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RESEARCH ARTICLE

Clinico-Epidemiological Study of Thalassemia in Wasit Governorate

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Abstract

Background: Globally, thalassemia is the most common genetic hemoglobin disorder. In the developing world, the majority of patients die before the age of 20 years. Objective: To determine the prevalence of thalassemia and different Clinico-epidemiological factors associated with thalassemic patients in Wassit governorate Subjects and Methods: A cross sectional study conducted at thalassemia center in Al-Kut hospital for Gynecology obstetrics and pediatric in Wasit governorate, included 425 patients, the data collection continued for the period of five months stating on 1st of March 2019 to 30th of July 2019. Results: The prevalence of thalassemia was 34.45% of the total patient attending Al-Kut Hospital for Gynecology Obstetrics and pediatrics during the period of the study with a mean ±SD age of patients 14.71±8.5years. Most cases from beta thalassemia, and major genotype regarding the genotype of thalassemia and clinical characteristics highly significant association were found between genotype and age of onset, age at first transfusion, frequency of blood transfusion, and regular blood transfusion. Regarding the complications of thalassemia higher percentage of study sample were iron overload, splenomegaly , protrusion of facial bones and teeth, (89.9%, 83.1%, 55.5%) respectively, while the lower percentage were visual impairments, hepatitis B, AIDS (5.6 %, 0.9%, 0.2%) respectively. Conclusion: The prevalence of thalassemia was 34.45% of the total patient attending Al-Kut Hospital for Gynecology Obstetrics and pediatrics during the period of the study Most cases from beta thalassemia, and major genotype significant association were found between genotype and age of onset, age at first transfusion, frequency of blood transfusion, and regular blood transfusion Recommendations: We recommend a comprehensive medical examination on the identification of pre-marital hemoglobin electrophoresis to enhance genetic counseling and to help reduce the transmission of these genetic diseases among generations, and use of the system-centered risk stratification model in order to individualize patient treatment for each.

Keywords: *Thalassemia, Hemoglobinopathies, Iraq, Prevalence, Wasit.*

Introduction

Thalassemia syndromes are caused by inherited blood disorder that decrease the synthesis of either alpha or beta globin chains of hemoglobin, Imbalance in globin chain synthesis results in anemia, red cell hemolysis, and tissue hypoxia [1].

Thalassemia can be broadly characterized, as α- or ß-thalassemia depending on the defective globin chain, and on the underlying molecular defects [2].Clinically, thalassemia displays a wide spectrum of phenotypes ranging from asymptomatic to lethal. According to the clinical severity, thalassemia is generally divided into three groups: (I) Thalassemia trait; they are carriers who are often asymptomatic, and do not need any treatment. (II) Thalassemia intermedia (TI); they have moderate anemia (Hb 60e100 g/L), and occasionally need red blood cell transfusion in a-thalassemia, it is known as Hb H disease. (III) Thalassemia major (TM); they have serious anemia and need blood transfusions for survival.

In alpha-thalassemia, this clinical form was named Hb Bart's hydrops fetalis, the fetus usually dies in utero, or shortly after birth. In general, the latter two groups are defined as thalassemia patients. The common symptoms of these patients include pallor, jaundice, splenomegaly, and skeletal deformities [3].

The epidemiology of thalassemia is highly prevalent in an area extending from sub-Saharan Africa through the Mediterranean region, and Middle East, to the Indian subcontinent, and east and southeast Asia. [4]. In Iraq, thalassemia is the evident health problem, specifically in Basrah governorate located in the southern part of the country and followed by Dohuk governorate lies midway between Iran, Turkey and Syria, countries also characterized by a relatively high frequency of thalassemia, the disease prevalence in Iraq is reinforced by the high rate of consanguineous marriages in the region [5].

There are several complications that a Thalassemia child faces during the lifetime due to the pathophysiology of the disease, and these complications cardiomyopathy, endocrinopathies and infections are more prevalent in the patients. These disease-related complications are believed to be associated with transfusion-related iron loading in patients [6].

Objective of the Study

To determine the prevalence of thalassemia and different Clinico-epidemiological factors associated with thalassemic patients in Wassit governorate

Subjects and Methods

Study Design: Across-sectional study.

