

Evaluation of High Risk Pregnancy Scoring System in Predicting Fetal and Maternal Outcomes in a Rural Tertiary Care HospitalNeelam Swaroop¹, Parul Verma², Neha Choubey³, Devansh Lalwani⁴¹Professor and Head, Department of Obstetrics and Gynaecology, T.S. Misra medical college, Lucknow, UP, India²Associate Professor, Department of Obstetrics and Gynaecology, T.S. Misra medical college, Lucknow, UP, India³Assistant professor, Department of Obstetrics and Gynaecology, T.S. Misra medical college, Lucknow, UP, India⁴Intern, Department of Obstetrics and Gynaecology, T.S. Misra Medical College, Lucknow, UP, India

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Abstract**Introduction:** High-risk pregnancies contributes for significant proportion of maternal and perinatal morbidity and mortality. Early identification of risk factors during antenatal care is essential for preventing adverse fetal and maternal outcome. The objective of the study was to estimate the prevalence of high risk pregnancy and to classify it into low, moderate and high risk pregnancy among the women in the tertiary care hospital.**Methods:** A prospective analytical study was conducted in the Department of Obs & Gynae at T.S. Misra Medical College, Lucknow, from January 2025 to December 2025. A total 550 antenatal women were evaluated using the Dutta and Das cumulative antenatal risk scoring system and were categorized as low risk (0–2), moderate risk (3–5), and high risk (≥ 6). Feto maternal outcomes were analyzed.**Results:** among 550 participants, 22.7% were low risk, 49.7% moderate risk, and 27.5% high risk. High-risk pregnancies showed significantly higher rates of preterm delivery, operative delivery, NICU admission, and low birth weight. Strong statistical association was found between the associated medical disorder like PIH, Anemia, Thrombocytopenia, IHCP, Multiple pregnancy along with the risk category. Strong statistical associations were also observed between risk category and fetal maternal outcomes ($p < 0.001$).**Conclusion:** Dutta and Das risk scoring was found to be an effective tool for predicting adverse fetal/maternal outcomes in low resource settings. Routine implementation of structured risk scoring assessment during antenatal care can identify high risk pregnancy at earliest, optimize referral, and improve the fetal/maternal outcomes.**Keywords:** High risk pregnancy, Dutta and Das pregnancy score, pre-term, NICU, Low birth weight.**DOI:** 10.25258/ijcpr.18.8.78

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Introduction

High-risk pregnancies continue to pose a significant global challenge in contemporary obstetrics, as a leading contributor to maternal and perinatal morbidity and mortality and a disproportionately large burden in developing countries.

According to the World Health Organization (WHO), nearly 295,000 women die annually due to pregnancy and childbirth-related complications, while millions of newborns experience adverse outcomes such as prematurity, low birth weight, birth asphyxia, and neonatal death. In developing nations, one of the leading causes of death for women of reproductive age is maternal mortality

[1]. Maternal mortality ratio (MMR) of India for the period 2021-2023, as per the national Sample Registration System (SRS) is 88/1,00,000 live birth; MMR of Uttar Pradesh is 141 per 1,00,000. Most of these complications are preventable through timely identification of women at increased obstetric risk and appropriate antenatal surveillance. [2,3,4]

A high-risk pregnancy is defined as one in which the mother, fetus, or both have an increased probability of developing complications before, during, or after delivery. Risk factors include maternal age (<18 or >35 years), previous obstetric complications, hypertensive disorders, diabetes

mellitus, anemia, multiple pregnancy, medical disorders, fetal growth restriction, placenta previa, and several socioeconomic determinants. Early recognition of these factors allows referral to higher centres and implementation of evidence-based interventions to improve pregnancy outcomes [5].

A high risk pregnancy can be identified by using a high risk pregnancy scoring system. There are several scoring systems that have been used to relate risk factors associated and with the resultant outcomes. In 1973, Hobet et al investigated high risk pregnancy scoring based on prenatal and intrapartum factors [6]. In 1977, Coopland et al described a simple antenatal high risk assessment form. Dutta and Das in 1990 devised a prenatal scoring system which itself was modification of high risk scoring system as proposed by coopland.

According to Dutta and Das scoring system was classified into three groups, low risk (score 1-2), moderate (score 3-5), high risk score (6 and above). They all found that high risk pregnancy yields in poor fetomaternal outcome.[7]

Thus, categorizing high risk pregnancy using simple and feasible scoring system will help in reducing maternal and fetal morbidity and mortality by early identification of high risk pregnancy, timely referral and proper management. This study was carried out to identify at risk women using Dutta and Das risk scoring system and fetomaternal outcome in relation to the risk score.

