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Impact Of Anemia On Feto-Maternal Outcomes In One Of The Tertiary Care Hospitals In Khyber Pakhtunkhwa

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Abstract

Objective: This descriptive case series aimed to determine the frequency of feto-maternal outcomes in pregnant women with iron deficiency anaemia at the Mardan Medical Complex, Mardan. The study was conducted between December 2020 and May 2021 in the Department of Obstetrics and Gynecology.

Methods: A total of 125 pregnant women diagnosed with anaemia were included in the study. Participants were followed up until delivery, and fetomaternal outcomes, including gestational hypertension, preeclampsia, postpartum haemorrhage, prolonged labour, low Apgar score, low birth weight, preterm delivery, and early neonatal death, were recorded based on predefined operational definitions.

Results: The study participants ranged from 18 to 40 years, with a mean age of 27.784±3.13 years. The mean gestational age was 30.112±2.89 weeks. Among the participants, gestational hypertension was observed in 47.2% of patients, preeclampsia in 60.8%, postpartum haemorrhage in 33.6%, prolonged labour in 40%, low Apgar score in 50.4%, low birth weight in 30.4%, preterm delivery in 28.8%, and early neonatal death in 8%.

Conclusions: The study findings suggest that maternal anaemia, specifically iron deficiency anaemia, increases the risk of adverse maternal and neonatal outcomes. It is crucial to closely monitor and promptly treat pregnant women with iron anaemia to reduce the risk of feto-maternal complications.

Keywords: Pregnancy, Iron deficiency anemia, Feto-maternal outcomes.

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1. Introduction

Anaemia is a widespread health concern, affecting a significant portion of the global population. Iron deficiency is the primary cause of anaemia worldwide, particularly among women. Various factors such as gastrointestinal illnesses such as inflammatory bowel disease, celiac disease, chronic kidney disease, cancer, and chronic heart failure can increase the risk of anaemia and iron deficiency. These conditions may also influence clinical outcomes. [1]

During pregnancy, maternal anaemia is a common occurrence, with approximately 50% of pregnant women worldwide being affected. [2] Iron deficiency anaemia, characterized by low haemoglobin and serum ferritin levels, can have detrimental effects on both the mother and the baby. [3] The World Health Organization (WHO) defines maternal anaemia during pregnancy based on specific haemoglobin concentration cutoff values, which may vary slightly depending on healthcare guidelines and populations. [4] Regular prenatal care is crucial for monitoring haemoglobin levels and addressing signs of anaemia to ensure a healthy pregnancy outcome.

Maternal anaemia is linked with low birth weight, prematurity, perinatal mortality, maternal infections, and reduced tolerance to blood loss and infection. [2,3] Additionally, it can negatively impact infant neurodevelopment. [4] Regardless of its cause, maternal anaemia has been linked to various adverse maternal and neonatal outcomes, such as cesarean sections, blood transfusions, low APGAR scores, preterm delivery, small-for-gestational-age infants, postpartum haemorrhage, and preeclampsia. [3,5]

Several studies have examined the frequency of fetomaternal outcomes in pregnancies complicated by iron deficiency anaemia. Mahmood et al. (2018) reported a high frequency of gestational hypertension, preeclampsia, postpartum haemorrhage, prolonged/obstructed labour, low birth weight, preterm delivery, and early neonatal death in women with iron deficiency anaemia during pregnancy. [5] Adnan et al. (2019) also found elevated frequencies of gestational hypertension, postpartum haemorrhage, low birth weight, and low APGAR

scores in pregnant women with iron deficiency anaemia. [6]

In Pakistan, a significant proportion of women experience anaemia during pregnancy, underscoring the importance of investigating the frequency of fetomaternal outcomes in this population. While extensive research has focused on neonatal outcomes, there is a dearth of information regarding maternal outcomes. Therefore, further studies are needed to determine the frequency of adverse outcomes associated with iron deficiency anaemia during pregnancy and to develop targeted interventions for pregnant women in Pakistan.

2. Materials & Methods

Study design: Descriptive case series.

