

Association Between Anemia and Pregnancy Complications in Elderly Primigravidae: Insights from Urban Hospitals

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ABSTRACT: Background: Anemia during pregnancy is a common concern, particularly in elderly primigravidae (pregnant women over 35 years). Anemia in this group is associated with various pregnancy complications such as preeclampsia, gestational diabetes, and preterm labor. However, limited research has been conducted to assess the full impact of anemia on maternal and neonatal outcomes in elderly primigravidae. **Objective:** This study aims to assess the association between anemia and pregnancy complications in elderly primigravidae admitted for delivery after 36 weeks of gestation in urban hospitals. **Methods:** A cross-sectional study was conducted in Chattogram from January 2022 to July 2023. Data were collected from 210 anemic pregnant women over 35 years of age admitted for delivery at or after 36 weeks of gestation. Data were gathered using structured questionnaires and medical records, with a focus on maternal characteristics, anemia severity (classified based on WHO criteria), pregnancy complications, and neonatal outcomes. The severity of anemia was categorized into mild, moderate, and severe. **Results:** The majority of participants were aged 35-37 years (59.0%), and the majority had mild to moderate anemia. Severe anemia was significantly associated with increased rates of preeclampsia (52.2%), gestational diabetes (34.8%), postpartum hemorrhage (47.8%), intrauterine growth restriction (52.2%), and preterm labor (56.5%). Additionally, severe anemia was associated with higher maternal ICU admissions, blood transfusions, and longer hospital stays. Neonatal outcomes were also poorer in cases of severe anemia, with higher rates of low birth weight and neonatal respiratory distress. **Conclusion:** Severe anemia in elderly primigravidae significantly contributes to adverse pregnancy and neonatal outcomes. Early diagnosis and management of anemia in this population are essential for improving maternal and neonatal health.

Keywords: Elderly Primigravidae, Anemia, Pregnancy Complications, Maternal Outcomes, Neonatal Outcomes.

INTRODUCTION

Anemia during pregnancy remains a major public health concern, posing substantial risks to both mothers and their unborn children, particularly in developing nations [1]. Defined by a reduction in red blood cells or hemoglobin levels, anemia impairs the blood's oxygen-carrying capacity, leading to fatigue, weakness, and other severe health complications [2, 3]. According to the World Health Organization (WHO), more than 40% of pregnant women

worldwide are affected by anemia, highlighting its critical significance. The causes of anemia are multifaceted, with iron deficiency being the most prevalent factor. Iron deficiency anemia occurs when the body lacks sufficient iron to produce hemoglobin, the protein in red blood cells responsible for oxygen transport [4]. This issue becomes especially pressing during pregnancy due to increased iron demands to support expanded blood volume, as well as the placenta and fetal development. Beyond iron

deficiency, other contributing factors include folate and Vitamin B12 deficiencies, chronic inflammation, parasitic infections, and hereditary conditions. These diverse elements collectively influence anemia prevalence across different populations [5]. The consequences of anemia during pregnancy are severe. Maternal anemia has been linked to preterm birth, low birth weight, maternal mortality, and infant mortality. Severe cases elevate the risk of infections, cardiac failure, and perinatal complications [6]. For the fetus, maternal anemia can lead to intrauterine growth restriction and adverse neurodevelopmental outcomes. Elderly primigravidae—women experiencing their first pregnancy at or above 35 years—are at a heightened risk of pregnancy-related complications due to age-related physiological changes, pre-existing comorbidities, and decreased vascular adaptability [7, 8].

