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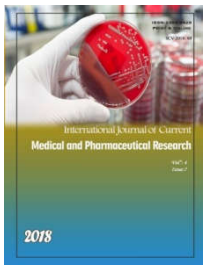

PREVALENCE OF THALASSEMIA AMONG CHILDREN CONCEIVED AS A RESULT OF COUSIN MARRIAGES

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ABSTRACT

Background and Aims; Thalassemia is widely prevalent Genetic Disorder in Pakistan. There is a positive association between Cousin Marriages and Thalassemia Because of accumulation of carrier in Thalassemia prevalent families. The aim of our study is assessing that whether cousin marriage is risk factor for thalassemia and awareness of importance of screening test among patients.
Materials and Methods: It was a cross sectional descriptive study which was conducted in Thalassemia Center near Ganga-raam Hospital, Lahore. Total 117 patients were interviewed after taking verbal consent using self-administered, pre-tested questionnaire. Patients were selected randomly. Data was analyzed using SPSS 20. The duration of study was 8 months.
Results*:* Majority of patients were of age 4-13 years, 56.1% were below poverty line. 81.2% of total 95 thalassemic subject's parents have cousin marriage. Thalassemia is more prevalent in males 63.2 %(74 patients) than that of females36.8 %(43 patients).The prevalence in 1st degree cousin is 73.5%, 2nd degree 6.8%, 3rd degree cousin is .9% and 18.8% subjects are unrelated.82.1% of subjects have hemoglobin level between 5-8 mg/dl. 96.6% parents of thalassemic patients are unaware about that they are thalassemic carrier.
Conclusion: The prevalence of Thalassemia among cousin marriage is 81.2%.

INTRODUCTION

Thalassemias is a inherited blood disease that follows the Autosomal recessive pattern of inheritance which is characterized by absent or decreased production of normal hemoglobin, resulting in a microcytic anemia of varying degree. In the thalassemia patient, mutation or deletion of the genes leads to abnormal production of the corresponding globins chains and an abnormal hemoglobin ratio.[1, 2]
It is classified in two different ways,

First is according to Defective Hemoglobin Chain [3]

1. Alpha (α) Thalassemias
2. Beta (β) Thalassemias
3. Delta (δ) Thalassemia,

Second is according to pattern of inheritance [4]

1. Thalassemia major
2. Thalassemia minor.

WHO recognize thalassemia as a most prevalent genetic Blood disease, found in more than 60 countries with a carrier population up to 150 millions. Prevalence rate in Pakistan Bangladesh, China, India and Malaysia is 6-8%.[5] Approximately 250 million people are heterozygote and at least 2,000,000 affected homozygote born annually.[6] Every year there are more than 4000 cases of Beta (β) thalassemia and about 8-10 million carriers in the Pakistan.[5]

Thalassemia major causes anemia that can be so severe that regular blood transfusions must be given throughout life. The other major complications of Thalassemia include iron over load, infection, bone deformities, enlarged spleen, slow growth rates and heart problems.[7, 8]

Pakistan has highest number of children with transfusion dependent thalassemia due to high frequency of gene, cousin marriages and high birth rate. The disease load is 2,000,00-3000,00 patients throughout the country and most of cases are undiagnosed due to lack of awareness.

Thalassemia is one of the major health problems because it not only causes the mental suffering to family because the life expectancy is 25-35 years but also cause economic burden due to regular transfusion. It has been suggested in a variety of observational and epidemiological studies that Cousin Marriages plays a significant role in Causation of Thalassemia. It is essential to know that Cousin Marriages play significant role in prevalence of Thalassemia, if it is True, we aware the importance of Screening test in Thalassemia prevalent families. In this we will be able to provide education about the disease we can raise awareness, encourage people to get tested

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for the trait, and spread knowledge about comprehensive treatment.[9]

***Literature review*:** Thalassemia is a serious public health concern and its incidence is increasing in Pakistan due to high frequency of gene, consanguineous marriages, high birth rate and lack of awareness. It is becoming clear that consanguineous marriages have relation with thalassemia According to a study conducted by UHS, human genetics & biotechnology department by Dr. M. Aslam Khan showed that 82.5% of the parents were cousins, 6.3% belong to the same cast and only 4.4% are out of their family (un-related). Offspring of the first cousin were predicted to share 12.5% of their genes.[10]A study on prevalence of thalassemia by GURBAK,M., turkey 2006 showed that the percentage of affected male is 55..5% and affected female is 45.5%. This showed that thalassemia is more prevalent in males than that of females.[11]A research paper by LODHI, Economics of thalassemia management in Pakistan, shows that In Pakistan thalassemia is more common among age of 10 years of age, and most of thalassemia patients requires one transfusion per month.[12] In thalassemia patients the level of hemoglobin is low due to defective & decrease hemoglobin formation. A book. Pathological basis of diseases written by Robbins & Cotran, showed that most of thalassemic patients have hemoglobin level between 3-6mg/dL.[13]The study of Qurat-ul-ain, Zoology department, G.C.U Faisalabad showed that thalassemia was highest in 1st birth order i.e. 48.6% and lowest in 8th birth order i.e. 01. It is suggested that thalassemia is high in first order due to unawareness about disease.[14]

