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A Four Years Review of Prevalence of Maternal Anemia in Prince Ali Ebn Al Hussein Military Hospital in Al Karak South of Jordan 2020-2024

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Abstract | **Original Research Article**

Background: Maternal anemia is one of the major public health issues and a common complication of pregnancy worldwide, mainly in low- and middle-income communities. It has a significant association with poor maternal and neonatal outcomes. Limited studies reported the severity and associated factors of maternal anemia in southern Jordan. ***Objective:*** To study the severity of maternal anemia for pregnant women seeking antenatal care at Prince Ali Bin Al-Hussein Military Hospital in Al Karak, south of Jordan. ***Methods:*** This cross-sectional study was conducted among pregnant females diagnosed with anemia during routine antenatal care. Data were collected using a structured questionnaire including sociodemographic data, antenatal booking time, dietary habits, and iron and multivitamin supplements use. Hemoglobin level was measured during antenatal visits, and anemia severity was classified according to World Health Organization criteria. Data were analyzed using frequencies for descriptive statistics, independent t-tests was used to identify significant mean differences of Hemoglobin level between different groups, and Pearson correlation analysis to identify Hemoglobin level correlation with several variables. ***Results:*** A total of 154 anemic pregnant women were included. Most cases were had mild (49.4%) to moderate anemia (48.7%), The mean hemoglobin level was 9.77 ± 1.0 g/dL. Late antenatal booking was detected in 77.3% of participants, and only 46.8% were adherent to iron and multivitamin treatment. Pregnant women who used supplements had significantly higher hemoglobin levels compared with non-users (10.5 ± 0.83 vs. 9.0 ± 0.85 g/dL; $p < 0.001$). Hemoglobin level had a strong significant negative correlation with lack of supplement use ($r = -0.717$, $p < 0.001$) and a weak significant positive correlation with educational level ($r = 0.163$, $p = 0.03$). ***Conclusion:*** Maternal anemia is common among pregnant women receiving antenatal care in southern Jordan, with most cases diagnosed with mild to moderate anemia. Late antenatal booking and poor compliance with supplementation were common. Early antenatal care, routine screening, and improved adherence to iron supplementation are significant to lessen the problem of maternal anemia and bad pregnancy outcomes.

Keywords: Maternal anemia; Pregnancy; Antenatal care; Iron supplementation; Jordan.

INTRODUCTION

Anemia is one of the most widespread medical conditions come across pregnancy and remains a major public health concern worldwide. The Royal College of Obstetricians and Gynaecologists (RCOG) defines anemia in pregnancy as a hemoglobin concentration less than11 g/dL in the first and third trimesters and less than10 g/dL in the second trimester, reflecting physiological hemodilution related to plasma volume expansion during pregnancy [1].

Anemia in pregnancy is multifactorial in origin; however, approximately 50–70% of cases related to iron deficiency anemia. Added conducive factors include folate and vitamin B12 deficiencies, inadequate dietary intake, short interpregnancy intervals, and chronic medical diseases [3]. The increased iron demands of pregnancy—mainly during the second and third trimesters—regularly exceed dietary intake, rendering pregnant women especially vulnerable to iron deficiency anemia.

Maternal anemia is associated with a wide-ranging of adverse maternal and neonatal outcomes. Previous studies have confirmed strong associations between anemia in pregnancy and low birth weight, preterm delivery, stillbirth, and increased neonatal

morbidity and mortality [5,8]. From the maternal perspective, anemia is related to increased risks of preeclampsia, antepartum hemorrhage, postpartum hemorrhage, and the need for blood transfusion, subsequently contributing substantially to maternal morbidity [7,9].

According to the World Health Organization (WHO), anemia in pregnancy is defined as hemoglobin levels below 11 g/dL and is classified as mild (9.0–10.9 g/dL), moderate (7.0–8.9 g/dL), or severe (<7.0 g/dL) [1,2]. The severity of anemia often get worse with proceeding gestation due to increasing physiological demands combined with inadequate nutritional intake and delayed intervention.