Duration of the Study

The data collection continued for the period of five months stating on 1st of March 2019 to the 30th of July 2019.

Place of Study

This study was performed in the thalassemia center in Al-Kut hospital for Gynecology obstetrics and pediatrics in Wassit governorate.

Inclusion and Exclusion Criteria

Inclusion Criteria

All thalassemic patients attending to thalassemia center in Al-Kut hospital for Gynecology obstetrics and pediatrics from Wassit governorate.

Exclusion Criteria

Thalassemic patients attending to thalassemia center in other hospitals outside Wassit governorate andthalassemic patients attending to thalassemia center in Al-Kut hospital for Gynecology obstetrics and pediatrics in Wassit governorate from other governorates.

Statistical Data Analysis

Analysis of data was carried out using the available statistical package of SPSS-25 (Statistical Packages for Social Sciences-version 25). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values).The significance of difference of different means (quantitative data) were tested using Students-t-test for difference between two independent means or ANOVA test for difference among more than two independent means.

The significance of difference of different percentages (qualitative data) was tested using Pearson Chi-square test (χ^2-test) with application of Yate's correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

Results

Table 1: The distribution of study sample according to demographic characteristic

Demographic characteristics	No	100%
Marital status		
Child	192	45.18
Single	213	50.12
Married	18	4.24
Divorced	2	0.47
Residence		
Urban	316	71.06
Rural	109	28.00
Education level		
Preschool (<6y)	62	14.6
Illiterate	65	15.3
Read and write	34	8.0
Primary school	160	37.6
Secondary school	50	11.8
High education	30	7.1
Diploma	6	1.4

College & higher	18	4.2
Family income		
Saving	112	26.35
Not saving	313	73.65
Body mass index (BMI)		
Thin (<18.5)	237	55.76
Normal (18.5-24.9)	171	40.24
Overweight (25-29.9)	15	3.53
Obese (>30)	2	0.47
Total	**425**	**100**

Regarding the marital status most cases (50.12%) were single and they were revealed that (71.06%) of patients were living in urban area. and the highest percentage of education level for patient were primary school student (37.6%).About family income the majority of cases (73.65%) from not saving family. And the highest percentage (55.76%) of body mass index (BMI) for patient were thin (>18.5)

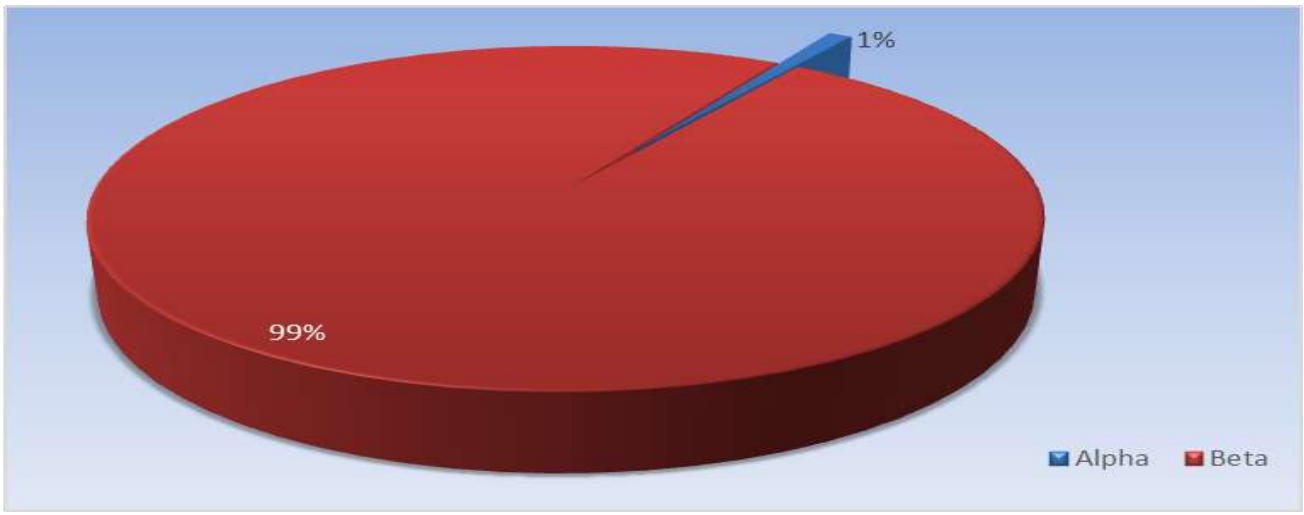

Figure 1: The distribution of the study sample according to type of thalassemia

Most cases of the study sample were from beta thalassemia (99%) and lower percentage (1%) from alpha thalassemia.

