

## **Effect of Ferrous Sulphate on Prevalence of Anemia Among Students of Technical and Medical Institute, Al-Mansoor, Baghdad**

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### **Abstract**

This study was conducted to investigate the prevalence of anemia among students (males and females) of the Technical and Medical Institute/ Al-Mansoor, Baghdad. 135 students aged 20 -22 years were subjected. Twenty-one students were found to be anemic. The prevalence of anemia among students was 15.55%, with no significant difference to sex. Then, the anemic students were treated with tablets of ferrous sulfate twice daily for 60 days. The treatment markedly elevated the hemoglobin concentration of both males and females and decreased the prevalence of anemia from 15.55% to 5.92%. The decrease in prevalence of anemia tended to be higher in anemic females as than anemic males (15.51% and 15.58% before treatment and 3.44% and 7.79% after treatment, respectively). So, treatment with ferrous sulfate tablets can effectively, reduce the prevalence of anemia among students and may reduce the complications of anemia among students.

**Key words:** anemia, hemoglobin, ferrous sulfate.

### **Introduction**

Anemia is a public health problem all over the world. The burden of this disease observed mainly in developing countries. Conservative estimations indicate that about 1500 million people are anemic worldwide, with about 1400 million in South Asian and African countries (1). In addition, the World Health Organization (WHO) estimates and other hospital based studies revealed that two-fifth of non-pregnant women and about half of pregnant women in developing countries have anemia (2, 3).

Studies have shown that clinical assessment of anemia is very unreliable when compared to other standard methods of hemoglobin estimation. One of the most crucial aspect management of anemia is determination of hemoglobin concentration. This affords to health care providers the opportunity to determine severity of the disease and the likely methods of prompt treatment (4).

Iron deficiency anemia (IDA) remains the most common single nutrient disorder worldwide. It is associated with several deleterious consequences, including anemia, reduced work capacity in adult, increased susceptibility to infection and impaired cognitive development and learning ability in children (5, 6). Iron deficiency anemia could be caused by parasites infections, such as hookworm which lead to intestinal bleeding and fecal blood loss and heme/iron deficiency (7). It occurs when the dietary or absorption of iron is insufficient and cannot be formed (8). Iron is an

essential component of proteins involved in oxygen transport (9). Plant foods contain most of the minerals and organic nutrients which are established as essential for human nutrition in addition to a number of unique organic phytochemicals that have been linked to promotion of good health (10).

Dietary iron is available in two forms:-

1. Heme iron which is found in the animal sources like red meats, fish and poultry. It is well absorbed and minimally affected by dietary factors.
2. Non-heme iron which is found in plant sources like legumes, leafy vegetables, fruits, molasses blackstrap and dairy foods. The bioavailability of non-heme requires acid digestion and varies depending on the concentration of enhancers (ascorbic acid and meat) and inhibitors (calcium, fiber, tea, coffee and wine) found in the diet (6, 11). Animal sources are good sources of iron but for a financial reason the plant sources are the starkest source of iron (6).

## Subjects and Methods

One hundred thirty five students (males and females) of Technical and Medical Institute/ Al-Mansoor, Baghdad were involved in this study which was conducted during the period from November 2008 to March 2009. Their age ranged from 20 -22 years. They were diagnosed as anemic with cut off point of hemoglobin as less than 12 g/dl and 13 g/dl for females and males, respectively (12).

Hemoglobin concentration was determined by using hemiglobincyanide method (1). The blood was collected by capillary action and used for measurement of hemoglobin concentration. The absorbance of sample and standard were measured in spectrophotometer at 540 nm. All subjects had no peptic ulcer and none of them was on hem tonic agent.

Two hundred mg of ferrous sulphate, produced in form of tablets by Sammara Drug Industries Company (Sammara-Iraq) was administered to each patient twice daily for 60 days. Hemoglobin concentrations were determined for all, pre and post treatment.

## Results and Discussion

Table (1) shows that the prevalence of anemia among male and female studied was 15.58% and 15.51%, respectively. No significant differences were noted.

One of the key causes of Iron deficiency anemia is poor bioavailability of iron in the diet. Most of anemic students in the present study were from low socioeconomic levels. They depend mostly on plant sources as source of iron, which are of a low biological value and low iron absorption, with little consumption of animal diet (meat or fish) which has a high biological value and easily iron absorption in comparison with plant sources (6). Their dependence on plant sources is due to a financial reason rather than habit. Another factor that may contribute to iron deficiency anemia is the bad dietary habits, whereas a high consumption of tea and coffee directly after meals as well as the low consumption of vegetables (which are rich in ascorbic acid) affecting the bioavailability of non-heme iron found in plant sources and thus cause anemia (6, 11). Also, vitamin A deficiency may be a common cause of anemia as iron deficiency (13).

