Contents lists available at UGC-CARE

International Journal of Pharmaceutical Sciences and Drug Research

[ISSN: 0975-248X; CODEN (USA): IJPSPP]

Available online at www.ijpsdronline.com

Original Research

Study of Epidemiology and Its Prognostic Factors for Expected Therapeutic Management Outcome alongwith the Antihypertensive Drug Pattern For Preeclampsia in Rural Setting

Shreya Singh[1*], Vikas Jogpal[1], Rashmi Ray[2], Abhishek Sharma[1]

[1]*Department of Pharmacology, School of Medical and Allied Sciences, G. D. Goenka University, Gurugram, Haryana, India.*
[2]*Department of Obstetrics and Gynaecology, SGT Medical College, Gurugram, Haryana, India.*

ARTICLE INFO

Article history:
Received: 11 May, 2023
Revised: 08 July, 2023
Accepted: 13 July, 2023
Published: 30 July, 2023

Keywords:
PIH, Epidemiology, Risk factors, Antihypertensive Drugs.

DOI:
10.25004/IJPSDR.2023.150409

ABSTRACT

This study analyses the association between epidemiological factors and preeclampsia and the antihypertensive drug pattern used at different stages of preeclampsia. Total 252 patients were enrolled for study. Some of the study variables were maternal age, history of infertility, family income, education, antihypertensive drug use, body mass index of the mother and baby's birth weight. The study was performed SGT Hospital, Gurugram and was given ethical clearance by the Institutional Ethical Committee (IEC). Data was collected with the help of validated questionnaires. The occurrence of pregnancy induced hypertension (PIH) in our study was found to be 47.2%. Maternal age, low socioeconomic status, less education level, >36 weeks of gestation are one of some major factors responsible for PIH. The current study implies that different dosage forms of labetalol was prescribed with p-value <0.05.

INTRODUCTION

Pregnancy-induced hypertension (PIH) is a form of hypertension that develops during pregnancy when there are no other known causes of raised blood pressure (140/90 mmHg, a rise in systolic pressure of 30 mmHg or a rise in diastolic pressure of 15 mmHg), when taken twice after rest, and when combined with generalized edema and/or proteinuria. Preeclampsia is the medical name for substantial proteinuria; eclampsia is the medical word for seizures or coma brought on by PIH. The prevalence of pr-eclampsia in the nulliparous population varies between 3 and 10% globally.[1]

In India, the overall prevalence of PIH is 15.2%,[2] although primipara women are four times more likely to get it than multipara women.

According to previous reports, hypertensive disorders of pregnancy (HDP) is significantly linked to future hypertension development.[3, 4] New data have shown that having high blood pressure during pregnancy, regardless of the cause or risk factors, is significantly correlated with the future occurrence of cardiovascular disease (CVD), chronic renal disease, and diabetes mellitus.[4-6]

Up to 10% of expectant mothers experience hypertension, which can either be caused by a chronic hypertension that already existed or by a new hypertensive condition brought on by pregnancy. The timing of the illness allows chronic hypertension to be recognized from gestational hypertension because it begins in early 20 weeks of pregnancy as well as persists beyond delivery.[7]

Pregnancy blood pressure is less than 140 mmHg systolic and 90 mmHg diastolic. Initially drawn from non-pregnant

***Corresponding Author:** Ms. Shreya Singh

Address: Department of Pharmacology, School of Medical and Allied Sciences, G. D. Goenka University, Gurugram, Haryana, India.

Email ✉**:** Shreyasingh19911@gmail.com

Tel.: +91-8377831716

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

populations, this definition was later evaluated as per the usual range of blood pressure readings during pregnancy. The reference limit (97th percentile) for blood pressure has a nadir of 138/86 mmHg at gestational weeks 18–20, rising to 144/95 mmHg at term, according to more recent prospective cohort data. The nadir is 132/83 mmHg when these data are limited to women under the age of 40, with a body mass index of less than 30 kg/m^2, the absence of underlying conditions, and pregnancy complications. These values increase to 138/90 mmHg at 38 weeks' gestation and 140/92 mmHg at 40 weeks' gestation.[8] These findings back up the conventional cut-off point for the diagnosis of pregnancy-related hypertension, which is 140/90 mmHg.[7]

