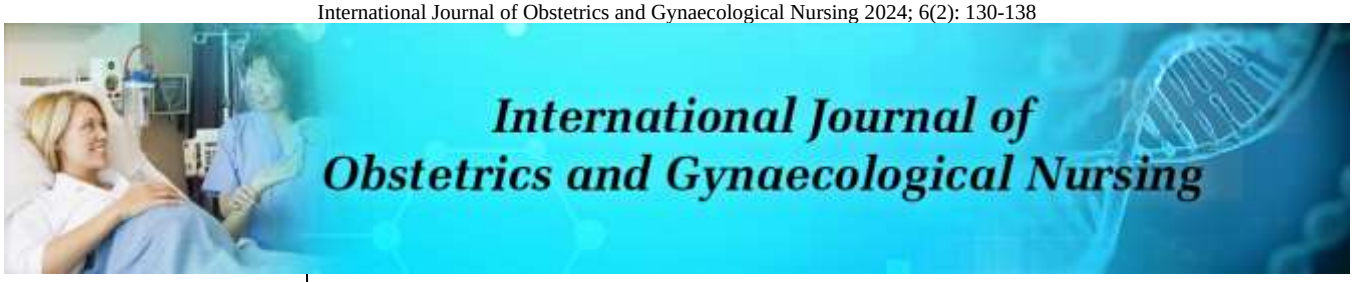


**E-ISSN:** 2664-2301
**P-ISSN:** 2664-2298
www.gynaecologicalnursing.com
IJOGN 2024; 6(2): 130-138
Received: 24-07-2024
Accepted: 29-08-2024

**Jennifer Nongkynrih**
M.Sc. Nursing, Department of Obstetrics and Gynaecological Nursing, College of Nursing, NEIGRIHMS, Shillong, Meghalaya, India

**Jodibala Haobijam**
Associate Professor, Department of Obstetrics and Gynaecological Nursing, College of Nursing, NEIGRIHMS, Shillong, Meghalaya, India

**Longjam Kamala Devi**
Associate Professor, Department of Obstetrics and Gynaecological Nursing, College of Nursing, NEIGRIHMS, Shillong, Meghalaya, India

**Corresponding Author:**
**Jennifer Nongkynrih**
M.Sc. Nursing, Department of Obstetrics and Gynaecological Nursing, College of Nursing, NEIGRIHMS, Shillong, Meghalaya, India

# A comparative study to assess the placental weight, maternal and neonatal outcome among anemic and non-anemic pregnant mothers in selected health care settings of Meghalaya

**Jennifer Nongkynrih, Jodibala Haobijam and Longjam Kamala Devi**

**DOI:** https://doi.org/10.33545/26642298.2024.v6.i2b.171

**Abstract**
A comparative study was conducted to assess and compare the placental weight, maternal and neonatal outcome among 50 anemic and 50 non-anemic pregnant mothers in Ganesh Das Maternal and Child Health Government Hospital, Shillong, Meghalaya using consecutive sampling technique. Data was collected by utilizing semi-structured questionnaire, biophysiological methods and records. While the collected data was analysis by employing descriptive and inferential statistics. The finding showed that the mean ± SD of placental weight of anemic and non-anemic mothers and placental diameter of anemic and non-anemic mothers respectively indicated no significant association of maternal outcome between the two groups. However, it was found that for both anemic and non-anemic pregnant mothers there was moderate positive correlation between placental weight and birth weight, head circumference, chest circumference and crown-heel length. There was significant association in both groups with monthly income of family, gestational age, antenatal checkup, consumption of iron and folic acid tablets and neonatal birth weight. The study found that a unit increase in placental weight increased the risk of low birth weight. Neonates born with ≥37 weeks gestation and multipara mothers were less likely to experience low birth weight.
**Conclusion:** The study revealed no significant difference in placental weight between anemic and non-anemic mothers, yet it highlighted a significant association between placental weight and birth weight. The correlation between placental weight and neonatal parameters suggests its crucial role in neonatal growth. Furthermore, multiple risk factors were associated with heightened anemia risk in pregnant women.

**Keywords:** Anemic and non-anemic pregnant mothers, health care settings, maternal outcome, neonatal outcome, placental weight

## Introduction
Anemia affects people in developed and developing countries at all stages of life [1] and as estimated by the World Health Organisation in 2019, 36.5% of pregnant women worldwide are impacted [2]. According to National Family Health Survey-5 report 2021, 45% of pregnant mothers in Meghalaya suffered from anemia [3]. Maternal anemia has remarkable influence on placenta [4] resulting in significantly low birth weight babies [5]. Placental weight serves as a pivotal benchmark for interpreting birth measurements and understanding their correlation with maternal biosocial characteristics.

## Need of the study
Pregnancy represents a significant life stage marked by substantial physiological and psychological transformations in the mother. Across each trimester, numerous adjustments take place, primarily aimed at fostering fetal development [6]. The placenta acts as a natural bridge connecting the mother and her fetus. As a result of the intimate interaction at this point, any maternal or fetal health issues can potentially affect the placenta and its functions. Maternal anemia could affect placental growth, potentially impacting the growth and development of the neonate. It was imperative to evaluate how maternal anemia impacts the placenta by conducting a thorough placental examination. Furthermore, it was essential to establish a connection between variations in placental weight and neonatal birth weight [7].

