| RESEARCH ARTICLE

A Study on the Prevalence of Anemia in Pregnant Women and Its Relationship with Blood Groups in Kunduz City

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ABSTRACT

Anemia is a common issue at various stages of women's lives, particularly during pregnancy. This condition refers to a state in which the capacity of transporting oxygen is reduced; this occurs due to a decrease in the number of red blood cells or decrease in level of hemoglobin.T his study aims to determine the prevalence of Anemia in pregnant women and the significance of relationship between blood groups and Anemia. This research is a survey study that examined 727 pregnant women. The studied population includes all pregnant women visiting health centers in Kunduz city. Sampling was conducted randomly, with samples selected randomly from each healthcare center. The pregnant women included in the study are aged between 16 and 48 years. In completing the designated checklist, the patients' characteristics, including age, blood group, hemoglobin level, Rh factor, number of children (both girls and boys), age at marriage, and intervals between breeding are recorded. The data was entered into SPSS 27 software to analyze the prevalence of Anemia and significance of blood groups. The results of this study indicate that the average hemoglobin level in pregnant women is 10.42 grams, with a maximum of 14 grams and a minimum of 4.7 grams. More than 65% of pregnant women in Kunduz province suffer from Anemia. The highest prevalence of Anemia is observed among the Arab and Turkmen ethnic groups. The average age at marriage for the patients is 21 years, and the average interval between breeding is 1.1 years, with a maximum number of children being 8 and a minimum of 1. Additionally, 87.2% of blood groups have a positive Rh factor, while 12.8% are Rh negative. The results indicate that more than half of pregnant women in Kunduz province suffer from Anemia, which in total it makes 65.2%. Furthermore, there is no significant relationship between blood groups and Anemia.

| KEYWORDS:

Anemia, Blood Group, Relationship, Pregnant Women, Kunduz City

Introduction

Anemia is a common issue during pregnancy worldwide, with significant short-term and long-term effects. Anemia is a condition in which the capacity of transporting oxygen is diminished due to a decrease in the number of red blood cells or a reduction in hemoglobin levels. According to a report from the World Health Organization, Anemia affects 1.62 milliard people globally, constituting approximately 24.8 percent of the population (Shan, Jan, Thaker, et al., 2022). Among the most common causes of Anemia are nutritional deficiencies, particularly of iron, folate, vitamin B12, and vitamin A. Additionally, non-nutritional deficiencies, such as Hemoglobinopathies, Malaria, and Tuberculosis, are also included (Akidagi, Pana, 2023). Several factors can lead to Anemia during pregnancy, including multiple pregnancies, short intervals between pregnancies, and nutritional deficiencies which are the primary reasons for Anemia, particularly iron deficiency Anemia (Mohammed, Aboubakr, Kumar, et al., 2024).Some studies have shown that inadequate nutrition, a history of chronic diseases, and limited access to healthcare services are significantly associated with the prevalence of anemia during pregnancy. (Saadi Abbas, 2020) Anemia has various types, one of them which is iron deficiency Anemia. The World Health Organization defines Anemia as a hemoglobin level below 13 grams per deciliter for men over 15 years old and below 12 grams per deciliter for non-pregnant women over 15 years old (Akidagi, Pana, 2023). However,

