International Journal of Gynaecology and Obstetrics Research
www.gynaecologyjournal.in
E-ISSN: 2663-3612, P-ISSN: 2663-3604
Received: 16-11-2025, Accepted: 15-12-2025, Published: 30-12-2025
Volume 7, Issue 2, 2025, Page No. 48-50

An observational study to evaluate serum lipid profile during 14-20 weeks of pregnancy as predictor of hypertensive disorders of pregnancy in the Department of Obstetrics & Gynaecology, SMS Medical College, Jaipur

Dr. Brijesh Dadhich[1], Dr. kanhaiyalal sharma[2], Dr. Suman[3], Dr. Sudha Saluja[4]
[1] Senior Consultant Gangri Hospital, SMS Medical College, Jaipur, Rajasthan, India
[2] Government District Hospital, Sanganer, Jaipur, Rajasthan, India
[3] Resident Doctor, SMS Medical College, Jaipur, Rajasthan, India
[4] Professor, SMS Medical College, Jaipur, Rajasthan, India

Abstract
Introduction: Hypertensive disorders of pregnancy are a significant global health concern, affecting approximately 10% of all pregnancies worldwide. Among these, pre-eclampsia—a condition characterized by high blood pressure and signs of organ damage, primarily to the liver or kidneys—is observed in 3–5% of pregnancies
Aim & Objectives
Aim
- To evaluate serum lipid profile during 14-20 weeks of pregnancy as predictor of hypertensive disorders of pregnancy.

Objectives
- To study serum lipid profile during 14-20 weeks of pregnancy.
- To look for association of abnormal lipid levels in pregnancy with hypertensive disorder of pregnancy.

Conclusion: The study provides compelling evidence that dyslipidemia during the early second trimester is associated with an increased risk of developing hypertensive disorders of pregnancy. Total cholesterol emerged as the most reliable single predictor, with moderate sensitivity and high specificity. Although other lipid fractions (VLDL, triglycerides, LDL) were elevated in HDP cases, their predictive accuracies were relatively lower. HDL, though lower in HDP groups, did not significantly differ from normotensive counterparts.

Keywords: Pre-eclampsia, serum lipid profile, dyslipidemia, early second trimester, total cholesterol, triglycerides

Introduction

Hypertensive disorders of pregnancy are a significant global health concern, affecting approximately 10% of all pregnancies worldwide. Among these, pre-eclampsia—a condition characterized by high blood pressure and signs of organ damage, primarily to the liver or kidneys—is observed in 3–5% of pregnancies [1]. According to Cunningham *et al*. [2], hypertension during pregnancy is a leading cause of maternal and perinatal morbidity and mortality, contributing to serious complications in 5–10% of all pregnancies globally.

Furthermore, pregnancy-induced hypertension (PIH), a subset of hypertensive disorders that manifests as new-onset hypertension after 20 weeks of gestation without accompanying proteinuria, has been identified in 3.9% of pregnancies [3].

The International Society for the Study of Hypertension in Pregnancy (ISSHP) defines hypertension as a systolic blood pressure exceeding 140 mmHg and/or a diastolic blood pressure exceeding 90 mmHg. Additionally, an increase in systolic blood pressure by 30 mmHg or diastolic blood pressure by 15 mmHg, measured at least 4 hours apart, or a single diastolic reading above 110 mmHg, is also classified as hypertension. This comprehensive definition encompasses chronic hypertension, gestational hypertension, and preeclampsia [4]. According to the American College of Obstetricians and Gynecologists (ACOG), hypertension is defined as a systolic blood pressure of 140 mmHg or higher or a diastolic blood pressure of 90 mmHg or higher, measured on two separate occasions at least 4 hours apart after 20 weeks of gestation in a woman with previously normal blood pressure [5]. This is accompanied by proteinuria, which is indicated by a 24-hour urine protein level of 300 mg or more, a protein/creatinine ratio of 0.3 mg/ dL or higher, or a dipstick reading of 2+ [6]

Aim & Objectives Aim

- To evaluate serum lipid profile during 14-20 weeks of pregnancy as predictor of hypertensive disorders of pregnancy.

Objectives

- To study serum lipid profile during 14-20 weeks of pregnancy.
- To look for association of abnormal lipid levels in pregnancy with hypertensive disorder of pregnancy.

Materials and Methods Inclusion Criteria

Pregnant women fulfilling the following criteria were included

- Singleton pregnancy
- Gestational age between 14 and 20 weeks confirm by firsttrimester ultrasonography
- Willingness to participate and provide informed consent
- Attending antenatal clinic at SMS Medical College during the study period

Exclusion Criteria

Participants were excluded based on

- Known pre-existing chronic hypertension, diabetes mellitus, or renal disorders
- History of lipid metabolism disorders or treatment with lipidlowering agents ● Multiple gestations
- Women diagnosed with thyroid dysfunction or any systemic illness potentially affecting lipid metabolism ● Refusal to consent or follow-up

Observation and Results

Table 1: Incidence of HDP and Normotensive across Subgroups

Group	Description	Number (N)	Percentage (%)
Group A	Normal Lipid + Normotensive	115	47.52%
Group B	Normal Lipid + HDP	6	2.48%
Group C	Abnormal Lipid + Normotensive	91	37.60%
Group D	Abnormal Lipid + HDP	30	12.40%
Total		242	100.00%
$\chi^2 = 17.26$, df = 1, **p < 0.001**			

Among the 242 pregnant women studied, 47.52% (N=115) had normal lipid profiles and were normotensive (Group A), while 2.48% (N=6) had normal lipids but developed hypertensive disorders of pregnancy (HDP) (Group B). A considerable proportion, 37.60% (N=91), had abnormal lipid profiles but remained normotensive (Group C). Notably, 12.40% (N=30) had both abnormal lipid profiles and developed HDP (Group D). This indicates a higher prevalence of HDP among those with abnormal lipid profiles compared to those with normal lipids. A chi-square test was performed to assess the association between lipid status and hypertensive disorders of pregnancy (HDP). The chi-square test result was highly significant ($\chi^2 = 17.26$, df = 1, **p < 0.001**), indicating a strong and statistically significant association between abnormal lipid levels and the risk of HDP.

