



RESEARCH ARTICLE

A Prospective Study on Gestosis Score as an Indicator of Hypertensive Disorder of Pregnancy in a Tertiary Care Center

Anshuman Jena¹, Mahija Sahu², Avasmica Toppo³, Sradha Suman Sahu^{4*}

ABSTRACT

Background: Hypertensive disorders of pregnancy (HDP), particularly preeclampsia, remain a major cause of maternal and perinatal morbidity and mortality worldwide. Early identification of high-risk pregnancies is essential for timely intervention. The gestosis score has been proposed as a simple, cost-effective screening tool for predicting HDP.

Aim: To evaluate the utility of the gestosis score as an indicator for predicting hypertensive disorders of pregnancy in a tertiary care center.

Methods: This prospective study was conducted in the Department of Obstetrics and Gynecology at a tertiary care center from February 2024 to November 2025. A total of 100 pregnant women beyond 20 weeks of gestation were included. Gestosis scores were calculated based on predefined risk factors. Patients were categorized into low, moderate, and high-risk groups. Statistical parameters including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy were calculated.

Results: The majority of patients (72%) were categorized as high risk (gestosis score ≥ 3). Preeclampsia and severe preeclampsia accounted for a significant proportion of cases. The gestosis score demonstrated high sensitivity (94.74%) and good specificity (83.33%) in predicting preeclampsia. The PPV and NPV were 90% and 90.91%, respectively, with an overall diagnostic accuracy of 90.32% ($p < 0.0001$).

Conclusion: The gestosis score is an effective, simple, and reliable tool for early identification of women at risk of hypertensive disorders of pregnancy. It can be particularly useful in resource-limited settings for improving maternal and fetal outcomes through early intervention.

Keywords: Gestosis score, Hypertensive disorders, Pregnancy, Negative predictive value (NPV), Sensitivity, Specificity

Indian J. Pharm. Biol. Res. (2026): <https://doi.org/10.30750/ijpbr.14.2.37>

INTRODUCTION

Hypertensive disorders are the most prevalent medical problems during pregnancy, accounting for 7-15% of all pregnancies. According to the World Health Organization's (WHO) systemic assessment on Maternal Mortality, pre-eclampsia is still the top cause of maternal mortality. Hypertension, along with bleeding and infection, makes up the lethal trio, contributing considerably to maternal and neonatal morbidity and mortality. Pre-eclampsia is widespread in India, with hypertensive disorders accounting for 7-15% of all pregnancy problems. According to the World Health Organization's (WHO) systemic assessment on Maternal Mortality, pre-eclampsia is still the top cause of maternal mortality. Hypertension, along with bleeding and infection, makes up the lethal trio, contributing considerably to maternal and neonatal morbidity and mortality(1).

According to the National Health Portal, the prevalence of pre-eclampsia in India is between 2 and 10% of all pregnancies, with an incidence of 8-10%. However, results vary substantially across studies and geographical

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How to cite this article: Jena A, Sahu M, Toppo A, Sahu SS. A Prospective Study on Gestosis Score as an Indicator of Hypertensive Disorder of Pregnancy in a Tertiary Care Center. Indian J. Pharm. Biol. Res. 2026;14(2):212-218.

Source of support: Nil

Conflict of interest: None.

Received: 22/04/2026 **Revised:** 10/05/2026 **Accepted:** 17/05/2026

Published: 09/06/2026

places in India, with some research indicating much higher rates, such as a 15.61% prevalence in a recent hospital-based study. Maternal mortality is significantly lower in high-income nations than in poor countries such as India. However, the incidence of pre-eclampsia has increased in the United States, possibly due to an increased frequency of predisposing conditions such as chronic hypertension, diabetes, and obesity. 5% of all women (1 in every 20) with severe pre-eclampsia or eclampsia were hospitalized to the intensive care unit(2).

Chronic hypertension and cardiovascular risk, such as coronary artery disease, are two long-term consequences of hypertension during pregnancy. Preeclampsia is a pregnancy disorder characterized by new-onset hypertension after 20 weeks of gestation, proteinuria (greater than 0.3g/L in a 24-hour urine collection, dipstick reading of 2+ by qualitative urine examination, or protein to creatinine ratio of 0.3mg/dL or higher), or other signs of end-organ dysfunction in a previously normotensive woman. Pre-eclampsia is highly related with fetal growth restriction (FGR), low birth weight (LBW), spontaneous or induced preterm delivery, respiratory distress syndrome (RDS), NICU admission, and cerebral palsy. Finally, according to the National Health Portal, pre-eclampsia affects 2-10% of pregnant women, with a frequency of 8-10%(3).