Simultaneously, the NFHS-5 report for 2021 brings attention to several key statistics regarding maternal health in Meghalaya which revealed that 45% of pregnant mothers in the region suffered from anemia. Additionally, 84.7% of pregnant mothers were provided with IFA (Iron Folic acid) tablets, with 43.3% and 20.6% taking them for at least 100 days and 180 days respectively. Moreover, only 8.3% of pregnant mothers consumed medication for intestinal parasites during pregnancy and 11.7% of reported cases resulted in low birth weight (<2.5 kg), with stillbirth cases accounting for 1% [3].

Few studies have explored placental weight, maternal, and neonatal outcomes among anemic and non-anemic pregnant women in India, with no such studies being undertaken in Meghalaya. Consequently, based on the review of existing literature and considering the gaps, the researcher identified the importance of examining and comparing placental weight, maternal and neonatal outcomes among anemic and non-anemic pregnant women in selected healthcare settings of Meghalaya.

**Objectives**

i. To assess and compare the placental weight among anemic and non-anemic pregnant mothers in selected health care settings of Meghalaya.
ii. To assess and compare the maternal and neonatal outcome among anemic and non-anemic pregnant mothers in selected health care settings of Meghalaya.
iii. To find the correlation between the placental weight, maternal and neonatal outcome among anemic and non-anemic pregnant mothers in selected health care settings of Meghalaya.

**Research methodology**

The study incorporated a quantitative research approach and a non-experimental comparative research design. Consecutive sampling technique was employed to select 100 pregnant mothers (50 anemic and 50 non-anemic pregnant mothers) who fulfilled the inclusion and exclusion criteria and were admitted in the labor room of selected health care settings of Meghalaya during the time frame of 15th January 2024 to 10th February 2024.

**Inclusion criteria**

1. Non-anemic and anemic pregnant mothers above 18 years admitted in maternity ward /labour room for delivery.
2. Pregnant mothers who are willing to participate.
3. Pregnant mothers having singleton pregnancy.

**Exclusion criteria**

1. Pregnant mothers having medical complications.

**Ethical consideration**

Ethical consideration was sought from the board of Thesis Review and Monitoring Committee (TRMC) and the Institute Ethical Committee (IEC) NEIGRIHMS (North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences). Formal permission was obtained from the Principal of the College of Nursing, NEIGRIHMS, the Directorate of Health Services, Shillong Meghalaya and the Medical Superintendent of the selected health care settings. The participants received a thorough explanation of the study to be conducted and their written consent was acquired.

**Development of the tool**

A semi-structured questionnaire was developed and data collection was carried out through interviews, observations, biophysiological methods and records. Spearman Brown Coefficient reliability test was used to determine tool's reliability which yielded a reliability coefficient result of 0.833. The tool consists of four sections:

- **Section I:** Socio-demographic and obstetric variables of anemic and non-anemic pregnant mothers.
- **Section II:** Maternal outcome of anemic and non-anemic pregnant mothers.
- **Section III**: Neonatal outcome of anemic and non-anemic pregnant mothers.

**Neonatal anthropometric measurements**

All neonates were personally examined for birth weight, crown-heel length, head and chest circumference.

- **Birth weight:** Birth weight of neonates were recorded in gram by using digital weighing machine.
- **Head circumference:** Head circumference (in cm) was measured by passing a non-elastic tape over the occipital protuberance and supraorbital ridges of neonate's head.
- **Chest circumference:** Chest circumference (in cm) was measured using non-elastic measuring tape at the level of nipple of neonate's chest.
- **Crown-heel length:** Neonates' crown heel length (in cm) was measured using infantometer with baby being laid supine, knees fully extended and soles of feet held firmly against foot board and head touching fixed board.

**Section IV:** Placental outcome of the anemic and non-anemic pregnant mothers.

**Placental weight**

The placenta is retrieved after placental delivery and cleansed by rinsing them under flowing tap water to eliminate any blood clots adhering to maternal surface. Thereafter, all membranes are trimmed and umbilical cord is severed at its attachment point on placental surface. Subsequently, placenta is dried using blotting paper. The placenta is then subjected to precise weighing. Placental weight is determined three times using calibrated digital weighing machine and mean value of three measurements is recorded in grams. These measurements are promptly carried out, preferably within thirty minutes post-delivery, to maintain precision [8, 9].

**Placental diameter**

The placenta is placed on a flat surface. The first maximum diameter of placenta is measured using non-elastic measuring tape graduated in centimetres, then the second maximum diameter is taken at right angle to first one. The mean of two measurements was considered as the diameter of placenta [10]. An information booklet was developed as a supplementary resource to support pregnant mothers in enhancing their understanding of anemia during pregnancy and its prevention.

**Data analysis**

Analysis of data was based on objectives of the study using

descriptive statistics (frequency and percentage) and inferential statistics (chi square, independent t test and multivariate logistic regression) using Statistical Package for Social Sciences version 25.0.

