

IRON DEFICIENCY ANEMIA; ROLE OF NUTRITIONAL DEPRIVATION AMONG FEMALE PATIENTS OF REPRODUCTIVE AGE GROUP

DR. SHEZADI SABAH871 street 14G 11/1
Islamabad**DR. IRUM FATIMA**27F Askari 4 Chaklala Cantt
Rawalpindi**DR. MUSARAT RAMZAN**

Askari Cement Wah

Objectives: 1) To determine the frequency of different causes of iron deficiency anemia in female patients of reproductive age group. 2) To determine the association between lack of balanced diet and iron deficiency anemia. **Design:** cross-sectional analytical study. **Setting:** Federal government services hospital, Islamabad. **Period:** From July 2008 to November 2008. **Material and Methods:** The study included female patients of reproductive age group i.e. 15-49 years of age having hemoglobin less than 11.5g/dl. The sampling technique was purposive. The data was analyzed using Microsoft excel 2000 and SPSS 10.0. Pearson correlation coefficient was used to determine the direction of relationship between total nutritional score and level of hemoglobin; student's t-test was used to determine the significance of association. A p-value of less than 0.05 was considered significant. **Results:** A positive correlation was observed between total nutritional score and level of hemoglobin ($r = 0.402$, $p\text{-value} = 0.008$). Correlation between animal protein and level of hemoglobin was 0.438 ($p\text{-value} = 0.004$) while between plant protein and level of hemoglobin was 0.211 ($p\text{-value} = 0.179$). **Conclusions:** It is concluded that there is a definite role of nutritional deprivation in the development of iron deficiency anemia. Lack of balanced diet especially protein group has much stronger association with this type of anemia. Animal protein as compared to plant protein has strong association with the development of iron deficiency anemia.

Key words: Iron Deficiency Anemia, Balanced Diet and Iron, Dietary.

INTRODUCTION

Nutritional anemia is a disease caused by malnutrition in its widest sense. It has been defined by WHO as "a condition in which the hemoglobin content of blood is lower than normal as a result of deficiency of one or more essential nutrients, regardless of the cause of such deficiency." By far the most frequent cause of nutritional anemia is iron deficiency and less frequently folate and B12¹.

Iron deficiency anemia is widely prevalent around the world affecting about 700 to 800 million people in less developed countries and 60 to 70 million in developed countries. On a regional basis, South Asia and Africa have the highest prevalence with an estimated rate of more than 40% in all age groups except for adult males and pregnant women; the latter group is the most vulnerable to anemia with an estimated prevalence rate of more than 65% in South Asia². World Health Organization report that from 35% to 75% (56% on average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic³.

"The World Health Organization has identified that iron and folic acid deficiency is a severe problem in Pakistan and it has devastating impacts on health and survival. It has been estimated that iron deficiency leads to 22,000 maternal deaths for the last 10 years⁴.

According to a recent National Nutritional Anemia Survey in anemic children, the most common cause is iron deficiency and it is approximately accounted for 83% of all anemias. The main cause of this anemia is dietary intake that is not sufficient to meet the physiological needs of the body. Other contributing factors considered to be responsible for iron deficiency anemia in Pakistan are lack of money, poverty, low bioavailability of iron from cereal-based diets, poor dietary practices and poor hygiene and sanitation which increase the risk of infections like hook worm infestation. These infections further increase the risk of anemia³. Iron deficiency is high on the list of risk factors for global maternal and perinatal mortality maternal malnutrition remains a major problem in Pakistan and India⁵. The consequences of iron deficiency includes, increased maternal mortality, increased numbers of preterm birth and/or low birth

weight, reduced adult work productivity and increased perinatal mortality and decreased cognitive and scholastic performance. The control of nutritional anemia is possible by providing the deficient nutrients either as therapeutic supplements or by fortification of commonly used food stuffs. Fortification is a sustainable and cost-effective approach.

The purpose of our study is to determine the frequency of different causes of iron deficiency anemia in female patients of reproductive age group and to determine the association between lack of balanced diet and iron deficiency anemia.

PATIENTS AND METHODS

This was a cross-sectional study conducted in Federal government services hospital, Islamabad over a period of five months from July 2008 to November 2008.