However, results vary substantially across studies and geographical places in India, with some research indicating much higher rates, such as a 15.61% prevalence in a recent hospital-based study. Maternal mortality is significantly lower in high-income nations than in poor countries such as India. However, the incidence of pre-eclampsia has increased in the United States, possibly due to an increased frequency of predisposing conditions such as chronic hypertension, diabetes, and obesity. 5% of all women (1 in every 20) with severe pre-eclampsia or eclampsia were hospitalized to the intensive care unit. Chronic hypertension and cardiovascular risk, such as coronary artery disease, are two long-term consequences of hypertension during pregnancy(4).

Preeclampsia is a pregnancy disorder characterized by new-onset hypertension after 20 weeks of gestation, proteinuria (greater than 0.3g/L in a 24-hour urine collection, dipstick reading of 2+ by qualitative urine examination, or protein to creatinine ratio of 0.3mg/dL or higher), or other signs of end-organ dysfunction in a previously normotensive woman. Pre-eclampsia is highly related with fetal growth restriction (FGR), low birth

weight (LBW), spontaneous or induced preterm delivery, respiratory distress syndrome (RDS), NICU admission, and cerebral palsy. Finally, pre-eclampsia can be classified as early onset (37 weeks)(5).

MATERIAL AND METHODS

STUDY DESIGN-prospective study

STUDY PERIOD- FEBRUARY 2024 TO NOVEMBER 2025

STUDY SAMPLE- 100 patient was taken

PLACE OFSTUDY-O&G department of MKCG, MCH, BERHAMPU

Inclusion Criteria

- Age more than 18 year
- All pregnant women who came to O&G department of MKCG, MCH after 20 wk of pregnancy till delivery

Exclusion Criteria

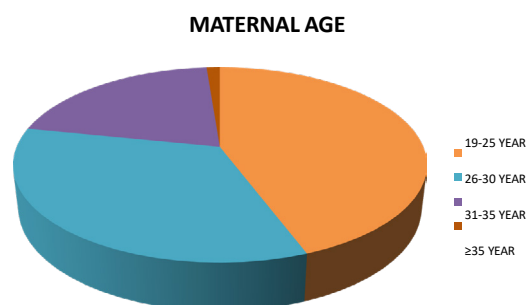
- Pregnant patient with COVID-19 disease
- Malignancy
- Liver disease
- Patient who not able to follow up
- Smoking

RESULTS

Obstetrical Observations

Distribution Of Sample As Per The Maternal Age

Age in years	No of patients	Percent
19-25	43	43%
26-30	33	33%
31-35	20	20%
>35	4	4%

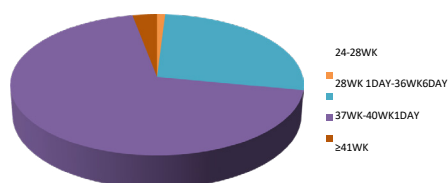


In our study pregnant women of age 19-25 year have 43%, 26-30 year of 33%, 31-35 year of 20% and more than 35 year of age 4%

Distribution of Sample as per the Gestational Age

Gestational age in wks	No of patients	Percent
24-28wk	1	1%
28wk 1day-36wk6day	27	27%
37wk-40wk6day	69	69%
>41wks	3	3%

MATERNAL GESTATIONAL AGE

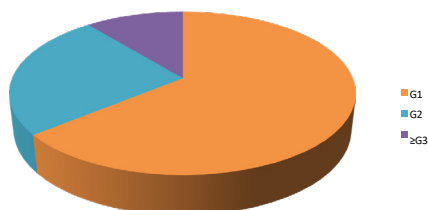


In our study pregnant women of gestational age 37wk to 40wk 6day are more i.e. 69%, 28wk 1day to 36wk 6day 27%, more than 41 wk of 3% and 24wk to 28wk 1%

Distribution of Sample as per the Parity

Parity	No of patient	Percent
G1	67	67%
G2	25	25%
≥G3	8	8%

MATERNAL PARITY

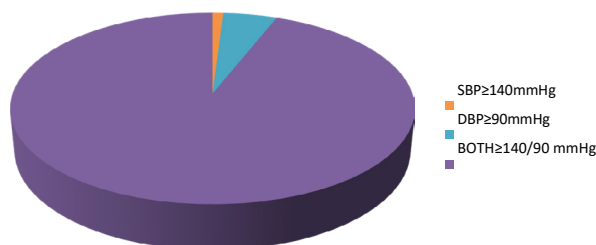


In our study pregnant women with primi-gravid (G1) is 67% and multigravida (≥G2) is 33%