Table 2: Age Group Distribution in Normotensive and HDP Groups

Age Group (Years)	Normotensive (N = 206)	HDP (N = 36)	Total (N = 242)
18–22	46 (22.4%)	4 (11.1%)	50 (20.7%)
23–27	65 (31.8%)	8 (22.2%)	73 (30.2%)
28–32	61 (29.4%)	11 (30.6%)	72 (29.8%)
33–37	29 (14.1%)	9 (25.0%)	38 (15.7%)
38–42	5 (2.3%)	4 (11.1%)	9 (3.7%)
Total	206 (100%)	36 (100%)	242 (100%)
$\chi^2 = 11.30$, df = 4, p = 0.023			

The distribution of hypertensive disorders of pregnancy (HDP) across different age groups showed notable variation. The majority of normotensive women were in the age group of 23– 27 years (31.8%), followed by 28–32 years (29.4%). In contrast, the highest proportion of HDP cases was observed in the age groups of 28–32 years (30.6%) and 33–37 years (25.0%).

A comparatively higher proportion of HDP cases was also noted in the older age group of 38–42 years (11.1%) compared to normotensive women in the same age (2.3%).

The chisquare test indicated a statistically significant association between age group and the occurrence of HDP ($\chi^2 = 11.30$, df = 4, p = 0.023), suggesting that the risk of developing HDP increases with advancing maternal age.

Table 3: Descriptive Statistics of Age in Normotensive and HDP Groups

Parameter	Normotensive (N=206)	HDP (N=36)
Mean ± SD	27.05 ± 5.48	30.04 ± 6.10
Median	27	31
Range	18 - 42	18 - 42
t = -3.57, p = 0.0005		

The comparison of maternal age between the normotensive and hypertensive disorder groups showed a statistically significant difference (t = -3.57, p = 0.0005). The mean age in the normotensive group was 27.05 ± 5.48 years, whereas it was significantly higher in the HDP Group at 30.04 ± 6.10 years. The median age was also higher in the HDP group (31 years) compared to the normotensive group (27 years).

Conclusion

The study provides compelling evidence that dyslipidemia during the early second trimester is associated with an increased risk of developing hypertensive disorders of pregnancy. Total cholesterol emerged as the most reliable single predictor, with moderate sensitivity and high Specificity. Although other lipid fractions (VLDL, triglycerides, LDL) were elevated in HDP Cases, their predictive accuracies were relatively lower. HDL, though lower in HDP groups, did not significantly differ from normotensive counterparts.

The association between lipid abnormalities and HDP points to the underlying role of endothelial dysfunction, pro-inflammatory states, and altered vascular homeostasis in the pathogenesis of preeclampsia and gestational hypertension. These findings align with existing literature on the metabolic underpinnings of pregnancyinduced hypertension, reinforcing the hypothesis that lipid metabolism plays a central role in maternal vascular adaptation.

Incorporating second-trimester lipid profiling into routine antenatal assessments could enable clinicians to identify high-risk pregnancies earlier and initiate appropriate monitoring or interventions. This proactive approach may help reduce the incidence and severity of HDPrelated complications, including fetal growth restriction, preterm birth, and maternal morbidity.

References

1. Fu R, Li Y, Li X, Jiang W. Hypertensive Disorders in Pregnancy: Global Burden from 1990 to 2019, Current Research Hotspots and Emerging Trends. Curr Probl Cardiol,2023:48(12):101982. doi:10.1016/j.cpcardiol.2023.101982.
2. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS, Hoffman BL, *et al*. Williams Obstetrics. 25th ed. New York: McGraw-Hill Education, 2018.
3. Terefe W, Getachew Y, Hiruve A, Derbew M, Mariam DH, Mammo D, *et al*. Patterns of hypertensive disorders of pregnancy and associated factors at Debre Berhan Referral Hospital, North Shoa, Amhara Region. Ethiop Med J,2015:2:5765.
4. Cífková R. Hypertension in pregnancy: a diagnostic and therapeutic overview. High Blood Press Cardiovasc Prev,2023:30(4):289–303. Doi: 10.1007/s40292-023-

00582-5. Epub 2023 Jun 13. PMID: 37308715; PMCID: PMC10403432.
5. Luger RK, Sibai BM. Hypertension in pregnancy. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing, 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK430839/
6. Croke L. Gestational hypertension and preeclampsia: A practice update. Am FAM Physician,2019:100(10):649-654.
7. Tomimatsu T, Mimura K, Matsuzaki S, Endo M, Kumasawa K, Kimura T. *et al*. Preeclampsia: maternal systemic vascular disorder caused by generalized endothelial dysfunction due to placental antiangiogenic factors. Int J Mol Sci,2019:20(17):4246. Doi:10.3390/ijms20174246.
8. Maynard SE, Min JY, Merchan J, Lim KH, Li J, Mondal S, *et al*. Excess placental soluble fms-like tyrosine kinase 1 (sFlt1) may contribute to endothelial dysfunction, hypertension, and proteinuria in preeclampsia. J Clin Invest,2003:111(5):649658. doi:10.1172/JCI17289.
9. Levine RJ, Maynard SE, Qian C, Lim KH, England LJ, Yu KF, *et al*. Circulating angiogenic factors and the risk of preeclampsia. N Engl J Med,2004:350(7):672–683. doi:10.1056/NEJMoa31884