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Research Article

Negative Implications of Maternal and Neonatal Outcomes in Pregnancy Associated with Anaemia in Aljouf, Saudi Arabia

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ABSTRACT

One of the most prevalent serious health issues is anaemia. It is a high-risk condition since it has negative pregnancy-related effects on both the mother and the fetus. The most vulnerable population to anaemia is pregnant women. This research was done in Aljouf, Saudi Arabia, to find out the negative effects of anaemia on maternal and fetal outcomes during pregnancy. Retrospective research was conducted on pregnant patients treated at the Maternity and Children Hospital (MCH), Sakaka, Aljouf, Saudi Arabia, over a 12-month period. All 480 pregnant women provided the necessary information, which included demographics like age, education, socioeconomic status, parity, birth intervals, trimester of pregnancy, BMI, history of fever, neonatal information, and investigative data. Participants with anaemia during pregnancy totaled 485; mild anaemia made up 18.7%, moderate anaemia 77.9%, and severe anaemia 3.2%. The age group of 30-34 years had the highest prevalence of anaemia (32.5%), multiparity (51.7%), and secondary education (51.7%). While 73.6% anaemia found in first trimester,63% in overweight women and 73.6% less than 2 years of birth intervals. Out of 485, 145 had abortions, and the remaining 340 expectant mothers had fetal distress at a rate of 14.4%, IUGR at a rate of 6.7%, LBWB at a rate of 10.8%, a cardiac anomaly at a rate of 0.2%, and 6.7% were admitted to the NICU. All anemic pregnant women have their blood hematocrit levels examined as well. For associated risk factors including fever, parity, and social classes, use multivariate analysis. Our study's pregnant participants were severely anemic, which had negative impacts on the developing fetus and newborn. The linked factors that contributed to the development of anaemia during pregnancy must be improved.

Keywords: *Anaemia, pregnancy, pregnancy outcomes*

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INTRODUCTION

Anaemia, which impacts 1.62 billion people worldwide and 24.8% of pregnant women, is the most prevalent public health concern (Ababiya *et al* ,2014). The WHO advised that pregnant women with hemoglobin levels below 11 g/dl, below 10.5 g/dl through the Quality Assurance in Primary Health Care Manual, and below 10 g/dl through the United States Preventive Service Task Forces be diagnosed with anaemia (Baig-Ansari *et al* ,2008). Reduced hemoglobin levels and a decreased blood's ability to carry oxygen are two symptoms of anaemia (Chaparro, 2019). In low- and middle-income countries, particularly, anaemia has been linked to maternal morbidity and mortality directly or indirectly (Rahman *et al* ,2019). However, reduced mother and fetal wellbeing might result from mild to moderate anaemia status during pregnancy. Conversely, Anaemia is a condition where there are fewer red blood cells in circulation or where there are lower-than-normal quantities of hemoglobin in the blood leads to reduce RBC's ability to provide oxygen to bodily tissue and organs (Stephen *et al*,2018).

According to the World Health Organization (WHO), anaemia during pregnancy is mild if hemoglobin levels are between 10g/dl and 10.9g/dl, moderate if levels are between 7g/dl and 9.9g/dl, and severe if levels are below 7g/dl (Bull BS *et al*, 2006). Previously reported that 40% of pregnant