Distribution of Sample as per Maternal Blood Pressure (BP)

Blood pressure	No. of patient	Percentage
Systolic bp (≥ 140 mm hg)	1	1%
Diastolic bp(≥ 90 mm hg)	5	5%
Both(≥ 140/90 mm hg)	94	94%

MATERNAL BLOOD PRESSURE

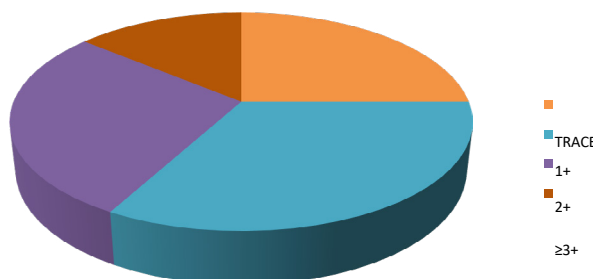


In our study pregnant women with both rise in systolic and diastolic BP is 94%, only rise in systolic BP is 1% and rise in diastolic BP is 5%

Distribution of Sample with respect to proteinuria (DIPSTICK)

Protein urea	No of patient	Percentage
Trace	25	25%
1+	33	33%
2+	28	28%
≥3+	14	14%

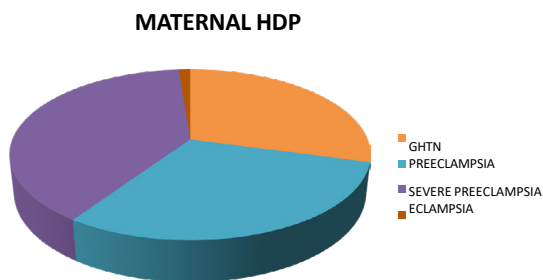
PROTEINURIA(DIPSTICK)



In our study pregnant women with trace proteinuria is 25%, 1+ proteinuria in 33%, 2+ proteinuria in 28% and more than equal to 3+ proteinuria in 14%

Distribution of Sample as per Different Grades of HDP

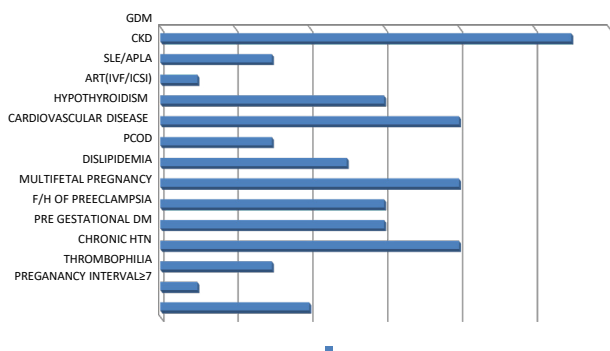
Diagnosis	No. of patient	Percentage
Ghtn	29	29%
Preeclampsia	30	30%
Severe preeclampsia	39	39%
Eclampsia	2	2%



In our study pregnant women with diagnosis gestational hypertension is 29%, preeclampsia 30%, severe preeclampsia 39% and eclampsia in 2%

Other Associated Maternal and Obstetrical High Risk Factor

Risik factor	No. of patient	Percentage
GDM	11	11%
CKD	3	3%
SLE/APLA	1	1%
Art(IVF/ICSI)	6	6%
Hypothyroidism	8	8%
Cardiovascular disease	3	3%
PCOD	5	5%
Dis-lipidemia	8	8%
Multifetal pregnancy	6	6%
F/H of preeclampsia	6	6%
Pre gestational dm	8	8%
Chronic htn	3	3%
Mental disorder	Nil	Nil
Thrombophilia	1	1%
Pregnancy interval \geq 7	4	4%



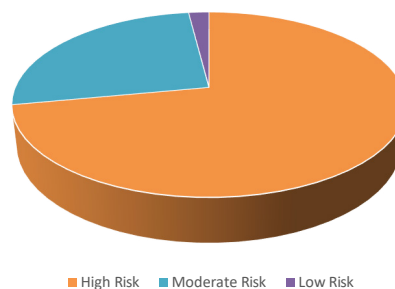
In our study pregnant women associated with other maternal and obstetrical high risk factor are as follow GDM(gestational

diabetes mellitus) is 11%,CKD(chronic kidney disease) is 3%, SLE(systemic lupus erythematosus) is 1%, ART(assisted reproductive technology) is 6%,hypothyroidism is 8%, cardiovascular disease 3%, PCOD(polycystic ovarian disease) is 5%, dislipidemia is 8%, multifetal pregnancy is 6% ,family history of preeclampsia, pre gestational diabetic mellitus is 8%, chronic hypertension is 3%, thrombophilia is 1%, pregnancy interval more than equal to seven year is 4% with no mental disorder.