In this group, anemia further exacerbates pregnancy risks, increasing the likelihood of hypertensive disorders, gestational diabetes mellitus (GDM), prolonged hospital stays, and adverse neonatal outcomes [9, 10]. Despite these risks, research on anemia and pregnancy complications specifically among elderly primigravidae remains limited, particularly in low-resource settings like Bangladesh. Chattogram, one of Bangladesh's largest cities, faces maternal health challenges influenced by socioeconomic disparities, dietary inadequacies, and inconsistent antenatal care. Understanding the impact of anemia in elderly primigravidae admitted for delivery after 36 weeks of gestation is crucial for informing maternal health policies and improving obstetric care. This study aims to assess the association between anemia and pregnancy complications in elderly primigravidae in Chattogram. By examining the prevalence and severity of anemia and its correlation with pregnancy outcomes, this research seeks to provide evidence-based recommendations for improving maternal and

neonatal health outcomes through better screening, management, and intervention strategies.

METHODOLOGY

This cross-sectional study was conducted in Chattogram to assess the association between anemia and pregnancy complications in elderly primigravidae (pregnant women aged over 35 years) who were admitted with complications for delivery at over 36 weeks of gestation. A total of 210 anemic women were selected for the study, with data collected between January 2022 and July 2023. All participants were admitted to the Obstetrics and Gynecology departments of Chattogram Medical College Hospital for delivery. The study used a structured questionnaire and medical records to collect comprehensive data on demographics, obstetric history, hemoglobin levels, complications during pregnancy, and delivery outcomes. Hemoglobin levels were measured using routine blood tests, with anemia defined as Hb < 11 g/dL, following the WHO criteria. Pregnancy complications such as preeclampsia, gestational diabetes, postpartum hemorrhage, preterm labor, and intrauterine growth restriction (IUGR) were recorded. Intern doctors, placed in the Obstetrics and Gynecology departments, were responsible for data collection, ensuring standardized and consistent methods. Informed written consent was obtained from all participants, ensuring ethical compliance and voluntary participation in the study. Patient confidentiality and anonymity were maintained throughout. Data were analyzed using SPSS software, applying descriptive statistics (mean, standard deviation, frequency, and percentages) and inferential statistical tests such as chi-square tests and logistic regression models to evaluate the associations between anemia and various pregnancy complications. A p-value < 0.05 was considered statistically significant.

RESULT

Table 1: Demographic and Basic Characteristics of Study Participants (N=210)

Characteristics	Number (n)	Percentage (%)
Age (years)		
35-37	124	59.0
38-40	68	32.4
>40	18	8.6
Educational Status		
Primary	45	21.4

Secondary	82	39.0
Higher Secondary	48	22.9
Graduate	35	16.7
Occupation		
Housewife	138	65.7
Service	52	24.8
Business	20	9.5

Table 1 provides an overview of the demographic distribution of the study participants. The majority were aged between 35-37 years (59%), with most participants having a secondary education (39%) and identifying as housewives (65.7%).

Table 2: Distribution of Anemia Severity (N=210)

Hemoglobin Level	Number (n)	Percentage (%)
Mild (10-10.9 g/dL)	98	46.7
Moderate (7-9.9 g/dL)	89	42.4
Severe (<7 g/dL)	23	11.0

Table 2 illustrates the distribution of anemia severity among the study participants. The majority of participants had mild anemia (46.7%), followed by moderate anemia (42.4%) and severe anemia (11.0%).

Table 3: Pregnancy Complications with Anemia Severity

Complications	Mild Anemia (n=98)	Moderate Anemia (n=89)	Severe Anemia (n=23)	P-value
Preeclampsia	28 (28.6%)	35 (39.3%)	12 (52.2%)	0.012*
GDM	22 (22.4%)	25 (28.1%)	8 (34.8%)	0.038*
PPH	15 (15.3%)	24 (27.0%)	11 (47.8%)	0.001*
IUGR	19 (19.4%)	28 (31.5%)	12 (52.2%)	0.004*
Preterm Labor	25 (25.5%)	32 (36.0%)	13 (56.5%)	0.008*

Statistically significant ($p < 0.05$)

Table 3 highlights the association between anemia severity and pregnancy complications. Severe anemia was significantly associated with increased rates of preeclampsia (52.2%), gestational diabetes (34.8%), postpartum hemorrhage (47.8%), intrauterine growth restriction (52.2%), and preterm labor (56.5%) when compared to mild and moderate anemia. Statistically significant differences were found for all complications ($p < 0.05$).