The type of sampling was purposive sampling and sample size is determined by Epi info. All female patients of reproductive age group i.e. 15-49 years of age having hemoglobin less than 11.5g/dl were included in our study. Initially 100 female patients of reproductive age group having picture of iron deficiency anemia on Blood CP were taken from medical wards and outpatient department and detailed histories were taken to determine the cause of anemia and from them only those women were selected for evaluation of nutritional status through a scoring system who had no above mentioned cause of iron deficiency anemia. All the items in the questionnaire were scored.

Variables followed were age, marital status, salary, number of family members, number of pregnancies, no of children, educational status, different causes of iron deficiency anemia, regular intake of meal, knowledge of importance of iron in food, hemoglobin level and different food items.

Data was collected by interviewing each respondent and entering the data in a pretested structured questionnaire. The data was analyzed using SPSS version 10 and Microsoft excel. Mean, standard deviation and percentages were used to describe data. Pearson correlation coefficient was used to determine relationship

between total nutritional score and level of hemoglobin. Student's t-test was used to determine the significance of association. A p-value of less than 0.05 was considered significant.

RESULTS

Out of 100 respondents 79 were married and 21 unmarried. The mean age of respondents was 32.7, the minimum age being 15 and maximum being 49. Frequency chart showed that number of females is highest in 40 and 45 year age group.

Considering economic status, 39 patients had an income of <5000, 48 had 5000-10000 and 13 respondent had more than 10000 per month. Among all respondents 39 women were illiterate (39%), 26 received primary education (26%), 30(30%) had secondary and only 5(5%) were bachelors. Frequency of patients with iron deficiency anemia was 42(42 %) whereas the second most common cause of anemia was bleeding from any site. Table-I reflects the frequency of various disorders associated with iron deficiency anemia.

Table-I. Frequency of different causes of iron deficiency anemia

Causes	Frequency	%age
Chronic dyspepsia	9	9.0
Chronic diarrhea	6	6.0
Worm Infestation	4	4.0
Menorrhagia	13	13.0
Bleeding from any site	13	13.0
Major Surgery in last 3 months	4	4.0
Malabsorbtion	5	5.0
Malignancy	1	1.0
Genetic disorder	1	1.0
Nutritional deprivation	42	42.0

DISCUSSION

It was a hospital based study in which we included female patients of reproductive age group. In the sample of 100 patients, 79 patients were married and 21 were unmarried and this result showed that iron deficiency anemia is more common in married females as

Table-II. Correlation between animal and plant proteins with level of hemoglobin

		Level of Hemoglobin	animal Protein	Plant Protein
Level of Hemoglobin	Pearson Correlation	1.000	.438	.211
	Sig.(2-tailed)	-	.004	.179
	N	42	42	42

***Correlation is significant at the 0.01 level (2-tailed)*

Table-III. Correlation between mean hemoglobin and total nutritional score

		Level of Hemoglobin	Total Score
Level of Hemoglobin	Pearson Correlation	1.000	.402
	Sig. (2-tailed)	-	.008
	N	42	42

*** Correlation is significant at the 0.01 level (2-tailed).*

compared to unmarried: this is attributed to number of factors like multiple pregnancies, lactation, bleeding, susceptibility to infections and the most important is negligence in dietary intake.

The mean age of the patients was 32.7 years and maximum number of patients was in ages 40-45 years and these results were very similar to a study conducted in Ayub teaching hospital regarding prevalence of iron deficiency anemia. In that study one hundred anemic patients were selected and from them detailed histories were taken, some tests were also performed to confirm the diagnosis. Results showed that sixty eight patients were found to have iron deficiency anemia and majority of the patients (82.2%) were aged 21-60 years. However, there were two peaks (21% & 25%) in age groups 21-30 and 41-50 respectively⁶.