## Results

**Table 1(a):** Frequency, percentage distribution and association of anemic and non-anemic pregnant mothers with socio-demographic variables. N=100

| Socio-Demographic Variables | Anemic (n=50) | | Non-Anemic (n=50) | | $\chi^2$ | df | *p*-value |
|---|---|---|---|---|---|---|---|
| | (f) | (%) | (f) | (%) | | | |
| **Age (in years)** | | | | | 2.218 | 2 | 0.330 |
| 19-26 | 21 | 42 | 24 | 48 | | | |
| 27-34 | 20 | 40 | 22 | 44 | | | |
| ≥ 35 | 09 | 18 | 04 | 08 | | | |
| **Place of residence** | | | | | 3.184 | 1 | 0.074 |
| Rural | 44 | 88 | 37 | 74 | | | |
| Urban | 06 | 12 | 13 | 26 | | | |
| **Type of family** | | | | | 1.999 | 1 | 0.157 |
| Nuclear | 25 | 50 | 32 | 64 | | | |
| Joint | 25 | 50 | 18 | 36 | | | |
| **Religion** | | | | | 3.473 | 1 | 0.062 |
| Christian | 38 | 76 | 45 | 90 | | | |
| Others | 12 | 24 | 05 | 10 | | | |
| **Level of education** | | | | | 2.701 | 3 | 0.440 |
| No formal education | 05 | 10 | 04 | 08 | | | |
| Primary education | 12 | 24 | 15 | 30 | | | |
| Secondary education | 23 | 46 | 16 | 32 | | | |
| Higher Secondary education and above | 10 | 20 | 15 | 30 | | | |
| **Occupational status** | | | | | 1.853 | 2 | 0.396 |
| Unemployed | 37 | 74 | 39 | 78 | | | |
| Unskilled worker | 12 | 24 | 07 | 14 | | | |
| Skilled worker | 01 | 02 | 04 | 08 | | | |
| **Monthly income of the family** | | | | | 8.042 | 3 | 0.045* |
| Less than or equal to Rs 5000 | 18 | 36 | 10 | 20 | | | |
| Rs 5001-10000 | 17 | 34 | 11 | 22 | | | |
| Rs 10001-15000 | 06 | 12 | 11 | 22 | | | |
| Above Rs 15000 | 09 | 18 | 18 | 36 | | | |
| **Dietary pattern** | | | | | 0.332 | 1 | 0.564 |
| Non-Vegetarian | 42 | 84 | 44 | 88 | | | |
| Vegetarian | 08 | 16 | 06 | 12 | | | |
| **Consumption of tea/ coffee with meal/ immediately after meal.** | | | | | 0.713 | 2 | 0.700 |
| Yes | 18 | 36 | 16 | 32 | | | |
| No | 32 | 64 | 34 | 68 | | | |
| If yes, specify how often | | | | | | | |
| Once | 09 | 18 | 10 | 20 | | | |
| Twice | 09 | 18 | 06 | 12 | | | |
| **Consumption of betel nut during pregnancy** | | | | | 0.762 | 1 | 0.383 |
| Yes | 37 | 74 | 33 | 66 | | | |
| No | 13 | 26 | 17 | 34 | | | |
| **Consumption of fruits per day** | | | | | 2.667 | 2 | 0.264 |
| 1-2/day | 29 | 58 | 31 | 62 | | | |
| >2/day | 08 | 16 | 12 | 24 | | | |
| Irregular/do not consume | 13 | 26 | 07 | 14 | | | |
| **Consumption of vegetables per day** | | | | | 5.076 | 3 | 0.166 |
| 1-2 times | 35 | 70 | 35 | 70 | | | |
| ≥ 3 times | 15 | 30 | 15 | 30 | | | |
| **Utensils used for cooking include** | | | | | 5.389 | 2 | 0.068 |
| Aluminium/steel | 40 | 80 | 31 | 62 | | | |
| Mixed | 10 | 20 | 19 | 38 | | | |
| **Washing of vegetables and fruits is done** | | | | | 2.174 | 1 | 0.140 |
| Before cutting | 48 | 96 | 44 | 88 | | | |
| After cutting | 02 | 04 | 06 | 12 | | | |

*****Significant =p≤ 0.05

Table 1(a) depicts that majority of anemic and non-anemic pregnant mothers are aged 19-26 and reside in rural areas. A higher percentage of non-anemic mothers belong to nuclear families compared to anemic mothers. Most of them are Christians and currently unemployed. A greater number of anemic mothers have monthly income of ≤ Rs 5000, while

non-anemic mothers have >Rs 15000. Both groups primarily consume non-vegetarian diets and avoid tea/coffee immediately after meals. Betel nut consumption is common during pregnancy for both groups. Both groups consume 1-2 fruits and vegetables daily, use aluminum/steel cookware and wash fruits and vegetables before cutting.

The analysis revealed significant association between family monthly income and anemia status in pregnant mothers ($\chi^2$ = 8.042, p = 0.045).

**Table 1(b):** Frequency, percentage distribution and association of anemic and non-anemic pregnant mothers with obstetric variables. N=100

| Obstetrics Variables | Anemic (n=50) | | Non-Anemic (n=50) | | $\chi 2$ | df | *p*-value |
|---|---|---|---|---|---|---|---|
| | (f) | (%) | (f) | (%) | | | |
| **Gravida** | | | | | | | |
| Primigravida | 15 | 30 | 11 | 22 | 0.832 | 1 | 0.362 |
| Multigravida | 35 | 70 | 39 | 78 | | | |
| **Parity** | | | | | | | |
| Primipara | 17 | 34 | 15 | 30 | 2.441 | 2 | 0.295 |
| Multipara | 24 | 48 | 31 | 62 | | | |
| Grand multipara | 09 | 18 | 04 | 08 | | | |
| **Gestational age** | | | | | | | |
| Preterm delivery <37 weeks | 15 | 30 | 06 | 12 | 4.882 | 1 | 0.027* |
| At term delivery ≥ 37 weeks | 35 | 70 | 44 | 88 | | | |
| **Antenatal checkup during pregnancy** | | | | | | | |
| <4 | 11 | 22 | 04 | 08 | 3.843 | 1 | 0.050* |
| ≥ 4 | 39 | 78 | 46 | 92 | | | |
| **Consumption of iron and folic acid tablets during the present pregnancy** | | | | | | | |
| 1-5 months | 36 | 72 | 26 | 52 | 4.244 | 1 | 0.039* |
| ≥6 months | 14 | 28 | 24 | 48 | | | |
| **Consumption of tablet *al*bendazole for deworming during pregnancy** | | | | | | | |
| Yes | 33 | 66 | 35 | 70 | 0.184 | 1 | 0.668 |
| No | 17 | 34 | 15 | 30 | | | |

