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Prevalence of β-thalassemia Patients in Missan Province

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Abstract

Thalassemia has been recognized by the world health organization as important inherited disorders principally impacting on the population of low income countries. The aim of current study was to investigate the prevalence of β-thalassemia disease in center of blood diseases and tumors population. 195 patients were interviewed for the different parameters including type of β-thalassemia disease, gender, age and information about their family. Results demonstrated that males were significantly ($p< 0.01$) more affected than females. In total patients, β-thalassemia major (78.97) was more frequent than thalassemia intermedia (21.03). The highest representation of β-thalassemia patients (22.05) was observed between (1-3) years of age group, where as affected patients were the highest from first birth order (48.72) than the lowest from fifth birth order (0.51) and more families have one child patient.

Key words: β-thalassemia , patients , Missan.

Introduction

Thalassemia are inherited disorders characterized by abnormal production of hemoglobin and associated with low hemoglobin and excessive destruction of red blood cells. Thalassemia is found in some 60 countries with the highest prevalence in the Mediterranean region , parts of north and west Africa , the middle east , the Indian subcontinent , southern Fareast and southeastern Asia , together composing the so-called thalassemia belt . In western countries , thalassemia affects mostly ndividuals whose ancestry are traceable to a high prevalence areas (Lory *et al.*, 1996 ; Birgens *et al.*, 1997 ; Vetter *et al.*, 1997 ; Rengelink- vander Lee , 1995) .

It has been estimated that approximately 7% of the world population are carriers of such disorders and that 300.000 - 400.000 babies with severe forms of these diseases are born each year (Wetherall and Clegg, 2001). The distribution of the disease, even in the thalassemia belt is not uniform. The highest frequency of α-thalassemia genes is found in southeast Asia and among those whose ancestors settled there from the west coast of Africa, the population of northern Thailand with a prevalence of about 5% to 10% harbors one of the highest incidences of α-thalassemia in the world (Lemmens-Zygulska *et al.*, 1996).

About 150 million people worldwide carry β-thalassemia genes. The genes are particularly prevalent in Italy and Greece. Other regions with the high gene frequency are Sardinia (11-34%) (Guiso *et al.*, 1996), Sicily (10%) , Greece (5-15%) and Iran (4-10%) (Lukens, 1993). High prevalence of both α and β-thalassemia is also present in southern China and Taiwan (Ko *et al.*, 1998).

In Arab countries the prevalence of thalassemia in Bahrin about 2% , in Oman about 2.4 % and in UAE about 1.7 % (Fareed *et al.*, 2007) . In Iraq the prevalence of thalassemia about 9.8 % (Al-Wagati , 2002), while in Mosul city the prevalence of thalassemia genes about 8.8% (khaleel *et al.*,2009).

Recent studies have suggested that low-income status and lack of awareness are also contributing in increasing the frequency of this disease. Other social factors, such as a preference to many within the ethnic groups and consanguineous marriage , have also contributed to the increased incidence of this disease (khaleel *et al.*,2009) . The aim of the current study was to collect baseline information on β-thalassemia in patient population of center of blood diseases and tumors in Missan province.

Material and Methods

Data collection

The present study was carried out in center of blood diseases and tumors in Missan province . Information was collected by interviewing the thalassemia patients or their close relatives. The collected information includes the gender, diagnosis i.e. specific type of thalassemia disease, numbers of children patients in each family, age, the family history including information about their sibs and offspring's and any other type of disease in the family and the associated disease process .

Statistical Analysis

The statistical analysis carried out for the study was calculated by SPSS (2001) .

Results

The present study was carried out on thalassemic hospitalized population (195 patients) of Missan province includind male (n=110) and female (n=85) patients. Among all patients male were found significantly affected with the thalassemia $p<0.01$ compared to female. In total patients, β-thalassemia major (78.97) was more frequant than thalassemia intermedia (21.03) (table 1)**.**

Percentage distribution of thalassemia patients among ten different age groups > 1 , 1-3 , 4-6 , 7-9 , 10-12 , 13-15 , 16-18 , 19-21 , 22-24 and < 24 years. the highest percentage (n= 43 , 22.05%) of thalassemia patients was observed in 1- 3 years of age groups . Whereas , the lowest percentage (n= 8 , 4.10%) of thalassemia patients were found in >

1 and < 24 years of age groups (table, 2) . The percentage distribution of thalassemia major and thalassemia intermedia in urban areas were (n=75, 85.23%) and (n=13, 14.77) respectively. The percentage distribution of thalassemia major and thalassemia intermedia in rural areas were (n=79, 73.83) and (n= 28 , 26.17) respectively (table , 3). The incidence of β-thalassemia wasn't significantly different between urban population and rural population.

The incidence of thalassemia was the highest in first birth order (n=95,48. 72) and the lowest in fifth birth order (n= 1 , 0.51) (table,4). The percentage distribution of β-thalassemia in the families are presented in table (5). One child patient per family was the highest (n=115, 58.97%) and four children patients per family was the lowest (n= 2 , 1.03%) , the families have one patient child were significantly different p<0.000 compared to others families .