women globally experience anaemia during pregnancy (Baig-Ansari *et al* ,2008), and in Saudi Arabia, the frequency was reported at 27.3% in 2019 (Azubuike, 2023). Pregnant women are deemed anemic by the World Health Organization (WHO) when their hemoglobin levels are less than 11 g/dl (Huch, 1992). Given its high prevalence, anaemia during pregnancy has received a lot of attention in order to better understand its effects on maternal and fetal outcomes. It has been found that hemoglobin levels less than 6 g/dl are linked to poor pregnancy outcomes, and that severe anaemia during pregnancy may have serious negative effects on both the mother and the fetus (Chaparro, 2019). Pregnant women who are anemic run the risk of postpartum hemorrhage, preterm labor, convulsions, and severe anaemia that can result in cardiac failure or death (Kumar *et al*, 2013). This illness frequently affects a country's socioeconomic standing since it has long-term effects like reduced cognitive development, decreased economic production, and worse quality of life, all of which contribute to the nation's underdeveloped economy (World Health Organization, 2011). According to studies conducted in both hospitals and communities, anaemia during pregnancy is significantly linked to maternal, fetal, and neonatal morbidity and mortality (Mohammed et al 2013, World Health Organization, 1992). Infections (urinary tract infections, puerperal sepsis), postpartum hemorrhage (PPH), abruptio placentae, puerperal venous thrombosis, heart failure, and maternal death are among the problems that affect mothers during pregnancy, as a result of the severe maternal anaemia, the fetus may also have intrauterine growth restriction (IUGR), preterm labor and premature rupture of the membranes, low birth weight, and increased perinatal or postnatal mortality due to the lowered oxygen supply (Brabin *et al* ,2001). Anaemia is the most prevalent illness among pregnant women in developing countries due to a lack of access to a healthy diet, including iron and other nutrients. Numerous physiological changes take place in the body during this phase, including a drop in blood hemoglobin levels and hormonal changes.

Even in healthy pregnant women, the level of hemoglobin drops due to an increase in the volume of circulating blood, which causes dilution (Paracha et al ,1997). There are numerous signs that show the connection between preterm birth, maternal anaemia from iron deficiency, and low birth weights, which may be caused by increased peripartum blood loss and placental abruption. There has thus been a general lack of consistency on the impact of maternal anaemia on pregnancy outcomes despite the increasing number of studies on this subject. The goal of this study, which was carried out in the Obstetrics department at Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia, was to assess the risks and outcomes of anaemia in pregnant women.

MATERIALS AND METHODS

This research on anaemia in pregnancy was done retrospectively between February 2021 and March 2022 at the Obstetrics Department of the Maternity and Children Hospital (MCH) Sakaka, Aljouf, Saudi Arabia. This study included 485 pregnant women who received prenatal care from the beginning of their pregnancy through delivery. Age, body mass index (BMI), and singleton pregnancy, history of abortion or ectopic pregnancy were added as inclusion criteria. Our research excluded any chronic illness.

Selection of sample size: Previous studies indicated that 39% of pregnant women in Saudi Arabia had anaemia in 2022. This information was used to determine the sample size using the method below: where n is the sample size, Z is the level of confidence (two-sided 95% confidence interval), and P is the prevalence of anaemia from the prior study = 39% = precision (5%). 485 people were determined to be the bare minimum sample size required for the current investigation.

Data gathering: We collected the results for the maternal, fetal, and clinical factors. We also retrieve reports from laboratory tests that show the hemoglobin and blood hematocrit levels.

Data evaluation: The data were examined using the statistical tool for SPSS version 22. For pertinent variables, descriptive statistics were calculated. The comparison analysis was conducted using the chi-square test, and the level of significance was established at $p< 0.05$. Chi-square was used to examine the relationships between anaemia and sociodemographic features, clinical traits, and related risk factors.

RESULTS

The demographic characteristics of participants are shown in Table 1. Age participation was 2.8%, 17.5%, 28.4%, 32.5%, and 18.5% for ages 20, 20-24, 25- 29 and 30-34, respectively (p=0.000). While in primi and multi parity, there were 21.2%, 51.7%, and 8.6% detections (p=0.000). Primary, secondary, and higher education backgrounds were respectively 21.8%, 51.7%, and 26.3% (p=0.001). The occupation determined to be 50.4% employed, 49.7% unemployed, and there was no significant difference between them.

Table 1:
Demographic criteria of participants of our study.

	Variables	Number (n=485) %	P values
Age (years)	Less 20	14 (2.8)	0.000
	20-24	85 (17.5)	
	25-29	138 (28.4)	
	30-34	158 (32.5)	
	Over 34	90 (18.5)	
Parity	0	103 (21.2)	0.000
	1-4	340 (70.1)	
	≥5	42 (8.6)	
Educational background	Primary	106(21.8)	0.001
	Secondary	251(51.7)	
	Higher	128(26.3)	
	Occupation		
	Employed	241(49.6)	-
	Unemployed	244(50.3)	

Table 2 shows the clinical characteristic that was available for all subjects. 58.3%, 18.3%, and 22.2% of the participants had anaemia in the first, second, and third trimesters,

respectively (p 0.001). The birth interval ranged between 73.6% and 26.3% less than and over 2 years (p=0.000) respectively. Out of 485 pregnant women, 29.8% had abortions or ectopic pregnancies due to anaemia (p = 0.000). BMI, socioeconomic status, and fever are among significant variables (p=0.000).

