabidha et al	23.65
Vats et al	26.5
Ahmed et al	37.2
Gawde et al	78

Table 7: Indication for LSCS: present study verses Patel et al' study.

Indications	Present study (%)	Patel et al (%)
Fetal distress	22.7	21.95
Oligohydraminos	18.2	2.4
Abruption	3.4	9
Abnormal Doppler	3.4	53.64

Table 8: FGR baby in present study verses other studies

Study	Percentage of FGR babies (%)
Present study	14.8
Lemi et al	12.5
Patel et al	21
Aabidha et al	9.67

59.99% patients were having BMI more than normal value in a study done by Aabidha et al.[15] In this study, 65 (60.1%) participants had BMI more than normal value while 34.3% had normal BMI. But 81.2% patients were having normal BMI in a study conducted by Ahmed et al which was more than twice the value in this study.[14]

In the study by Ahmed et al 45.2% patients were diagnosed with pre-eclampsia between 36-40 weeks of gestation.[14] In this study, 67.6% patients of pre-eclampsia were diagnosed between 36 to 40 weeks. Patel et al had shown that pre-eclampsia was diagnosed mostly at 28 to 32 weeks which was in contrast to this study.[16] This was due to exclusion of patients less than 32 weeks in our study.

79.6% patients had late onset pre-eclampsia which was similar to the results of the study (82.1%) by Singh et al.[13] 6.48% of patients had imminent symptoms in this study which was in accordance with 7.2% patients had imminent symptoms in study conducted by Ahmed et al.[14]

In our study, 88.9% of pregnancy was terminated or delivered after 36 weeks of gestation which was two times higher than the result shown by Joshi et al 40.83%.[3] This maybe because patients in early weeks of gestation were not included in this study.

Preterm deliveries of various studies were compared with our study.[11,12,14,15,17]

LSCS rate-81.5% was higher when compared to other studies by Gawde et al-54%, Aabidha et al-48.3%.[12,15] Reason for higher caesarean rate was due to late referrals, higher incidence of oligohydraminos and less induction of labour. Indication for cesarean section was compared between our study and study by Patel et al.[16]

Fetal Doppler was not routinely done in our hospital this maybe the reason for decreased percentage of abnormal Doppler as an indication for caesarean section.

Several maternal complications were (1) severe pre-eclampsia was 17.6% in this study which was similar to 19% in Ahmed at al study and 17.5% in Lemi et al study.[11,14] Whereas percentage of severe pre-eclampsia was higher (41.5%) in the study by Singh et al;[13] (2) PPH-13% in this study was in accordance with 17.3% in Gawde et al study and 10.75% in Aabidha et al study;[12,15] (3) percentage of abruption was 8.9% in a study by Gawde et al, 5% in Patel et al study, 5.4% in Lemi et al study, 1.6% in Ahmed et al study whereas it was 3.7% in our study;[11,12,14,16] (4) 5.6% had eclampsia as a complication in this study. Eclampsia was seen in 5.6% in Ahmed et al study, 5.37% Aabidha et al study, 1.22% in Lemi et al study and 1.4% in Singh et al study.[11,13-15] But in a study by Patel et al it's very high up to 36%.[16] All 4 patients of antepartum eclampsia underwent LSCS-1 patient had eclampsia as indication while others had fetal distress as indication for LSCS in this study.

In our study, 30.5% were LBW babies, 0.9% very LBW. In study done by Ahmed et al it's 26% and 11.6% respectively and result of the study by Vats et al was 25.5% and 6.1% respectively.[14,17] Percentage of very LBW babies was less in our study because mothers delivered below gestational age 32 weeks were excluded.

13.9% babies had APGAR<7, while 24.5% newborn in study by Vats et al had APGAR<7. 0.9% IUD was reported in our study which was lower when compared to 8.6% in

study report of Aabidha et al.[15,17] Still birth rate was 1.9% in this study which was in accordance with the Lemi et al study results (1.7%) and Aabidha et al study result (2.15%).[11,15] Overall perinatal mortality in this study was 3.8% whereas it's 10% in Vats et al study.[17]

In this study 33.3% were small for gestational age babies which was in agreement with result by Ahmed et al (36.4%).[14] Comparison of fetal growth restriction in pre-eclampsia with various studies.[11,15,16]

Almost 48.6% of the newborns were admitted in NICU with various reasons. This was comparable with 27.6% in Ahmed et al, 25.5% in Vats et al and 36.6% in Lemi et al studies.[11,14,17]

Limitations

Patients who got delivered below 32 weeks of gestation were not included in this study. Pre-eclampsia with other existing disorders like GDM, anemia, thyroid, renal, cardiac disorders were excluded in this study. Because of all the above mentioned reasons, the magnitude of the disease can't be determined correctly. Long term fetal and maternal complications were not addressed in this study.