Table (1): Percentage distribution of β-thalassemia according according to the gender.

β-thalassemia types	Male patients		Female patients		Total		P . value
	Number	Percentade	Number	Percentade	Number	Percentade	
thalassemia major	94	85.45	60	70.59	154	78.97	0.01
thalassemia intermedia	16	14. 55	25	29.41	41	21.03	0.01
Total	110		85		195	100	

Table (2) : Percentage distribution of β-thalassemia according to the age

Age groups (years)	Thalassemia patients	
	Number	Percentade
> 1	8	4.10
1-3	43	22. 05
4-6	31	15.90
7-9	25	12.82
10-12	27	13.85
13-15	18	9.23
16 -18	15	7.69
19 -21	11	5.64
22-24	9	4.62
<24	8	4.10
Total	195	100

The value of Chi – squre calculated was 31.970 Under df = 9 , while Chi – squre table is 23.589 Under df = 9 (Al- Mashadani and Hermz , 1989)

Table (3): percentage distribution of β- thalassemia according to the area

thalassemia types	Urban		Rural		P . value
	Number	Percentade	Number	Percentade	
thalassemia major	75	85.23	79	73.83	NS
thalassemia intermedia	13	14.77	28	26.17	
Total	88		107		

NS : non – significant

Table (4): Percentage distribution of β-thalassemia patients in different birth order

Thalassemia patients	Birth order					Total	P. value
	1	2	3	4	5		
Number	95	64	26	9	1	195	0.000
Percentade	48.72	32.82	13.33	4.62	0.51	100	

The value of Chi – squre calculated was 81.426 Under df = 4 , while Chi – squre table is 14.860 Under df = 4 (p<0.005) (Al- Mashadani and Hermz , 1989).

Table (5) : Percentage distribution of β-thalassemia patients in the family

Thalassemia patients	One child perfamily	two child perfamily	three child perfamily	four child perfamily	Total	P . value
Number	115	64	14	2	195	0.000
Percentage	58.97	32.82	7.18	1.03	100	

The value of Chi – squre calculated was 84.800 Under df = 3 , while Chi – squre table is 12.838 Under df = 3 (p<0.005) (Al- Mashadani and Hermz , 1989)

Discussion

Thalassemia is recognized as the most prevalent genetic blood disorder in the world . However , β-thalassemia the most common autosomal single - gene disorder world wide , found in more than 60 countries with a carrier population of up to 150 millions (Wetherall and Clegg , 2001) .

Among 195 subjects , incidence of β-thalassemia major and intermedia in present study was 78.97% and 21.03%

respectively in Missan province comparable to that of 77.1 % and 19.7% accordind to Abdul-Karim *et al*. (2005) in Iraq , 64% and 36 % in Lebanon (Inati *et al*., 2006) and 93% and 7% in Pakistan (Q. Ain *et al*., 2011) respectively .

Thalassemia major was more prevalence than thalassemia intermedia as shown above , Thalassemia major can often be prevented by avoiding marriage of two carrier parents or by performing prenatal diagnoses in high risk mothers . Marriage of two carrier parents results in a 25 % chance of producing thalassemic offspring , 50 % chance of producing a carrier who can pass on the disease if he / she marriage a nother carrier and a 25% chance of normal offspring (not thalassemia or carrier) (Ganie , 2005 ; Wahidiyat , 2006).

In current study the number of affected males (n=110, 56.41%) was significally higher ($p<0.01$) than affected females (n=85, 43.59%). Abdul- Karim *et al*. (2005) reported the percentage of affected males (63.1%) higher than affected females (36.9%). Q. Ain *et al*., (2011) found the percentage of affected males (65.66 %) was significally higher ($p <0.01$) than affected females (34.33 %). However, a statistically non-significant difference between number of male and female thalassemia patients reported by Asadi-Pooya and Doroudchi (2004). This difference in thalassemic patients is noteworthy and deserves . Further investigation considering thalassemia as a single-gene disease transmitted by a recessive mode of inheritance.

The highest percentage of β-thalassemic patients (22. 05) was between (1-3) years of age groups. This result agree with Majeed *et al*. (2013) whom found a total of 48.1% of the population group under study was in child bearing age. Abdul-Karim *et al*. (2005) found the patients age were mostly < 10 years (73 patients 46.5%) and there was no patient above the age of 30 years , these finding can be explained due to increasing disease load and shortened life expectancy in thalassemia patients. The incidence of β-thalassemia was significantly unchange between urban population and rural population. this result may be the marriage between sibs are common in Missan province . Where as ,Q. Ain *et al*. (2011) found the incidence of β-thalassemia was significantly ($p<0.001$) higher in urban population (80.66 %) than rural (19.33 %).

Current results also reveal that the incidence of β-thalassemia was the highest in 1^{st} order and the lowest in 5^{th} order. However, it is suggested that increased number of thalassemic patients in 1^{st} birth order is due to parent s unawareness about disease and consanguinity. Analysis of the data collected in the present study indicated that almost 58.97% families have one β-thalassemia child, 32.82 % families have two β-thalassemia children and 7.18 have three β-thalassemia children.

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