The economic status of most patients in our sample was very low; about 87 patients had monthly income of less than Rs.10, 000 and only 17 had income of more than Rs10,000; it meant that iron deficiency was more common in low socioeconomic class and the reasons were varied but the most important was inadequate amount of food. In our study it was shown that the nutritional scores also followed the above pattern and were much less in low income groups. A study was

conducted in Karachi to determine socioeconomic differences in housewife's ability to take nutritional care which supported the effect of income on the nutritional level with the significance level 0.015⁷. These results were much similar to the study conducted in Malaysia to assess the iron status and dietary intake of 165 adolescents, comprising 74 male and 91 female. About 35% to 40% of the subjects showed deficient values for haematocrit, serum ferritin, serum iron, mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV) and transferrin saturation (TS) and 20% were anaemic (Hb<12 g/L). Iron deficiency anaemia (85.0%) contributed largely to the prevalence of anaemia. The dietary iron intake of the adolescents was unsatisfactory, with approximately 98% of subjects failing to meet the Malaysian RDA (Recommended Daily Allowance) level. Almost all the female subjects (91%) had dietary iron intake below two-thirds of the RDA level⁸.

A study done on English-speaking Caribbean women showed that nutritional anemia was more prevalent among women of childbearing age. Iron and folate deficiencies and, to a much lesser extent, protein deficiency resulting from insufficient dietary intake were the major nutritional factors contributing to that anemia⁹.

Another issue was role of education in the development

of anemia. In our study of iron deficient ladies, 39% were illiterate, 26% had primary education, 30% secondary education and only 5% were bachelors. It meant that educational status of women had great impact on the said problem and the analysis showed that mean hemoglobin level of illiterate women was less than those who had higher education. We also found that amount of food had more influence than frequency of meals in the development of iron deficiency anemia. A study conducted in India regarding prevalence of anemia among pregnant and lactating females which showed that there were many contributing factors found on multiple regression analysis that included literacy, occupation, living standard index, awareness about anemia, regular consumption of iron tablets and increased food intake¹⁰.

Iron deficiency anemia is caused by number of factors like menorrhagia, gastrointestinal bleeding, nutritional insufficiency etc. In our study among 100 patients, 42 did not suffer from secondary anemia but nutritional deprivation was the main cause leading to iron deficiency anemia. These result matched another study which was conducted at the department of Medicine, Fauji Foundation Hospital, Rawalpindi, Pakistan, to document the most common cause of anemia in a rural population. It showed that among 205 patients who presented with findings consistent with the presence of anaemia, the predominant type of anemia was hypochromic microcytic in 93 (43.36%) cases, followed by hematological malignancies in 46 (22.43%) cases. Iron deficiency was noted in the majority of cases and the main cause of iron deficiency was nutritional deficiency¹¹. Another survey was conducted in Tanzania which showed significant association between iron deficiency and low BMI (body mass index). The same survey further reflected low iron availability from the common food items consumed¹². This augmented the association highlighted in our study.

Analysis of our study supported the relationship between total nutritional score and hemoglobin level; a positive correlation between these two variables was confirmed and unpaired t-test was performed to confirm the significance of this correlation (P value 0.333) that was more than 0.05, so therefore it supported our hypothesis

that there was no difference between the two means. This indicated that at any point if total score was less, hemoglobin level was also decreased and if the total nutritional score was more, hemoglobin level was more too. It proves that lack of balanced diet leads to iron deficiency anemia.

Another important finding of our study was that the correlation between animal protein and mean hemoglobin level (0.438) was stronger than the correlation between plant protein and hemoglobin level (0.211). It supported the fact that deficiency of both types of proteins led to anemia but deficiency of animal protein contributed more to iron deficiency anemia and low hemoglobin level.

This study gave a fair evidence to accept our null hypothesis which stated that there was no difference in the two means. It meant that at any point if total nutritional score was less, hemoglobin level was also decreased and vice versa. However there were a few limitations in our study which restrict the degree of external validity in the results owing to the small sample size and the design of the study. The results of the study can further be cemented by prospective analytical designs with much more precision and external validity.

CONCLUSION

It is concluded that there is a definite role of nutritional deprivation in the development of iron deficiency anemia and lack of balanced diet especially deficient in protein group has much stronger association with this type of anemia. Animal protein as compared to plant protein has strong association with the development of iron deficiency anemia. In addition there are other factors like low economic status and low educational level that are associated with iron deficiency anemia.

Copyright© 12 Apr, 2010.

