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A Comparative Study on the Relationship Between Placental Weight and Neonatal Outcomes Among Anaemic Mothers and Non-Anaemic Mothers in Selected Hospital, Rajnandgaon, Chhattisgarh

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Abstract: ***Maternal anemia is a common pregnancy complication that may impact placental function and fetal development. This study aims to compare placental weight and neonatal outcomes among anemic and non-anemic mothers to determine the potential effects of maternal anemia on fetal growth and neonatal health. A comparative cross-sectional study was conducted among 200 mothers (100 anemic, 100 non-anemic) who delivered at term in a tertiary care hospital. Placental weight, neonatal birth weight, Apgar scores, and neonatal complications were recorded. Statistical analysis, including independent t-tests, chi-square tests, and Pearson correlation, was performed to examine differences between the two groups. The average placental weight was slightly lower in anemic mothers (495 ± 55 g) compared to non-anemic mothers (510 ± 50 g), though not statistically significant (p = 0.16). Neonates of anemic mothers had significantly lower birth weights (2600 ± 500 g vs. 2700 ± 450 g, p = 0.03) and lower Apgar scores at 1 minute (7.4 vs. 8.2, p = 0.02) and 5 minutes (8.3 vs. 9.0, p = 0.01). Neonatal complications, including respiratory distress and NICU admissions, were more frequent among the anemic group, but the difference was not statistically significant (p = 0.08). A moderate positive correlation was found between placental weight and neonatal birth weight (r = 0.45 for anemic, r = 0.52 for non-anemic).Maternal anemia is associated with lower neonatal birth weight and reduced Apgar scores, indicating possible fetal distress. Although placental weight differences were not statistically significant, the findings highlight the importance of managing maternal anemia to improve neonatal health outcomes. Further studies with larger samples are recommended to confirm these findings and explore additional contributing factors.***

Keywords: ***Maternal anemia, placental weight, neonatal outcomes, birth weight, Apgar score, fetal growth, pregnancy complications, neonatal health.***

I. INTRODUCTION

Maternal anemia is one of the most prevalent nutritional deficiencies during pregnancy, affecting nearly 40% of pregnant women worldwide. Anemia during pregnancy is associated with adverse maternal and fetal outcomes, including preterm birth, low birth weight, intrauterine growth restriction (IUGR), and increased neonatal morbidity. The placenta plays a crucial role in fetal development by ensuring adequate oxygen and nutrient supply. However, maternal anemia can compromise placental function, potentially affecting neonatal outcomes.

This study aims to examine the relationship between placental weight and neonatal outcomes in anemic and non-anemic mothers. By comparing placental weight, neonatal birth weight, and Apgar scores between the two groups, this research seeks to understand the potential impact of anemia on fetal health.

A. Statement Of The Problem

A comparative study on the relationship between placental weight and neonatal outcomes among anaemic mothers and non-anaemic mothers in selected hospital, Rajnandgaon, Chhattisgarh.

B. Objectives of the Study

1) To compare the placental weight and neonatal outcomes between anemic and non-anemic mothers.
2) To evaluate the impact of placental weight on neonatal birth weight, Apgar scores, and neonatal complications.
3) To determine the correlation of placental weight and neonatal outcomes among anemic and non-anemic mothers.

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This study is essential as it could lead to better clinical interventions for managing anemia during pregnancy, optimizing placental function, and improving neonatal outcomes in anemic mothers.

C. Conceptual Framework

The conceptual framework of this study is based on the feto-placental unit model, which highlights the interdependence of maternal health, placental function, and neonatal outcomes. Maternal anemia may lead to placental insufficiency, which can reduce oxygen and nutrient transfer to the fetus, thereby impacting birth weight and neonatal health.

D. VARIABLES

1) Independent Variable: Maternal anemia status (anemic vs. non-anemic).
2) Mediator Variable: Placental weight.
3) Dependent Variables: Neonatal birth weight, Apgar scores, neonatal complications.

II. RESEARCH DESIGN AND METHODOLOGY

A. Study Design

This is a comparative cross-sectional study conducted in a tertiary care hospital's maternity ward. The study compares placental weight and neonatal outcomes between anemic and non-anemic mothers who delivered at term.