Table 2:
Clinical characteristic of all participants.

	Variables	Total number (n-485) %	P values
Trimester	First	283 (58.3)	0.001
	Second	89(18.3)	
	Third	108 (22.2)	
Pregnancy interval	Less than 2 years	357(73.6)	0.000
	More than 2 years	128(26.3)	
Abortion / Ectopic pregnancy	Yes	145(29.8)	
	No	340(70.1)	
BMI	< 18.5	8(1.6)	0.000
	18.5-24.9	149(30.7)	
	25.0-29.9	306(63)	
	≥30	22(4.5)	
Socioeconomic class	Low	165 (34)	0.000
	Middle	239(49.2)	
	High	81(16.7)	
Fever	Yes	145(29.8)	
	No	340(70.1)	

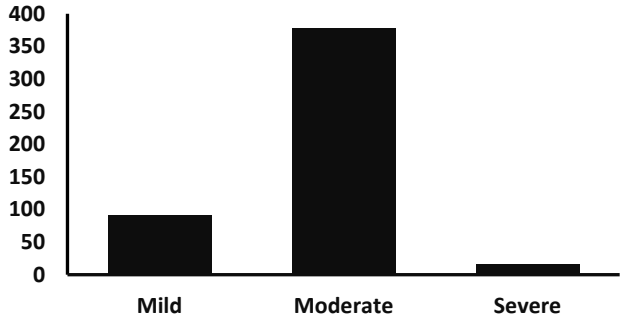

Figure 1:
Severity of anaemia present among all pregnant women

All pregnant women's anaemia severity is depicted in Table 3 and Figure 1; it is 18.7%, 77.9%, and 3.2% for mild, moderate, and severe anaemia, respectively, with a significant difference between them of p=0.001.

Our findings established the blood hematological values for every pregnant woman with anaemia (Table 3).

Table 3:
blood hematological study among all pregnant women.

Name of investigation	Mean stander deviation
Hb,g/dl	7.23 ± 2.15
HCT, %	54.75 ± 6.81
WBC count, ×109	5.77 ± 4.89
PLT count, ×109	357.69 ± 138.81
MCV, FL	68.26 ± 10.63
MCH, pg	25.10 ± 3.55
MCHC, g/dL	29.75 ± 10.33

Table 4:
Multivariate analysis for associated risk factors with anaemia.

Variables	Odds	P value	95% (CI)
Fever	0.5	0.01	0.4-0.6
Para 0	1.5	0.22	0.7-2.7
1-4	2.2	0.71	0.7-2.6
Over 4	1.3	0.41	0.5-3.0
Middle social class	0.5	0.16	0.4-1.9
Upper social class	0.2	0.00	0.3-0.5

Table 4 showed the results of a multivariate analysis of the risk variables for anaemia in pregnancy. Anaemia and the history of fever in the pregnant woman were found to be significantly correlated by multivariate analysis (OR = 0.5; p=0.01; 95% CI = 0.4-0.6), para0,1-4, over4 (OR 1.5, p=0.22,95% Cl 0.7-2.7, OR 2.2;p=0.71; 95%Cl 0.7-2.6, OR 1.3;p=0.41.95% Cl 0.5-3.0) and upper and middle social classes (OR 0.2;p=0.00,95%Cl 0.3-0.5 and OR 0.5;p=0.16;95%Cl 0.4-1.9).

Table 5:
Assessment of pregnancy outcomes among all pregnant women.

