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ORIGINAL ARTICLE

Prevalence of anemia in pregnancy; a survey from gynecological clinics in Khyber Pakhtunkhwa Pakistan

Heema[1], Nabila Shams[2*], Maria Saleem[1], Faiza Rahman[2], Kausar Rehman Shinwari[1]

[1] Liaqat memorial hospital Kohat, [2] Rehman Medical College, Rehman Medical Institute, Peshawar

ABSTRACT

Background: This study aims to find the prevalence of anemia in pregnancy in district Kohat from three gynecological clinics.

Methods: This cross-sectional study was conducted from August 2024 to March 2025 at gynecological clinics of Kohat including Health Ways hospital, Liaqat Memorial hospital and Dr. Jamila Rehman gyne clinic Hangu. Total 600 pregnant women via convenient sampling were enrolled in the study prior proper consent. Demographic data were recorded on pre-designed proforma and 5cc blood was withdrawn for hemoglobin (HB) analysis. All the data were entered in SPSS. Descriptive statistics were applied to represent demographics of the participants. Chi-square test was applied to find the possible association between age, education status, pregnancy and iron supplementation with the development of anemia. P-value <0.05 was border line for significance.

Results: In our study the prevalence of anemia was 68% (Hb=<11gm/dl), in which 45% had mild anemia while 23% had moderate anemia and none of the women were presented with severe anemia. The mean age of 26 ± 3.5 years in which 210 (35%) were below 25 years and 390 (65%) were above 25 years of age. About 80% (480) participants were illiterate and rest had only primary education. High percentage of participants 500 (83.3%) were house wives. Majority of the participants 390 (65%) were having their first pregnancy and 420 (70%) were in their 3rd trimester. Furthermore, 252 (42%) women were having a history of taking supplements to improve anemia while rest were unaware. Increasing age, illiteracy, first pregnancy and no iron supplementation were significantly associated with the development of anemia in pregnant women with p-value <0.001.

Conclusion: There is high prevalence of anemia particularly in aged women, having first pregnancy, women with low education status, low socioeconomic status and women who does not take iron rich food or iron supplementations

Keywords: Anemia, Iron Deficiency Anemia, Pregnant Women, Prevalence Studies.

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Introduction

Anemia during pregnancy remains a serious public health problem around the world, especially in developing countries such as Pakistan. This is characterized by a lack of Hb in the blood, leading to a decrease in oxygen transport capacity and increased maternal harmful risks and fetal outcomes (1). Worldwide, anemia affects approximately 38% of pregnant women,

resulting in a higher prevalence in low-income regions based on factors such as nutritional defects, poor socioeconomic

CORRESPONDING AUTHOR
Dr. Nabila Shams
Senior Registrar, Rehman Medical College, Rehman Medical Institute, Peshawar
Email: nabila.shams@rmi.edu.pk

conditions, and limited access to health care (1, 2). According to a recent meta-analysis published in 2022, reported the prevalence of anemia in pregnancy 36.8%, with mild anemia as high as 70% (3). In Pakistan, according to a study in Lahore reported 57.7% prevalence in pregnant participants (4). During pregnancy, there is an increase demand of iron and other macro and micro nutrients that supports the growing fetus. Anemia readily occurs if a woman does not consume food rich in iron, folate or vitamin B12. The World Health Organization (WHO) defines anemia where the Hb levels in pregnant women below 11 g/dL and is classified into three sub-categories; mild anemia (Hb= 10-10.9gm/dl), moderate anemia (Hb= 9-9.9gm/dl) and severe anemia (Hb= <8gm/dl) (3). This indicates anemia and emphasizes its importance as a health indicator (5). Anemia during pregnancy can have serious consequences for both mothers and children, including premature birth, low birth weight, intrauterine growth retardation, and increased maternal death risk (6, 7). Furthermore, fetal well-being, such as an Apgar score, provides insight into neonatal health that can be impaired by maternal anemia (8).

Considering the importance of the effects of anemia on mothers and neonatal health (9), this study aims to assess the prevalence of anemia among pregnant women visiting a gynecological clinic in Kohat, Khyber Pakhtunkhwa Pakistan. There is very limited information on the prevalence of anemia, or very low sample was recruited. This study gives insight into the prevalence of anemia during pregnancy among patients visiting three gynecological clinics in Kohat Khyber Pakhtunkhwa.