B. Study Population

1) *Inclusion Criteria:*

- Pregnant women delivering at term (37–42 weeks).
- Singleton pregnancies.
- Diagnosed anemia (Hb < 11 g/dL) or non-anemia (Hb ≥ 11 g/dL).

2) *Exclusion Criteria:*

- Preterm deliveries.
- Multiple pregnancies.
- Severe maternal complications (e.g., preeclampsia, diabetes).

C. Sample Size and Sampling Technique

A total of 200 mothers (100 anemic and 100 non-anemic) were recruited using a convenience sampling method.

D. Data Collection Methods

1) Maternal hemoglobin levels were recorded from prenatal visits.
2) Placental weight was measured immediately after delivery.
3) Neonatal birth weight was recorded using a neonatal scale.
4) Apgar scores at 1 minute and 5 minutes were documented.
5) Neonatal complications such as NICU admissions were noted.

E. Data Analysis

1) Descriptive Statistics: Mean, standard deviation, frequency, and percentage.
2) Comparative Analysis: Independent t-tests for continuous variables, chi-square tests for categorical variables.
3) Correlation Analysis: Pearson correlation between placental weight and neonatal outcomes.

III. RESULTS AND ANALYSIS

A. Descriptive Statistics

Table 1: Maternal Characteristics

Parameter	Anemic Mothers (n=100)	Non-Anemic Mothers (n=100)	p-value
Maternal Age (years)	27.4 ± 4.2	28.1 ± 3.9	0.32

Hemoglobin Level (g/dL)	9.2 ± 1.1	12.8 ± 0.7	<0.001*
Parity (number of previous births)	2.1 ± 0.9	2.3 ± 0.8	0.14

(*p < 0.05 indicates statistical significance)

Table 2: Comparison of Placental and Neonatal Outcomes

Parameter	Anemic Mothers (n=100)	Non-Anemic Mothers (n=100)	p-value
Placental Weight (g)	495 ± 55	510 ± 50	0.16
Neonatal Birth Weight (g)	2600 ± 500	2700 ± 450	0.03*
Apgar Score (1 min)	7.4 ± 1.2	8.2 ± 0.9	0.02*
Apgar Score (5 min)	8.3 ± 0.9	9.0 ± 0.8	0.01*
NICU Admissions (%)	12%	6%	0.08

(*p < 0.05 indicates statistical significance)

Table 3: Correlation Between Placental Weight and Neonatal Outcomes

Correlation	Anemic Mothers (r-value)	Non-Anemic Mothers (r-value)
Placental Weight vs. Birth Weight	0.45	0.52
Placental Weight vs. Apgar Score (1 min)	0.42	0.47
Placental Weight vs. Apgar Score (5 min)	0.39	0.44

Placental Weight vs. Neonatal Birth Weight: Moderate positive correlation (r = 0.45 in anemic, r = 0.52 in non-anemic).
Placental Weight vs. Apgar Score: Moderate correlation (r = 0.42 in anemic, r = 0.47 in non-anemic).

IV. SUMMARY OF FINDINGS

Placental weight was slightly lower in anemic mothers, but the difference was not statistically significant. Neonatal birth weight was significantly lower in anemic mothers (p = 0.03). Apgar scores were lower at both 1 and 5 minutes in neonates of anemic mothers (p = 0.02, p = 0.01). NICU admissions were higher in anemic mothers' neonates but not statistically significant (p = 0.08). A positive correlation was found between placental weight and neonatal outcomes. These findings highlight the importance of managing maternal anemia to improve neonatal health and reduce perinatal risks.

V. DISCUSSION

Maternal anemia was associated with lower birth weight and reduced Apgar scores, highlighting fetal distress. Placental weight differences were not statistically significant, suggesting compensatory placental adaptations. Neonatal complications (e.g., NICU admission) were more frequent in the anemic group, though not statistically significant.

VI. CONCLUSION

Maternal anemia negatively impacts neonatal birth weight and Apgar scores, suggesting fetal distress and increased perinatal risk. While placental weight differences were not statistically significant, the association between lower birth weight and anemia underscores the importance of maternal anemia management.

