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Epidemiology of thalassemia in Baghdad, Iraq: A Single Center Experience

Hussein.O. Kready[1*], Mohammed mohammed[2], Abdullah Salim Al-Karawi[3], Tareq Jafaar Al-Jindeel[4]

Al-Hadi University College, Dept. of Medical Laboratory Technolgies, Baghdad, Iraq[1,2,3,4]

Corresponding Author: 1*

ABSTRACT— Thalassemia is the most common hemoglobin disorder in the world including in Iraq. Population migration and intermarriage between different ethnic groups have had a major impact on disease epidemiology. This retrospective study was conducted in the Thalassemia Care Center of Ibn- Al-Baladi General Hospital, Baghdad from January 2017 to December 2020. The aim was to observe the prevalence and spectrum of thalassemia as well as demographic and social factors of thalassemia patients. Data were analyzed both manually and by SPSS-26. The mean age of patients was from 1 - 40 years (± 3.66). Near about half of patients (50%) were diagnosed at the age of 1-10 years. The majority of patients belonged to the lower middle class, with male predominance (52.8%). The percentage of β thalassemia major was the highest (64.6%) followed by β thalassemia intermedia (21.3%) and sickle cell disease (7.9%) and alpha-thalassemia (6.3%). Male predominance was found in every type of thalassemia. A nationwide screening program should be carried out to address the carrier status of the population at risk. There may be further analysis regarding the clinical diversity of thalassemia.

KEYWORDS: Thalassemia; Socio-demographics; Pattern of thalassemia; β-Thalassemia; Beta Thalassemia; Alpha Thalassemia; α-Thalassemia

1. INTRODUCTION

Globally, thalassemia is the most common hereditary hemoglobinopathy and occurs in 4.4/10,000 live births [1]. In the developing world, the majority of patients die before the age of 20 years. The prevalence of thalassemia had increased from 33.5/100,000 in 2010 to 37.1/100,000 in 2015, while the incidence rate had decreased from 72.4/100,000 live births to 34.6/100,000 live births between 2010 and 2015. β-Thalassemia major (β-TM) represented 73.9% of all types of thalassemia. About 66.0% of patients were under 15 years old; 78.8% were offspring of parents who were related, and 55.9% had at least one complication. Respectively, 13.5 and 0.4% of thalassemia patients were infected with hepatitis C virus (HCV) and hepatitis B virus (HBV) at some point in their lives. No patients were infected with the human immune deficiency virus (HIV) [2]. Thalassemia is a genetic disorder characterized by decreased hemoglobin production resulting in ineffective erythropoiesis. It is the most common type of hereditary anemia registered in Iraq in 16 thalassemic centers in 2015 [1], [2]. Both males and females are equally affected by thalassemia and this disorder occurs in approximately 4.4/10,000 live births. Also, it was estimated that the prevalence of beta-thalassemia carrier state is 1.5% in the general population. In Iraq, there is little data on the epidemiology and burden of thalassemia. The total number of registered thalassemia patients was 11,165 representing 66.3% of all registered hereditary anemias in these centers [2]. Thalassemic patients are susceptible to many complications, like marked hepatosplenomegaly, which occurs due to excessive red cell destruction. (25.8% of the patients in Iraq have splenomegaly, and 4.4% of them have hepatomegaly), extramedullary hematopoiesis, iron overload, osteoporosis in (67.5% of the patients in Iraq) and osteopenia in (9.4% of the patients in Iraq). In a study done in 2015, 66.4% of

thalassemia patients were under 15 years with splenomegaly and growth retardation representing the most frequent complications. Thalassemia represents a great burden. In Iraq, a report from the Federal Board of Supreme Audit in 2016 revealed that the cost of management of each patient is 1428.00-3785.00 US$/month. In the Arabian region, high proportions of consanguineous marriages have resulted in a high incidence of genetically based disorders, particularly autosomal recessive ones, and thalassemia is one of them [3], [4]. Thalassemia is a preventable disease, and many countries had succeeded in its prevention through a comprehensive approach starting from spreading knowledge and awareness and developing a program to control the disease through premarital investigation and antenatal detection with therapeutic abortion [5- 7]. As awareness is critical in prevention, it needs assessment to identify its level among the general population as well as students from the medical field because some studies showed that even the medical field required more education about the disease prevention methods. [4] the present study aims to assess the demographics profile as well as the cumulative number of thalassemic patients in one of the thalassemia centers in Baghdad by which we can provide information to health authorities regarding the spectrum and other related messages to take necessary steps, and there is little data available in Iraq about this subject.

The objectives of this study were to determine the prevalence, incidence, and trends of thalassemia patients in Iraq.

2. Material and Methods

This study was a retrospective one. All thalassemia patients registered in the accessible Ibn-Al-Baladi thalassemia centers in Baghdad from 2017 until December 2020, were included. Data were acquired from patients' files and the center's registries.

Overall, 254 thalassemia patients were assessed and information was recorded. Collected data were analyzed using SPSS version 26 software and expressed as mean ± SD, demographic and clinical features of the study participants were summarized using descriptive statistics.

3. Results

During the study period, 254 thalassemia patients were identified. Among these patients, 134 (52.8%) were males and 120 (47.2%) were females [Table 1]. Data depicted in table-2 demonstrated the thalassemia types in all the 254 patients. The number of patients with beta-thalassemia intermedia were 54 (21.3 %) compared to those with beta-thalassemia major which were 164 (64.6%). The number and percent of patients with α-Thalassemia were 16 (6.3 %) whereas those diagnosed with sickle cell were 20 (7.9%). In tables 3, and 4, of the total 254 patients, 128 (50.8 %) were diagnosed with thalassemia between 1-10 years, 72 (28.7%) between 11 and 25years, 52 (20.5%) between 26 and 40 years. Tables 3, and 4 show also the genders, age limit, and type of thalassemia of subjects. Of the total 254 patients, most had a positive sibling history.