Setting: Department of Obstetrics and Gynaecology, Mardan Medical Complex, Mardan.

Duration: December 1, 2020, to May 30, 2021.

Sample size: 125 calculated using the WHO sample size software, with a 95% confidence level, 5% margin of error, and expected prevalence of early neonatal death by 8.9% in pregnancy with iron deficiency anaemia.

Sampling technique: Non-probability consecutive sampling.

Inclusion criteria: Women aged 18-40 years with singleton pregnancy on ultrasound, gestational age > 20 weeks, parity 0-4, and maternal anaemia. The World Health Organization (WHO) defines maternal anaemia in pregnancy as a haemoglobin concentration below 11.0 grams per deciliter (g/dL) in the first and third trimesters and below 10.5 g/dL in the second trimester.

Exclusion criteria: History of thalassemia, sickle cell anaemia, and women with antepartum haemorrhage.

Data collection: Patients who met the inclusion criteria were enrolled after ethical committee permission. Baseline demographic information was collected, and informed consent was taken. Fetomaternal outcomes were noted until delivery.

Data analysis: Quantitative variables were analyzed for mean ± standard deviation, while frequencies and percentages were calculated for qualitative variables. Fetomaternal outcomes were stratified by age, gestational age, parity, poor economic status, and education level. Post-stratification was done through the chi-square test, with a p-value less than 0.05 considered significant.

3. Results

Table-1 Mean ± Standard Deviation of age(years) and gestational age(weeks); frequency distribution of characteristics associated with pregnancy

Characteristics	Mean	Standard Deviation
Age (Years)	27.784	3.13
Gestational Age (Weeks)	30.112	2.89
Characteristics	Frequency	Percentage
Gestational Hypertension		
Yes	59	47.2%
No	66	52.8%
Preeclampsia		
Yes	76	60.8%
No	49	39.2%
PPH		
Yes	42	33.6%
No	83	66.4%
Prolonged Labour		
Yes	50	40%
No	75	60%
Low Apgar Score		
Yes	63	50.4%
No	62	49.6%
Low Birth Weight		
Yes	38	30.4%
No	87	69.6%
Preterm Delivery		
Yes	36	28.8%
No	89	71.2%
Early Neonatal Death		
Yes	10	8%
No	115	92%

Table 1 depicts the mean age and standard deviation of 27.784±3.13 years while the mean gestational age and standard deviation was 30.112±2.89 weeks. The frequency and percentages of complications associated with pregnancy were assessed; Gestational hypertension was observed in 47.2% of the patients, preeclampsia 60.8%, postpartum haemorrhage 33.6%, prolonged labour 40%, low Apgar score 50.4%, low birth weight 30.4%, preterm delivery 28.8% and early neonatal death in 8% of the patients.

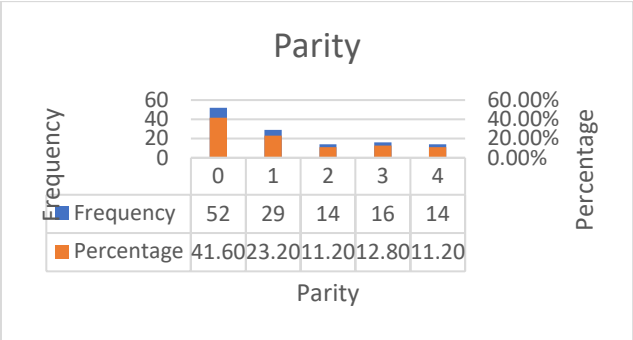

Figure-1 Frequency and Percentage of patients according to parity.

Figure 1 shows the frequency distribution and percentage of patients according to parity. The frequency of parity levels 0,1,2,3 and 4 was 52, 29, 14, 16, and 14 respectively.

Table-2 Stratification of fetomaternal outcomes concerning Gestational Hypertension and Preeclampsia.