***Significant =p≤ 0.05

Table 1(b) illustrates 70% of anemic and 78% of non-anemic mothers were multigravida; 48% and 62% were multipara; 70% and 88% mothers delivered at term (≥ 37 weeks); 78% and 92% went for < 4 antenatal checkups; 72% and 52% consumed IFA tablets for 1-5 months; 66% and 70% took albendazole during pregnancy.

Additionally, significant associations were found for gestational age ($\chi^2$ = 4.882, p = 0.027), antenatal checkups ($\chi^2$ = 3.843, p = 0.050), and IFA tablet consumption ($\chi^2$ = 4.244, p = 0.039) among the two groups.

**Figure 1: Bar diagram showing frequency and percentage distribution of pregnant mothers in Ganesh Das Maternal and Child Health Government Hospital, Shillong according to WHO classification of anemia in pregnancy. N=100**

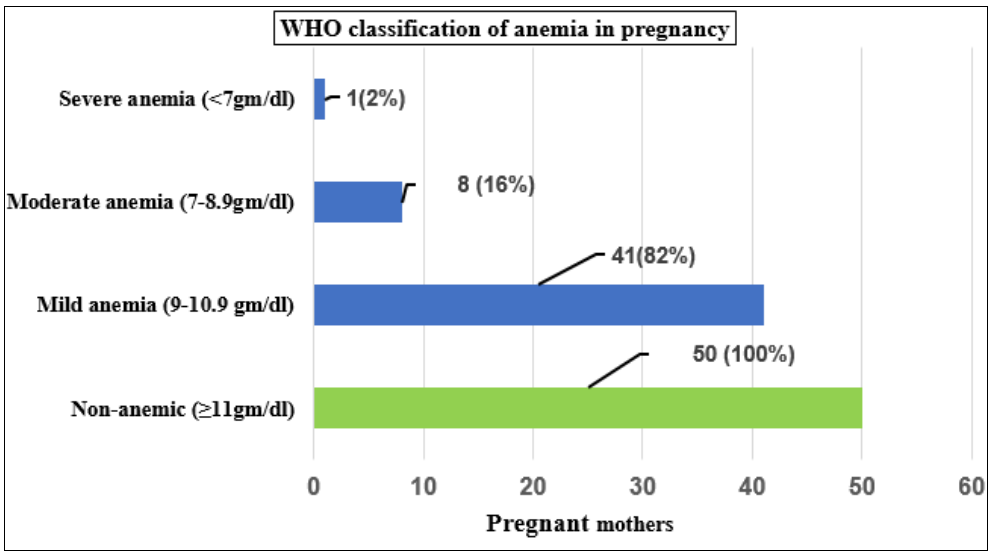


**Fig 1:** Portrays that 82% of anemic pregnant mothers has mild anemia.

Table 2 portrays 92% anemic and 98% non-anemic pregnant mothers experienced spontaneous labor onset; 48% and 58% had normal vaginal deliveries with episiotomy; 72% and 74% had no complications at birth; 16% anemic mothers had perineal tears while 14% had prolonged labor. Additionally, no significant associations were found in maternal outcomes between anemic and non-anemic mothers.

**Table 2:** Frequency, percentage distribution and association of maternal outcome among anemic and non-anemic pregnant mothers. N=100

| Maternal Outcome | Anemic (n=50) | | Non-Anemic (n=50) | | $\chi$ 2 value | df | p value |
|---|---|---|---|---|---|---|---|
| | (f) | (%) | (f) | (%) | | | |
| **Onset of labor** | | | | | | | |
| Spontaneous | 46 | 92 | 49 | 98 | 1.895 | 1 | 0.169 |
| Induced | 04 | 08 | 01 | 02 | | | |
| **Mode of delivery** | | | | | | | |
| Normal vaginal delivery with episiotomy | 24 | 48 | 29 | 58 | | | |
| Normal vaginal delivery without episiotomy | 18 | 36 | 15 | 30 | 0.680 | 3 | 0.878 |
| Breech delivery | 03 | 06 | 02 | 04 | | | |
| Instrumental delivery- ventouse extraction | 05 | 10 | 04 | 08 | | | |
| **Maternal complications at birth** | | | | | | | |
| Present | 14 | 28 | 13 | 26 | | | |
| Absent | 36 | 72 | 37 | 74 | | | |
| **Types of maternal complications** | | | | | 0.051 | 1 | 0.822 |
| Prolonged labor | 05 | 10 | 07 | 14 | | | |
| Perineal tear | 08 | 16 | 05 | 10 | | | |
| Retained placenta | 01 | 02 | 01 | 02 | | | |

