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Original Research Article

Effectiveness of gestosis score for prediction of hypertensive disorder of pregnancy in a tertiary hospital

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ABSTRACT

Background: Hypertensive disorders of pregnancy (HDP) are major causes of maternal morbidity and mortality. Early identification of women at increased risk is important, especially in resource-limited settings. The HDP-Gestosis Score is a simple clinical risk-assessment tool that may facilitate early risk stratification. Objectives were to evaluate the effectiveness of the Gestosis score in predicting pre-eclampsia (PE) and to assess the effectiveness of aspirin prophylaxis in high risk.
Methods: In this prospective observational study 440 pregnant women at 20 weeks gestation were enrolled and followed until term for the development of HDP. Participants with a Gestosis score ≥3 were considered high risk and were prescribed low-dose aspirin. The predictive performance of the score and the association between risk factors, aspirin use, and PE were assessed.
Results: Among 440 participants, 206 (46.8%) had a gestosis score ≥3. For prediction of PE, the score demonstrated sensitivity 76.34%, specificity 61.1%, positive predictive value 34.47%, and negative predictive value 90.6%. High Gestosis scores were significantly associated with gestational diabetes mellitus (82.4%), excessive gestational weight gain (69.8%), maternal hypothyroidism (89.5%), multifetal pregnancy (82.6%), previous hypertensive disease in pregnancy (84.2%), and chronic hypertension (100%) (p=0.001). Women not taking aspirin had higher odds of developing PE (OR 7.882, 95% CI 4.118-15.086).
Conclusions: The Gestosis Score demonstrated good sensitivity and a high negative predictive value. Its moderate specificity indicates that it is more appropriate for risk stratification than diagnosis. Aspirin prophylaxis was associated with a lower occurrence of PE in the studied cohort.

Keywords: Gestosis score, Hypertensive disorders of pregnancy, Pre-eclampsia, Aspirin prophylaxis, Risk prediction, Antenatal screening

INTRODUCTION

The term hypertensive disorders in pregnancy (HDP) refers to a group of conditions ranging from already existing chronic hypertension in the index pregnancy to complex multisystem disorders like PE leading to eclampsia, HELLP syndrome, acute renal failure, pulmonary edema, stroke, and left ventricular failure.[1] PE is one of the commonest complications of pregnancy, affecting 4.6% pregnancies worldwide and 1.8-16.7% pregnancies in the developing countries. It accounts for 19% of maternal deaths.[2] Despite the fact that many mothers seek hospital-based delivery, a significant gap is identified in the early detection and subsequent management of these patients. Serious maternal problems such as cerebrovascular hemorrhage, pulmonary edema, and acute renal failure can be seen in patients of severe preeclampsia or eclampsia.[3,4] Fetuses may experience intrauterine growth restriction leading to an increase in

perinatal morbidity and mortality.[5] Prediction or early diagnosis of these conditions in pregnancy followed by management can help reduce maternal and perinatal morbidity and mortality. A simple risk model has been structured as the HDP gestosis score (by Dr. Gorakh Mandrupkar, 2020) for effective screening and prediction of PE. It takes into account 27 clinical and demographic current and potential risk factors for the expectant mother. The severity of each clinical risk factor in the development of PE is assigned a score of 1, 2, or 3. A thorough history and examination of the woman yields a final score. A pregnant woman is classified as "at risk for PE" and treated appropriately if her total score is equal to or higher than 3.[6]

Thus, careful history taken early at 20 weeks can be an effective method for prediction and prevention of mothers 'at risk' for developing HDP. The standard of care for pregnant women with gestosis score >3 is use of low dose aspirin (75-150 mg) but aspirin does not prevent HDP in all cases.[6]

Aims and objectives

Aim and objectives were to predict PE using the Gestosis score and assess the effectiveness of aspirin in preventing preeclampsia.

METHODS

The study was conducted at Kalinga Institute of Medical Sciences, Bhubaneswar from February 2023 to November 2024. This was a Tertiary hospital based observational prospective study. The 440 patients were included in the study. All pregnant patients at 20 weeks of pregnancy visiting the OBGYN OPD of Pradyumna Bal Hospital, KIMS, Bhubaneswar and willing to participate in this study were enrolled and were followed up to term for development of HDP. Those with score of ≥3 were given low dose aspirin and followed up to term.