Table 2: Distribution of the study sample according to genotype of thalassemia and clinical characteristics of thalassemia

Clinical characteristics of thalassemia		Major		Intermediate		Total		
		No	%	No	%	No	%	P value
Age of onset (month)	**<6m**	89	28.08	6	5.56	95	22.35	0.0001*
	6---	156	49.21	6	5.56	162	38.12	
	12---	38	11.99	12	11.11	50	11.76	
	18---	7	2.21	4	3.70	11	2.59	
	24---	13	4.10	12	11.11	25	5.88	
	36---	12	3.79	25	23.15	37	8.71	
	48---	2	0.63	11	10.19	13	3.06	
	≥60m	0	0.00	32	29.63	32	7.53	
Age at first transfusion (month)	**<6m**	89	28.08	4	3.70	93	21.88	0.0001*
	6---	154	48.58	6	5.56	160	37.65	
	12---	36	11.36	12	11.11	48	11.29	
	18---	7	2.21	4	3.70	11	2.59	
	24---	17	5.36	12	11.11	29	6.82	
	36---	12	3.79	19	17.59	31	7.29	
	48---	0	.00	10	9.26	10	2.35	
	≥60m	2	0.63	41	37.96	43	10.12	
Frequency of blood transfusion (times/year)	**<5 T/y**	4	1.26	12	11.11	16	3.76	0.0001*
	5---9	2	0.63	12	11.11	14	3.29	
	10---14	16	5.05	22	20.37	38	8.94	
	15---19	96	30.28	36	33.33	132	31.06	
	20---24	5	1.58	2	1.85	7	1.65	

	25—29	166	52.37	18	16.67	184	43.29	
	≥30 T/y	28	8.83	6	5.56	34	8.00	
Splenectomy	**Yes**	45	14.20	24	22.22	69	16.24	0.051
	No	272	85.80	84	77.78	356	83.76	
Blood transfusion treatment	**Regularly**	223	70.35	53	49.07	276	64.94	0.0001*
	Irregularly	94	29.65	55	50.93	149	35.06	
Problem of blood transfusion	**No problem**	122	38.49	49	45.37	171	40.24	0.484
	Headache & back pain	51	16.09	15	13.89	66	15.53	
	Itching & rash	80	25.24	28	25.93	108	25.41	
	Shivering	64	20.19	16	14.81	80	18.82	

Regarding the genotype of thalassemia and clinical characteristics of thalassemia highly significant association was found between to genotype and age at onset, age at first transfusion, frequency of blood transfusion, and regular blood transfusion