Table 4: Mode of Delivery Distribution

Mode of Delivery	Number (n)	Percentage (%)
Normal Vaginal	82	39.0
Cesarean Section	128	61.0

Table 4 shows the mode of delivery among the study participants. A majority of the deliveries were via Cesarean section (61.0%), while 39.0% of participants had a normal vaginal delivery.

Table 5: Maternal Outcomes Based on Anemia Severity

Outcomes	Mild Anemia (n=98)	Moderate Anemia (n=89)	Severe Anemia (n=23)	P-value
ICU Admission	5 (5.1%)	12 (13.5%)	8 (34.8%)	0.001*
Blood Transfusion	12 (12.2%)	28 (31.5%)	18 (78.3%)	<0.001*
Hospital Stay >7 days	18 (18.4%)	32 (36.0%)	15 (65.2%)	0.002*

Statistically significant ($p < 0.05$)

Table 5 provides an overview of maternal outcomes based on anemia severity. Severe anemia was significantly associated with higher rates of ICU admission (34.8%), blood transfusions (78.3%), and

longer hospital stays (>7 days) (65.2%) compared to mild and moderate anemia. All differences were statistically significant ($p<0.05$).

Table 6: Association of Anemia Severity with Neonatal Outcomes

Neonatal Outcomes	Mild Anemia (n=98)	Moderate Anemia (n=89)	Severe Anemia (n=23)	P-value
Neonatal Mortality	2 (2.0%)	4 (4.5%)	6 (26.1%)	0.009*
Low Birth Weight	12 (12.2%)	22 (24.7%)	13 (56.5%)	0.004*
Respiratory Distress	18 (18.4%)	26 (29.2%)	16 (69.6%)	<0.001*

Statistically significant ($p<0.05$)

Table 6 presents neonatal outcomes concerning maternal anemia severity. Severe anemia was associated with a higher incidence of neonatal mortality (26.1%), low birth weight (56.5%), and

respiratory distress (69.6%) compared to mild and moderate anemia. All associations were statistically significant ($p<0.05$).

Table 7: Risk Factors Associated with Anemia Severity (Logistic Regression Analysis)

Risk Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	P-value
Age >40 years	1.98	1.11-3.60	0.02*
Low Socioeconomic Status	2.31	1.32-4.03	0.01*
Multiple Pregnancies	2.56	1.45-4.51	0.003*
Gestational Diabetes	1.85	1.12-3.04	0.03*

Statistically significant ($p<0.05$)

Table 7 shows the risk factors associated with anemia severity. Logistic regression analysis identified that age over 40 years, low socioeconomic status, multiple pregnancies, and gestational diabetes were significant risk factors for severe anemia, with p-

values less than 0.05. The odds ratio for these factors ranged from 1.85 to 2.56, indicating that these factors increased the likelihood of developing severe anemia during pregnancy.

Table 8: Comparison of Postpartum Recovery Based on Anemia Severity

Recovery Outcome	Mild Anemia (n=98)	Moderate Anemia (n=89)	Severe Anemia (n=23)	P-value
Postpartum Hemorrhage	15 (15.3%)	22 (24.7%)	18 (78.3%)	<0.001*
Fatigue	35 (35.7%)	48 (53.9%)	19 (82.6%)	0.002*
Hospital Discharge in <3 days	58 (59.2%)	33 (37.1%)	6 (26.1%)	<0.001*

Statistically significant ($p<0.05$)

Table 8 illustrates the postpartum recovery outcomes concerning anemia severity. Severe anemia was associated with a higher incidence of postpartum hemorrhage (78.3%), fatigue (82.6%), and longer hospital stays (26.1%) compared to mild and moderate anemia. Statistically significant differences were observed in all outcomes ($p<0.05$).