Table (2) shows that the administration of ferrous sulfate tablets to all of anemic students twice daily for 60 days markedly decreased the number of anemic students from 21 to 8 students and hence the prevalence of anemia among anemic students from 15.55% to 5.92%. The decrease in prevalence of anemia after treatment was tended to be higher in females as compared to males (15.51% and 15.58%, respectively) before treatment and became 3.44% and 7.79%, after treatment, respectively.

The present subjects were treated with 200 mg of ferrous sulphate tablet. Oral iron therapy is usually considered as the first-line therapy for patients with IDA (14). Iron sulfate in a dose of 300 mg provides 60 mg of elemental iron, whereas 325 mg of iron gluconate provides 36 mg of

elemental iron. Indication for intravenous iron is only indicating in case of chronic bleeding intolerance to iron or hemoglobin level below 6 g/dl (15). Improvement of Hb concentration in anemic students and thus decrease in prevalence of anemia was clear. However, it was more remarkable in female than male students (table 2). Differences that had been encountered might be due to noncompliance of male students given oral iron (16), intestinal malabsorption and concomitant deficiencies of vitamin B12 and folic acid (13) that might have a retard response.

Iron deficiency anemia is the most common nutritional deficiency worldwide. It causes poor work performance, decreased immunity and mental development in children and adolescents (5, 6). So, to reduce the prevalence of anemia, the present study recommended screening for iron deficiency in students at the beginning of academic year. Therefore, iron supplementation is given for anemic students.

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**Table (1) Mean ± SD of hemoglobin concentration (g/dl) and prevalence of anemia among students.**

Gender	Studied Subjects		Anemic Subjects		Prevalence of anemia (%)
	Number	Hb ± SD	Number	Hb ± SD	
Males	77	15.02 ± 2.46	12	10.03±1.02	15.58
Females	58	13.03 ± 2.51	9	9.91±1.36	15.51
Total	135	14.16 ± 2.66	21	9.98±1.28	15.55

**Table (2) Effect of administration of iron on hemoglobin concentration of anemic subjects and prevalence of their anemia.**

Gender	No. of anemic subjects before treatment	No. of anemic subjects after treatment	Prevalence of anemia (%) before treatment	Prevalence of anemia (%) after treatment
Males	12	6*	15.58	7.79
Females	9	2**	15.51	3.44
Total	21	8	15.55	5.92

\* Hb level for treated anemic males < 13 g/dl.

\*\* Hb level for treated anemic females < 12g/dl.

## تأثير كبريتات الحديد في إنتشار فقر الدم بين طلبة المعهد الطبي التقني/ المنصور، بغداد

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### الخلاصة

أجريت الدراسة الحالية لتقصي إنتشار فقر الدم بين طلبة تراوحت أعمارهم بين 20-22 سنة من المعهد الطبي التقني/ المنصور، بغداد. وجد أن 21 طالبا من بين 135 طالبا مشمولين بالدراسة يعانون من فقر الدم. كانت نسبة إنتشار فقر الدم بين الطلبة تعادل 15.55% مع عدم وجود فرق معنوي بين الجنسين. عولج الطلبة المصابين بفقر الدم بأقراص كبريتات الحديد بواقع مرتين يوميا مدة 60 يوما. أدت المعالجة بأقراص كبريتات الحديد إلى إرتفاع واضح بتركيز الهيموكلوبين لدى الجنسين ومن ثم خفض إنتشار فقر الدم بين الطلبة من 15.55% إلى 5.92%. كان الإنخفاض واضحا لدى الإناث مقارنة بالذكور، إذ كانت نسبة إنتشار فقر الدم على التوالي 15.51% و 15.58% قبل المعالجة وأصبحت 3.44% و 7.79% بعد المعالجة. وبهذا فإن المعالجة الفموية بكبريتات الحديد أخفضت بصورة فعالة إنتشار فقر الدم بين الطلبة المعانين من فقر الدم ومن ثم قد تقلل من مضاعفات فقر الدم عليهم.

الكلمات المفتاحية: فقر الدم، الهيموكلوبين، كبريتات الحديد.