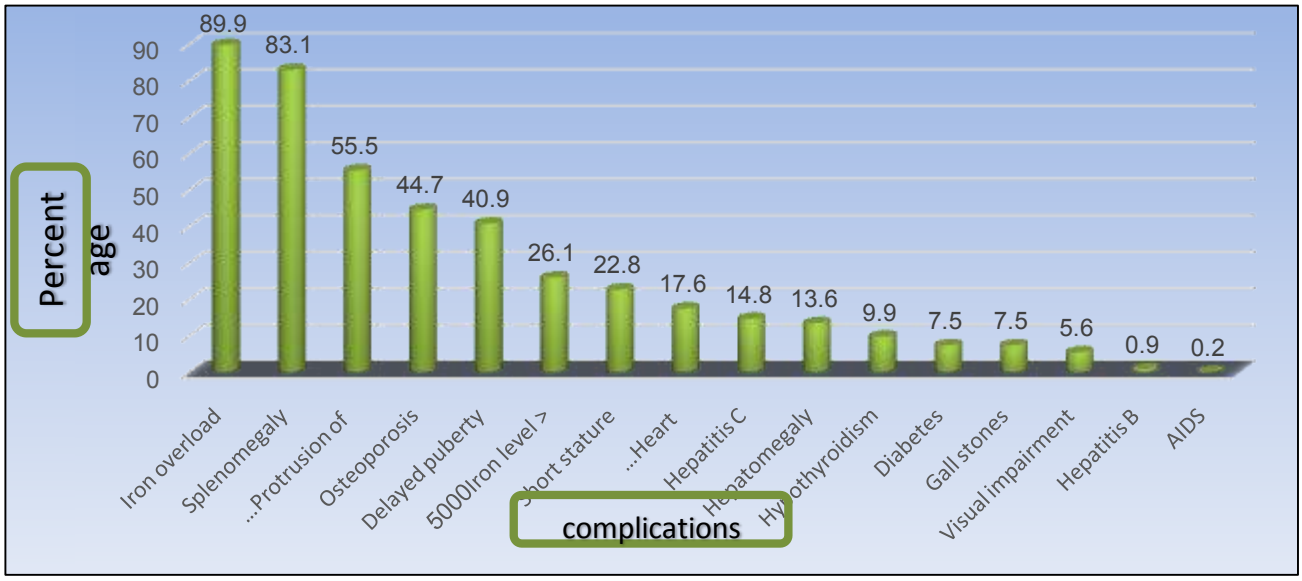

Figure 2: The distribution of the study sample according to complications of thalassemia

Regarding the complications of thalassemia study the higher percentage of study sample were in iron overload, splenomegaly, protrusion of facial bones and teeth, (89.9%, 83.1%, 55.5%) respectively, while the lower percentage were visual impairments, hepatitis B, AIDS (5.6 %, 0.9%, 0.2%) respectively.

Table 3: Distribution of the study sample according to genotype of thalassemia and iron chelation agent

		Major		**Intermediate**		**Total**		
		No	**%**	**No**	**%**	**No**	**%**	**P value**
Type of iron chelation therapy	**Deferasirox (DXF)**	233	73.50	76	70.37	309	72.71	0.0001*
	Deferoxamine (DFO)	60	18.93	8	7.41	68	16.00	
	DXF & DFO	2	0.63	0	0.00	2	0.47	
	No chelation therapy	22	6.94	24	22.22	46	10.82	
	Total	317	100.00	108	100.00	425	100.00	
Route of chelation therapy use	**Oral**	233	78.98	76	90.48	309	81.53	0.040*
	Intravenous	7	2.37	2	2.38	9	2.37	
	Subcutaneous	55	18.64	6	7.14	61	16.09	
Number of doses/week	**0**	30	10.17	6	7.14	36	9.50	0.360
	1	2	0.68	0	0.00	2	0.53	
	2	22	7.46	4	4.76	26	6.86	
	3	19	6.44	10	11.90	29	7.65	
	4	14	4.75	6	7.14	20	5.28	
	5	22	7.46	5	5.95	27	7.12	
	6	10	3.39	6	7.14	16	4.22	
	7	176	59.66	47	55.95	223	58.84	

Side effect of chelation therapy	**Yes**	18	6.79	1	1.28	19	5.54	0.061
	No	247	93.21	77	98.72	324	94.46	

Regarding the genotype of thalassemia and iron chelation agent significant association was found between genotype and type of iron chelation therapy, and route of chelation therapy use

Discussion

The current study showed that the prevalence of thalassemia was 34.45% of the total patient attending in Al-Kut Hospital for Gynecology Obstetrics and pediatrics during the period of the study. Which differe from other reported studies [7, 8, 9, 10]. The true prevalence of thalassemia among general population cannot be extrapolated from this study because the sample is considered as a convenient sample which is subjected a selection bias and does not represent the total thalassemia in the community.

The study found that most of the patients with thalassemia after exclusion of children and adolescent age group showed low percentage of marriage (4.24%) this because they refuse to marry or the family refuse to be engaged to avoid get diseased children this agree with [11] (2.7%) were married and (14%) in adult Iranian patients [12].Most of the sample (71.06%) were from urban area, this result is similar to what had been reported by Alkinani, *et.al.,* [11] in their study in the same governorate in which they found that (64.1%) of their sample were living in urban area, also Joseph *et.al.,* [13] in their study in India in which they found that (81.4%) were living in urban area.

