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A Survey Study of the Prevalence of Anemia among Students of the Faculty of Nursing at the University of Qadisiyah in Iraq

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ABSTRACT

A representative group of 100 volunteer university students was tested for a directory of the mild thalassemia, comprehensive blood counts were analyzed using the automated blood cell and blood tests. Patients with anemia, irregular erythrocytes indices, or morphological characteristic of mild thalassemias such as hypochromia, microcytosis, target cell erythrocytosis, and family date of thalassemia were then examined for determination of HbA_2 & HbF levels. microcolumn chromatography was used to measure HbA2 ,while HbF was done using alkali denaturation. Seventy-seven of the thousand samples tested positive for thalassemia minor, all of them had HbA_2 greater than 3.6 percent and higher, associated made with most of the status with moderate anemia,erythrocytosis, hypochromic microcytic red cells. We conclude that the spread of thalassemia minor in our community, represented at college students at fertile age, to be 7.7%. We assume that the remaining university of Qadisiyah and all Iraq will obtain similar data in the future so that world literature is given national status .

Keywords: Anemia, β-Thalassemia , HbA_2 , HbF

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INTRODUCTION

Anemia is defined as a state in which hemoglobin (Hb) is below the usual age and sex range of the patient. It is one of humanity's most common disorders. Thirty percent of the world's population will be overacted at some stage. This condition of the decrease oxygen-carrying vastness of blood can happen because of different causes involving inadequate erythrocytes produce, blood loss , or hemolysis. Thalassemia is characterized by a reduction in the synthesis of one or more globin chains that form the molecules of erythrocytes that hold oxygen (Weatheral,2006). Hemoglobin is tetrameric molecules, with 2 α-like and 2 β-like globin polypeptide chains, each associated with a heme group (Kong et al, 2004). In a normal adult, HbA (α2β2) accounts for around 97.5% of the hemoglobin in erythrocytes; there is another component called HbA2 (α2δ2), which normally constitutes < 2.5% of total hemoglobin. Fetal hemoglobin or HbF (α2γ2) is the major hemoglobin synthesized before birth, but a normal adult has < 1% Hb F (Kanavakis et al,2006).

β-thalassemia is one of the world's most severe heath issues and is the cause of a large number of childhood deaths annually mostly in malaria -endemic regions worldwide(Centis et al,2000).

It is a recessive autosomal condition characterized by hemolytic anemia microcytosis and. It results from multiple molecular defects in which Hb synthesis of β-globin chains reduces (β+-thalassemia) or removes (β0-thalassemia) (Angastiniotis and Modell,1998). Their phenotypic finding varies greatly from the mutations in β-thalassemia .These can include extremely mild, clinically and phenotypically silent mutations. (Weatheral and Catovsky, 2005), for those that are uncommon and produce intermediate thalassemia phenotype, even in the heterozygous state, due to the inheritance of one single copy of the abnormal gene(Thein,1992).

Between these two extremes lie the majority of β-thalassemia mutations with a symptom in carriers and transfusion-dependent anemia for homozygotes and compound heterozygotes (Weatherall et al,1998). In Iraq, there is a definite need for a carrier screening program. It is really hard to reach a consensus regarding the time of screening due to a lack of knowledge and public understanding about the disease. The stigma attached to being a carrier for the thalassemia gene usually creates reactions against blood testing for this public health problem.

We aim is to find the spreads in The University of Qadisiyah to complement the data already available. Hopefully, in the future, a national survey will utilize the data available to provide a consensus figure for the prevalence of this extremely important genetic problem.

SUBJECTS AND METHODS

One thousand university students were randomly involved in this study, including (36) females and (63) males, aged 18-28 years (S.D±5.4). Students were included in this study on a voluntary basis. Participants were requested to give information regarding personal and health data. After having all the requested permissions, the sample collection started on December 12th, 2019. Samples were collected in the colleges after giving a brief talk to the students regarding the nature of the disease and concentrating on the way to prevent it by population and premarital programs. 100 university students were screened. The sample collection ended in May 2008. venipuncture from each participant was obtained from a sample of 2ml venous blood collected in an EDTA tube.