The present study was conducted at rural tertiary care hospital to assess the effectiveness of the Dutta-Das system in predicting maternal outcomes (i.e. need of Cesarean sections (LSCS) and Intensive Care Unit (ICU) hospitalization) and fetal outcomes (i.e. low birth weight and Neonatal Intensive Care Unit (NICU) hospitalization and its usefulness as a screening tool for identifying pregnancies requiring intensified antenatal care and institutional delivery.

Methods

Type of study: Prospective analytical study.

Study Duration: January 2025 to December 2025.

Sample size: 550

Study centre: T.S Misra medical college and hospital, Department of obstetrics and gynaecology, Lucknow.

Inclusion Criteria:

1. All antenatal women who were admitted in labour room after 28weeks for delivery

2. Women willing to participate in the study.
3. Babies were followed till discharge.

Exclusion Criteria:

1. Patients who refused to participate in the study.

The total number of antenatal women evaluated and scored by cumulative antenatal risk scoring system were 550. The categories of risk were determined as low risk (score 0-2), moderate risk (score 3-5), and high risk (score >6). Reproductive history, related medical disorders, current pregnancy complications, history of previous deliveries, mode of delivery, gestational age at birth, length of stay, birth weight of the baby, APGAR score, and NICU admission were recorded. Maternal outcomes were LSCS, blood transfusion, postpartum hemorrhage, ICU admission and duration of stay. Neonatal outcomes were low birth weight (<2.5 kg), NICU hospitalization, lower than 7 NICU APGAR, and perinatal mortality. Chi-square tests were used to test the association between risk category and outcome variables with $p < 0.05$ deemed as statistically significant. Various studies proved high level of statistical validity, which proves the validity of the risk-scoring model.

Results

A total of 550 women that formed part of this study and were classified into various categories in regards to the Dutta and Das scoring system⁽¹⁾, around 125 women (22.7%) were allocated to low risk, 273 (49.7%) moderate risk and 152 (27.5%) were categorized under high risk.

Mean age of the study was 28.8 years. Mean age in low risk category was 28 years, in moderate risk it was 28.48 years, while in high risk category it was 30 years. We have seen that the older the maternal age (>35 years) is the greater is the likelihood that they will be cut off under high risk (30 cases). Primigravida's was set to be the most massive subgroup; there were 286 cases out of 550 total cases.

There is a statistically significant association between the antenatal risk category and the presence of bleeding after 20weeks, anemia, hypertension, multiple pregnancy, prolonged pregnancy, oligohydromnios/ polyhydromnios, PROM, and small for fetus ($p < 0.05$). Rh negative status was not significantly associated with the risk category in our study ($p = 0.066$). There is a strong statistically strong association seen between the past obstetric history like previous history of PIH, abortion, infertility, previous history of PPH, previous LSCS and history of previous neonatal death or still birth with the risk category.

Table 1: DUTTA and DAS scoring system [8]

Reproductive history factors	Score	Associated disease factors	Score
AGE		diabetes mellitus	3
<16 years	0	cardiac diseases	3
16-35 years	1	chronic renal disease	2
>35 years	2	prev. gynae surgery	1
PARITY		infective hepatitis	1
p-0	2	pulmonary TB	2
p-1-4	0	Undernutrition	2
p>=5	2	other diseases (according to severity)	1 to 3
PAST OBSTETRIC HISTORY		Present pregnancy factors	
abortion / infertility	1	bleeding <20 weeks	1
PPH/ manual removal	1	bleeding >20 weeks	3
baby>4000g	1	anemia<10g/dl	1
PIH/hypertension	1	Hypertension	2
prev. LSCS	2	HTN with albuminuria	3
still birth/ neonatal death	3	multiple pregnancy / breech	3
prolonged labour	1	Rh isoimmunisation	3
		prolonged pregnancy	1
		oligohydramnios/ polyhydramnios	2
		PROM	2
		small for date	1

Table 2: Distribution of study subjects according to risk score.

Risk score	Value	Number	Percentage (%)
Low score	0-2	125	22.7
Moderate score	3-5	273	49.7
High score	>=6	152	27.5
Total		550	100

Table 3: Distribution according to age and parity to risk factor.

Category	Low Risk [125]	Moderate Risk [273]	High Risk [152]	Grand Total
Age<16	0	0	0	0
Age>35	0	10	30	40
Parity=0	72	168	46	286
Parity 1-4	73	105	46	224
Parity>5	0	0	0	0

Table 4: Distribution of cases according to present pregnancy factors.