Age (years)	Gestational Hypertension		p-value
	Yes	No	
18-30	45(46.4%)	52(53.6%)	0.736
31-40	14(50%)	14(50%)	
Gestational age (weeks)	Gestational Hypertension		
21-30	30(45.5%)	36(54.5%)	0.679
>30	29(49.2%)	30(50.8%)	
Parity	Gestational Hypertension		
0-2	43(45.3%)	52(54.7%)	0.440
3-4	16(53.3%)	14(46.7%)	
Age	Preeclampsia		
18-30	57(58.8%)	40(41.2%)	0.385
31-40	19(67.9%)	9(32.1%)	
Gestational age (weeks)	Preeclampsia		
21-30	38(57.6%)	28(42.4%)	0.435
>30	38(64.4%)	21(35.6%)	
Parity	Preeclampsia		
0-2	55(57.9%)	40(42.1%)	0.236
3-4	21(70%)	9(30%)	

5. Discussion

Anaemia is a global health issue that affects individuals worldwide, including females of reproductive age. Our study focused on the fetomaternal outcomes of anaemia in a developing country. However, the findings in our study are specific to the population and setting studied and cannot be generalized to other regions. The study revealed that maternal anaemia was associated with various adverse outcomes. Among the patients included in the study, 47.2% experienced gestational hypertension, 60.8% had preeclampsia, 33.6% suffered from postpartum haemorrhage, 40% had prolonged labour, 50.4% had a low Apgar score, 30.4% gave birth to low birth weight babies, 28.8% experienced preterm delivery, and 8% had early neonatal death. These findings are consistent with previous studies conducted by Mahmood et al. and Adnan et al., which reported similar rates of adverse outcomes associated with iron deficiency anaemia during pregnancy. [9] These outcomes include gestational hypertension, preeclampsia, postpartum haemorrhage, prolonged/obstructed labour, low birth weight, preterm delivery, and early neonatal death. Studies from other developing South Asian countries have also reported comparable trends, with adverse neonatal outcomes including low placental weight, low birth weight/very low birth weight, poor Apgar score, small for gestational age, fetal anaemia, birth asphyxia, stillbirth, and preterm delivery.[7,8] The adverse maternal outcomes include preeclampsia, postpartum haemorrhage, infections, and cesarean delivery. While in developed countries the incidence of nutritional anaemia in pregnancy is declining, it still poses risks for poor maternal outcomes. Studies conducted in Scotland and Finland have shown that maternal anaemia increases the risk of, severe obstetric haemorrhage, antepartum haemorrhage, the need for blood transfusion, preterm delivery, postpartum infection, maternal death, small for gestational age, and neonatal intensive care unit admission. [10,11] Currently, there are no standard guidelines for the management of labour and delivery in women with moderate-to-severe anaemia. Further research is needed to assess the value of treating anaemia as an independent risk factor in predicting pregnancy outcomes, particularly through interventional studies with larger sample sizes and focusing on anaemia of various etiologies.

Table-3 Stratification of Prolonged Labour Concerning Age

Age (years)	Prolonged Labour		p-value
	Yes	No	
18-30	40(41.2%)	57(58.8%)	0.599
31-40	10(35.7%)	18(64.3%)	
Prolonged Labour concerning Gestational age (weeks).			
Gestational age (weeks)	Prolonged Labour		0.826
	Yes	No	
21-30	27(40.9%)	39(59.1%)	
>30	23(39%)	36(61%)	
Prolonged Labour concerning parity			
	Prolonged Labour		0.275
Parity	Yes	No	
0-2	40(42.1%)	55(57.9%)	
3-4	10(33.3%)	20(66.7%)	
Low Apgar Score concerning age			
Age (years)	Low Apgar score		
	Yes	No	
18-30	52(53.6%)	45(46.4%)	0.182
31-40	11(39.3%)	17(60.7%)	
Low Apgar Score concerning gestational age (weeks)			
Gestational age (weeks)	Low Apgar Score		
	Yes	No	