Significant =p≤ 0.0

**Table 3:** Frequency, percentage distribution and association of neonatal outcome among anemic and non-anemic pregnant mothers. N=100

| Neonatal Outcome | Anemic (n=50) | | Non-Anemic (n=50) | | $\chi^2$ | df | *p*-value |
|---|---|---|---|---|---|---|---|
| | (f) | (%) | (f) | (%) | | | |
| **Baby cried immediately at the time of birth** | | | | | | | |
| Yes | 40 | 80 | 42 | 84 | | | |
| No | 10 | 20 | 08 | 16 | | | |
| **If no, specify reason** | | | | | 0.071 | 1 | 0.790 |
| Respiratory distress syndrome | 06 | 12 | 05 | 10 | | | |
| Perinatal asphyxia | 02 | 04 | 00 | 00 | | | |
| Meconium aspiration | 02 | 04 | 03 | 06 | | | |
| **APGAR score at 1 minute** | | | | | | | |
| Severely depressed (0-3) | 01 | 02 | 02 | 04 | | | |
| Moderately depressed (4-6) | 09 | 18 | 07 | 14 | 0.596 | 1 | 0.742 |
| No depression (7-10) | 40 | 80 | 41 | 82 | | | |
| **APGAR score at 5 minutes** | | | | | | | |
| Moderately depressed (4-6) | 01 | 02 | 03 | 06 | 1.042 | 1 | 0.307 |
| No depression (7-10) | 49 | 98 | 47 | 94 | | | |
| **Birth Weight** | | | | | | | |
| Low birth weight (<2500g) | 10 | 20 | 01 | 02 | 8.274 | 1 | 0.004* |
| Normal birth weight (≥2500g) | 40 | 80 | 49 | 98 | | | |
| **Head circumference (cm)** | | | | | | | |
| <33 | 16 | 32 | 07 | 14 | | | |
| 33-35 | 29 | 58 | 36 | 72 | 4.609 | 2 | 0.100 |
| >35 | 05 | 10 | 07 | 14 | | | |
| **Chest circumference (cm)** | | | | | | | |
| <30 | 07 | 14 | 01 | 02 | | | |
| 30-33 | 38 | 76 | 44 | 88 | 4.939 | 2 | 0.085 |
| >33 | 05 | 10 | 05 | 10 | | | |
| **Crown-heel length (cm)** | | | | | | | |
| <50 | 19 | 38 | 14 | 28 | | | |
| 50-52 | 27 | 54 | 29 | 58 | 1.647 | 2 | 0.439 |
| >52 | 04 | 08 | 07 | 14 | | | |
| **Congenital malformation identified at birth** | | | | | | | |
| Present | 01 | 02 | 01 | 02 | | | |
| Absent | 49 | 98 | 49 | 98 | 0.000 | 1 | 1.000 |
| **If present, specify finding** | | | | | | | |
| Cleft lip and palate | 01 | 02 | 01 | 02 | | | |
| **Complications at birth needing SNCU admission** | | | | | | | |
| Absent | 37 | 74 | 41 | 82 | 0.932 | 1 | 0.334 |
| Present | 13 | 26 | 09 | 18 | | | |

*****Significant =p≤ 0.05

Table 3 highlights that all neonates were alive at birth; 80% and 84% neonates of anemic and non-anemic mothers cried immediately at birth; 98% and 94% had no depression at 5 minutes. In terms of neonatal birth weight >2500gm, head circumference (33-35cm), chest circumference (30-33 cm), crown-heel length (50-52 cm), the findings for anemic group are stated respectively as 40 (80%), 29 (58%), 38 (76%), 27 (54%) and the findings for non-anemic mothers are 49 (98%),36 (72%), 44 (88%) 29 (58%).

Furthermore, 98% neonates of both groups had no

congenital malformations, while 1 (2%) each had cleft lip/palate; 74% and 82% neonates of both groups had no complications at birth. Lastly, 26% and 18% neonates of anemic and non-anemic mothers were admitted to SNCU. There was statistically significant association with birth weight ($\chi^2$ = 8.274, p = 0.004) between two groups.

**Table 4:** Comparison of neonatal outcome: birth weight, head circumference, chest circumference and crown-heel length of neonates among anemic and non-anemic pregnant mothers. N=100

| Neonatal Outcome | Pregnant mothers | Mean | SD | 't' value | df | P value |
|---|---|---|---|---|---|---|
| Birth weight (gm) | Anemic | 2885.44 | 444.595 | - 1.708 | 98 | 0.091 |
| | Non-anemic | 3032.84 | 361.457 | | | |
| Head Circumference (cm) | Anemic | 33.09 | 1.848 | - 2.070 | 98 | 0.041* |
| | Non-anemic | 33.77 | 1.408 | | | |
| Chest Circumference (cm) | Anemic | 31.24 | 1.866 | - 2.070 | 98 | 0.041* |
| | Non-anemic | 31.90 | 1.266 | | | |
| Crown-heel length (cm) | Anemic | 49.82 | 1.754 | - 2.073 | 98 | 0.041* |
| | Non-anemic | 50.53 | 1.661 | | | |

*Significant =p≤ 0.05

Table 4 showed no significant difference in birth weight (t (98) = -1.708, p = 0.091). However, significant differences were observed in head circumference, chest circumference, and crown-heel length, with t-values of t (98) = -2.070, t (98) = -2.070 and t (98) = -2.073, respectively yielding *p*-value s of 0.041.