REFERENCES

1. Park K. **Preventive and social medicine**. 18th ed. Jabalpur (India): M/s Banarsidas bhanot publishers; 2007. p.465.
2. Paracha PI, Khan SM, Ahmad I, Nawab G. **Effect of iron supplementation on biochemical indices of iron status in selected preadolescent school girls in**

- Northwest frontier province Pakistan.** Asia Pacific J Clin Nutr [serial online] 1993[2007 April 8];2:[177-181]. Available from: <http://www.healthyeatingclub.com/APJCN/volume2/vol2.4/paracha.htm>
3. Allen LH. **Anemia and iron deficiency: effects on pregnancy outcome.** Am. J. Clinical Nutrition [serial online] 2000 May [2007 April 4];71(5):[1280s-1284s]. Available from: www.ajcn.org/cgi/content/full/71/5/1280s.
 4. **ADB to pilot project to combat nutritional problems in Pakistan.** [Online]. 2006 Mar 26[2007 April 5]. Available from: <http://www.adb.org/Media/Articles/2006/9538.Pakistan-flour-fortification/default.asp>.
 5. Lambret J, Chatterjee M. **Women and nutrition: reflections from India and Pakistan.** [2007 April 20]. Available from: <http://www.unsystem.org/scn/archives/npp06/ch16.htm#topofpage>.
 6. Idris M, Rehman A. **Iron deficiency anemia in moderate to severely anemic patients.** J. Ayub Med Coll. [serial online] 2005 17[2007 June 6];(3). Available from: <http://www.ayubmed.edu.pk/JAMC/PAST/17-3/Idrees.pdf>
 7. Hakeem R, Asar F, Sheikh AH. **Socioeconomic differences in housewife's ability to take nutritional care.** J Pak Med Assoc [serial online] 2004 July [2007 July 15];54(7):[382-90]. Available from: <http://www.pak-medinet.com/5620>
 8. Foo LH, Khor GL, Tee ES, Prabakaran D. **Iron status and dietary iron intake of adolescents from a rural community in sabah, Malaysia.** Asia Pac J Clin Nutr.[serial online] 2004 [2007 July 24];13(1):[48-55]. Available from: [g:/iron status and dietary iron intake of adolescents-\[Asia Pac J Clin Nutr_2004\]-Pubmed result.htm](http://www.g:/iron%20status%20and%20dietary%20iron%20intake%20of%20adolescents-[Asia%20Pac%20J%20Clin%20Nutr_2004]-Pubmed%20result.htm)
 9. Johnson AA, Latham M C, Roe DA. **Nutritional anemias in the English-speaking Caribbean: a review of the literature.** Am J Public Health. 1982 [2007 August 4];72(3):[285–289]. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1649808>.
 10. Agarwal KN, Agarwal DK, Sharma A, Sharma K, Prasad K, Kalita MC et al. **Prevalence of anemia in pregnant and lactating women in India.** Indian J Med Res [serial online] 2006 August [2007 Aug 2];124:[173-184]. Available from: <http://icmr.nic.in/ijmr/2006/august/0808.pdf>.
 11. Yaqoob N, Abbasi SM, **Nutritional iron deficiency in our population.** J. coll Physicians Surg Pak 2002 July [2007 July 20];12(7):[395-7]. Available from: <http://www.pak-medinet.com/view.php?id=2611>.
 12. Tatala S, Svanberg UIF, Mduma B. **Low dietary iron availability is a major cause of anemia: a nutrition survey in the lindi district of Tanzania.** Am J Clin Nutr [serial online] 1998. [2007 Jun 14];68:[171-8]. Available from: www.ajcn.org/cgi/reprint/68/1/171.pdf.

Article received on: 26/01/2010

Accepted for Publication: 12/04/2010

Received after proof reading: 26/10/2010

Correspondence Address:

Dr. Shezadi Sabah
871 street 14 G 11/1
Islamabad
sabah_imran00@yahoo.com

Article Citation:

Sabah S, Ramzan M, Fatima I. Iron deficiency anemia; Role of nutritional deprivation among female patients of reproductive age group. Professional Med J Dec 2010;17(4):686-690.

PREVIOUS RELATED STUDIES

- Farhat R, Roohi M. Iron deficiency anemia; safety and efficacy on intravenous iron sucrose versus oral ferrous sulphate. Professional Med J Jun 2007; 14(2): 263-265.
- Ahmed S, Fareed N, Sadiq N, Ali S, Sultan M, Khurshid U. Iron deficiency anemia; single versus three times daily doses of ferrous sulphate. Professional Med J Jun 2009; 16(2): 209-215.