during pregnancy, Anemia is defined as a hemoglobin concentration of less than 11 grams per deciliter or a hematocrit of less than 33 percent (Abdallah, John, Hancy, et al., 2022). Anemia has negative effects on the health of both the mother and the child. A higher risk of maternal and neonatal mortality is associated with severe Anemia (Shan, Jan, Thaker, et al., 2022). Pregnant women with Anemia may be at higher risk for miscarriage, premature delivery, premature rupture of membranes, postpartum hemorrhage, and maternal mortality. Infants whose mothers suffer from Anemia may be at risk for low birth weight, congenital defects, perinatal death, and lower cognitive ability (Pusporini, Salmah, Wahyu, et al., 2021). The ABO blood group system was discovered by Karl Landsteiner in 1900, and the Rh system was identified by Landsteiner and Alexander Wiener in 1940. The International Society of Blood Transfusion (ISBT) has recently identified 43 blood group systems, including 345 red blood cell antigens. In addition to their vital role in hematologic diseases, blood transfusion, and immunology, blood group systems are also associated with various other conditions; for instance, women with blood type O are more likely to suffer from Anemia than others (Mohammed, Aboubakr, Kumar, et al., 2024). Additionally, blood group O is associated with an increased prevalence of infections such as Cholera, Measles, and Tuberculosis. Blood group A is linked to a higher incidence of Pseudomonas aeruginosa infections, while blood group B is associated with an increased risk of Gonorrhea, Tuberculosis, E. coli infections, Pneumonia, and Salmonella infections. Blood group AB is linked to a higher prevalence of E. coli and Salmonella infections (Cendal, Olejaik, 2021). Additionally, research has indicated that individuals with blood type A are at a higher risk of cardiovascular diseases, blood type O is linked to a reduced risk of certain types of cancers, and blood type B is associated with an increased risk of specific infections (Abegaz, 2021) Some studies have investigated the relationship between maternal ABO blood groups and pregnancy complications, including Preeclampsia and related disorders (such as Eclampsia, Hemolysis, Elevated liver enzymes, Anemia, intrauterine growth restriction, venous thromboembolism, postpartum hemorrhage, and gestational diabetes) (Framchini, Mengoli, Lippi, 2016).

Since there has been no research conducted on the prevalence of Anemia among pregnant women in Kunduz city and accurate statistics are not available, this study can provide more precise data on the prevalence of Anemia and its relationship with blood groups. This research aims to achieve two main objectives: to determine the prevalence of Anemia among pregnant women in Kunduz city and to explore the relationship between Anemia and blood groups. Specifically, how prevalent is Anemia among pregnant women in Kunduz, and what is the relationship between Anemia and blood groups? The results of this study will provide valuable information for the treatment and prevention of Anemia issues among pregnant women and the relationship with blood groups.

Materials and Methods

This research is a survey study, which examined 727 pregnant women. The target population includes all pregnant women visiting health centers in Kunduz city, including Kunduz Provincial Hospital (400 beds), Al-Biruni Clinic, Al-Shafa Clinic, Niyazi Clinic, Sina Waez Clinic, and Omran Khan Clinic. Sampling for this study was conducted randomly, with samples from each health center being selected randomly among pregnant women aged between 16 and 48 years.

In completing the designated checklist, patients' characteristics such as age, blood group, hemoglobin level, Rh factor, number of children (girls and boys), age at marriage, and interval between breeding were recorded. The women who visited the centers belonged to different ethnic groups, including Tajik, Pashton, Uzbek, Hazara, Turkmen, and Arab. At the health centers' laboratories, after determining the hemoglobin levels and blood groups of the pregnant women, the above characteristics were documented. The data were first entered into Excel and then coded into SPSS software. A Normality test was also conducted to verify the accuracy of the data. Using SPSS27, the analysis was performed to achieve the predetermined objective, which is to determine the significance level, prevalence, and frequency of Anemia in relation to blood groups.

Table 1 shows the number of blood groups in different ethnicities of pregnant women.

The number of blood groups in different ethnicities of pregnant women					
Total	O	AB	B	A	Variable
304	83	35	79	107	Pashton
268	61	25	81	101	Tajik
93	24	5	29	35	Uzbek
21	4	1	5	11	Hazara
4	1	0	1	2	Arab
37	14	4	8	11	Turkmen

Table 2 shows the number of anemic and normal pregnant women.