Gestosis Score of Different Categories of HDP

Risk catagory	Gestosis score criteria	No of patient
High risk	Total score \geq 3	72
Moderate risk	Total score=2	26
Low risk	Total score=1	2

Gestosis Score of Patient



SENSITIVITY, SPECIFICITY, POSITIVE PREDICTIVE VALUE, NEGATIVE PREDICTIVE VALUE ANDDIAGNOSTIC ACCURACY FOR PREDECTING PREECLAMPSIA IN PREGNANCY

Parameter	Sensitivity	Specificity	Ppv	Npv	Diagnostic accuracy	P-value
Gestosis score	94.74%	83.33%	90%	90.91%	90.32%	<0.0001

DISCUSSION

In our study, the sensitivity, specificity, PPV (positive predictive value), NPV (negative predictive value), diagnosis accuracy, and p-value for gestosis score in pregnant women with preeclampsia were 94.74%, 83.33%, 90%, 90.91%, 90.30%, and <0.001.

A similar study was conducted at GMC Amritsar in Punjab, India, from September 2023 to December 2024. The gestosis score has 82.35% sensitivity, 82.69% specificity, 43.75% PPV, 96.63% NPV, and an 82.64% diagnosis accuracy for predicting preeclampsia(6).

Another study was conducted at AIIM, Jamu, India, between June 2020 and December 2021. The gestosis score demonstrated 83.1% sensitivity, 97.5% specificity, 85.51% PPV, 97.03% NPV, and a diagnosis accuracy of 95.35% for predicting preeclampsia(70). Another study was conducted at JLMCH in Mayaganj, Bhagalpur, Bihar, India, from January to December 2022. The gestosis score demonstrated 86.66% sensitivity, 96.49% specificity, 86.91% PPV, 97.98% NPV, and a diagnosis accuracy of 96.12% for predicting preeclampsia(7).

Another study was undertaken at B.R.D MCH in Gorakhpur, Uttar Pradesh, India, from April 2023 to March 2024. The gestosis score has 90% sensitivity, 85% specificity, 85.7% PPV, 89.5% NPV, and an 88% diagnostic accuracy for predicting preeclampsia (71). Another study was undertaken at MVJ MCH in Bangalore, Karnataka, India, from August 2023 to August 2024. The gestosis score has 83.1% sensitivity, 97.51% specificity, 85.51% PPV, 97.30% NPV, and a diagnosis accuracy of 95.35% for predicting preeclampsia(8).

Study	Year	Place	Sample size (n)	Sensitivity
Present Study	2024-2025	Odisha	100	94.74%
Sharma et al	2023-2024	Punjab	100	82.35%
Vingh et al	2023-2024	Up	200	90%
Reddy et al	2023-2024	Karnataka	100	83.1%
Imam et al	2022	Bihar	109	86.66%
Gupta et al	2020-2021	Jammu	473	83.1%

According to the above comparison, my gestosis score has a sensitivity of 94.74% for the diagnosis of PE, which is comparable to other studies. Sensitivity refers to a disease's detection rate. It indicates that the score is quite effective in detecting PE and seldom misses the diagnosis. High sensitivity is ideal for screening.

Comparison of Specificity of Gestosis Score with Other Study

Study	Year	Place	Sample size(n)	Specificity
Present Study	2024-2025	Odisha	100	83.33%

Sharma et al	2023-2024	Punjab	100	82.69%
Vingh et al	2023-2024	Up	200	85%
Reddy et al	2023-2024	Karnataka	100	97.51%
Imam et al	2022	Bihar	109	96.49%
Gupta et al	2020-2021	Jammu	473	97.5%

According to the aforementioned comparison, my gestosis score has a specificity of 83.33% for the diagnosis of PE, which is comparable to other studies. Specificity is the genuine negative rate, which describes how effectively the test performs for healthy persons. It assesses the test's capacity to accurately screen out healthy individuals so that they do not receive unneeded therapy.

Comparison of PPV of Gestosis Score with Other Study

Study	Year	Place	Sample size (n)	PPV
Present study	2024-2025	Odisha	100	90%
Sharma et al	2023-2024	Punjab	100	43.75%
Vingh et al	2023-2024	Up	200	85.7%
Reddy et al	2023-2024	Karnataka	100	85.51%
Imam et al	2022	Bihar	109	86.91%
Gupta et al	2020-2021	Jammu	473	85.51%

From the above comparison it is found that my PPV (positive predictive value) of gestosis score for diagnosis of PE is comparable with other study i.e. 90%. It indicate the probability of truth. PPV 90% means that out of all the people who test positive, 90% of them truly have the disease.