A complete blood count (CBC) using electronic blood analyzer that was coulter counter model (ACT diff Beckman with eighteen parameters) including (Hb, WBC count, platelet count, packed cell volume (PCV), mean cell volume (

MCV), mean cell hemoglobin (MCH) ,mean cell hemoglobin concentration(MCHC),red blood cell (RBC) count. Those with low red cell indices (MCV, MCH ,and MCHC) and high RBC count were further investigated for the determination of hemoglobin A_2 (HbA2) and hemoglobin F (HbF) levels. CBC was done within one hour of sample collection. For red cell morphology, freshly prepared, Leishman-stained blood films were used. When a low red cell index also means an elevated HbA2(to more than3.5%) with or without elevation of HbF, any individual shall be considered as a carrier.

HbA2 estimation was done chromatographically using a commercial kit (Beta-Thal HbA2 Quick Column) from (Helena Laboratories). The alkali denaturation method is used to estimate HbF (Dacie,2006).

RESULTS

A total of 100 students were studied, they included 63 males (63.2%) and 36 females (36.8%) correspond to a male: female ratio of 1.7:1. Ages of screened students ranged between 18-28 years with a mean age of 22.7 years (S.D±5.4). Seventy five percent of them were below 22 years. Figure 3 shows the age and sex distribution of studied students.

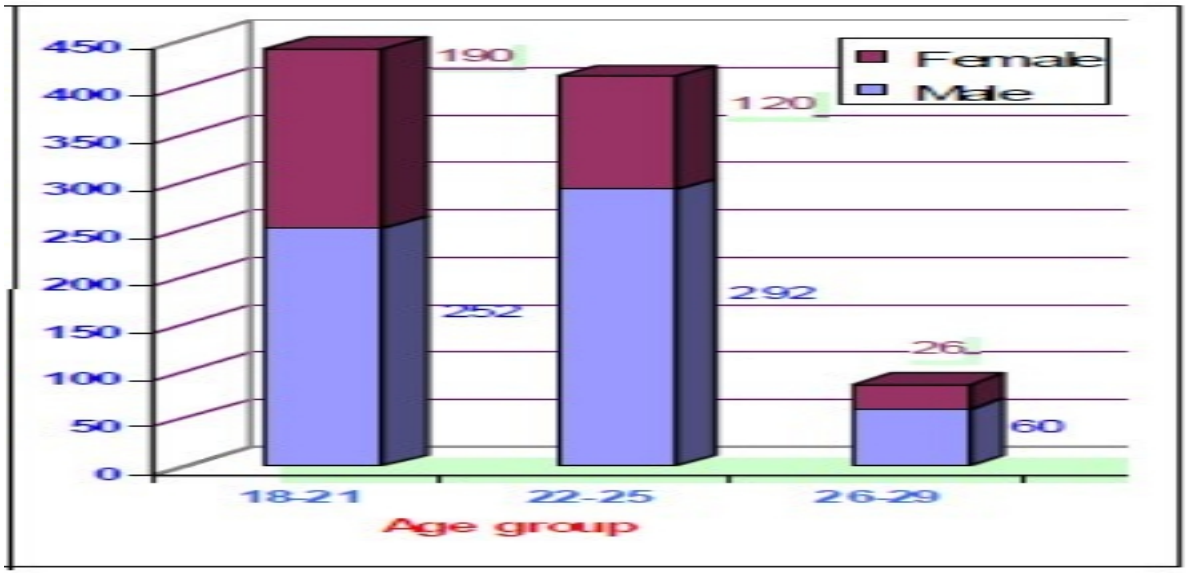

Figure 1: Age and gender distribution of studied students

According to the results of the CBC and Hb fractions pattern; subjects were divided into three groups:

Group I: Individuals with normal CBC. This group included 33 students. **Group II**: Individuals with low red cell indices and high HbA_2 levels with or without elevation of HbF levels, these individuals were considered to be βthalassemia carriers. This group included 7 students; this figure makes the frequency of β-thalassemia trait in this sample (7.7%).

Group III: Individuals with low red cell indices but normal hemoglobin fractions, these were labeled as having anemia with low indices.