VII. RECOMMENDATIONS

1) Early screening and nutritional interventions for anemia in pregnancy.
2) Further longitudinal studies to assess long-term neonatal outcomes.

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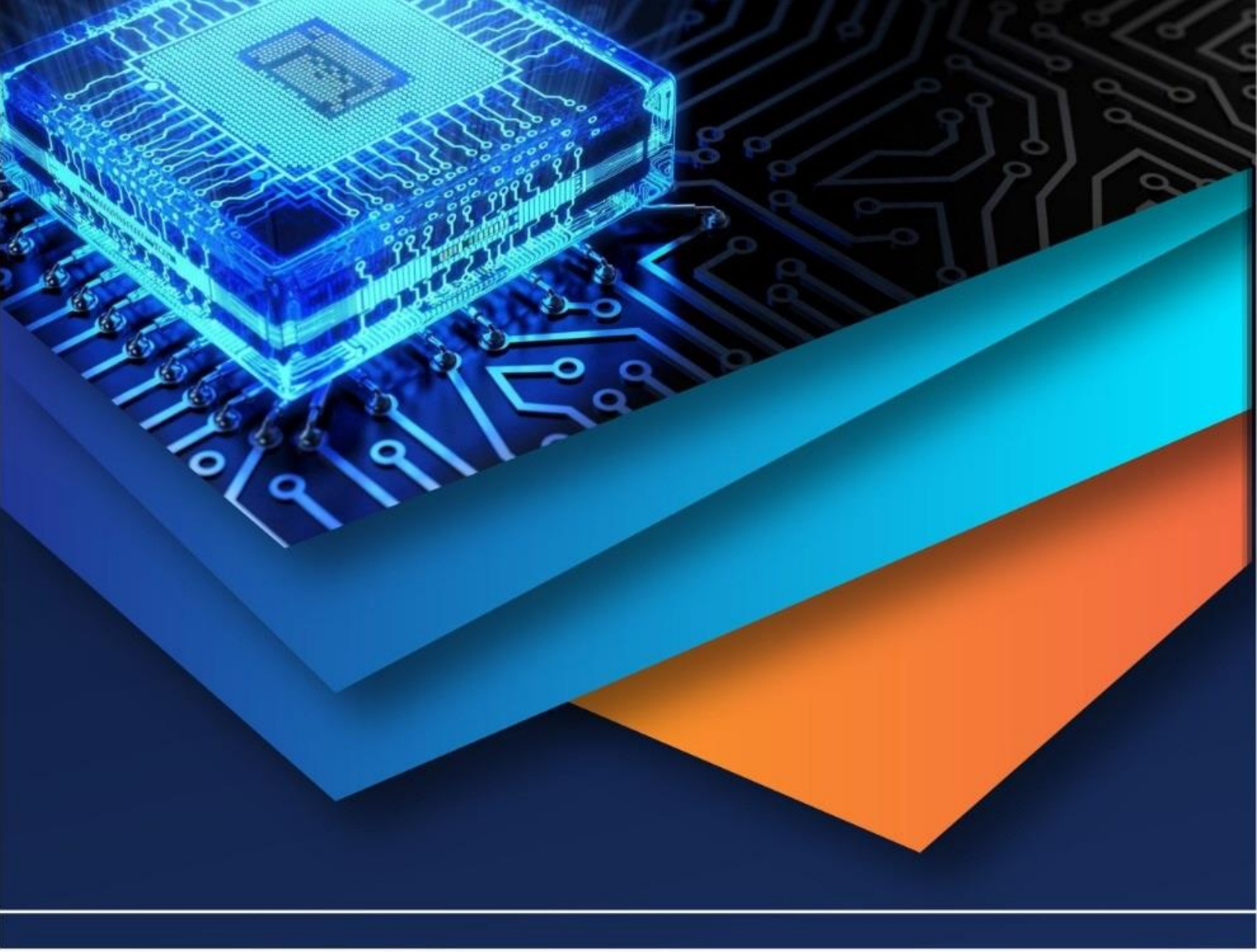

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