Factors	Numbers (n=340) %
Normal growth	173 (50.8)
Intrauterine growth restriction (IUGR)	23 (6.7)
Fetal destress	39 (14.4)
Premature delivery	44 (12.9)
Low birth weight baby (LBWB)	37 (10.8)
Cardiac anomaly	1 (0.2)
Neonatal Admission NICU	23 (6.7)

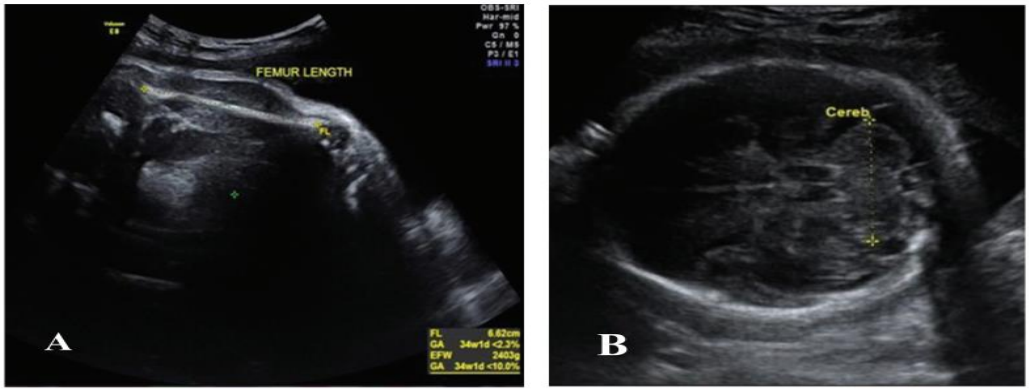

Plate 1
(A) Image from an ultrasound showing the FL measurement, which is 34w1d. (B) An ultrasound scan displaying the measurement of TCD for 37w0d. IUGR was suggested by the difference between the mean gestational age determined by LMP and ultrasonography, which was 35w3d (*Singh et al*, 2022).

According to our findings, there were 24.4% abortions and 50.8% cases of normal fetal growth. IUGR, or fetal destress, was present in 6.7%, 14.4%, 12.9%, 10.8%, 0.2%, and 6.7% of cases. Table 5 shows the prevalence of premature birth, LBWB, cardiac abnormality, and neonatal hospitalization to the neonatal intensive care unit (NICU), accordingly.

DISCUSSION

We are aware of no prior studies on anaemia in pregnancy in Aljouf, Saudi Arabia. For pregnant women, anaemia continues to be a significant medical condition with high rates of morbidity and mortality. Anaemia can have negative effects such as preterm labor, pre-eclampsia, heart failure, intrauterine death, risk of developing anaemia in infancy, intrauterine growth retardation, and improper mental development in the infant if it is left misdiagnosed and untreated. In the current study, we assessed anaemia in pregnancy. Of the 485 pregnant women who were diagnosed with anaemia, we found that mild anaemia affected 18.7% of them, moderate anaemia affected 77.9%, and severe anaemia affected 3.2% of them. While anaemia was more prevalent (32.5%) in the 30–34 age range, similar findings from other studies were also noted (Munjal Pandya1 *et al*, 2022). However, another study found that due to the average age for childbearing, over 63% of pregnant women had anaemia (Manoj *et al*, 2019). Our study also revealed that anaemia in pregnancy was present in 21.2%, 70.1%, and 8.6% of primiparous and multiparous women. In our study, 21.8%, 51.7%, and 26.43% had elementary, secondary, and higher education backgrounds, respectively.

Anaemia in higher education indicates that these individuals have education but lack understanding of the importance of food during pregnancy. We demonstrated that the period between births was 73.6% less than two years, and since replacing the body's iron takes about two years; a shortage of time could lead to anaemia in pregnancy. It was previously stated that 57.2% of pregnancies ended with births within 2 years (Klebanoff, 1989). In our study, the first, third, and second trimesters had the highest rates of anaemia in pregnancy—58.3%, 22.2%, and 18.3%, respectively. Our findings revealed the presence of the IUGR, 6.7% LBWB, 10.8%, fetal destress, 0.2%, and normal fetal growth at 50.8%. we presented the normal fetal and IUWR in figure 2. Our research thus identifies the anaemia in pregnancy that ultimately lowers maternal and newborn morbidity and mortality.