**Table 5:** Comparison of placenta between anemic and non-anemic pregnant mothers. N=100

| Placenta | Pregnant mothers | Mean | SD | 't' value | df | p value |
|---|---|---|---|---|---|---|
| Placental weight(gm) | Anemic | 447.780 | 94.99 | -0.727 | 98 | 0.496 |
| | Non-anemic | 460.580 | 80.58 | | | |
| Placental diameter(cm) | Anemic | 18.44 | 1.6024 | -1.538 | 98 | 0.127 |
| | Non-anemic | 18.97 | 1.8362 | | | |

*Significant =p≤ 0.05

Table 5 represents an independent t-test for placental weight and placental diameter with t-value, t(98) = -0.727, p = 0.469 and t(98) = -1.528, p = 0.127 respectively indicating no significant difference between anemic and non-anemic pregnant mothers.

**Table 6 (a):** Correlation between placental weight and birth weight among anemic and non-anemic pregnant mothers. N=100

| Variables | Pregnant mothers | r | *p*-value |
|---|---|---|---|
| Placental weight and birth weight | Anemic (n=50) | 0.661 | 0.000* |
| | Non-anemic(n=50) | 0.615 | 0.000* |

*Significant =p≤ 0.01

Table 6 (a): Highlights moderately positive and statistically significant correlation for placental weight and birth weight among anemic (r = 0.661, p = 0.000) and non-anemic mothers (r = 0.615, p = 0.000). N=100

Table 6 (b) illustrates moderately positive and statistically significant correlations between placental weight and head circumference**,** chest circumference, crown-heel length where anemic group have r = 0.657(p = 0.000)**,** r=0.663(p = 0.000) and r=0.436 (p = 0.002) while non-anemic group have correlations r = 0.378 (p = 0.007)**,** r= 0.375(p = 0.007) and r=0.546 (p = 0.000) respectively.

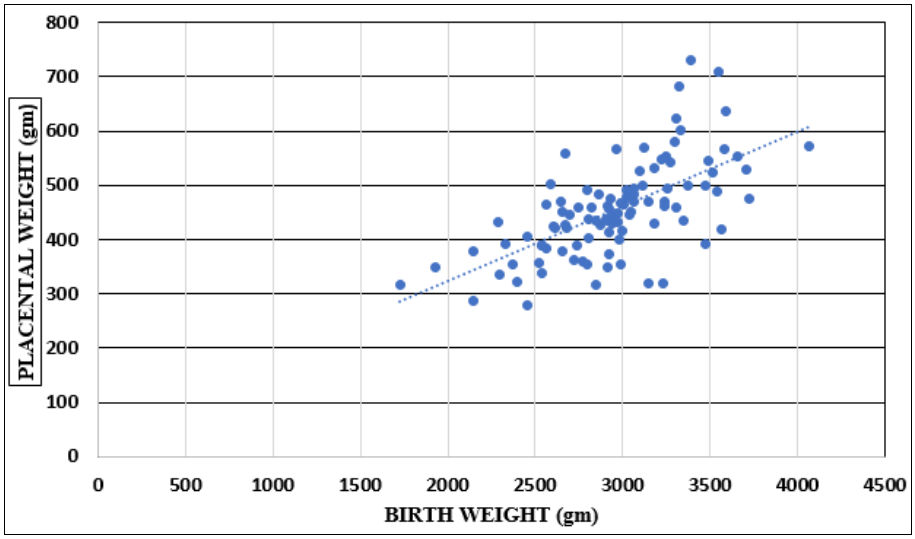


**Fig 2:** Correlation of placental weight with birth weight in anemic and non-anemic pregnant mothers.

**Table 6 (b):** Correlation between placental weight and head circumference, placental weight and chest circumference, placental weight and crown-heel length among anemic and non-anemic pregnant mothers. N=100

| Variables | Pregnant mothers | r | *p*-value |
|---|---|---|---|
| Placental weight and head circumference | Anemic (n=50) | 0.657 | 0.000* |
| | Non-anemic (n=50) | 0.378 | 0.007* |
| Placental weight and chest circumference | Anemic (n=50) | 0.663 | 0.000* |
| | Non-anemic (n=50) | 0.375 | 0.007* |
| Placental weight and crown-heel length | Anemic (n=50) | 0.436 | 0.002* |
| | Non-anemic (n=50) | 0.546 | 0.000* |

*Significant =p≤ 0.01

**Table 7 (a):** Association between anemia in pregnant mothers and its risk factors from the multivariate logistic regression model. N=100