CONCLUSION

Pre-eclampsia is one of the most common medical disorder complicating pregnancy. In this study, pre-eclampsia is more common in primi gravida, age group 21-25 years, socioeconomic class IV, obese mothers. This can be reduced by emphasising early registration, providing adequate nutrition through existing government schemes and educating women and their family members on significance of routine antenatal check up at primary health centres. Cesarean section is more in this study. Maternal and fetal morbidities are increased with pre-eclamspia. NICU admissions were high (48.6%) among pre-eclamptic women. All the fetomaternal morbidities can be reduced by blood pressure monitoring, albuminuria evaluation and clinical evaluation of fundal height at each visit. Fetal Doppler to look for persistent uterine artery diastolic notching in second trimester. Growth scan with fetal Doppler to identify FGR. Early referrals from primary health centres and early admission of pre-eclamptic mothers for maternal and fetal monitoring so as to decide timely intervention.

Recommendations

Improve nutrition, hydration and ensure protein rich diet for antenatal mothers. Early diagnosis and referral to appropriate centres for evaluation and follow up. Screening fetal Doppler to be done to predict pre-eclampsia and prophylactic tablet aspirin to be started for needed patients. Serial USG to pick up patients of SGA, FGR, fetal placental insufficiency early. Early admission of pre-eclamptic mother is needed for effective blood pressure control and fetal surveillance. $MgSO_4$ can be used as both prophylaxis and treatment for eclampsia.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Wolde Z. Hypertensive disorders of pregnancy in Jimma university specialised hospital. Ethiop J Health Sci. 2011;21(3):147-54.
2. Williams J. Williams Obstetrics 25 ed. In: Gary CF, eds. New York: McGraw Hill; 2018: 710-54.
3. Joshi P, Kathaley M, Borade S, Dashrathi R. Maternal and perinatal outcome in hypertensive disorders of pregnancy-A retrospective study. MVP J Med Sci. 2018;5(1):87-91.
4. Melese MF, Badi MB, Aymalem GL. Perinatal outcomes of severe preeclampsia/eclampsia and associated facors among mothers admitted in Amhara region referral hospitals, North West Ethiopia, 2018. BMC Pregn Childbirth. 2019;12:147.
5. Ukah UV, De Silva DA, Payne B, Magee LA, Hutcheon JA, Brown H, et al. Prediction of adverse maternal outcomes from pre-eclampsia and other hypertensive disorders of pregnancy: a systematic review. Pregnancy Hypertens. 2018;11:115-23.
6. Berhe AK, Ilesanmi AO, Aimakhu CO, Mulugeta A. Effect of pregnancy induced hypertension on adverse perinatal outcomes in Tigray regional state, Ethiopia: a prospective COHORT study. BMC Pregnancy Childbirth. 2019;20(1):7.
7. Madazli R, Yuksel MA, Imamoglu M, Tuten A, Oncul M, Aydin B, et al. Comparison of clinical and perinatal outcomes in early and late onset preeclampsia. Arch Gynecol Obstet. 2014;290(1):53-7.
8. Hnat MD, Sibai BM, Caritis S, Hauth J, Lindheimer MD, MacPherson C, et al. Perinatal outcome in women with recurrent preeclampsia compared with women who develop preeclampsia as nulliparas. Am J Obstet Gynecol. 2002;186(3):422-6.
9. Bramham K, Briley AL, Seed P, Poston L, Shennan AH, Chappell LC. Adverse maternal and perinatal outcomes in women with preeclampsia: a prospective study. Am J Obstet Gynecol. 2011;204(6):512.
10. Abalos E, Cuesta C, Carroli G, Qureshi Z, Widmer M, Vogel JP, et al. Preeclampsia, eclampsia and adverse maternal and perinatal outcomes: a secondary analysis of the WHO multicountry survey on maternal and newborn health. BJOG. 2014;121(1):14-24.
11. Tolu LB, Yigezu E, Urgie T, Feyissa GT. Maternal and perinatal outcome of preeclampsia without severe feature among pregnant women managed at a tertiary referral hospital in urban Ethiopia. PLoS One. 2020;15(4):0230638.

12. Gawde A, Bhosale UT. A study of maternal and perinatal outcome in Preeclampsia. Ind J Recent Trend Sci Technol. 2014;10(2):267-70.
13. Singh A, Chawla S, Pandey D, Jahan N, Anwar A. Fetomaternal outcome in cases of pre-eclampsia in a tertiary care referral hospital in Delhi, India: a retrospective analysis. Int J Scientif Stud. 2016;4(2):100-3.
14. Ahmed M. Study of feto-maternal outcome in pregnancy induced hypertension. Glob J Med Res Gynecol Obstetr. 2014;14(1):20-5.
15. Aabidha PM, Cherian AG, Paul E, Helan J. Materna and fetal outcome in pre-eclampsia in a secondary care hospital in South India. J Fam Med Prim Care. 2015;4(2):257-60.
16. Patel J, Desai N, Mehta ST. Study of fetomaternal outcome in cases of preeclampsia. Int J Scientif Res. 2015;4(7):503-5.
17. Vats K, Paul M. Study of fetal outcome in hypertensive disorders of pregnancy in a tertiary care maternity hospital of Delhi. Int J Reproduct Contracept Obstetr Gynecol. 2016;5(11):3773-7.

Cite this article as: Priyamvadha PM, Kala R, Kumar A. Maternal and perinatal outcome in pregnancies complicated by preeclampsia: a hospital based prospective study. Int J Reprod Contracept Obstet Gynecol 2022;11:1691-7.