In conclusion, health problems with anaemia during pregnancy in Aljouf, Saudi Arabia. Demographic variables are crucial in the development of anaemia. Significant correlations exist between anaemia during pregnancy and higher parity, middle and lower socioeconomic position, birth intervals of less than two years, and excess body weight. prenatal and neonatal complications, including IUGR, LBWB, heart anomalies, and fetal stress, are associated with anaemia in pregnant women. Baby was also brought to the NICU because of a serious ailment. Therefore, encouraging antenatal checkups, educating about iron supplement intake, promoting a nutritious diet, maintaining good hygiene, and providing appropriate counseling about birth spacing and contraception use should all be recommended in order to prevent anaemia.t.

REFERENCES

Ababiya T & Gabriel T (2014). Prevalence of Anaemia Among Pregnant in Ethiopia and Its Management: A Review. Department of Pharmaceutics and Social Pharmacy Haramaya University Harar Ethiopia. I*nter Res J of Pharm* 5(10).

Baig-Ansari N, Badruddin SH, Karmaliani R*et al* (2008). Anaemia prevalence and risk factors in pregnant women in an urban area of Pakistan. *Food and Nutr Bull* 29(2): 132-139.

Chaparro CM, Suchdev PS (2019). Anaemia epidemiology, pathophysiology, and etiology in low- and middle-income countries. *Ann N Y Acad Sci*, 1450:15-31.

Rahman MM, Abe SK, Rahman MS, *et al* (2016). Maternal anaemia and risk of adverse birth and health outcomes in low- and middle-income countries: systematic review and meta-analysis. *Am J Clin Nutr.* 103(2):495-504. doi:10.3945/ajcn.115 .107896.

Stephen G, Mgongo M, Hussein Hashim T, *et al* (2018). Anaemia in pregnancy: prevalence, risk factors, and adverse perinatal outcomes in northern Tanzania. *Anaemia*. (9):1-9.

Bull BS, Lichtman MA, Beutler B, *et al* (2006). Morphology of the Erythron, In WJ Williams (Ed), Williams Haematology, McGraw-Hill, USA. 369-385.

Azubuike Uma Inya , Amaechi Peter Achara , Aloysius Obinna kwuka *et al* (2023). *European Journal of Preventive Medicine*. 11(2): 21-31.

Huch R (1992). The critical hemoglobin/hematocrit value in obstetrics]. Beitr Infusionsther. 30:228-34.

Kumar KJ, Asha N, Murthy DS, Sujatha M, *et al* (2013). Maternal anaemia in various trimesters and its effect on newborn weight and maturity: an observational study. *Int J Prev Med*. 4:193-9.

World Health Organization (2015). The Global Prevalence of Anaemia in 2011. World Health Organization.

Mohammed YG, Emmanuel AU (2013). The pattern of anaemia in Northern Nigerian Women. *Journal of Medicine and Medical Sciences.* 4 (8): 319-323.

World Health Organization (1992). The prevalence of anaemia in women: A tabulation of available information. WHO/MCH/MSM/92.22nd edition.

Brabin BJ, Premji Z, Verhoeff F (2001). An analysis of anaemia and child mortality. Journal of Nutrition. 132: 636S-645S.

Paracha PI, Hameed A, Simon J, Jamil A & Nawab G (1997). Prevalence of Anaemia in Semi-Urban Areas of Peshawar, Pakistan-A Challenge for Health Professionals and Policy Makers. *Pak J Med Assoc* 47: 49-53.

Singh J, Thukral CL, Singh P, *et al* (2022). Utility of sonographic transcerebellar diameter in the assessment of gestational age in normal and intrauterine growth-retarded fetuses. *Niger J Clin Pract* .25:167-72.

Munjal Pandya, Janki Pandya, Gira Dabhi *et al* (2022). A retrospective study of prevalence of anaemia in pregnancy at tertiary care hospital, Ahmedabad. *National Journal of Physiology, Pharmacy and Pharmacology*. | Vol 12 | Issue 07.

Manoj K, Raza A (2019). Study of prevalence of anaemia in pregnant woman attending in tertiary care hospital at A.N.M.C.H., Gaya, Bihar. *J Med Sci Clin Res* .7:384-87.

Klebanoff MA, Shiono PH, Berendes HW, *et al* (1989). Facts and artifacts about anaemia and preterm delivery. JAMA. 262:511-5.