MATERIAL AND METHODS

Study design

The study design that was used in this research is"Descriptive Cross sectional type of study design"

Area of study

Thalassemia centre near Gangaram hospital and Thalassemia centre in Children Hospital.

Duration of study

The duration of study is eight month

Sampling technique

The sampling technique is convenient sampling

Sample selection
Inclusion criteria

- Person should be Diagnosed a Thalassemia major patient.
- Both sexes, male or female.
- Any Age Group, patient less than 10 years of age interviewed by their guardian.

Exclusion criteria

Patient is not willing to participate.

Data collection procedure

Those fulfilling the inclusion criteria were recruited for the study from thalassemia centres in Gangaraam and Children hospitals. After informed consent information was collected by interviewing the thalassemia patient's i.e. specific type of thalassemia, exact relationship between father and mother their family history and any other disease in their family. Those patients less than 10 years of age, information was collected from their guardian. All the findings were collected on a structured questionnaire.

RESULT

In our Research we studied 117 subjects and the prevalence of thalassemia among children conceived as a result of cousin marriages was 81.2 %(95 subjects) and in the children of non-cousins is 18.8%(22 subjects). The mean age of patients in this study was 11 years. The greatest age group ranges from 4years to 14 years(80.1%). The mean age of diagnosis was 1 year. Out of 117 patients, 63.2% were males and 36.8% were females. 8.5 % of patients had their hemoglobin levels below 5mg/dl, 82.1% had their hemoglobin level between 5 mg/dl to 8 mg/dl and 9.4% of patients had their hemoglobin above 8 mg/dl.

DISCUSSION

In our Research we studied 117 subjects and the prevalence of Thalassemia among children conceived as a result of cousin marriages was 81.2 %(95 subjects) and in the children of non-cousins is 18.8%(22 subjects)(Tabel-1). In a previous research conducted by UHS, human genetics & biotechnology department by Dr. M. Aslam Khan the prevalence of thalassemia among cousin marriages was 82.5% and 4.4% unrelated.

Table 1 Analysis of Prevalence of Thalassemia

Prevalence of Thalassemia				
INCIDENCE	FREQUENCY	PERCENT	VALID PERCENTAGE	CUMULATIVE PERCENT
COUSIN	95	81.2	81.2	81.2
NON-COUSIN	22	18.8	18.8	100.0
TOTAL	117	100.0	100.0	

According to our research among the children of cousins, the prevalence in the children of 1st Degree cousins was 91.6% i.e. 86/95 subjects, The prevalence in the children of 2nd Degree cousin was 8.4% i.e. was 8/95 subjects, The prevalence in the children of 3rd Degree cousin was 1.05% i.e. is 1/95 subjects (table-2). Among the children of unrelated parents, the prevalence was 18.8%, i.e. 22/117 subjects. Previous research by Khalida Nasreen Abdullah showed that 53% parents of the affected children were first cousins, 11% parents were second cousins,14% were relatives other than 1st and 2nd cousins and 22% were unrelated..

Tabel 2 Analysis of Degree of relationship in parents of Thalassemia patients

Gender Of Thalassemic Patient * Degree Of Relationship						
		Degree Of Relationship				
		First	**Second**	**Third**	**no relation**	**Total**
Gender Of Thalassemic Patient	**Female**	**32**	**2**	**1**	**8**	**43**
	Male	**54**	**6**	**0**	**14**	**74**
Total		**86**	**8**	**1**	**22**	**117**

We saw that the prevalence rate is higher among males as compared to that in females. 63.2 % (74 subjects) were males and 36.8% (43 subjects) were females. Male to female ratio was 5:3 (Table-3). A previous study on prevalence of thalassemia by GURBAK,M., turkey 2006 showed that the prevalence in males is 55.5% and in females is 45.5%.

Out of the total thalassemic patients we studied, 41% transfused blood once/month, 38.5% transfused blood twice a

month, 7.7% transfused blood thrice a month, 9.4% transfused blood 4 times a month(Table-5).