Preeclampsia is an inflammatory condition particular to pregnancy, with two main paths of pathophysiology, however its causes are still unclear.[9] Placental preeclampsia, which typically appears before 34 weeks of pregnancy, results from aberrant placental vascular development and inadequate transformation of the mother's spiral arteries to appropriately feed the placenta and foetus with nutrition.[10]

Most signs and symptoms can be alleviated by birth, although preeclampsia can linger after delivery and occasionally recur in the postpartum period.[11, 12] Preterm preeclampsia and other hypertensive diseases of pregnancy pose a significant long-term risk for developing cardiovascular disease (CVD) and cerebrovascular illness.[13,14]

Additionally, it is advised that patients with severe preeclampsia diagnosed at or after 34 0/7 weeks of pregnancy have their babies once the mother has stabilized, rather than delaying the procedure to allow for steroid therapy. When preeclampsia with severe characteristics is discovered in patients fewer than 34 weeks gestation, expectant treatment may be used when sufficient stability of the maternal and foetal well-being has been established.[15]

Some studies in past have suggested that when severe preeclampsia develops before 25 + 6 weeks of pregnancy, expectant treatment should not be regularly addressed. It can be provided from 26 and 27 + 6 weeks under strict supervision, and the perinatal survivability relies on the neonatal treatments supplied in their hospital.[16]

India has recently been working to lower maternal and foetal mortality through initiatives such as organisational deliveries, rapid detection of disorders associated with pregnancy, calcium supplementation for expectant mothers, and high-quality antenatal care with a focus on preeclampsia.[17]

Clinically valuable analyses of pregnant women at high risk with high death and near-miss rates, such as HDP at the beginning of pregnancy (34 weeks of gestation), might identify possible areas for maternal healthcare improvement and raise awareness of quality-of-care concerns.[18]

Epidemiology of Preeclampsia

According to studies, having a surgical cesarean section in the past increases the risk of preeclampsia developing in the next pregnancy. One of the main risk factors for preeclampsia in people who have previously undergone cesarean section is the prolonged time between pregnancies.[19, 20]

Preeclampsia and eclampsia prevalence differences may be related to differences in facility and geographical features, such as diagnostic capabilities or service accessibility, in addition to variances in the distribution of maternal risk factors.[21]

Materials and Methods

The prospective observational study was carried out at Indoor-outdoor patient department along with the labour ward of SGT Hospital, Gurugram to study the various epidemiological factors and the antihypertensive drug pattern. The study took place from August 2022 to March 2023 after getting approval from Screening Ethics Committee.

Antenatal women coming for normal antenatal visit, aged more than 18 years, having more than or equal to 20 gestational weeks who were willing to participate were enrolled in the study.

Antenatal women who were not willing to participate with chronic hypertension, pre-existing renal diseases, autoimmune disorders and other inflammatory diseases were excluded from the study.

The goal of the study was stated to the study subjects. Formal informed consent was obtained to access both the patient's medical history and personal data. Pregnant women who had systolic blood pressure >140 mm Hg and/or diastolic blood pressure >90 mm Hg on two different occasions were classified as hypertensive, whereas those who had normal readings were classified as normotensive. Registered practitioners used a standardized mercury sphygmomanometer to assess blood pressure. The following information was obtained from the patients' medical records: demographics, obstetric history, current antihypertensive medication details, gestational age, and blood pressure data.

Total 252 patients were enrolled in the study; out of the total, 119 patients were hypertensive and 133 patients were normotensive. Data was collected with the help of validated questionnaires after receiving the informed consent and completing the selection process. The patients were also interviewed and data was also collected from the hospital records regarding patient's age, weight, socioeconomic status, baby's weight, BMI of mother and treatment strategies were also statistically analysed for normotensive and hypertensive patients.

Data was collected qualitatively and quantitatively and was compared between both the groups i.e., normotensive and hypertensive women with the help of the Chi-

square test, Student's t-test and Fisher's exact test was applied where observations were less than 5 in a group. Binary logistic regression was used to compare the age distribution between the normotensive and hypertensive groups in order to ascertain whether it was related to PIH. All data analysis has been performed by using Graph pad Prism, version 7.0 for Windows. $p < 0.05$ values were considered significant.