Regarding the type of thalassemia, this study showed higher percentage (99%) were beta thalassemia, while lower percentage (1%) was alpha thalassemia. This results agree with other reported study in Iraq [5, 15].This may be due to alpha-thalassemia is prevalent in tropical and subtropical world regions where malaria was and still is epidemic, but as a consequence of the recent massive population migrations, alpha-thalassemia has become a relatively common clinical problem in North America, North Europe, and Australia [16].

While Beta-thalassemia is prevalent in Mediterranean countries, the Middle East, Central Asia, India, Southern China, and the Far East as well as countries along the north coast of Africa and in South America [17].The study showed highly-significant association regarding the age at onset and type of thalassemia which is consistent with [18]. Regarding age of onset showed the higher percentages (38.12%) of the sample obtained were at 6 months of disease.

This result agree with Abdul-Jalil 2011 in Iraq [19] who found that higher percentages were at up to one year of age of onset disease. This may be because the parents were more aware about their children when first discover the disease. The study showed highly-significant association regarding the age at first transfusion and type of thalassemia which is consistent with other reported study [19, 20]. This difference may t reflect the severity of disease and different strategy in treatment. Regarding the complications of thalassemia, this study showed higher percentage (89.9%) were iron overload.

This result is similar to other reported study [21]. The progressive iron overload in Beta thalassemia is the consequence of ineffective erythropoiesis, increased gastrointestinal absorption of iron, lack of physiologic mechanism for excreting excess iron, and above all multiple blood transfusions. A unit of red blood cells transfused contains approximately 250 mg of iron, while the body cannot excrete more than 1 mg of iron per day. [23].Regarding the protrusion of facial bones and teeth, the present study showed high percentage (55.5%). This result agree with Al Shemmari 2005 in Ramadi [24] and Al-Azawi 2005 [25].

Highly-significant association regarding the type of iron chelation and type of thalassemia, most cases were deferasirox (DXF) used from TM type are the higher percentage (73.50%) of the study sample. This result agree with [15] in their study were (91.6%) of TM used deferasirox (DXF), and disagree with Chuncharunee *et.al.,* 2019 [26].In their study in Thailand where the higher percentage (47.3%) in deferiprone type from TM patient. This difference may be due to using other types of iron chelation.

Conclusion

The prevalence of thalassemia was 34.45% of the total patient attending Al-Kut Hospital

for Gynecology Obstetrics and pediatrics during the period of the study Most cases from beta thalassemia, and major genotype significant association were found between genotype and age of onset, age at first transfusion, frequency of blood transfusion, and regular blood transfusion.

Recommendations

We recommend a comprehensive medical examination on the identification of pre-marital hemoglobin electrophoresis to enhance genetic counseling and to help reduce the transmission of these genetic diseases among generations, and use of the system-centered risk stratification model in order to individualize patient treatment for each complication.