The number of normal and anemic individuals			
Total	Anemic	Normal	Variable
267	179	88	A
203	132	71	B
70	37	33	AB
167	126	61	O
636	416	220	City
91	58	33	Village

Results

The results indicate that the average hemoglobin level in pregnant women is 10.42 grams, with a maximum of 14 grams and a minimum of 4.7 grams, which indicates Anemia. The highest percentage of Anemia is found in pregnant women with blood group O, followed by those with blood group AB. Among the different ethnic groups, the lowest hemoglobin levels were observed in the Arab ethnic group, followed by the Turkmen, indicating that Anemia is more prevalent in the Arab and Turkmen groups compared to others.

The frequency of blood group A is higher than that of the other blood groups in pregnant women, with 36.7% having blood group A and the lowest being blood group AB at 9.6%. The average age at marriage is 21 years, with a maximum of 28 years and a minimum of 16 years, indicating that most women marry at the age of 21 or older. The majority of visitors to health centers are Pashton, while the fewest visitors belong to the Arab ethnic group. Among the visitors, 87.2% have a positive Rh factor.

Out of all variables, only two—interval between breeding and number of children—were found to be related to Anemia, while the other variables showed no significant correlation with Anemia. It is noteworthy that 87.5% of surveyed pregnant women were urban residents, while the remaining 12.5% were rural residents.

Table 3 shows the number of normal and anemic individuals in different ethnicities.

The number of normal and anemic individuals in different ethnicities					
Total	Anemic	Normal	Rh-	Rh+	Variable
304	191	113	263	41	Pashton
268	172	96	235	33	Tajik
93	65	28	12	81	Uzbek
37	27	10	5	32	Turkmen
21	15	6	1	20	Hazara
4	4	0	1	3	Arab

Table 4 shows the average and the relationship of the mentioned variables with Anemia.

The average and the relationship of the variables with Anemia.				
P-value	Median	Maximum	Minimum	Variable
0,734	28 years old	48 years old	16 years old	Age
0,507	City	City	Village	Residence
0,139	A	A	AB	Blood types
0,307	Positive	Positive	Negative	Rh Factor
0,139	10,4254	14	4,70	Hemoglobin level
0,004	3	14	Pregnant	Number of children

0,0034	1.1 year	23 year	1 year	Interval between breeding
0,626	21 years old	28 years old	16 years old	Marriage age
0,385	Pashton	Pashton	Arab	Ethnicity
0,172	1	7	1	Number of girl
0,396	1	8	1	Number of boy

Discussion

Anemia is a condition in which the concentration of hemoglobin in the blood is lower than the normal level based on age and gender. It is important to note that Anemia is not a disease itself; rather, it is a sign or symptom of an underlying condition. The World Health Organization's criteria for Anemia are less than 13 grams per deciliter in men and less than 12 grams per deciliter in women. These criteria vary based on age, gender, and pregnancy status in women (Saxena, Chamoli, & Batra, 2018). A hemoglobin concentration of less than 11 grams per deciliter or a hematocrit level of less than 33 percent indicates Anemia (Abdallah, John, Hancy, et al., 2022). Globally, the prevalence of Anemia among women in the age group of 15 to 49 years is 29% (Kumar& Rani, 2017). The prevalence of Anemia in pregnant women due to iron deficiency is reported to be 70% in India and 13.6% in Germany (lr, 2002). In Iran, there is no precise information available on the prevalence of Anemia in pregnant women due to iron deficiency; however, in one study, it was reported to be 33% among pregnant women (f, 2003)). The results indicate that the prevalence of Anemia or iron deficiency in the villages of Pakistan is 90.5%. The prevalence of anemia among pregnant women in Sudan is estimated to be around 50%, with the most common types being iron deficiency anemia and vitamin B12 deficiency anemia (Adam & Ibrahim, 2018). (Ansari & Jehan, 2008). And in pregnant women in Bandar Abbas, the prevalence is 13.6% (Barooti, 2010). The prevalence of Anemia in pregnant women is 22.5% in Jahrom and 8.6% in Iran (f, 2003). Anemia and its prevalence in pregnant women are influenced by factors such as living environment, age, number of pregnancies, ethnicity, and type of diet (f, 2003)). The relationship between blood groups and various diseases has been a topic of interest for many researchers to date. Numerous studies have examined the correlation between blood groups and diseases such as infectious diseases, hematological disorders, cancers, and autoimmune diseases (Muñiz-Diaz, 2021). The current study shows that 65.2% of pregnant women in Kunduz city suffer from Anemia. According to the results, 87.5% of the pregnant women who visited health facilities were urban residents, while 12.5% were from rural areas. The average hemoglobin level in pregnant women in Kunduz city is 10.42 grams, with a maximum of 14 grams and a minimum of 4.7 grams, indicating that more than half of the pregnant women are anemic. No similar study has focused exclusively on pregnant women and included indicators of ethnicity and the relationship between blood groups as markers of Anemia in Afghanistan, particularly in Kunduz province. Some studies have shown that the consumption of other essential nutrients and their deficiencies, such as folate, are associated with preterm birth or neural tube defects, and most of them have a significant relationship with folate intake (San Khoo, & Fischer, 2018). The relationship between blood groups and various diseases has been a topic of interest for many researchers to date. Numerous studies have examined the correlation between blood groups and diseases such as infectious diseases, Hematological disorders, Cancers, and Autoimmune diseases (Muñiz-Diaz, 2021). A study conducted in India indicates that blood group B has the highest prevalence of Anemia, followed by blood groups O, AB, and A (Akidagi, Zeynep; 2023). This study, aims at examining the prevalence of Anemia among pregnant women in Kunduz city and its relationship with blood groups, was conducted on 727 pregnant women. The individuals were divided into two groups, anemic and normal, based on their hemoglobin levels. As a result of the statistical analyses, the sensitivity to Anemia for those visiting health centers was evaluated based on their blood groups. The results indicate that Anemia does not have a significant relationship with blood groups; however, the variables of the number of children and the intervals between births have a significant impact on Anemia. The first related study on blood groups in Turkey was conducted in 1918, where blood groups of 6,982 individuals were examined, and it was found that 39.99% of these individuals had blood group A, 28.26% had blood group O, 17.09% had blood group B, and 14.66% had blood group AB. It was also determined that 89.49% of the participants had the Rh+ blood factor, while 10.51% had the Rh- blood factor. Research in the United States shows that the distribution of blood groups in the American population is as follows: 46.70% blood group O, 37.10% blood group A, 12.10% blood group B, and 4.10% blood group AB. The distribution in the United Arab Emirates is similar to that of the United States, with 46.63% blood group O, 41.78% blood group A, 8.56% blood group B, and 3.04% blood group AB. Conversely, a study in Greece showed a similar blood group distribution of Turkey, with the most common blood groups being 48.9% blood group A, 34.21% blood group O, 12.04% blood group B, and 5.56% blood group AB. A study in India showed a different distribution of blood groups, introducing B, O, A, and AB as the most common groups (Akidagi & Dana, 2023). In the current study, the blood groups among pregnant women were found to be 36.7% A, 27.9% B, 9.6% AB, and 25.7% O, with the highest prevalence of Anemia in blood group O, followed by AB; however, 87.2% of the blood groups were Rh positive, and 12.8% were Rh negative.

Conclusion

The results of this study indicate that, from perspective of plenty, individuals with blood group O are the most prevalent, followed by blood group A, when compared to other blood groups from perspective of Anemia. Regarding ethnicity, Arabs are more likely to be anemic than other ethnic groups, followed by Turkmen. The average hemoglobin level in all individuals visiting health centers was 10.42 grams, and the Anemia rate among pregnant women in Kunduz city is 65.2%, meaning more than half of pregnant women in Kunduz province are affected by Anemia. Data analysis shows that Anemia does not have a significant relationship with blood groups, with a P-value greater than 0.05 (P = 0.139). However, the variables of interval between breeding and number of children have a significant relationship with Anemia.

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