ORIGINAL ARTICLE

FREQUENCY OF IRON DEFICIENCY ANEMIA IN PREGNANCY, AND ITS ASSOCIATED MATERNAL AND PERINATAL OUTCOMES

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ABSTRACT

Objective: Pregnancies are typically affected by anemia with an increased risk of adverse outcomes for both maternal and neonatal. The purpose of the present study was to determine the frequencies of iron deficiency anemia in pregnancies, and its maternal and perinatal outcomes.

Methodology: This cross-sectional study was conducted on 104 pregnant women in the Department of Obstetrics and Gynecology, Fatima Hospital Baqai Medical University from January 2019 to January 2021. All pregnant women with iron deficiency anemia attending Fatima hospital at any trimester were enrolled. Patients were categorized into anemic (Hb<10 g/dL) and non-anemic (Hb> 10 g/dL) patients based on their Hb levels. Postpartum hemorrhage (PPH), placental abnormalities, sepsis (infection), and preeclampsia were different maternal outcomes. Low birth weight (LBW), prematurity, stillbirth, Small for gestational age (SGA), and intrauterine growth restriction (IUGR) were different fetal outcomes. SPSS version 27 was used for data analysis.

Results: The overall mean age was 26.76±5.9 years. The mean Hb level was 8.76± 1.2 g/dL. Of the total 104, the frequency of anemic and non-anemic pregnant women was 93.3% (n=97) and 6.7% (n=7) respectively. The mean parity of pregnant women was 5 (±3). Out of 104, the frequency of mild, moderate, and severe anemia was 52.9% (n=55), 38.4% (n=40), and 8.7% (n=9) respectively. Of the 97 anemic pregnant women, the frequency of various maternal outcomes such as postpartum hemorrhage (PPH), placental abnormalities, pre-eclampsia, and infection or sepsis was 29 (29.9%), 8 (8.2%), 58 (59.8%), and 2 (2.1%) respectively.

Conclusion: Iron deficiency anemia in the third trimester of pregnancy is associated with adverse maternal and neonatal outcomes. Nutritional status of the mother must be adequate to prevent poor outcomes during pregnancy.

Keywords: Anemia,maternal anemia, adverse pregnancy outcomes, neonatal outcome

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INTRODUCTION

Anemia is one of the most frequent dietary deficiencies seen across the world, while people of all age and either gender affected by nutritional anemia especially women that lead to maternal morbidity and mortality [1]. Nutritional anemia is thought to affect approximately two-thirds of pregnant women in developing countries. Anemia was found in majority of these women during

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conception whereas non-pregnant women of underdeveloped countries suffered almost 50% from anemia [2]. In Pakistan, the incidence of anemia among married women aged 15-44 years in urban and rural area are 26% and 47% respectively [3, 4]. The causes of anemia during pregnancy in underdeveloped nations are complex and vary by geographical area [5]. Globally, the most prevalence cause of anemia was iron deficiency during pregnancy and it is exacerbated by increasing blood volume of maternal and fetus needs through pregnancy [6, 7]. Other contributing concerns include genetic reasons and poor cleanliness, which can lead to infections and infestations [8].

Anemia is a worldwide issue that has major effects for mothers and their children. Postpartum hemorrhage, postpartum febrile morbidity, and sepsis are among the poor perinatal outcomes found in anemic pregnant women, according to evidence [9]. Preeclampsia, placenta Previa, caesarean birth, and premature labor are all increased by anemia during pregnancy [10]. Maternal anemia, on the other hand, raises the risk of maternal and neonatal mortality [11]. Pregnant women are more vulnerable to anemia, which can result in early birth and low birth weight. It is a problem in children since anemia is linked to delayed mental and physical development. Anemia in pregnancy can be caused by a variety of diseases such as iron insufficiency, vitamin B12, chronic infections, and folic acid. Maternal anemia, regardless of the cause, has been linked to an increased risk of adverse pregnancy outcomes. Preterm birth, (weight below the 10th percentile for the gestational age), small-for-gestational-age (SGA), postpartum hemorrhage (PPH), and preeclampsia are further adverse outcomes [12-14]. Despite the fact that, various studies investigated the numerous prospective of neonatal outcomes in Pakistani neonates, but limited attention paid to maternal outcomes [15]. As a result, purpose of the present study was to determine the frequencies of iron deficiency anemia in pregnancies, and its maternal and perinatal outcomes.