4. Discussion

The prevalence of thalassemia in Iraq is slightly increasing despite decreasing incidence. These results are in agreement with those shown [2] Screening for carriers, and intensified premarital screening and counseling programs, coupled with strong legislation can help in further decreasing the incidence rate. In this study, we assessed the patients diagnosed with thalassemia according to their demographic and type of thalassemia profiles.

In this study, 254 patients 134(52.8%) males and 120 (47.2%) females] were enrolled.

Similar results were also reported earlier by many investigators [8- 10]. Which showed the prevalence of 65.5%, 56%, and 62.1%, respectively. The current study also indicates that thalassemia is more common in males than in females because the parents give more attention to their male child and are ready to spend more money on a male child compared to a female one. We found that most of the patients 218 (85.9%) were diagnosed with b-thalassemia irrespective of their age [Table 2]. A similar result was reported [11] and also supported by an earlier study conducted by [12]. The study finding shows a higher number of thalassemia patients come to thalassemia centers for regular blood transfusion and for treatment of other medical conditions, and it is necessary to take it as a public health problem because thalassemia causes a huge psychological and financial drain on patients and their families. Thalassemia patients and their parents require life-long psychological support for the prevention of mental health issues. Several effective psychological strategies are available. Cognitive-behavioral family therapy, which is capable of increasing compliance to treatment, lessening the emotional burden of disease, and improving the quality of life of caregivers, can be an effective psychological approach for patients with b-thalassemia major [13]. To improve the situation, public education about thalassemia is of great importance and should be imparted through periodic meetings addressed to health professionals including doctors and nurses working in the community and family members. This fatal disease can be prevented by taking measures such as premarital screening, genetic counseling, and prenatal diagnosis; identifying silent carriers, and counseling them to avoid marriages between them. This study is the first of its kind in the setting of central India, and the results of this study will lead to increased awareness about different aspects of thalassemia.

5. References

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Table-1: Thalassemic patients grouped by their gender

		Frequency	Percent	Difference	*P*-value
Valid	Male	134	52.8	5.6 %	>0.05
	Female	120	47.2		
	Age	14.20 ± 11.198			
	Total	254	100.0		

Table-2: Thalassemia types in the examined patients

		Frequency	Percent	Valid Percent
Valid	β-Thalassemia intermedia	54	21.3	21.3
	β-Thalassemia major	164	64.6	64.6
	α-Thalassemia	16	6.3	6.3
	sickle cell	20	7.9	7.9
	Total	254	100.0	100.0

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Table-3: Number and gender of Thalassemic patients arranged by the age ranges.

			Male		Female	
Age category	No.	%	No.	%	No.	%
<10 Years old	130	50.8	66	26	64	25.2
11-25 Years old	72	28.7	47	18.5	25	9.8
26-40 Years old	52	20.5	21	8.3	31	12.2
Total	254	100	134	52.8	120	47.2

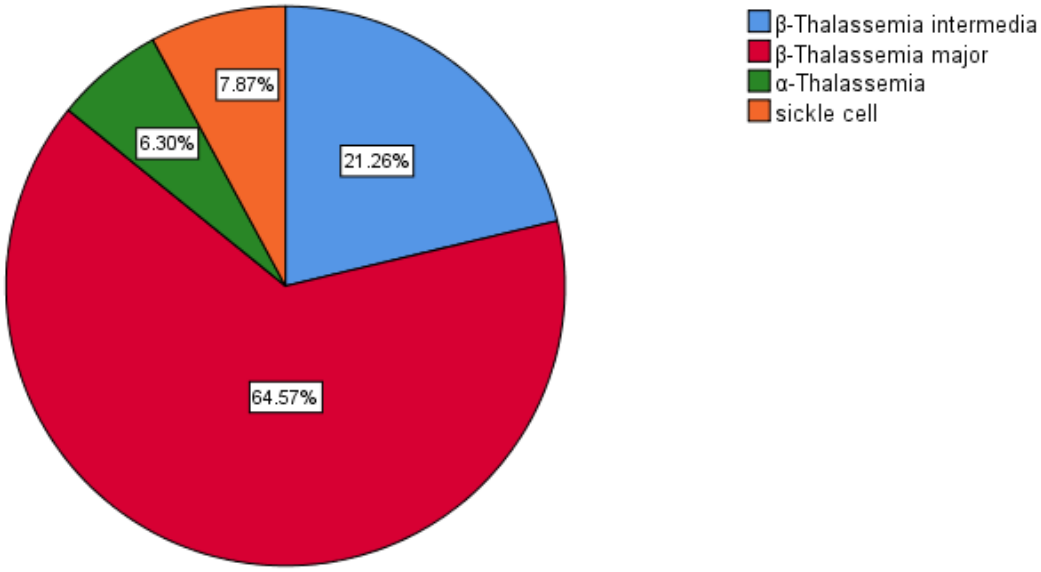

Figure 1. Total number of patients and their percentages; Significant differences were found in β-Thalassemia major patients.

Table-4: Types of Thalassemia grouped according to their Age ranges.

Age category	β-Thalassemia intermedia		β-Thalassemia major		α-Thalassemia		sickle cell	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Age <10	28	11	82	32.3	9	3.5	11	4.3
Age 11-25	12	4.8	50	19.7	3	1.2	7	2.8
Age 26-40	14	5.5	32	12.6	4	1.6	2	0.8
Total	54	21.3	164	64.6	16	6.3	20	7.9