| Background Characteristics | Odds Ratio (OR) | S.E | 95% CI |
|---|---|---|---|
| **Age group** | | | |
| 19-26 years[a] | 1 | | |
| 27-34 years | 1.74 | 1.66 | (0.27-11.36) |
| 35 years and above | 5.47 | 8.92 | (0.22-133.6) |
| **Residence** | | | |
| Rural[a] | 1 | | |
| Urban | 0.07** | 0.08 | (0.01-0.75) |
| **Family type** | | | |
| Joint[(a)] | 1 | | |
| Nuclear | 0.04*** | 0.05 | (0.01-0.41) |
| **Education level** | | | |
| Illiterate[a] | 1 | | |
| Primary | 0.31 | 0.40 | (0.03-3.89) |
| Secondary | 34.40 | 53.2 | (1.66-712.9) |
| Secondary and above | 0.92 | 1.45 | (0.04-20.12) |
| **Religion** | | | |
| Others[a] | 1 | | |
| Christian | 0.01*** | 0.01 | (0.00-0.22) |
| **Maternal Occupation** | | | |
| Unemployed[a] | 1 | | |
| Unskilled | 7.19 | 7.99 | (0.81-63.6) |
| Skilled | 18.47 | 95.8 | (0.00-482024.2) |
| **Monthly Income (in rupees)** | | | |
| 0-5000[a] | 1 | | |
| 5001-10000 | 0.51 | 0.48 | (0.08-3.21) |
| 10001-15000 | 0.01*** | 0.02 | (0.00-0.31) |
| Above 15000 | 0.63** | 0.08 | (0.00-0.95) |
| **Consumed Betelnut** | | | |
| No[a] | 1 | | |
| Yes | 3.45 | 3.91 | (0.37-31.85) |
| **Consumption of fruits** | | | |
| Do not consume[a] | 1 | | |
| >2 fruits per day | 0.32 | 0.35 | (0.03-2.68) |
| **Consumption of vegetables** | | | |
| 1-2 vegetables per day[a] | 1 | | |
| 3 and more vegetables per day | 4.05 | 3.82 | (0.63-25.7) |
| **Gravida** | | | |
| Primigravida[a] | 1 | | |
| Multigravida | 0.01 | 0.03 | (0.00-1.07) |
| **Gestational age** | | | |
| <37 weeks[a] | 1 | | |
| ≥37 weeks | 0.05** | 0.06 | (0.004-0.52) |
| **ANC Visits** | | | |
| <4 months[a] | 1 | | |
| ≥4 months | 0.27 | 0.29 | (0.03-2.20) |
| **Birth weight** | | | |
| <2500g[a] | 1 | | |
| ≥2500g | 0.05 | 0.09 | (0.00-1.64) |
| **Parity** | | | |
| Primipara[a] | 1 | | |
| Multipara | 139.2** | 321.0 | (1.51-12772.9) |
| Grand multipara | 161.3** | 411.8 | (1.08-24040.6) |

[a]: Reference group; *** *p*-value <0.01; ** *p*-value <0.0

The data in table 7(a) revealed that pregnant mothers residing in the urban areas were less likely (OR: 0.07, 95% CI: 0.01-0.75) to be anemic as compared to those residing in rural areas. Also, pregnant mothers with nuclear type of family were less likely (OR: 0.04, 95% CI: 0.01-0.41) to be anemic as compared to those from joint family. The pregnant mothers who were Christian were less likely (OR: 0.01, 95% CI: 0.00-0.22) to be anemic as compared to other religion. The pregnant mothers with monthly family income of Rs. 10001-15000 were less likely (OR: 0.01, 95% CI: 0.00-0.3) to be anemic as compared to pregnant mothers with monthly family income of < Rs 5000. Similarly, pregnant mothers with monthly family income of above Rs. 15000 were less likely (OR: 0.63, 95% CI: 0.00-0.95) to be anemic as compared to pregnant mothers with monthly family income of < Rs 5000. Among the obstetric variables, the multivariate logistic regression model showed that pregnant mothers with gestational age ≥37 weeks were less 71 likely to be anemic (OR: 0.05, 95% CI: 0.004-0.52) as compared to pregnant mothers with gestational age < 37 weeks.

Lastly, pregnant mothers who were multipara were more likely to have anemia (OR: 139.2, 95% CI: 1.51-12772.9) as compared to pregnant mothers who were primipara. Similarly, pregnant mothers who were grand multipara were more likely to have anemia (OR: 161.3, 95% CI: 1.08-24040.6) as compared to pregnant mothers who were primipara.

**Table 7 (b):** Association between low birth weight and its risk factors from the multivariate logistic regression model. N=100

| Background Characteristics | Odds Ratio (OR) | S. E | 95% CI |
|---|---|---|---|
| Placental weight | 0.95** | 0.017 | (0.92-0.98) |
| **Gravida** | | | |
| Primigravida[a] | 1 | | |
| Multigravida | 3.23 | 5.11 | (0.14-71.9) |
| **Gestational age** | | | |
| <37 weeks[a] | 1 | | |
| ≥37 weeks | 0.03*** | 0.04 | (0.002-0.43) |
| **ANC Visits** | | | |
| <4 months[a] | 1 | | |
| ≥4 months | 0.33 | 0.40 | (0.03-3.53) |
| **Parity** | | | |
| Primipara[a] | 1 | | |
| Multipara | 0.03** | 0.54 | (0.00-0.98) |
| Grand multipara | 0.45 | 0.82 | (0.013-15.7) |

[a]: Reference group; *** *p*-value <0.01; ** *p*-value <0.05

The data presented in table 7(b) shows that a unit increase in placental weight of the mother increased the risk of low birth weight by 0.95 (OR: 0.95, 95% CI: 0.92- 0.98). A child born to mothers with gestational age ≥37 weeks were less likely (OR: 0.03, 95% CI: 0.002- 0.43) to have low birth weight as compared to pregnant mothers with gestational age < 37 weeks. Similarly, a child born to multipara mothers is less likely (OR: 0.03, 95% CI: 0.00-0.98) to have low birth weight as compared to a child born to primipara mothers.

## Discussion

The maternal outcomes indicated that 30% of anemic mothers and 12% of non-anemic mothers experienced preterm delivery, consistent with findings of (Late) Akhuli K *et al*. (2016), which reported preterm delivery rates of 23.43% in anemic women and 5.55% in non-anemic women [5].