METHODOLOGY

*Study Deign and Setting:*This cross-sectional study was conducted on 104 pregnant women in the Department of Obstetrics and Gynecology, Fatima Hospital Baqai Medical University from January 2019 to January 2021. Study protocol was approved by the institutional research and ethical committee. Informed written consent was obtained.

Inclusion Criteria: All pregnant women with iron deficiency anemia attending Fatima hospital at any trimester were enrolled.

*Exclusion Criteria:*Pregnant women with history of premature delivery, women with congenital malformation diagnosed on sonographic diagnosis, and multiple pregnancies and pregnancy induced hypertension like obstetrical complications were excluded.

Data Collection Procedure: Patients were categorized into anemic (Hb<10 g/dL) and non-anemic (Hb> 10 g/dL) patients based on their Hb levels. Demographic details such as age, smoking status, body weight, parity, and height were collected. Postpartum hemorrhage, placental abnormalities, sepsis (infection), and preeclampsia were different maternal outcomes. Low birth weight (LBW), prematurity, stillbirth, small for gestational age (SGA), and intrauterine growth restriction (IUGR) were different fetal outcomes. A skilled technician took 3 mL of venous blood at the time of enrolment using normal procedures. These classifications were as follows: Mild anemia Hb levels (9.0 to 10.9 g/dL), moderate anemia Hb levels (7.0 to 8.9 g/dL), and severe anemia Hb levels < 7.0 g/dL.

*Statistical Analysis:*Data analysis was done using statistical packages for social sciences (SPSS) version 27. Quantitative variables were expressed as mean and standard deviation whereas qualitative variables were presented as frequencies and percentages. To examine the relationship between categorical variables, a chi-square test was used. A p-value of 0.05 was regarded as significant.

RESULTS

The mean age was 26.76±5.9 (R: 17-45 years). The

mean Hb level was 8.76± 1.2 g/dL. Of the total 104, the frequency of anemic and non-anemic pregnant women was 93.3% (n=97) and 6.7% (n=7) respectively. The mean parity of pregnant women was 5 (±3). Out of 104, the frequency of mild, moderate, and severe anemia was 52.9% (n=55), 38.4% (n=40), and 8.7% (n=9) respectively. The overall mean value of Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC), platelet count test (PLT), neutrophil, lymphocytes, and birth weight was 69.35±10.29, 21.21±1.02, 29.422±3.52, 30.52±7.76, 72.58±6.39, 20.75±6.88, and 2.667±0.51 respectively. The frequency of LBW neonates in pregnant women with iron deficiency anemia was 36 (34.6%).

Table-I: Maternal and perinatal outcomes.

Maternal Outcome	N (%)
Postpartum hemorrhage (PPH)	29 (29.9)
Placental abnormality	8 (8.2)
Pre-eclampsia	58 (59.8)
Infection (sepsis)	2 (2.1)
Perinatal Outcome	
Preterm birth	37 (38.1)
Small for gestational age (SGA)	66 (68)
Low birth weight (LBW)	36 (34.6)
Intrauterine growth restriction (IUGR)	24 (24.7)

Table-I represents the different maternal and perinatal outcomes. Of the 97 anemic pregnant women, the frequency of various maternal outcomes such as postpartum hemorrhage (PPH), placental abnormalities, pre-eclampsia, and infection or sepsis was 29 (29.9%), 8 (8.2%), 58 (59.8%), and 2 (2.1%) respectively. Perinatal outcomes such as preterm, SGA, and IUGR were found in 37 (38.1%), 66 (68%), and 24 (24.7%) respectively(table I)

The mild, moderate and severe maternal and perinatal outcomes are presented in table II.

Table II: Severity of IDA in relation to maternal and perinatal outcomes

Maternal outcome	Mild N (%)	Moderate & Severe N (%)
Postpartum hemorrhage (PPH)	7 (7.2)	22 (22.6)
Placental abnormality	1 (1.03)	7 (7.2)
Pre-eclampsia	15 (15.5)	43 (44.3%)
Infection	0 (0)	2 (2.1)
Perinatal outcome	**Mild N (%)**	**Moderate & severe N (%)**
Preterm birth (PTB)	18 (18.6)	19 (19.6)
Small for gestational age (SGA)	23 (23.7)	43 (44.3)
Low birth weight (LBW)	9 (9.3)	27 (27.8)
Intrauterine growth restriction (IUGR)	7 (29.2)	17 (17.5)

DISCUSSION

The present study mainly focused on the prevalence of iron deficiency anemia in pregnancies, and its maternal and neonatal outcomes and found that maternal anemia is a prevalent condition that gynecologists and obstetricians face across the world, particularly in underdeveloped nations. The present study found an adverse maternal and perinatal outcome associated with anemia in pregnancy. Several investigations have produced comparable findings to ours. Mu et al. [16] conducted a retrospective study on anemia among pregnant women and reported that moderate to severe anemia was found in 35% pregnant women. The present study observed that PPH was more prevalent in anemic pregnant women as compared to non-anemic. There were 17 and 19-fold increase risk of IOL and infections among anemic women. Premature birth, SGA, and LBW were different neonatal outcomes associated with anemia [17, 18]. Ullah A et al. [19] found a strong link of PPH and newborn death with severe cases of anemia, but no link to maternal mortality.

Low placental weight, fetal anemia, SGA, lower Apgar score stillbirth, and premature birth are all

related with maternal anemia [20, 21]. Among the maternal unfavorable outcomes documented in the literature were PPH, placental abnormalities, infections, and preeclampsia [22, 23]. Though, the prevalence of nutritional anemia is modest and declining in affluent nations during pregnancy, it is nevertheless linked to poor mother outcomes [24]. Maternal anemia was found to increase the risk of postpartum, blood transfusion requirement, infections, and mother mortality [25]. Another study reported that SGA, NICU admission, and preterm birth were significantly associated with antenatal anemia [26].

The frequency of anemia (93.3%) in our research population was greater than in previous Pakistani investigations (90%). The higher anemia prevalence might be due to the measurement of hemoglobin levels taken during 2nd trimester of pregnancy, concentrations should be lowest because plasma volume expands faster than red cell mass. This is compatible with the discovery that 75% of anemia cases were mild which is higher than ours [27]. Another study conducted in India on 4,775 pregnant women from 11 different states reported that 87% women suffered from anemia with pregnancy of >20 weeks [28]. In other underdeveloped countries, the frequency of anemia among pregnant women ranges from 35% to 81% [29, 30].

The non-anemic pregnant women had higher BMI than anemic pregnant women. The mean mid-pregnancy BMI of severely anemic women, on the other hand, was 22.1 ± 3.7, indicating that these women had enough calorie consumption but that their diets were composed of insufficient iron absorption diet leading to anemia. Our study's anemic women were also significantly shorter than the non-anemic women, indicating a chronic trend of undernutrition in their early childhood and signaling not only insufficient calorie or nutrient intake but also insufficient overall diet.

The risk of low birth weight (LBW), premature delivery, low Apgar score, and perinatal mortality is raised. Maternal anemia, regardless of origin, has been linked to an elevated risk of both maternal and newborn poor outcomes. The probable reasoning is that babies with low Apgar scores are more likely to have neonatal problems, increasing the risk of perinatal morbidity and death [20]. A low Apgar score was shown to be related with higher mortality in preterm infants, according to the study [31]. In this study, women with hemoglobin levels less than 11 mg/dl were 4.1 times more likely to have unfavorable perinatal outcomes than those with hemoglobin levels greater than 11 mg/dl. This conclusion is similar with the findings of the previous study [32].

*Study Limitation:*Anemia is a multi-factorial condition caused by numerous risk factors. However, the current investigation focused on limited risk factors associated with anemia. The limited sample size impacted the study findings and strength. Hemoglobin level was taken from institute medical record which might lead to measurement bias.

CONCLUSION

Iron deficiency anemia in the third trimester of pregnancy is associated with adverse maternal and neonatal outcomes. About 8.7% pregnant women had severe iron-deficiency anemia followed by mild iron deficiency 38.4%. Nutritional status of the mother must be adequate to prevent poor outcomes during pregnancy. Proper prenatal care will aid in the reduction of possible adverse outcomes.

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Author's Contribution:

NQ: concept and design, manuscript writing and results analysis

FN: critical review, edited and approved the manuscript

NA: data collection, edited and approved the manuscript

NA: data collection, edited and approved the manuscript

FL: edited and approved the manuscript

S:review, edited, and approved the manuscript

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