Present pregnancy factors	Low risk N(%) [125]	Moderate risk N(%) [273]	High risk N(%) [152]	χ^2	P value
Bleeding <20 weeks	0	0	3(1.9)	7.9	0.019
Bleeding >20 weeks	0	3(1.09)	13(8.5)	24.05	<0.001
Anemia	10(8)	49(17.9)	23(15.1)	6.7	0.035
Hypertension	3(2.4)	23(8.4)	36(23.6)	35.46	<0.001
Edema	0	0	0		
Albuminuria	0	0	0		
Multiple pregnancy	0	0	7(4.6)	18.57	<0.001
Breech	0	3(1.09)	20(13.1)	42.49	<0.001
Rh negative	0	10(3.6)	7(2.5)	5.45	0.66
Prolonged pregnancy	23(18.4)	23(8.4)	10(6.5)	12.31	0.002
Oligo/poly	3(2.4)	36(13.2)	10(6.6)	13.70	0.001
PROM	0	30(10.9)	26(17.1)	24.79	<0.001
Small for date	3(2.4)	33 (12.08)	33 (21.7)	23.42	<0.001

Table 5: Distribution of cases according to past obstetric history.

Previous pregnancy factors	low risk N(%) [125]	Moderate risk N(%) [273]	High risk N(%) [152]	χ^2	P value
Previous history of PIH	0	0	20(13.1)	54.34	<0.001
Previous abortion/infertility	33 (26.4)	63(23)	92(60)	65.22	<0.001
Previous PPH/MRP	0	0	3(1.9)	7.90	0.019
Previous history of 4kg baby	0	1(0.36)	3(1.9)	4.68	0.096
Previous LSCS	13(10.4)	79(28.9)	63(41.44)	32.82	<0.001
Previous Neonatal death/ Still birth	7(5.6)	7(2.5)	23(15.1)	24.90	<0.001

TABLE 6-Distribution according to associated medical disorders.

Associated disease factor Total	Low risk N(%) 125	Moderate risk N(%) 273	High risk N(%) 152	χ^2	P value
Diabetes mellitus	0	3(1.09)	52(34.2)	136.92	<0.001
H/O Gyne surgery	3(2.4)	3(1.09)	0	3.66	0.160
IHCP	13(10.4)	71(26)	50(32.9)	19.63	<0.001
Asthma	0	3(1.09)	0	3.06	0.216
Cholelithiasis	0	3(1.09)	0	3.06	0.216
Thrombocytopenia	6(4.8)	36(13.1)	16(10.5)	6.39	0.041
Cardiac disease	0	0	0		
Chronic renal disease	0	0	0		
Pulmonary tuberculosis	0	0	0		
Infective hepatitis	0	0	0		
Under nutrition	0	0	0		

Table 7: Distribution of study subjects according to major outcomes.

Outcome		Low risk N(%)	Moderate risk N(%)	High risk N(%)	χ^2	P value
Maternal Outcomes	No. of cases	(125)	(273)	(152)		
LSCS	405	69(55)	204(75)	132(87)	35.707	<0.001
NVD	215	56(45)	69(25.2)	90(59.2)	49.44	<0.001
PPH	33	7(5.6)	10(3.6)	16(10.5)	8.2	0.017
ICU admissions	6	0	1(0.3)	5(3.2)	9.52	0.009
Hospital stay <5days	519	125	266(97)	128(84.2)	41.77	<0.001
Hospital stay >5days	31	0	7(2.5)	24(15.7)		
Blood transfusion	49	4(3.2)	19(6.9)	26(17.1)	18.88	<0.001
FETAL OUTCOMES						
NICU admissions	240	30(24)	66(24.1)	144(94)	223.01	<0.001
Term	418	118(94)	214(78.3)	86(56.5)	55.49	<0.001
Pre-term	132	7(5.6)	59(21.6)	66(43.4)	55.49	<0.001
APGAR score <7	33	3(2.4)	12(4.3)	18(12)	13.32	<0.001
LBW babies	148	20(16)	66(24.1)	62(41)	23.49	<0.001
Perinatal mortality	0	0	0	0	N/A	

Table 8: Distribution according to birth weight.