Early antenatal booking, routine hemoglobin screening, timely beginning of iron, folic acid, and multivitamin supplementation, and good compliance are vital strategies for preventing progression of anemia during pregnancy. These interventions have been shown to reduce progression from mild to moderate or severe anemia and enhance maternal and neonatal outcomes [6,11].

Materials and Methods

Study Design and Setting

This study was conducted at the Department of Obstetrics and Gynaecology, Prince Ali Bin Al Hussein Military Hospital, in Al-Karak, southern Jordan. The hospital offers secondary and tertiary obstetric services and serves a large population from the surrounding governorates. Data were collected during routine antenatal care visits during the study period.

Study Population

Pregnant women who were attended the antenatal care clinic and diagnosed with low hemoglobin levels on routine screening were asked to participate in the study and referred to the dedicated anemia follow-up clinic.

Data Collection

General assessment using a standardized questionnaire was applied to study Participants in the anemia clinic. Consent form was gotten from the participant after explanation the study procedure and the study purpose by a senior obstetrics and gynecology resident to ensure accuracy and completeness of responses. The questionnaire data included maternal age, parity, gestational age at presentation, educational level, socioeconomic status, nutritional habits, use of iron and multivitamin supplements, timing of antenatal booking, family history of anemia, meal patterns, and prior obstetric history.

Laboratory Assessment

Venous blood samples were withdrawn by well-trained nurse, during routine antenatal visits and analyzed in the hospital laboratory to measure hemoglobin concentration. according hemoglobin levels, anemia severity was classified as mild, moderate, or severe according to WHO criteria [1]. Clinical and laboratory data were recorded and analyzed to determine the severity of anemia and to examine the associations between hemoglobin levels and potential risk factors, including supplement use, timing of booking, educational status, and socioeconomic indicators.

Data Handling and Analysis:

Data were cleaned and managed using SPSS VERSION 24, frequencies and means were used to descriptive data, independent t-test to identify means differences between groups according several variables and Pearson correlation analysis to test Hemoglobin level correlation with several variables.

Results

A total of 154 pregnant women diagnosed with anemia during antenatal care were included in the analysis. employed participants were (73.4%), women who had no formal education were (61.7%). Regular use of antenatal supplements, including iron and multivitamins, was reported by (46.8%) of participants. women with late antenatal booking were 77.3%. Regarding anemia severity, mild anemia (hemoglobin 10.0–10.9 g/dL) was observed in 49.4% of participants, and moderate anemia (7.0–9.9 g/dL) in 48.7%. Severe anemia (<7.0 g/dL) was detected in (0.6%). Two participants (1.3%) had hemoglobin levels ≥11 g/dL at assessment.

The mean gestational age for the participants was 7.73 months (SD ±1.6), ranging from 2 to 9 months. The mean hemoglobin concentration was 9.77 g/dL (SD ±1.0), with values ranging from 6.9 to 14.5 g/dL. Independent t-test analysis showed a statistically significant difference in mean hemoglobin levels between women who used supplements and those who did not. Supplement users had higher hemoglobin levels (10.5 ± 0.83 g/dL) compared with non-users (9.0 ± 0.85 g/dL; $p < 0.001$). No significant differences were observed in relation to booking time, educational level, or occupation ($p > 0.05$).

Pearson correlation analysis demonstrated a strong negative correlation between hemoglobin levels and lack of supplement use ($r = -0.717$, $p < 0.001$). A weak but statistically significant positive correlation was observed between hemoglobin concentration and educational level ($r = 0.163$, $p = 0.03$).

Table 1: Socio-demographic and antenatal characteristics of anemic pregnant women (N = 154)

Variable	Category	n	%
Occupation	Employed	113	73.4
	Unemployed	41	26.6
Education	Educated	95	38.3
	Not educated	59	61.7
Use of supplements	Yes	72	46.8
	No	82	53.2
Antenatal booking time	Early booking	35	22.7
	Late booking	119	77.3

Table 2: Distribution of anemia severity among the study population

Anemia classification (Hb g/dL)	n	%
Normal (≥11.0)	2	1.3
Mild (10.0–10.9)	76	49.4
Moderate (7.0–9.9)	75	48.7
Severe (<7.0)	1	0.6