DISCUSSION

Anemia in pregnancy, particularly in elderly primigravidae, is a major public health concern, with significant implications for both maternal and neonatal outcomes. This study aimed to assess the association between anemia and pregnancy complications in elderly primigravidae in Chattogram, Bangladesh. The results highlight the detrimental effects of anemia on pregnancy outcomes

and provide insight into the critical need for early intervention and management. The majority of participants in this study were aged between 35-37 years (59.0%), which aligns with other studies indicating that the risk of complications in pregnancy increases significantly after the age of 35. Among the 210 anemic women, 46.7% had mild anemia, 42.4% had moderate anemia, and 11.0% had severe anemia, which is consistent with global reports suggesting that anemia affects a significant proportion of pregnant women, particularly in low- and middle-income countries [11, 12]. The high prevalence of anemia in this study emphasizes the importance of screening and early intervention in elderly pregnant women. This study found that severe anemia was significantly associated with various pregnancy complications, including preeclampsia (52.2%), gestational diabetes mellitus (34.8%), postpartum hemorrhage (47.8%), intrauterine growth restriction (52.2%), and preterm labor (56.5%). These findings are consistent with previous research showing that anemia is a well-established risk factor for hypertensive disorders like preeclampsia, gestational diabetes, and poor fetal growth outcomes [13, 14].

In particular, the association between severe anemia and preterm labor in this study corroborates other studies that have shown an increased risk of preterm birth in anemic pregnant women [15, 16]. The higher rates of postpartum hemorrhage and intrauterine growth restriction in women with severe anemia are concerning. Similar results have been reported that anemia during pregnancy significantly increases the likelihood of poor maternal outcomes, such as PPH and fetal growth restriction [11]. This is thought to be related to reduced oxygen delivery to the placenta and poor nutritional support for fetal development [17]. In terms of maternal outcomes, severe anemia was associated with higher ICU admission rates (34.8%), blood transfusions (78.3%), and longer hospital stays (65.2%). These findings are in line with those of other studies, which have shown that anemia in pregnancy often leads to a need for intensive maternal care and intervention [8, 9]. Moreover, studies have demonstrated that women with severe anemia are at increased risk for hemorrhage and complications during labor [10, 11]. Neonatal outcomes were also significantly worse in the severe anemia group, with higher rates of low birth weight and neonatal respiratory distress. These findings are consistent with global data that show that anemia during pregnancy can result in poor neonatal

outcomes, including preterm birth, low birth weight, and increased neonatal morbidity [18]. The increased likelihood of low birth weight in anemic women is particularly alarming, as it contributes to long-term health risks for the child, including developmental delays and chronic conditions [18-27]. Chi-square and logistic regression analyses indicated that severe anemia was an independent risk factor for adverse pregnancy and neonatal outcomes. The p-values for the association between anemia and complications such as preeclampsia, gestational diabetes, PPH, IUGR, and preterm labor were all significant ($p < 0.05$), further confirming the clinical relevance of these findings. These statistical analyses underscore the need for early screening and management of anemia in elderly pregnant women to reduce the risks associated with pregnancy complications and improve maternal and neonatal outcomes.

Limitations and Future Recommendations

While this study provides valuable insights, it is not without limitations. The data were collected from a single urban hospital in Chattogram, and therefore, the results may not be generalizable to other regions in Bangladesh, particularly rural areas. Additionally, the cross-sectional design of the study limits the ability to establish causal relationships. Future longitudinal studies that include a broader sample from different regions and healthcare settings would be useful in confirming these findings.

CONCLUSION

In conclusion, severe anemia in elderly primigravidae is strongly associated with increased pregnancy complications, poor maternal outcomes, and adverse neonatal health. Early diagnosis and management of anemia, along with regular antenatal care, are essential for improving the health outcomes of both mothers and their infants. These findings should prompt healthcare providers to prioritize anemia screening and treatment in elderly pregnant women, particularly those over 35 years of age.

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