	<1.5kg	1.5kg to 2.5kg	>2.5kg	χ^2	P value
	(4)	(144)	(402)	30.49	<0.001 Highly significant
Low risk (125)	0	20(13.8)	105(26.1)		
Moderate risk (273)	0	66(45.8)	207(75.8)		
High risk (152)	4(2.6)	58(38)	90(59.2)		

In this study there were 132 (87%) cases which had cesarean in high risk category while 69 (55%) cases in low risk category. 7 (5.6%) cases had PPH in low risk category while 16 (10.5%) cases in high risk category. 4 (3.2%) cases had blood transfusion in low risk category while 26 (17%) cases had in high

risk category. All the patients in low risk category were discharged within 5 days whereas among high risk category about 24 (15.7%) patients required more than 5 to 10 days of hospital stay. We found none of the patient in low risk category who required ICU Admission, while among high risk

group 5 (3.2%) cases had ICU admission. Among low risk category only 32 (24%) neonates' required NICU admissions, whereas in high risk category it was 144 (94%). Preterm delivery was only 7 (5.6%) in low risk category while there was 66 (43.4%) preterm birth in high risk category. In low risk category 20 (16%) cases had low birth weight whereas in high risk category it was 62 (41%) cases. There was no perinatal or maternal mortality in our study. Hence there was a statistically significant association between the antenatal risk category scoring system with both maternal and fetal outcomes.

Discussion

The present study evaluated the performance of the Dutta and Das high-risk pregnancy scoring system in predicting maternal and fetal outcomes among 550 pregnant women. Of the study population the prevalence of low risk was 22.7%, moderate risk 49.7%, and high risk was (27.5%). This study can be compared to previous studies by Bansal et al and Bernard et al. [10,11].

Our current research shows the usefulness of antenatal risk scoring predicting the maternal and fetal outcomes in a tertiary care unit in a low resource setting. One of the important finding was that more than three-quarters of the group fell into moderate- or high-risk groups. Similar proportions of high risk pregnancies also have been reported in other Indian studies, representing the high burden of complicated antenatal cases that are treated in referral hospitals. This highlights the relevance of the Dutta -Das cumulative antenatal risk scoring system [8] as an effective and feasible means of risk stratification at an early stage of routine care.

Advanced maternal age (>35 years) showed a greater likelihood of being categorized into the high-risk category in our study. Advanced maternal age is a well-established predictor of medical disorders like hypertensive disorders, gestational diabetes mellitus, also associated with increased prevalence of cesarean delivery, fetal growth restriction, and adverse neonatal outcomes. Bernard et al. also reported that increasing maternal age significantly influenced the antenatal risk classification. [11]

A highly significant association was observed between the high-risk group and cesarean section ($p < 0.001$). In this present study, 87% of women in the high-risk category underwent cesarean delivery compared to 55% in the low-risk group, suggesting that increasing the antenatal risk scores correlates with the higher operative intervention. Similar observations were also found in the study conducted by Sindhusa et al., [12] who demonstrated significantly higher cesarean rates among women with high risk risk category. Bansal

et al. also reported increased operative delivery in high-risk pregnancies. [10]

Maternal complications were considerably more frequent among women classified as high risk. Postpartum hemorrhage occurred in 10.5% of the high-risk group compared with 5.6% in the low-risk group, while blood transfusion was required in 17% high risk group versus 3.2% in low risk group. Furthermore, ICU admission occurred only among high-risk women (3.2%), whereas none of the low-risk women required critical care. These findings support the ability of the Dutta and Das scoring system to identify women at increased risk of severe maternal morbidity.

Similar results were also seen in study done by K Aruna et al. [9]. Comparable results were also reported by Sindhusa et al., who found significantly higher maternal complications with increasing antenatal risk scores. [12]

The scoring system also demonstrated a strong association between high risk group with adverse neonatal outcomes. NICU admission was required in 94% of neonates born to high-risk mothers compared with 24% among low-risk pregnancies, while low birth weight occurred in 41% versus 16%, respectively. These findings indicate that antenatal risk stratification effectively predicts neonatal morbidity.

Similar observations were reported by Bansal et al., [10] who found higher rates of NICU admission, prematurity, low birth weight, and perinatal complications among women with high-risk scores. Bernard et al. [11] and Maria et al. [13] also demonstrated that high-risk pregnancies were significantly associated with adverse neonatal outcomes.

No maternal or perinatal mortality was observed in the study. This favorable outcome may reflect early identification of high-risk pregnancies, timely referral, institutional delivery, and prompt obstetric intervention. Similar findings have been reported in tertiary care centres where comprehensive antenatal surveillance reduces mortality despite increased maternal morbidity.

Conclusions

Overall, the findings of the present study demonstrate that the Dutta and Das high-risk pregnancy scoring system is a practical, inexpensive, and effective tool for identifying pregnancies at increased risk of adverse maternal and fetal outcomes. Its routine use during antenatal care can facilitate early referral, intensified monitoring, timely intervention, and optimal utilization of healthcare resources and ultimately contributing to improve the maternal and neonatal outcomes.

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