Methods

This cross-sectional study was conducted from August 2024 to March 2025 at gynecological clinics of Kohat including Health Ways hospital, Liaqat Memorial Hospital and Dr. Jamila Rehman gyne clinic Muslim Abad. Ethical approval was obtained prior to study initiation from the Institutional Review Board, Health Ways hospital with approval letter no. KH/2024/045 dated 10-07-2024. A total of 600 pregnant women meeting the inclusion criteria were enrolled in the study. The sample size was calculated using OpenEpi (www.openepi.com) based on an estimated prevalence of anemia approximately 74.6% in Pakistan reported recently (10), with a 95% confidence interval and 80% power. The calculated sample size was 292; however, to achieve better picture, we enrolled 600 pregnant participants (200 from each hospital). Inclusion criteria encompassed women willing to participate and provide informed consent. Exclusion criteria included women with multiple pregnancies, or presence of comorbid conditions such as hypertension, diabetes mellitus, cardiovascular, renal, or hepatic diseases. Patients with active internal bleeding, a family history of hemoglobinopathies like thalassemia or sickle cell anemia, or infectious diseases such as malaria or hepatitis were also excluded to minimize confounding factors. The demographic characteristics were recorded on pre-designed proforma followed 5cc

blood sample collection from each participant using aseptic conditions. The blood tubes (EDTA) were readily transferred to the laboratory for Hb analysis. The patients were classified in to four groups. No anemia (Hb= >11gm/dl), mild anemia (Hb= 10-10.9gm/dl), moderate anemia (Hb= 9-9.9gm/dl) and severe anemia (Hb= <8gm/dl) (11).

Data were entered into SPSS version 26.0 for analysis. Numerical variables were expressed as mean and standard deviation while categorical variables were expressed in frequencies and percentages. The prevalence of anemia was calculated as the proportion of anemic pregnant women in the total sample. Independent sample t-tests compared mean differences between normal Hb group and anemic group. The significance level was set at $p<0.05$. Results were presented with tables and figures generated using MS Excel.

Results

This study enrolled 600 pregnant women with the mean age of 26 ± 3.5 years in which 210 (35%) were below 25 years and 390 (65%) were above 25 years of age. Total 80% (480) participants were illiterate and rest had only primary education. High percentage of participants 500 (83.3%) were house wives. Majority of the participants 390 (65%) were having their first pregnancy and 420 (70%) were in their 3rd trimester. Furthermore, 252 (42%) women were having a history of taking supplements to improve anemia while rest were unaware. Further details can be found in table 1.

Table 1: demographic characteristics of study participants

Variables	Total (N)	Percent (%)
Age (years)	26 ± 3.5	
<25	210	35
>25	390	65
Education level		
Illiterate	480	80
Primary	120	20
Occupation		
Housewife	500	83.3
Job	100	16.7
Pregnancy		
1st	395	65
2nd	205	35
Trimester		
1st	100	16.7
2nd	80	13.3
3rd	420	70
Gravidity		
Primi	360	60
Multi	240	40
Iron supplementation		
Yes	252	42
No	348	58

In our study the prevalence of anemia was 408 (68%) (Hb=<11gm/dl), in which 45% had mild anemia while 23% had moderate anemia and none of the women were presented with severe anemia which is graphically shown in figure 1.

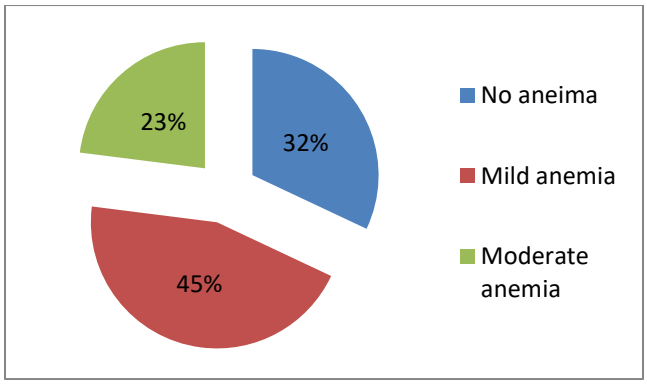

Figure 1: Prevalence of anemia in pregnancy (%)

To find the possible association between different study parameters with anemia, chi-square was applied. Increasing age, illiteracy, first pregnancy and no iron supplementation were significantly associated with the

development of anemia in pregnant women with p-value <0.001. Furthermore, the odds of developing anemia was greater in patients with age below 25 years, illiterate, having second pregnancy and with no iron supplementation. All the data are summarized in table 2.