Questionnaire: The questionnaire used for data collection was validated, pretested and prestructured. The data collected include various epidemiological factors, demographic profile, socioeconomic status, and other factors.

Results and Discussion

During the entire study, 302 informed consent forms were collected. Out of that, 50 patients were excluded from the study as per the exclusion criteria, including chronic hypertension, kidney disorder and multiple pregnancy. Total 252 pregnant women were enrolled in the study matching the inclusion criteria.

Fig. 1 indicates the prevalence of preeclampsia which is 47.22% (119 patients) and normotensive 51.58% (133 patients).

Fig. 2 shows the age distribution plot according to the age distribution.

Table 1 lists the comparison between hypertensive and normotensive patients based on several risk factors observed during the study. Age, BMI, primigravida/ multigravida, history of diabetes, history of infertility and various other risk factors are shown in Table.

Mean age of hypertensive women was found to be 25.90 ± 2.73 and of normotensive was found to be 24.96 ± 4.23. BMI distribution was found to be very less significant. Distribution as per gravida was found to be significant. A comparison of history of diabetes and history of infertility between normotensive and hypertensive was found to be significant. Patient's socioeconomic status was divided into four groups and the results were non-significant. Analysis of alcohol intake showed that most women were not taking alcohol. A maximum number of females were found to have educational qualifications of 10+2 with 51.26% in hypertensive and 40.60% in normotensive group. The relationship of hypertensive disorder with any relatives with high BP was found significant.

As illustrated in Table 1, age was found related with the occurrence of preeclampsia with p=0.03, also Primigravida and multigravida was also associated with odds ratio 0.63 and p=0.01, history of diabetes and history of infertility were also found related to preeclampsia with $p<0.05$. Antenantal care received on time also played a major role and is related to preeclampsia incidences with p=0.03.

Table 2 shows the comparison of baby weight in hypertensive and normotensive pregnancies, in which < 2.5 kg was majorly found in hypertensive pregnancies

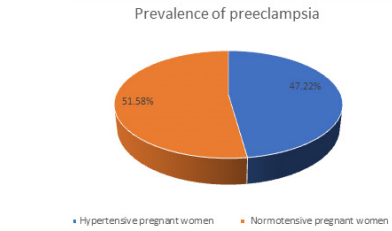

Fig. 1: Prevalence of preeclampsia

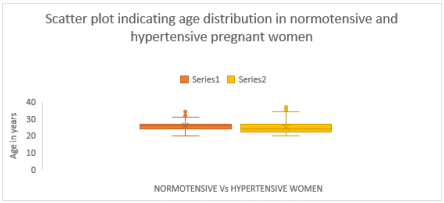

Fig. 2: Scatter Plot showing age distribution in normotensive and hypertensive pregnant women

which was 61.34% and weight >2.5 kg was mainly found in normotensive pregnancies. There was one case of intrauterine fetal death (IUFD).

Table 2 clearly shows that birth weight was <2.5 in majorly hypertensive patients and it was more than >2.5 in normotensive patients.

Table 3 shows that 56.3% of hypertensive females delivered baby during 34 to 37 gestational weeks, compared to 93.23% of normotensive females delivered baby during more than 37 weeks.

Table 3 illustrates that time of delivery i.e. extremely preterm (<34 weeks) , moderate to late preterm (34-37 weeks) preterm or full term (>37 weeks) is strongly related to HDP showing $p<0.05$.

Tables 4 and 5 shows the antihypertensive drug pattern and its effect onhypertensive pregnancies' systolic blood pressure and diastolic blood pressurs. In this, patients were prescribed labetalol tablet at the stage of mild preeclampsia i.e., >140/90 mmHg–150/100 mmHg, labetalol injection was prescribed at the stage of severe preeclampsia i.e., >150/100 mmHg–160/105 mmHg and labetalol injection along with $MgSO_4$ at the stage of impending preeclampsia i.e., ≥160/105 mmHg along with symptoms like blurring vision, constipation, headache or seizures

Table 6 shows the baby weight at the time of birth and in different groups of pregnant women taking antihypertensives and it shows the significant comparison between the different groups as shown in table.

Table 6 illustrates the baby weight under two categories i.e. < 2.5 and <2.5 kg under different dosage forms of labetalol and also when labetalol injection given along with MgSO4 infusion.

In our study, the prevalence of preeclampsia was found to be 51.58%. Also, the age factor and BMI is not playing a major role as it is rural, so patients were having less than or around 25 years.

Table 1: Shows comparison between hypertensive and normotensive patients based on several risk factors

Risk factor	*Hypertensive N_H=119 (100%)*	*Normotensive N_N=133 (100%)*	*Odds ratio*	*p-value**
Distribution according to age				
Age in years	25.90 ± 2.73	24.96 ± 4.23	NA	0.03
Distribution according to BMI				
Underweight	17.44 ± 0.43	17.62 ± 0.48	NA	0.176768673 ns
Normal Weight	21.55 ± 1.35	17.92 ± 0.41	NA	0.000002
Overweight	26.29 ± 0.86	25.92 ± 0.73	NA	0.180727368 ns
Distribution according to gravida				
Primi gravida	70 (58.82%)	92 (69.17%)	0.63	0.01
Multi gravida	49 (41.17%)	41 (30.82%)		
Distribution according to history of diabetes				
Yes	22 (18.48%)	20(15.03%)	1.28	1.1E-130
No	97 (81.51%)	113 (84.96%)		
Distribution according to history of infertility				
Yes	28 (23.52%)	12 (9.0%)	3	3.5E-139
No	91 (76.47%)	117(87.96%)		
Distribution according to family income				
< 5000	3243.9 ± 875.13	3471.89 ± 967.38	NA	0.4 ns
5000-10000	8120.35 ± 1301.57	8379.79 ± 1280.68		0.34 ns
10000-15000	13361.51 ± 1347.96	13618.36 ± 1178.28		0.36 ns
> 15000	17666.66 ± 1527.25	17403.77 ± 1016.34		0.8 ns
Distribution according to alcohol intake				
Yes	3 (2.52%)	2 (1.50%)	1.69	0 ns
No	116 (97.47%)	131(98.49%)		
Distribution according to antenatal care received on time				
Yes	111 (93.27%)	96 (72.18%)	5.34	0.03
No	8 (6.27%)	37(27.81%)		
Distribution according to educational status				
10	28(23.52%)	18 (13.53%)	1.96	6.50E-115
10+2	61(51.26%)	54 (40.60%)	1.53	1.06E-17
graduation	23 (19.32%)	50 (37.59%)	0.39	3.96E-54
missing	7 (5.88%)	11(8.27%)	0.69	0 ns
Distribution according to relatives with high BP				
Yes	46(38.65%)	73(54.88%)	3.78	4.82E-31
No	19(15.96%)	114(85.71%)		

Results are calculated as mean ± SD for quantitative data. Odds ratio were calculated for qualitative data. p<0.05 is considered as significant value and P>0.05 is considered as not significant and is symbolized as ns.

Table 2: Comparison of baby weight in normal and complicated pregnancy

Baby Weight (kg)	*Hypertensive*	*Normotensive*	*p-value*
> 2.5	46(38.65%)	121 (90.97%)	0.07 ns

Results are expressed as % and *p-value* is calculated using chi square test. *p-value*<0.05 considered to be as significant value. ns-p value not significant.

Although, our study provides strong evidence of primigravida women having more chances of having

Table 3: Comparison of gestational weeks at the time of delivery

Gestational week	*Hypertensive*	*Normotensive*	*p-value*
Extremely preterm (< 34 weeks)	25(21%)	2(1.5%)	
Moderate to late preterm (34–37 weeks)	67 (56.3%)	7(5.26%)	2.25E-24
Full term (>37 weeks)	27(22.68%)	124(93.23%)	

Results are expressed as % and p-value is calculated using chi square test. *p-value*<0.05 considered to be as significant value

Table 4: Usage pattern of antihypertensive drugs administered during pregnancy in hypertensive patients (systolic blood pressure)

Drug	*Stage*	*Systolic Blood Pressure (Before Treatment)(mmHg)*	*Systolic Blood Pressure (After Treatment)(mmHg)*	*p-value*
Labetalol Tablet	Mild Preeclampsia (>140/90 mmHg–150/100 mmHg)	149	131	
Labetalol Injection	Severe Preeclampsia (>150/100 mmHg–160/105 mmHg)	163	133	0.007500701
Labetalol Injection + MgSO4 injection	Impending Eclampsia (≥160/105 mmHg along with symptoms like blurring vision, constipation, headache or seizures)	168	128	

p-value < 0.05 considered to be as significant value. ns- *p-value* not significant. *p-value* is calculated using ANOVA

Table 5: Usage pattern of antihypertensive drugs administered during pregnancy in hypertensive patients (diastolic blood pressure)

Drug	*Stage*	*Diastolic Blood Pressure (Before Treatment)(mmHg)*	*Diastolic Blood Pressure (After Treatment)(mmHg)*	*p-value*
Labetalol Tablet	Mild Preeclampsia	97	90	
Labetalol Injection	Severe Preeclampsia	102	91	0.015465343
Labetalol Injection+ MgSO4 injection	Impending Eclampsia	107	87	

p-value < 0.05 considered to be as significant value. ns p-value not significant. *p-value* is calculated using ANOVA

hypertensive disorder compared to multigravida and other factors such as diabetes, family history of hypertension and antenatal care received on time had significant role. It is critical to provide follow-up and personalized information to lower the ensuing risk of pregnancy pathology.[22]

Our research shows that HDP are directly associated with preterm births. This information may enhance risk estimate and communication concerning preterm births if combined with additional known risk variables. (e.g., lifestyle, parity). We have clearly shown that labetalol tablet was given at various stages of hypertension and patients showed improvement in symptoms at systolic and diastolic blood pressure levels with a p-value <0.05.

This study can conclude the direct relationship of different epidemiological and socioeconomic factors and the antihypertensive drug pattern in the totally different rural setup considering India's genetic and demographic variability. Qualitative research, including older women has shown that such knowledge and assurance from doctors can assist to allay worries about perinatal health and better define individual risk perceptions.[23]

Additionally, this study found that preeclampsia in pregnancy was significantly influenced by chronic hypertension. Similar to earlier research, which examined singleton and multiple foetal pregnancies, it was shown that persistent hypertension increased the probability of developing preeclampsia.[24, 25] This is because long-term high blood pressure can harm internal organs and result in vascular issues. This is consistent with earlier research that indicated preeclampsia risk factors including persistent hypertension.[24, 26] In the current investigation, a family history of persistent hypertension was the primary risk factor for developing late-onset preeclampsia. This is consistent with earlier research.[27, 28]

Additionally, all preeclamptic women should be counseled against gaining weight after giving birth because doing so increases the likelihood of developing preeclampsia again.[29] In addition, pregnant women with previous instances of preeclampsia must be counselled to start controlling their blood pressure immediately during pregnancy.[30] This knowledge is crucial for raising awareness of potential lifestyle changes and for early preeclampsia identification in subsequent pregnancies.

Table 6: Baby weight in individual treatment group Results are expressed as %age

Baby weight (kg)	*Labetalol tab*	*Labetalol injection*	*Labetalol injection + MgSO4 injection*
> 2.5	22 (18.48%)	15 (12.60%)	1 (0.84%)
< 2.5	44 (36.97%)	7 (5.88%)	11 (9.24%)

According to Sripad *et al.*'s research in Nigeria, women's financial circumstances prevented them from seeking care during the initial phases of PE/E.[31]

Risk factors for eclampsia and severe preeclampsia with early onset were examined by Nanjundan *et al.*[32] They discovered that staying in a joint family, overweight, having a previous episode of preeclampsia or eclampsia in a prior pregnancy, passive smoking exposure, insufficient antenatal care, a family record of hypertension in one or more close relatives, and lower socioeconomic status were all linked to a higher chance of developing preeclampsia and eclampsia. Obstetricians can use these risk variables to identify patients who are at preeclampsia risk and to perform primary prevention.

Wadhwani *et al.* reported results similar to our study that in order to regulate the blood pressure of pregnant mothers while providing expectant care, women with early onset-PE were initiated on antihypertensive medication, but women with late onset-PE who acquired severe hypertension necessitating antihypertensive therapy received rapid pregnancy termination.[33]

This study's key advantages are the standardized data

collection and the nationwide population-based design. Future studies can be done by taking more population, considering other drugs prescribed, and taking more factors into consideration. It is still important to do research on preeclampsia since it will help develop new, effective preeclampsia treatments as our knowledge of the condition grows.

Acknowledgements

The authors are very much thankful to the Department of Obstetrics and Gynaecology, SGT Hospital for providing ethical approval to carry out our study.

References

1. Kumari Shekhawat S, Choudhary V, Shekhawat U. Co-Relation Of Fundus Changes & Pregnancy Induced Hypertension-A Prospective Observational Study. IOSR J Dent Med Sci. 2019; 18: 46–54.
2. K. DRK, Nayak DSR. Preeclampsia/Eclampsia and Retinal Micro Vascular Characteristics Affecting Maternal and Foetal Outcome: A Prospective Study amongst South Indian Pregnant Women. Int J Innov Res Dev. https://www.internationaljournalcorner.com/index.php/ijird_ojs/article/view/134039 (2013, accessed 4 July 2023).
3. Sattar N, Greer IA. Pregnancy complications and maternal cardiovascular risk: opportunities for intervention and screening. BMJ. 2002; 325: 157–160.
4. Callaway LK, Mamun A, McIntyre HD, et al. Does a history of hypertensive disorders of pregnancy help predict future essential hypertension? Findings from a prospective pregnancy cohort study. J Hum Hypertens. 2012; 27: 309–314.
5. Bellamy L, Casas JP, Hingorani AD, et al. Pre-eclampsia and risk of cardiovascular disease and cancer in later life: systematic review and meta-analysis. BMJ Br Med J. 2007; 335: 974.
6. Wilson BJ, Watson MS, Prescott GJ, et al. Hypertensive diseases of pregnancy and risk of hypertension and stroke in later life: results from cohort study. BMJ Br Med J. 2003; 326: 845.
7. Wiles K, Damodaram M, Frise C. Severe hypertension in pregnancy. Clin Med (Northfield Il). 2021; 21: e451–e456.
8. Green LJ, Mackillop LH, Salvi D, et al. Gestation-Specific Vital Sign Reference Ranges in Pregnancy. Obstet Gynecol. 2020; 135: 653–664.
9. Dadelszen P Von DA. Classification of the hypertensive disorders of pregnancy. researchgate.net, https://www.researchgate.net/profile/Dr-Hoodbhoy/publication/312916347_The_FIGO_Textbook_of_Pregnancy_Hypertension/links/5889b3efa6fdcc9a35c35ee1/The-FIGO-Textbook-of-Pregnancy-Hypertension.pdf#page=51 (2016, accessed 17 January 2023).
10. Achamrah N, Ditisheim A. Nutritional approach to preeclampsia prevention. Curr Opin Clin Nutr Metab Care. 2018; 21: 168–173.
11. Goel A, Maski MR, Bajracharya S, et al. Epidemiology and mechanisms of de novo and persistent hypertension in the postpartum period. Circulation. 2015; 132: 1726–1733.
12. American College of Obstetricians, Task Force on Hypertension in Pregnancy. Hypertension in pregnancy. Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. Obstet Gynecol. 2013; 122: 1122–1131.
13. Coutinho T, Lamai O, Nerenberg K. Hypertensive Disorders of Pregnancy and Cardiovascular Diseases: Current Knowledge and Future Directions. Curr Treat Options Cardiovasc Med. 20. Epub ahead of print 1 July 2018. DOI: 10.1007/S11936-018-0653-8.
14. Tooher J, Thornton C, Makris A, et al. All hypertensive disorders of pregnancy increase the risk of future cardiovascular disease. Hypertension. 2017; 70: 798–803.
15. Magee LA, Nicolaides KH, Von Dadelszen P. Preeclampsia. Obstet Gynecol Surv. 2022; 77: 641–643.
16. Gangadhar L, Rengaraj S, Thiyagalingam S, et al. Maternal and perinatal outcome of women with early-onset severe pre-eclampsia before 28 weeks: Is expectant management beneficial in a low-resource country? A prospective observational study. Int J Gynecol Obstet. 2023; 161: 1075–1082.
17. Malik A, Jee B, Gupta SK. Preeclampsia: Disease biology and burden, its management strategies with reference to India. Pregnancy Hypertens. 2019; 15: 23–31.