This group included 6 students. **Figure 2** shows the prevalence of β-thalassemia minor among the studied sample. The various hematological parameters of studied groups are summarized in table (1)

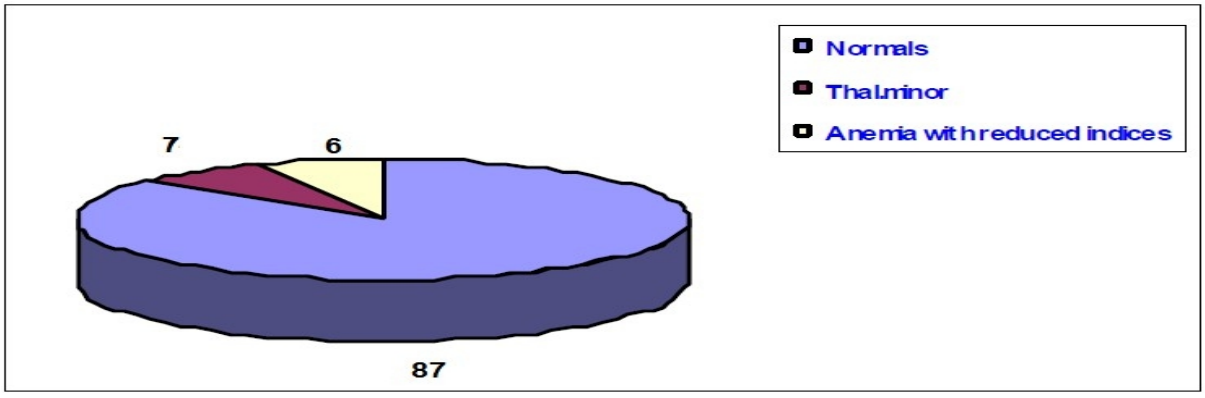

Figure 2:Distribution of students in different groups

Table1: Statistical summary of the hematological and clinical parameter of studied subjects

Variable	Group	Number	Mean	Standard Deviation	P -Value
Age	Normal	87	22.7	3.7	0.615

	Tha.minor	7	23.1	3.5	
	H.ch.Anemia	6	22.9	4.2	
	Total	100	22.7	3.8	
*Hb gm/dl	Normal	87	14.4	1.6	
	Tha.minor	7	12.7	1.8	0.0
	H.ch.Anemia	6	12.5	2.4	
	Total	100	14.1	1.8	
Pcv%	Normal	87	42.7	5.6	
	Tha.minor	7	39.9	5.2	0.0
	H.ch.Anemia	6	38.7	6.7	
	Total	100	42.2	5.8	
MCV fl	Normal	87	78.9	3.8	
	Tha.minor	7	69.1	8.3	0.0
	H.ch.Anemia	6	75.3	6.3	
	Total	100	85.6	7.3	
MCH pcg	Normal	87	29.7	1.7	
	Tha.minor	7	22.1	3.2	0.0
	H.ch.Anemia	6	24.4	2.9	
	Total	100	28.8	3.1	
MCHC g/dl	Normal	87	34.1	0.9	
	Tha.minor	7	31.5	1.5	0.0
	H.ch.Anemia	6	31.9	1.7	
	Total	100	33.8	1.3	
RBC×10^6/ul	Normal	87	4.9	0.5	
	Tha.minor	7	5.8	0.8	0.0
	H.ch.Anemia	6	5.1	0.8	
	Total	100	5.0	0.6	

*Hemoglobin F was elevated to more than 1% in 33% of carriers. No significant differences in total Hb, HbA2 level and other red cell indices were noted between carriers with elevated HbF and those with normal HbF level.

DISCUSSION

We report an overall spread of anemia at 57% in the study participants. Since there are no documented manners ready for the spread of anemia between college students, it can just be contrasted with that observed for the total Qadisiyah population, demographic Health Survey, Qadisiyah (Iraq), NFHS-3, clear spread in Qadisiyah for the 18-29 years age group at 37 percent for females and 63 percent for males [www.rchiips.org/NFHS/report.shtml.].

Furthermore, for those with an education level of 10 years or more, it also reported lesser prevalence rates of 47% for females and 17% the males. We report a much higher prevalence of 67% among the females and 49% among the males which is 1.43 and 2.88 times that reported by NFHS-3 for educated females and males respectively.

The results could possibly be partially explained as follows. The participants were first- year MBBS students who were selected for the course at all Qadisiyah in the Iraq level. As a result, most of them were away from their families.

This fatigue associated with that of having to deal with the specialist course study pressure may have caused them to neglect their diet. At the time of the study, the participants had been being in this new situation for about 6 months at the time of the study. The tension factor may also have begun much earlier when they were planning for their twelfth standard test and the subsequent competitive review.