The present study found that anemic pregnant mothers had significantly higher rates of low birth weight (20% vs. 2%, P = 0.004) and preterm births (30% vs. 12%, P = 0.027) compared to non-anemic mothers. These findings align with Gopal Singh Charan *et al*. (2023), highlighting similar trends in perinatal outcomes [11].

The study found no significant differences in placental weight (Anemic: 447.78 g, non-anemic: 460.58 g, P = 0.496) or diameter (Anemic: 18.44 cm, non-anemic: 18.97 cm, P = 0.127). In contrast, Patel *et al*. (2021) reported significant differences in placental metrics [12].

The study found a significant positive correlation between placental weight and birth weight in both anemic and non-anemic mothers, aligning with Raveendran Sathasivam *et al*. (2023) [13].

The study revealed that urban mothers were less likely to be anemic (OR: 0.07) compared to rural mothers. Higher incomes reduced anemia risk, while multipara and grand multipara mothers showed increased anemia likelihood, consistent with findings from Terefe Derso *et al*. (2017) [14].

## Conclusion

The study identifies key associations between socio-demographic and obstetric factors and anemia in pregnant mothers. It also demonstrates significant correlations between neonatal characteristics and placental weight, emphasizing the need to understand these factors to improve health outcomes for mothers and infants.

## Acknowledgement

I wish to formally acknowledge and extend my sincere appreciation to Mr. Badondor Shylla, Guest Lecturer in Research and Statistics at the College of Nursing, NEIGRIHMS and Dr. Strong P. Marbaniang, Assistant Professor in the Department of Statistics at St. Anthony's College, Shillong, Meghalaya for their expert contributions in enhancing the statistical analysis.

## Conflicts of interest

There are no conflicts of interest.

## Financial support

Not available

## References


1. Youssry MA, Radwan AM, Gebreel MA, Patel TA. Prevalence of maternal anemia in pregnancy: The effect of maternal hemoglobin level on pregnancy and neonatal outcome. Open J Obstet Gynecol. 2018;8:676-687.
2. World Health Organization. The Global Health Observatory [Internet]. Available from: https://www.who.int/data/gho/data/themes/topics/anemia_in_women_and_children. Accessed on 10th January 2023.
3. NFHS-5 findings on anemia prevalence in children and women. [Internet]. Available from: https://faculty.in/data_nfhs_5_findings_reveal_increase_in_anemiaprevalence_in_children_women_across_most_states/. Accessed on 10th January 2023.
4. Hamood MA, Abid SJ, Abdulla TN, Akram W. Correlation between neonatal outcomes and maternal anemia among attending pregnant women in Al-Elwiya Maternity Teaching Hospital. J Pharm Bioallied Sci. 2023 Jul;15(2):S1164-S1167. DOI: 10.4103/jpbs.jpbs_180_23. Epub 2023 Jul 11. PMID: 37693953; PMCID: PMC10485535.
5. Akhuli K, Mani S, Podder L. Status of anaemia among parturient women and its consequences on maternal and neonatal outcome. Int. J Nurs Res Pract. 2016;3:04-10.
6. Kaur B, Sharma K. A co-relational study to measure the placental weight and birth weight among non-anemic and anemic pregnant women. Int. J Obstet Gynaecol Nurs. 2024;6(1):31-35.
7. Panti AA, Ekele BA, Nwobodo EI, Yakubu A. The relationship between the weight of the placenta and birth weight of the neonate in a Nigerian hospital. Niger Med J. 2012 Apr 1;53(2):80-84.
8. BT N. Study of correlation of neonatal outcomes with gross abnormalities of placenta and umbilical cord. J Nepal Paediatr Soc. 2017 Sep 1, 37(3).
9. Khatun S, Shah DK, Shrestha N, Yadav AK. Ratio of placenta to birth weight in anemic and non-anemic mothers. J Nobel Med Coll. 2022 Jun 29;11(1):61-66.
10. Tiruneh ST. Correlation between gross morphology of the human placenta and birth weight in normotensive and pre-eclamptic pregnancies in Northwest Ethiopia. Anatomy. 2018 Apr 6;12(1):27-32.
11. Charan GS, Kalia R, Khurana MS. Prevalence of anemia and comparison of perinatal outcomes among anemic and nonanemic mothers. J Educ Health Promot. 2023;12:01-07.
12. Patel V, Lakhani JD, Bhatt Shweta. A comparative study to assess the relationship of placental weight with birth outcome among anemic and non-anemic mothers admitted in tertiary care hospital of Vadodara, Gujarat. J Cardiovasc Dis Res. 2021;12:1750-1756.
13. Sathasivam R, Selliah P, Sivalingarajah R, Mayorathan U, Munasinghe BM. Placental weight and its relationship with the birth weight of term infants and body mass index of the mothers. J Int. Med Res. 2023;51(5):01-10.
14. Derso T, Abera Z, Tariku A. Magnitude and associated factors of anemia among pregnant women in Dera District: A cross-sectional study in northwest Ethiopia. BMC Res Notes. 2017;10:01-08.
15. Anitha R, Kala J. Comparative study of maternal and fetal outcome in nutritional anemia through the course of pregnancy. IOSR J Dent Med Sci. 2018;17:37-43.


**How to Cite This Article**
Nongkynrih J, Haobijam J, Devi LK. A comparative study to assess the placental weight, maternal and neonatal outcome among anemic and non-anemic pregnant mothers in selected health care settings of Meghalaya. International Journal of Obstetrics and Gynaecological Nursing. 2024; 6(2): 130-138.