18. Drechsel KCE, Adu-Bonsaffoh K, Olde Loohuis KM, et al. Maternal near-miss and mortality associated with hypertensive disorders of pregnancy remote from term: a multicenter observational study in Ghana. AJOG Glob Reports. 2022; 2: 100045.
19. Mazda Y, Tanaka M, Terui K, et al. Postoperative renal function in parturients with severe preeclampsia who underwent cesarean delivery: a retrospective observational study. J Anesth. 2018; 32: 447–451.
20. Sarkar S. Prevalence and determinants of the use of caesarean section (CS) in the dichotomy of 'public' and 'private' health facilities in West Bengal. India. Clin Epidemiol Glob Heal. 2020; 8: 1377–1383.
21. Bilano VL, Ota E, Ganchimeg T, et al. Risk Factors of Pre-Eclampsia/Eclampsia and Its Adverse Outcomes in Low- and Middle-Income Countries: A WHO Secondary Analysis. PLoS One. 2014; 9: e91198.
22. Quaresima P, Visconti F, Interlandi F, et al. Awareness of gestational diabetes mellitus foetal-maternal risks: an Italian cohort study on pregnant women. BMC Pregnancy Childbirth. 2021; 21: 1–8.
23. Bayrampour H, Heaman M, Duncan KA, et al. Advanced maternal age and risk perception: A qualitative study. BMC Pregnancy Childbirth. 2012; 12: 1–13.
24. Conde-Agudelo A, Belizán JM. Risk factors for pre-eclampsia in a large cohort of Latin American and Caribbean women. BJOG An Int J Obstet Gynaecol. 2000; 107: 75–83.
25. Aksornphusitaphong A, Phupong V. Risk factors of early and late onset pre-eclampsia. J Obstet Gynaecol Res. 2013; 39: 627–631.
26. Lee CJ, Hsieh TT, Chiu TH, et al. Risk factors for pre-eclampsia in an Asian population. Int J Gynecol Obstet. 2000; 70: 327–333.
27. Qiu C, Williams MA, Leisenring WM, et al. Family history of hypertension and type 2 diabetes in relation to preeclampsia risk. Hypertension. 2003; 41: 408–413.
28. Roes EM, Sieben R, Raijmakers MTM, et al. Severe Preeclampsia is Associated with a Positive Family History of Hypertension and Hypercholesterolemia. Hypertens Pregnancy. 2009; 24: 259–271. Available from: http://dx.doi.org/101080/10641950500281076.
29. Villamor E, Cnattingius S. Interpregnancy weight change and risk of adverse pregnancy outcomes: a population-based study. Lancet. 2006; 368: 1164–1170.
30. [Hypertensive Pregnancy Complications and Eclampsia] Hypertensive svangerskapskomplikasjoner og eklampsi, https://www.legeforeningen.no/foreningsledd/fagmed/norsk-gynekologisk-forening/veiledere/veileder-i-fodselshjelp/hypertensive-svangerskapskomplikasjoner-og-eklampsi/ (accessed 4 July 2023).
31. Sripad P, Kirk K, Adoyi G, et al. Exploring survivor perceptions of pre-eclampsia and eclampsia in Nigeria through the health belief model. BMC Pregnancy Childbirth. 2019; 19: 1–11.
32. Nanjundan P, Bagga R, Kalra JK, et al. Risk factors for early onset severe pre-eclampsia and eclampsia among north Indian women. J Obstet Gynaecol. 2011; 31: 384–389. Available from: https://doi.org/103109/014436152011566389.
33. Wadhwani P, Saha PK, Kalra JK, et al. A study to compare maternal and perinatal outcome in early vs. late onset preeclampsia. Obstet Gynecol Sci. 2020; 63: 270.

HOW TO CITE THIS ARTICLE: Singh S, Jogpal V, Ray R, Sharma A. Study of Epidemiology and Its Prognostic Factors for Expected Therapeutic Management Outcome alongwith the Antihypertensive Drug Pattern For Preeclampsia in Rural Setting. Int. J. Pharm. Sci. Drug Res. 2023;15(4):455-460. **DOI:** 10.25004/IJPSDR.2023.150409