Study procedure

It was a questionnaire-based study based on gestosis score assessment. Consented subjects were evaluated based on their Gestosis score. If gestosis score <3 then the patienta were followed till term for and development of HDP. If gestosis score ≥3 then low dose aspirin was prescribed and patient were followed till term for the development of HDP.

Table 1: Gestosis score table (Dr. Gorakh Mandrupkar) good clinical practice recommendations (GCPR) 2019 HDP FOGSI-ICOG and Gestosis India association.[6]

Risk factors	Score
Age older than 35 years	1
Age younger than 19 years	1
Maternal anemia	1
Obesity (BMI>30)	1
Primigravida	1
Short duration of sperm exposure (cohabitation)	1
Woman born small for gestational age	1
Family history of cardiovascular disease	1
Polycystic ovary syndrome	1
Inter pregnancy interval more than 7 years	1
Conceived with assisted reproductive techniques (IVF/ICSI) treatment	1
MAP>85 mmHg	1
Chronic vascular disease (Dyslipidaemia)	1
Excessive weight gain during pregnancy	1
Maternal Hypothyroidism	2
Family history of PE	2
Gestational diabetes mellitus	2
Obesity (BMI>35)	2
Multifetal pregnancy	2
Hypertensive disease during previous pregnancy	2
Pregestational diabetes mellitus	3
Chronic hypertension	3
Mental disorders	3
Inherited/acquired thrombophilia	3
Maternal chronic kidney disease	3
Autoimmune diseases (SLE/APLA/RA)	3
Pregnancy with assisted reproductive (OD or surrogacy) treatment	3

RESULTS

The mean age of participants is approximately 28.35 years with a standard deviation of 4.33, while the BMI ranges between 12.50 and 44.60, with a mean of 24.75.

Gestosis score distribution and predictive accuracy

Among 440 participants, 206 (46.8%) had Gestosis ≥3. The Gestosis score demonstrated 76.34% sensitivity, 61.1% specificity, PPV 34.47%, and NPV 90.6% for predicting preeclampsia. These results indicate the score's robustness as an early screening tool, capable of identifying most women who subsequently developed HDP while minimizing false negative

Women with high Gestosis scores exhibited significant associations with multiple risk factors

Maternal hypothyroidism (89.5%), GDM (82.4%), excessive weight gain (69.8%), chronic hypertension (100%), multifetal pregnancy (82.6%).

History of hypertensive disorders (84.2%) (p=0.001). PCOD and parity showed no significant correlation (p=0.50 and 0.87).

These findings emphasize the multifactorial nature of HDP risk.

Impact of aspirin prophylaxis

Aspirin prophylaxis was significantly associated with reduced preeclampsia incidence (χ^2=43.26, p=0.001). Women not on aspirin had 11.43 times higher odds (95% CI: 6.722-19.438) of developing preeclampsia. The RR for aspirin users was 0.460 (95% CI: 0.359-0.590), reflecting a 54% relative risk reduction.

Despite this, preeclampsia incidence among women with Gestosis ≥3 remained notable, suggesting additional underlying mechanisms.

Table 2: Demographic characteristics.

Variables	Minimum	Maximum	Mean	Std deviation
Age (in years)	18	47	28.35	4.332
BMI	12.5	44.6	24.75	3.955

Table 3: Gestosis score as a diagnostic test for chronic hypertension/ PE.

Test	Outcome present-(PE)	Outcome absent	Total
Test positive (gestosis score ≥3)	71 (TP)	135 (FP)	206
Test negative (gestosis score 1-2)	22 (FN)	212 (TN)	234

Table 4: Risk factors Gestosis score distribution and predictive accuracy.