Table 2: Association of different study parameters with anemia

Variables	Hemoglobin status		p-value	Odds ratio (95% CI)
Age (years)	Normal	Anemic		
<25	42	168	<0.001	2.5 (1.67-3.69)
>25	150	240		
Education status				
Illiterate	100	380	<0.001	12.4 (7.8-20.3)
Primary	92	28		
Pregnancy				
First	160	235	<0.001	3.6 (2.45-5.58)
Second	32	173		
Iron supplementation				
Yes	152	100	<0.001	11.7 (7.6-17.56)
No	40	308		

Discussion

Anemia during pregnancy remains a significant public health concern, particularly in low-resource settings like Kohat, Pakistan. The present study aimed to assess the prevalence of anemia among pregnant women attending gynecological clinics, with a particular focus on hemoglobin levels in relation to anemia severity and gestational age. The overall prevalence of anemia in our cohort was 68%, in which 45% had mild anemia and 23% had moderate anemia. Many reports published in the past to evaluate the prevalence of anemia in different ethnic groups. According to a systematic review by Rahman et al representing Malaysian women reported that the prevalence of anemia in pregnancy ranges from 19.3% to 57.4% (12). Similarly, another systematic review by Geta et al representing Ethopian women reported the prevalence of anemia to be 26.4% (13). Various studies have been published in Pakistan reporting variable prevalence of anemia in pregnancy. According to a study published by Anjum et al representing Faisalabad district shows 75% prevalence of anemia (5). Similar high prevalence of anemia was also reported by Irfan et al where the prevalence was 82.8% in Tehsil Banda Daud Shah, 64.3% in Takht-e-Nasrati and 55.7% in Karak Khyber Pakhtunkhwa (14). According to a recent meta-analysis published by Sehar et al representing Pakistani cohort shows the overall prevalence of anemia to be 54.9% (15). The highest prevalence in Pakistan was found in urban areas of Pakistan where Ansari et al reported the overall prevalence 90% in pregnancy (16). This high prevalence of anemia in pregnancy in Pakistani women is due to low socioeconomic status, decrease level of education and low intake of iron rich food as found in our study that increasing age, illiteracy, first pregnancy and no intake of iron supplements were significantly associated with increase prevalence of anemia with p-values <0.001. In consistent with our findings, a study published by Azmat et al also found significant association between education, socioeconomic status and occupation with anemia (4). Similar findings were also reported by Siddiqui et al which

shows strong association of demographics parameters with anemia in pregnancy (17). Khalid et al also reported strong association of age, socioeconomic burden, education status, and iron supplementation with the development of anemia in pregnancy (18). Our findings are consistent with regional data, indicating that anemia remains a widespread challenge that requires coordinated efforts to improve maternal and fetal health outcomes.

Conclusions

This study evaluates the prevalence of anemia in Kohat Khyber Pakhtunkhwa Pakistan. We found that anemia is very common in pregnancy particularly in aged women, having first pregnancy, women with low education status, low socioeconomic status and women who does not take iron rich food or iron supplementations.

Future recommendations

Iron supplementation programs at district levels needs to be initiated. Furthermore, awareness programs regarding the iron rich foods particularly in areas where literacy rate is very low and where most of the women are housewives to limit adverse outcomes to both mother and fetus.

Study limitations

This study focuses only patients from Kohat Khyber Pakhtunkhwa. Multiple centers across Khyber Pakhtunkhwa or across Pakistan should come in liaison for such prevalence studies to know the exact prevalence of a disease.

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Data acquisition, analysis and interpretation	H, NS, MS, FR
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All the authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed.