Frequency of Beta Thalassemia in Anemic Pregnant Women

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Authors' contributions

This work was carried out in collaboration among all authors. Author Khadija and SPA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors YMA and SOA managed the analyses of the study. Authors TA and AA managed the literature searches. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Objective: To determine the frequency of beta thalassemia trait among pregnant women presenting with anemia.
Method: A cross sectional study was conducted in Gynecology & Obstetric department, district headquarters hospital Mardan from January 2019 to June 2020. This study includes all pregnant women who presented with anemia and having age 15 to 45 years. Patients with known hemoglobinopathies were excluded from the study. Collected data was analyzed using SPSS 20.
Results: Mean age of the patient was 27.7 years and mean hemoglobin level was 8.7g/dl. Age distributions showed mother age 15 to 25 years were 40%, 26 to 36 years were 35% and 36 to 45

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years were 25%. Thalassemia trait was found in 40% anemic pregnant women. Thalassemia trait percentage was high in mother having age 15 to 25 years.

Conclusion: Beta thalassemia trait is a common cause anemia in pregnancy. All pregnant women presenting with anemia should be investigated for it.

1. INTRODUCTION

Anemia has been defined as hemoglobin level of less than 11 g/dl by world health organization [1]. Anemia during pregnancy is reported to be 12 to 25% and adversely affect the outcome of pregnancy [2,3]. Thalassemia trait and Iron deficiency anemia are the most common reported causes of anemia during pregnancy [4]. Thalassemia is a genetic disorder which results in defective hemoglobin synthesis. Thalassemia is common in Mediterranean counties and high prevalence in Pakistan is due to consensual marriages [5]. Thalassemia has 2 major types, alpha and beta. Beta thalassemia is mainly due to defective synthesis of beta chain and results in imperfect hemoglobin production [6]. Numerous sign and symptoms are here to detect the condition of anemia during pregnancy including fatigue, weakness, fade coloring, irregular heartbeat, difficulty in breathing, hypoxia, dizziness, chest pain, hands and feet become cold and severe headache. Homozygous mutation presents with thalassemia major and heterozygous mutation in the gene lead to thalassemia trait. Thalassemia major patient presents with severe anemia and they require regular blood transfusion with chelating agents. Thalassemia major is health burden and this can be prevented by proper screening and knowing the carries stat [7]. People with thalassemia have an increased risk of infection. This is especially true if the spleen has been removed. The spleen aids in fighting infection and filters unwanted material, such as old or damaged blood cells. Thalassemia is often accompanied by the destruction of a large number of red blood cells and the task of removing these cells causes the spleen to enlarge. Splenomegaly can make anemia worse, and it can reduce the life of transfused red blood cells. Severe enlargement of the spleen may necessitate its removal. Patient with thalassemia trait presents with micro-cytic hypochromic anemia but not of clinical importance [8]. Hemo-dilution in pregnancy leads to physiologic anemia and thalassemia trait may worsen this situation.1-7% population in Pakistan are in the carrier state of thalassemia trait [9].Lack of screening facilities and high rate of consensual marriage in the society are the main reason behind high transmission rate of thalassemia in Pakistan [10]. Intrauterine growth retardation, preterm labor and low birth weight is being reported to be associated with anemia in pregnancy [11]. The outcome of pregnancy is largely associated with pregnant women is not being affected by thalassemia trait. In the current study, we analyzed data of all pregnant women who presented with anemia, in order to determine the frequency of beta thalassemia trait and outcome of pregnancy. There are different risk factors associated with anemic condition during pregnancy as females had greater menstrual flow before pregnancy; sometime concurrent pregnancies means after very short period of delivery females become pregnant. Morning sickness, continuous vomiting during gestational period are also risk factors. Female that has allergic reaction with nutritional items that contain Iron contents in huge quantity and the major risk factor is concern is giving birth to twins in single delivery.

2. MATERIALS AND METHODS

A Cross sectional study was conducted in the department of Obstetrics and Gynecology, district headquarters hospital Mardan from January 2019 to June 2020. This study includes 140 patients who presented with the complaint of anemia having a hemoglobin level below 10g/dl in 1st trimester and age between 15 to 45 years. Patients who are diagnosed cases of other hemoglobinopathies were excluded from the study. Approval was taken from the hospital ethical approval committee prior to conduct a study. Data was collected using a predesigned proforma, which includes patient demographics, hemoglobin level, Hb electrophoresis. The collected data were revised, tabulated, coded and fed in PC having statistical analysis program SPSS-20. Statistical analysis was carried out using SPSS-20. Data was presented and suitable analysis was carried out according to the type of data. Mean and standard deviation was calculated for numerical data like age and Hb level while frequency and percentages were

calculated for categorical data like thalassemia trait, age groups. Chi square test was used for categorical data like age groups and thalassemia traits.

3. RESULTS

Our study includes 140 patients with mean age of 27.74 Years±5.16.Mean hemoglobin level was 8.7 mg/dl ± 0.83. Age of the patient was analyzed in categories, 56 patients (40%) were in range of 15 to 25 years, 49 patients (35%) were in range of 26 to 35 years and 35 patients (25%) were in range of 36 to 45 years. Beta thalassemia trait was recorded in 60 patients (42.9%). Beta thalassemia trait was cross tabulated with age of the mother as shown in Table 1.

Females belong to numerous remote areas so they were unable to follow the protocols as described by the physician and their nutritional level was also inadequate to overcome the problem of anemic condition during pregnancies. Residential status of reported females is mentioned in Table 3.

Females, which were included in the study, had appeared in the hospital with different sign and symptoms and the frequency of such indication are mentioned in Table 4.

Table 1. Age in categories * Beta Thalassemia trait Cross-tabulation

			Beta Thalassemia trait		Total	P value
			Yes	No		
Age in categories	15 to 25 years	Count	27	29	56	
		% within Age incategories	48.2%	51.8%	100.0%	
		% within Beta Thalassemia trait	45.0%	36.2%	40.0%	
	26 to 35 years	Count	22	27	49	
		% within Age in categories	44.9%	55.1%	100.0%	0.05
		% within Beta Thalassemia trait	36.7%	33.8%	35.0%	
	36 to 45 years	Count	11	24	35	
		% within Age in categories	31.4%	68.6%	100.0%	
		% within Beta Thalassemia trait	18.3%	30.0%	25.0%	
Total		Count	60	80	140	
		% within Age in categories	42.9%	57.1%	100.0%	
		% within Beta Thalassemia trait	100.0%	100.0%	100.0%	

Table 2. Level of hemoglobin among patients

Level of hemoglobin	Number	Frequency
Mild	61	43.57%
Moderate	55	39.28%
Severe	24	17.14%

Table 3. Area wise distribution of study group

Area of residency	Number	Frequency
RURAL	96	68.57%
URBAN	44	31.42%

Table 4. Sign and symptoms of females appeared in hospital

Sign and symptoms	Number	Frequency
Fade color	33	23.57%
Yellowish eyes	76	54.28%
Hypoxia	12	8.57%
Breathing difficulty	19	13.57%

4. DISCUSSION

Anemia in pregnancy has certain effect on outcome and unfortunately common in this part of the world. Beta thalassemia trait is one of the leading causes of anemia during pregnancy [12]. In developing countries like Pakistan this poses a significant health burden. Carrier rate in the world is 5 to 7% while in Pakistan reported carrier rate is up to 18% [13,14]. Hemoglobin electrophoresis and other hematological parameters are used to reach diagnosis of thalassemia trait [15]. Mean age of the patient as reported in different studies varies from 20 to 35 years while mean hemoglobin level was 7 to 10 gm/dl [16]. In our study the mean hemoglobin level of pregnant women was 8.7 gm/dl ± 0.83 and mean age was 27.7 years. Age of the patient has been correlated with anemia in pregnancy with most common reported age is 25 to 30 years. A study reported that 46.9% patient with anemia in pregnancy were in the age range of 21 to 30 years. This same study reported the mean age of 27 years which is same as in current study [17].Current study showed that most of the mother had age between 15 to 25 years and thalassemia trait percentage was also high in this age group.

Anemia in pregnancy has effect on outcome and several studies showed association with worse outcome. Most of the thalassemia traits are diagnosed during workup for anemia during pregnancy [18]. Current study showed 42% pregnant women who presented with anemia were diagnosed as thalassemia trait. An international literature review showed thalassemia trait percentage in the range of 10 to 15% while study conducted locally has reported thalassemia trait as high a 56% [19,20]. Thalassemia rate is high in this region. High rate of cousin's marriages led to accumulation of defective gene.

5. CONCLUSION

Our study concluded that beta thalassemia trait is among one of the common causes of anemia in pregnancy and recommend screening of all pregnant women presenting with hemoglobin level below 10 g/dl.

CONSENT

It is not applicable.

ETHICAL APPROVAL

Approval was taken from the hospital ethical approval committee prior to conduct a study. Data was collected using a predesigned proforma, which includes patient demographics, hemoglobin level, Hb electrophoresis.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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