21-30	31(47%)	35(53%)	0.417
>30	32(54.2%)	27(45.8%)	
Low Apgar Score concerning parity			
Parity	Low Apgar Score		
	Yes	No	
0-2	52(54.7%)	43(45.3%)	0.084
3-4	11(36.7%)	19(63.3%)	
Low Birth Weight concerning age			
Age (years)	Low Birth Weight		
	Yes	No	
18-30	25(25.8%)	72(74.2%)	0.036
31-40	13(46.4%)	15(53.6%)	
Low Birth Weight concerning gestational age (weeks)			
Gestational age (weeks)	Low Birth Weight		
	Yes	No	
21-30	23(34.8%)	43(65.2%)	0.253
>30	15(25.4%)	44(74.6%)	
Low Birth Weight concerning parity			
Parity	Low Birth Weight		
	Yes	No	
0-2	23(24.2%)	72(75.8%)	0.007
3-4	15(50%)	15(50%)	

Table 3 illustrates the stratification of prolonged labour and low Apgar score with age, gestational age (weeks), and parity level at p-value>0.05 which depicts that there is no significant association between these variables.

Stratification of low birth weight concerning age and parity level shows a significant association at p-value <0.05 except gestational age (weeks).

Table-4 Stratification of Low Birth Weight Concerning parity

Parity	Low Birth Weight		p-value
	Yes	No	
0-2	23(24.2%)	72(75.8%)	0.007
3-4	15(50%)	15(50%)	
Preterm Delivery concerning gestational age.			
Gestational age (weeks)	Preterm Delivery		0.69
	Yes	No	
21-30	18(27.3%)	48(72.7%)	
>30	18(30.5%)	41(69.5%)	
Preterm Delivery concerning parity			
	Preterm Delivery		0.275
Parity	Yes	No	
0-2	25(26.3%)	70(73.7%)	
3-4	11(36.7%)	19(63.3%)	
Early Neonatal Death concerning age			
Age (years)	Yes	No	
18-30	6(6.2%)	91(93.8%)	0.164
31-40	4(14.3%)	24(85.7%)	
Early Neonatal Death concerning parity			
Parity	Yes	No	
0-2	6(6.3%)	89(93.7%)	0.127
3-4	4(13.3%)	26(86.7%)	
No	2(5.3%)	36(94.7%)	

Early Neonatal Death concerning educational level.

Educational level		Early Neonatal Death		Total	p-value
		Yes	No		
Uneducated	Yes	2(3.4%)	37(56%)	39 (31.2%)	0.000

	No	57(96.6%)	29(44%)	86 (68.8%)	
Primary	Yes	6(10%)	39(59%)	45(36%)	0.000
	No	53(90%)	27(41%)	80(64%)	
Secondary	Yes	0(0%)	19(28.8%)	19(15.2%)	0.000
	No	59(100%)	47(71.2%)	106(84.8%)	
Graduate	Yes	1(1.7%)	16(24.2%)	17(13.6%)	0.000
	No	58(98%)	50(75%)	108(86.4%)	
Higher	Yes	1(1.6%)	4(6%)	5(4%)	0.213

Table 4 illustrates the stratification of low birth weight with a parity level at p-value>0.05 which shows that there is no significant association, it also shows the stratification of preterm delivery concerning gestational age and parity level at p-value>0.05 with a non-significant association, early neonatal death concerning age and parity level also shows a non-significant association at p-value>0.05. Early neonatal death with educational level shows a significant association at p-value <0.05 except for higher education level. Another study showed that the median overall prevalence of low back pain was higher among females than males across all age groups, contradicting our findings. [23]

5. Conclusion

In conclusion, our study highlights the association between maternal anaemia and adverse maternal and neonatal outcomes. It emphasizes the importance of identifying at-risk women and providing them with timely and adequate care. Furthermore, awareness campaigns should be conducted to educate women about the significance of maternal nutrition and its impact on the health of both the mother and newborn. This awareness should extend beyond pregnant women to encompass all women of childbearing age.

CONFLICTS OF INTEREST- None

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Potential competing interests: None to report

Contributions:

S.Y - Conception of study
S.Y, M.S - Experimentation/Study Conduction
M.M.S - Analysis/Interpretation/Discussion
M.S - Manuscript Writing
S.Y, M.S, M.M.S - Critical Review
S.Y, M.S, M.M.S - Facilitation and Material analysis

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