The lack of access to favorite food may have contributed to a loss appetite to eat in an unfamiliar place. The coarse provision of junk food may have contributed to the problem. Lack of parental control may also be assumed to have led. Many students were dependent on their meals from the canteen or tiffin provider, neither of these networks supplied new fruit as part of the meals. Just the disorder provided the salad. The majority of the students took a snack instead of a healthy breakfast.

The menstrual failure of female anemia is considered greater. Media exposed to reports on weight loss can alter and lead to an unfair diet for many young women (Neumark-Sztainer et al,2007).

Documented research supports a need for research obesity analysis of social pressure. Frequent review of journal submissions around dieting/weight loss is closely connected with unhealthy weight-control demeanor in girls (but not boys). A need has been lately felt for interventions aimed at reducing exposure to, and the importance placed on, media messages regarding dieting and weight loss (Van den Berg et al,2007). In the case of the females, these factors are in addition to all the factors mentioned above which are common for the sexes. It would be inappropriate to blame the lack of erythropoietin stimulatory effect of testosterone for anemia in females. This physiological difference eliminates only the extra stimulation of erythropoiesis, which is only available for males and is possibly compensated with the lower Hb cut for anemia diagnosis for women. Pregnancy and lactation are two more factors adding to the loss of iron from the mother. However, these factors were not applicable as far as this study group was concerned.

Regarding the countries near or neighboring Iraq, the estimated prevalence of β-thalassemia minor was, in Qatar 28% (Fawzi et al,2003), Saudia Arabia 3% (Bashir,1992), Lebanon 2 to 3% (Khouri et al,1986), Jordan 3-3.5% (Bashir et al,1991), the prevalence in Turkey is ranging between 3.4 in East Anatolia to 11% in Western Thrace and Antalya (Aksoy et al,1985), these results are comparable to our results. The mean difference between the means of MCV for the three groups was 88, 69 ,and 75 fl respectively; here there is an obvious difference of 19 fl between the MCV of the normal students in comparison with the carriers. The MCH values were 29.7, 22.1, 24.4 pcg respectively with a p-value of less than 0.001which is a highly significant difference. 7.6 pcg was the difference between the MCH values of the carriers and the normal students (Table 1). Mean cell hemoglobin concentration (MCHC) values were 34.1, 31.5 ,and 31.9 g/dl respectively; there is a significant difference of 2.6 g/dl between the normal subjects and carriers with a p-value of < 0.001. Finally, RBC counts were notably elevated among β-thalassemia carriers as compared to the normal. RBC counts were 4.9, 5.8, 5.0 ×10^6 /ul with 0.9 ×10^6/ul difference between carriers and normal subjects and p value was < 0.001(Table 1). During this study, complete blood count (CBC) was performed on a total of one thousand university students. It was the cornerstone to determine the subjects on whom HbA2 had to be estimated.

Reduced MCV or MCH values in the majority of heterozygous β-thalassemia have been used as a basis for population screening for these disorders (18,22), and although cut-off values for the MCV and MCH of 80 fl and 27 pcg respectively may involve a relatively large number of confirmatory HbA2 estimation it would detect virtually all affected cases. Hemoglobin A2 estimation was done for 143 students with hypochromic microcytic parameters. Seventy- seven of these were β-thalassemia carriers based on rises HbA2 levels. No association could be noticed between the severity of anemia and HbA2 level. It was noted that the increasing level of HbA2 above 6% was negatively associated with MCV, when MCV values were less than 72 fl, among 11 carriers with HbA2 more than 6% we have 9 individuals (81.8%) whom MCV values were less than 72 fl. The same thing when applied to MCH we have 81.8% of carriers having MCH values of (22 pcg) and less, no such relationship could be found between HbA2 level and RBC count.

CONCLUSION

1.This study revealed that the prevalence of thalassemia minor or thalassemia carrier state in our community is 7.7%.

2.Thalassemia carriers can be detected through clinical examination and complete blood count. The cardinal feature of the thalassemia carrier state is elevated HbA2 level.

The facts underlined the need to include hostel and mess in the same location as the study site, introduce an improvement in lifestyle, adjustments, and frequent anemia for screening by nursing students for anemia. The problem may be prevalent even in hostels catering to other fields of study and must be looked into and remedial measures are instituted.

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