Tabel 3 Analysis of Prevalence of Thalassemia in Male/Female

Gender Of Thalassemic Patient				
Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Female	43	36.8	36.8	36.8
Male	74	63.2	63.2	100.0
Total	117	100.0	100.0	

Tabel 4 Analysis of Level of Hemoglobin Thalassemia Patients

Level Of Hemoglobin	Frequency	Percent	Cumulative Percent
1-4 mg/dl	10	8.5	8.5
5-8 mg/dl	96	82.1	90.6
9-12 mg/dl	11	9.4	100.0
Total	117	100.0	

Children upto 12 years of age, who had 1-2 transfusion were 52.9% and with 2-7 transfusion were 7.9% while Children above 12 years of age, who had 1-2 transfusion were 26.5% and with 2-7 transfusion were 11.96%(Table-6). A research paper by LODHI, Economics of thalassemia management in Pakistan, showed that In Pakistan thalassemia is more common among children of 10 years of age, and 61% of thalassemia patients require one transfusion per month.

Tabel 5 Analysis of Number of Transfusion in Thalassemia Patients

Number Of Transfusion	Frequency	Percent	Cumulative Percent
1	48	41.0	41.0
2	45	38.5	79.5
3	9	7.7	87.2
4	11	9.4	96.6
5	2	1,8	98.4
6	2	1.8	100.0
Total	117	100.0	

On blood examination, we found that 8.5% (10 subjects) had Hb level in the range 1-4mg/dL, 82.1% (96 subjects) had Hb level in the range 5-8mg/dL while 9.4% (11 subjects) had Hb level in the range 9-12mg/dL(Table-4). This showed that most of the thalassemia patients have Hb level in the range 5-8mg/dL. A book *Pathological basis of diseases*written by Robbins & Catron, showed that most of thalassemic patients had hemoglobin level between 3-6mg/dL.

Tabel 6 Relationship between Age of patient and Number of Transfusion

Age of Patient-Number of Transfusion				
		no of transfusion		
		1-2 Transfusion	2-7 Transfusion	Total
Age of patient1	upto 12 years	62	9	71
	above 12 years	31	14	45
Total		93	23	116

On studying the birth order, we saw that thalassemia was most prevalent among first birth order, i.e. 38.5% (45 subjects). Among 2nd birth order, the prevalence was 14.5% (17 subjects) while among 3rd birth order, the prevalence was 17.1% (20 subjects),(Tabel-7). A previous study of Qurat-ul-ain, Zoology department, G.C.U Faisalabad showed that thalassemia was highest in 1st birth order i.e. 48.6% and lowest in 8th birth order i.e. 01. Prevalence in 1st birth order was high due to unawareness of parents.

Tabel 7 Analysis of Birth Order which is Most Thalassemia Prevalent

Birth Order which is Most Thalassemia Prevalent				
INCIDENCE	FREQUENCY	PERCENT	VALID PERCENT	CUMULATIVE PERCENT
FIRST	45	38.5	38.5	38.5
SECOND	17	14.5	14.5	53.0
THIRD	20	17.1	17.1	70.1
FOURTH	13	11.1	11.1	81.2
FIFTH	13	11.1	11.1	92.3
SIXTH	6	5.1	5.1	97.4
SEVENTH	2	1.7	1.7	99.1
EIGHT	1	.9	.9	100.0
TOTAL	117	100.0	100.0	

Tabel 8 Educational Status of Father of Thalassemia patient

	Educational Status Of Father Of Thalassemic Patient			Total
	Graduate	Matric	Illitrate	
Incidence	12	63	42	117

On asking about the educational status of parents, we saw that the fathers of most of the thalassemic patients were not very highly educated, and so they are not much aware of this problem. 53.84% of the fathers of these patients were matriculates, 35.8% were illiterate while 10.25% were graduates (Table-8). Most of the mothers of the patients we studied were illiterate, i.e. 54.7%. Among the rest, 35% were matriculates and 10.25% were graduates (Table-9).

Most of the parents, before marriage, were not aware of themselves being the carriers of thalassemia. They did not even know about the disease, let alone the knowledge of their carrier state. 96.6% of the total parents were totally unaware of this disease while only 3.4% knew about it (Table10).

Tabel 10 Analysis of Awareness of Thalassemia in Parents

Awareness In Parents About Thalassemia				
Awareness	Frequency	Percent	Valid Percent	Cumulative Percent
No	113	96.6	96.6	96.6
Yes	4	3.4	3.4	100.0
Total	117	100.0	100.0	

Awareness among parents was found to be directly related their literacy rate. Most of the parents who did not know about this disease were unaware because they were illiterate. On comparing the literacy rates, we found that 35.9% of the parents did not know about thalassemia because they were illiterate. 50.4% of those with matriculation did not know, while only 0.03% with this educational status knew about this disease. It was surprising to find that none of the graduates knew about thalassemia (Table-11).