References

1. Verhovsek MM, Chui DHK (2018) The Thalassemia Syndromes. Anemia, 48.
2. Brancaleoni V, Di Pierro E, Motta I, Cappellini MD (2016) Laboratory diagnosis of thalassemia. Int. J. Lab. Hematol., 38: 32-40.
3. Shang X, Xu X (2017) Update in the genetics of thalassemia: what clinicians need to know. Best Pract Res Clin Obstet. Gynaecol., 39: 3-15.
4. Taher AT, Weatherall DJ, Cappellini MD (2018) Thalassaemia. Lancet., 391(10116):155-67.
5. Kadhim KA, Baldawi KH, Lami FH (2017) Prevalence, incidence, trend, and complications of thalassemia in Iraq. Hemoglobin, 41(3):164-8.
6. Teawtrakul N, Jetsrisuparb A, Pongudom S, Sirijerachai C, Chansung K, Wanitpongpun C, et al (2018) Epidemiologic study of major complications in adolescent and adult patients with thalassemia in Northeastern Thailand: the E-SAAN study phase I. Hematology, 23(1):55-60.
7. Samavat A, Modell B (2004) Iranian national thalassaemia screening programme. Bmj., 329(7475):1134-7.
8. Modell B, Khan M, Darlison M (2000) Survival in ß-thalassaemia major in the UK: data from the UK Thalassaemia Register. Lancet, 355(9220):2051-2.
9. Angastiniotis M, Vives Corrons J-L, Soteriades ES, Eleftheriou A (2013) The impact of migrations on the health services for rare diseases in Europe: the example of haemoglobin disorders. Sci. World J., 2013.
10. Modell B, Darlison M, Birgens H, Cario H, Faustino P, Giordano PC, et al (2007) Epidemiology of haemoglobin disorders in Europe: an overview. Scand J. Clin Lab. Invest., 67(1):39-70.
11. Alkinani AA, Abbas APDMF, Faraj Apdsa, Jumaa RM (2017) AN Epidemiological Study of Thalassaemia Patients Attending Thalassaemic Center in Wassit Governorate.
12. Miri-Aliabad G, Fadaee M, Khajeh A, Naderi M (2016) Marital status and fertility in adult Iranian patients with ß-Thalassemia Major. Indian J. Hematol. Blood Transfus., 32(1):110-3.
13. Joseph N, Pai S, Sengupta S, Bharadwaj S, Dhawan S, Khare K (2018) A clinico-epidemiological study of thalassemia cases in India. J. Nat. Sci. Biol. Med., 9(2):236.
14. Yaseen NY, Fadhel AM, Hameed AH, Khaleel KJ (2009) Prevalence of thalassemia genes in Mosul. Iraqi J. Sci., 50(Supplement):8-10.
15. Trachtenberg F, Vichinsky E, Haines D, Pakbaz Z, Mednick L, Sobota A, et al (2011) Iron chelation adherence to deferoxamine and deferasirox in thalassemia. Am J. Hematol., 86(5):433-6. 16.
16. Galanello R, Cao A (2011) Alpha-thalassemia. Genet Med., 13(2):83.
17. Galanello R, Origa R (2010) Beta-thalassemia. Orphanet J. Rare Dis. [Internet]. 5(1):11. Available from: https://ojrd.biomedcentral.com/articles/10.1186/1750-1172-5-11
18. Mikael NA, Al-Allawi NAS (2018) Factors affecting quality of life in children and adolescents with thalassemia in Iraqi Kurdistan. Saudi Med. J., 39(8):799.
19. Abdul-Jalil FH (2011) Studies of Biochemical Changes in Serum of Patients with Different Types of Thalassemia. Iraqi Journal of Community Med., 24(3):228-33.

20. Hassan TH, Salam MMA, Zakaria M, Shehab M, Sarhan DT, El Sayed HZ, et al (2019) Impact of Genotype of Beta Globin Gene on Hepatic and Myocardial Iron Content in Egyptian Patients with Beta Thalassemia. Indian J. Hematol. Blood Transfus., 35(2):284-91.

21. Wahyuni MS, Ali M, Rosdiana N, Lubis B (2011) Quality of life assessment of children with thalassemia. Paediatr Indones., 51(3):163-9.

22. Ikram N, Hassan K, Younas M, Amanat S (2004) Ferritin levels in patients of beta thalassaemia major. Int. J. Pathol., 2(2):71-4.

23. Giardina PJ, Grady RW (2001) Chelation therapy in ß-thalassemia: an optimistic update. In: Seminars in hematology. Elsevier, 360-6.

24. Al Shemmari ZH, Al MBCBEJ (2005) B-thalassemia major in Ramadi. J. Fac. Med., 47(2):109-13.

25. Al-Azawi TN, Abdul-Jalil FH, Abdul-Karim ET (2005) Study Of Different Clinical And Demographic Characters Of Patients With Thalassemia And Their Relation To Hemoglobin, Some Minerals And Trace Elements And Albumin Levels In Their Blood. Iraqi J. Med. Sci., 4(1):21-37.

26. Chuncharunee S, Teawtrakul N, Siritanaratkul N, Chueamuangphan N (2009) Review of disease-related complications and management in adult patients with thalassemia: A multi-center study in Thailand. PLoS One, 14(3):e0214148.