Comparison of NPV of Gestosis Score with Other Study

Study	Year	Place	Sample size (n)	Npv
Present study	2024-2025	Odisha	100	90.91%
Sharma et al	2023-2024	Punjab	100	96.63%
Vingh et al	2023-2024	Up	200	89.5%
Reddy et al	2023-2024	Karnataka	100	97.30%
Imam et al	2022	Bihar	109	97.98%
Gupta et al	2020-2021	Jammu	473	97.03%

Based on the above comparison, my PPV (positive predictive value) of gestosis score for the diagnosis of PE is 90%, which is comparable to other studies. It indicates the possibility of truth. PPV 90% means that 90% of those who test positive actually have the disease.

Comparison of Diagnosis Accuracy of Gestosis Score with Other Study

Study	Year	Place	Sample size (n)	Diagnosis accuracy
Present study	2024-2025	Odisha	100	90.32%
Sharma et al	2023-2024	Punjab	100	82.64%
Vingh et al	2023-2024	Up	200	88%
Reddy et al	2023-2024	Karnataka	100	95.35%
Imam et al	2022	Bihar	109	96.12%
Gupta et al	2020-2021	Jammu	473	95.35%

Based on the above comparison, my gestosis score diagnosis accuracy for PE is 90.32%, which is comparable to other studies. Accuracy is the fraction of all correct test findings, including positive hits and negative clearing. Diagnosis accuracy of 90.32% means that of the 100 people tested, the test correctly identified around 90%. According to the findings of the above comparative study, the gestosis score is an effective tool for diagnosing preeclampsia in pregnant women in low-resource countries such as India. My sensitivity, specificity, PPV, NPV, and diagnostic accuracy are comparable to prior studies.

Any unplanned or unexpected obstetric or medical problem linked with PE patients may pose a risk to the fetus' or mother's well-being. According to WHO, around 30% of pregnancies in India are high risk, and 70-80% of perinatal or maternal deaths occur in the high risk group. One of the leading causes of maternal and perinatal death is hypertensive disorders during pregnancy. Though maternal and newborn mortality rates are significantly higher than the SDG targets, there is a downward trend in NMR and MMR, which has been linked to effective antenatal care during which antepartum and intrapartum risk factors can be detected. Several risk assessment systems have been developed to identify high-risk pregnancies(9).

In their 2019 good clinical practice recommendation, FOGSI-GESTOSIS-ICOG proposed using the HDP gestosis score to identify women at high risk of hypertensive disorders of pregnancy. We therefore conducted this study to analyze the gestosis score in PE patients and to demonstrate the connection of gestosis score. This rating system is straightforward, easy to use, and effective for all present and emerging risk variables. Each risk factor is assigned a score of one, and women with a score of three or higher are considered to have a high risk of PE. In our study, the gestosis score indicated that 29% were at intermediate risk, whereas 71% were at high risk of PE(10).

The score is based on several risk factors associated with an increased risk of developing PE due to underlying mechanisms such as maternal nutrient depletion, arterial stiffening, endothelial dysfunction, placental maladaptation, placental functioning, increased lipid oxidation products, decreased antioxidants, maternal inflammatory response, genetic factors, antipaternal immune response, and so on(11). The gestosis score was substantially linked with PE. In other research, PE has been linked to a poor maternal outcome and the need for surgery. The bad fetal outcome in PE has been attributed to uteroplacental insufficiency, which compromises the fetus' circulation. Thus, the score may aid in identifying women at high risk of developing HDP and predicting fetal and maternal outcomes due to underlying hypertension illness(12).

Our findings contributed to the existing literature, and we proposed that the HDP gestosis score might be used as a low-cost technique for identifying high-risk pregnant women who are at risk of developing HDP.

CONCLUSION

The gestosis score is a valuable tool for early detection of women at high risk of developing hypertension disorders, particularly in resource-constrained communities. The tool can be used by even first-line healthcare providers to screen for HDP throughout the prenatal period. The sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy for predicting PE are: 94.74%, 83.33%, 90%, 90.91%, and 90.32%, respectively. Overall, it appears to be a unique marker with a diagnostic accuracy of 90.32% in predicting the development of PE. The gestosis score has a superior negative predictive value (90.91%) and a higher specificity (83.33%).

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