Table 3: Descriptive statistics of gestational age and hemoglobin level

Variable	Mean	Minimum	Maximum	SD
Gestational age (months)	7.73	2	9	1.6
Hemoglobin (g/dL)	9.77	6.9	14.5	1.0

Table 4: Comparison of mean hemoglobin levels according to selected variables (t-test)

Variable	Category	Mean Hb (SD)	Mean difference	t-value	p-value
Supplement use	Yes	10.5 (0.83)	1.5	12.6	<0.001
	No	9.0 (0.85)			
Booking time	Early	9.9 (0.83)	0.2	1.1	>0.05
	Late	9.7 (1.0)			
Education	Yes	9.9 (0.9)	−0.36	−2.0	>0.05
	No	9.5 (1.0)			
Occupation	Employed	9.9 (0.96)	−0.2	−1.4	>0.05
	Unemployed	9.7 (1.0)			

Significance considered at $p < 0.05$.

Table 5: Pearson correlation between hemoglobin level and selected variables (N = 154)

Variable	Pearson's r	p-value
Supplement use	−0.717	<0.001
Educational level	0.163	0.03

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DISCUSSION

Maternal anemia remains a significant health problem among pregnant women getting antenatal care at Prince Ali Bin Al Hussein Military Hospital in southern Jordan. Most cases in this study were mild to moderate, with severe anemia being rare, a pattern consistent with global WHO reports representing that mild anemia accounts for roughly 14.1% and Moderate Anemia Accounts for approximately 9.3% of the global population across all ages. While Severe Anemia represents less than 1% of global cases. pregnant women worldwide are risk to anemia, mostly in its less severe forms [1,2,12].

The mean hemoglobin level of 9.77 g/dL links to moderate anemia and reflects a clinically relevant problem of iron deficiency. Similar results have been stated in low- and middle-income countries, where inadequate dietary intake, late antenatal booking, and poor adherence to supplementation contribute significantly to maternal anemia [3,4,].

The strong association between antenatal supplement use and better hemoglobin concentrations is the key finding of this study. Women who had good compliance to the iron and multivitamin supplements had significantly higher hemoglobin levels than non, constant with evidence from randomized trials and systematic reviews representing the effectiveness of prenatal iron supplementation in reducing maternal anemia and iron deficiency at term [5,6,13]. Despite

these profits, more than half of the women were not compliant with supplementation. Poor adherence is a commonly reported challenge and is often linked to gastrointestinal side effects, lacking of counseling, or late presentation to antenatal care [7]. These findings highlight the need for enhanced patient education and counseling to enhance supplements adherence.

Late antenatal booking was reported in this study. Although booking time was not statistically associated with hemoglobin levels, delayed clinic attendance limits early recognition and timely intervention. Early antenatal booking has been shown to reduce the development of anemia and improve maternal and neonatal outcomes [8,9].

The weak positive correlation between educational level and hemoglobin concentration suggests that education may indirectly impact maternal health through enhanced health-seeking behavior and adherence to supplementation, consistent with global findings [10]. The lack of association with occupation may imitate the relatively homogeneous socioeconomic background of women attending a military hospital.

Overall, these findings stress that maternal anemia is largely preventable through early antenatal care, routine screening, and consistent supplementation. Public health strategies concentrating on early booking, nutritional education, and adherence to iron therapy are essential to lessen anemia-related maternal and neonatal complications [6,8,11].

CONCLUSION

Maternal anemia remnants a major public health disorder among pregnant women attending antenatal care in southern Jordan. Mild to moderate were the most cases of maternal anemia. In this study, the importance of iron and multivitamin supplementation is stated, because a high negative correlation was found between poor adherence of supplement use and hemoglobin levels. Moreover, the high prevalence of late antenatal booking and poor compliance to supplementation underlines significant barriers to effective anemia management. Therefore, women should be encouraged to get early antenatal care, routine screening, and enhanced compliance with iron supplementation through better counseling and education to decreasing the problem of maternal anemia and its associated adverse pregnancy outcomes.

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