Tabelb 11 Relationship Between Educational Status and Awareness

		Awareness In Parents About Thalassemia In Parents		Total
		No	Yes	
Educational Status Of Parents Of Thalassemic Patient	Graduate	12	0	12
	Illiterate	62	2	64
	Matric	39	2	41
Total		113	4	117

Among the total thalassemic patients we studied, most of the male patients were diagnosed at the age of 7 months while most of the female patients were diagnosed at the age of 3 months. So basically most of the total patients were diagnosed before they were 1 year old. However, on studying the female population, we also saw that some of the patients remained undiagnosed even at the age of 7 years.

According to our research, percentage of the families who had a tradition of cousin marriages was 59.8% while those families who did not have this tradition were 40.2%(Table-12). It was found that in the families with this tradition, the number of affected children were greater.

Tabel 12 Analysis of Tradition of Cousin marriages in Thalassemia patients

Tradition Of Cousin Marriages In Family			
Tradition of cousin Marriage	**Frequency**	**Percent**	**Cumulative Percent**
No	47	40.2	40.2
Yes	70	59.8	100.0
Total	117	100.0	

In thalassemia prevalent families, the incidence of thalassemia is much greater. In our research it was found that in such families, 34.7% of total children were suffering from thalassemia (Table-13).

Tabel 13 Analysis of Prevalence of Thalassemia in Thalassemia Families

Gender	Total Normal Children	Total Affected Children	Total
MALE	252	100	352
FEMALE	237	70	307
Total	489	170	

CONCLUSION

The prevalence of Thalassemia among children conceived as a result of cousin marriages was 81.2 % and prevalence of thelesemia in unrelated marriages was 18.8%.

References

1. Weatherall David J, "Chapter 47. The Thalassemias: Disorders of Globin Synthesis" (Chapter). Lichtman MA, Kipps TJ, Seligsohn U, Kaushansky K, Prchal, JT:Williams.Hematology,8e:http://www.accessmedicine.com/content.aspx?aID=6123722
2. http://en.wikipedia.org/wiki/Thalassemia
3. Hamosh, A.; Scott, A.; Amberger, J.; Bocchini, C.; McKusick, V. (2004). "Online Mendelian Inheritance in Man (OMIM), a knowledgebase of human genes and genetic disorders". *Nucleic Acids Research*33 (Database issue): D514–D517. doi:10.1093/nar/gki033. PMC 539987. PMID 1560825
4. Harrison's Principles of Internal Medicine *17th Edition*. McGraw-Hill medical. September 2008. p. 776. ISBN 0-07-164114-9
5. Cao, A. and Galanello, R, 2002. Effect of consanguinity on screening of thalassemis. *N. Engl. J. med*.,347:1200-1202
6. Gupta, A, Hattori, Y. and Agarwal, S., 2002. Initiation codon mutation in an Asian Indian families. *Am. J.Hemotol*., 71:134-136
7. Cianciulli P (October 2008). "Treatment of iron overload in thalassemia". *Pediatr Endocrinol Rev*. 6 Suppl 1: 208–13. PMID 19337180.
8. "Thalassemia Complications". *Thalassemia*. Open Publishing. Retrieved 27 September 2011
9. Alwan, A. and Modell B., 2005. Community control of genetic and congenital disorders. WHO Regional office for the Eastern Mediterranean, Alexandria, Egypt.
10. Hafeez M, Aslam M, Ali A, Rashid Y, Jafri H. Regional and ethnic distribution of beta thalasemia mutation and effect of consanguinity in patients referred for prenatal diagnosis. *J Coll Physicians and Surg Pak*. 2007;17(3):144-147.
11. Gurbak, M., Sivasli, E.,Coskun., Y., Bozkurt, A.I and ERGIN, A., 2006. Prevalence and hematological characteristics of beta-thalassemia trait in Gaziantep urban area, Turkey. 23:419-425.
12. Lodhi, Y., 2003. Economics of thalassemia management in Pakistan. IN: *Thalassemia awareness week* (ed. S. Ahmad) Friends of thalassemia.
13. ROBBINS, COTRAN,. 2010. Review of introduction of thalassemia major, Pathological basis of diseases, edi 10: 648-649
14. Qurat A., Laiq., M Hassan.,2011. Prevalence of beta thalassemia patients associated with consanguinity and ANTI-HCV positivity. *Pakistan J Zool.,* vol. 43(1), pp.29-36,2011.

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