Risk factors	Gestosis score (1-2)	Gestosis score (≥3)	Phi coefficient	P value
PCOD	34 (53.9)	29 (46.1)	0.006	0.50
GDM	9 (17.6)	42 (82.4)	-0.258	0.001
Excessive weight gain	19 (30.2)	44 (69.8)	-0.189	0.001
Maternal hypothyroidism	8 (10.5)	68 (89.5)	-0.391	0.001
Multifetal pregnancy	4 (17.4)	19 (82.6)	-0.16	0.001
HTN disease during prev pregnancy	3 (15.8)	16 (84.2)	-0.159	0.001
Chronic hypertension	0 (0.0)	39 (100.0)	-0.332	0.001
Primi	115 (50.2)	114 (49.8)	0.138	0.87

Table 5: Effect of aspirin on PE prophylaxis in Gestosis score ≥3

Aspirin use	Outcome present, (PE)	Outcome absent, (Normal)	Total
Taking aspirin	51 (60.7)	33 (39.3)	84
Not taking aspirin	20 (16.4)	102 (83.6)	122
Total	71 (34.5)	135 (65.5)	206

Table 6: Effect of aspirin on PE prophylaxis in Gestosis score ≥3 risk analysis.

Risk estimate	Value	95 % CI (Lower-Upper)
Odds ratio (Taking / not taking)	7.882	4.118-15.086
Relative risk (for PE)	3.704	2.395-5.728
Relative risk (for normal outcome)	0.470	0.356-0.620

DISCUSSION

The present study confirms that the Gestosis score is a reliable clinical tool for predicting HDP. Its sensitivity (76.34%) is comparable to that reported by Mandrupkar (2020) and previous community-based studies. [4] The high NPV (90.6%) indicates strong exclusion ability, making it useful for identifying women at low risk. Our analysis revealed significant associations between high Gestosis scores and metabolic conditions such as GDM, hypothyroidism, and excessive gestational weight gain. Hypothyroidism has been linked with preeclampsia development. The 100% association between chronic hypertension and high Gestosis score underscores its predictive relevance. The Gestosis score's moderate specificity (61.1%) reflects its use as a screening, not diagnostic tool.[12,13] The International Federation of Gynecology and Obstetrics (FIGO) also recommends structured maternal risk assessment and early screening strategies for the prediction and prevention of PE.[14]

A high false positive rate is acceptable in antenatal screening as missed high risk cases may cause severe consequences. In an observational study of the HDP-Gestosis score by Gupta et al the authors reported specificity of 97.51% and NPV of 97.03% for predicting PE (while sensitivity was 83.1%).[7] Aspirin remains an important intervention for the prevention of PE in high-risk pregnancies, as demonstrated by randomized controlled trials and supported by systematic reviews and international recommendations.[8,15-17] A further up-to-date systematic review by Wang et al concluded that starting aspirin between 12-16 weeks gestation at 75 mg/day was associated with a 38% reduction in PE (RR=0.62; 95% CI: 0.53-0.74) among high-risk women.[9] In our cohort, the relative risk of 0.460 aligns with this evidence, although persistence of PE among women with Gestosis ≥3 suggests that factors such as delayed initiation, non-compliance, or underlying placental/vascular pathology may blunt the effect. The persistent incidence despite prophylaxis underscores the multifactorial nature of HDP. Beyond platelet aggregation, mechanisms such as abnormal spiral artery remodeling, systemic inflammation, and angiogenic imbalance play roles unmitigated by aspirin. Genetic polymorphisms influencing prostaglandin synthesis may also affect response.[10,11]

The Gestosis score offers an evidence-based, low-cost approach for early HDP risk detection. Integrating it into routine ANC visits allows stratification, early counselling, and prophylactic initiation. Combining the score with biochemical markers could further enhance predictive precision.

The strengths of this study is a prospective design, adequate sample size and real-world relevance. Limitations include a single-center data and potential confounders such as aspirin adherence. Future multicentric validation and integration with Doppler or angiogenic profiling could refine its predictive capacity.

CONCLUSION

The present study confirms that the Gestosis score is a reliable clinical tool for predicting HDP. Its sensitivity (76.34%) is comparable previous community-based studies. The high NPV (90.6%) indicates strong exclusion ability, making it useful for identifying women at low risk. Aspirin remains the cornerstone for preventing preeclampsia in high-risk women. Women not on aspirin had 11.43 times higher odds (95% CI: 6.722-19.438) of developing preeclampsia.

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