NUTRITIONAL IRON DEFICIENCY IN WOMEN OF CHILD BEARING AGE—WHAT TO DO?

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Background: Iron deficiency is the most common aetiology of anaemia worldwide and has several risk factors. Although iron deficiency anaemia (IDA) can occur at any age, women from reproductive age group are particularly vulnerable to develop IDA due to increased nutritional demand during pregnancy. Objective was to determine the frequency and nutritional risk factor of iron deficiency anaemia in women of child bearing age. This descriptive, cross sectional study was conducted from October 2005 to March 2006 at the Department of Medicine, Ward-5, and out-patients department of Jinnah Postgraduate Medical Centre, Karachi. **Method:** Two hundred non-pregnant females of child bearing age were included in the study; 100 with no previous pregnancy and remaining 100 with at least one prior history of pregnancy. All the relevant information, i.e., demographic and socioeconomic was collected through a questionnaire. **Results:** Two hundred patients with signs and symptoms of anaemia were recruited. Out of them 89 patients were found to be having iron deficiency anaemia in various age groups. Results also showed that dietary habit of patients was one of the causative factors leading to iron deficiency anaemia. **Conclusion:** To overcome iron deficiency anaemia a thorough and comprehensive strategy is required, i.e., educating the subjects to consume food rich in iron, community based program, monitoring severely anaemic cases and their treatment.
Keywords: Nutrition, Iron deficiency anaemia, Child bearing age

INTRODUCTION

An estimated 2000 million people suffer from anaemia making it the world's most common nutritional disorder.[1] It is a common cause of morbidity and is one of the most frequent medical problems that confront a physician.[2] The most common cause of anaemia in the world is iron deficiency. The diagnosis of iron deficiency anaemia (IDA) is usually indicated firstly by appropriate history (e.g., anaemia in a menstruating woman), and secondly, confirmed by such diagnostic tests as a low serum ferritin, a low serum iron level, an elevated serum transferring and a high total iron binding capacity (TIBC).[3]

Risk for iron deficiency is a function of iron loss, iron intake, iron absorption, and physiological demand. Women of child bearing are especially at high risk for iron deficiency. The iron deficiency can lead not only to anaemia but to decreased work capacity, abnormal neuro-transmitter function and altered immunological and inflammatory defenses.[4] Iron deficiency at any time in life may disrupt metabolic processes and subsequently change cognitive and behavioural functioning. Women of reproductive age are among those most vulnerable to iron deficiency and may be at high risk for cognitive alterations due to iron deficiency.[5]

World Health Organization (WHO) report on maternal health and safe motherhood program reveals an alarming rate of anaemia among pregnant women in developing countries. A cycle of deteriorating health from pregnancy to pregnancy occur when these women are unable to replace blood loss during child birth and their anaemia became exacerbated by the demand of breast feeding.[6]

Anaemia may be a result of insufficient iron intake in the diet (due to either consumption of food with insufficient iron or limited dietary iron availability) and to blood loss caused by parasitic infection. These factors often operate concurrently, with their individual importance varying from region to region.[7]

Hookworm intensity was significantly associated with haemoglobin level; for each 1,000 egg increase, haemoglobin was reduced by 2.4 g/L. Living in different ecological zones, eating <1 serving of meat/ week, and farming were significantly associated with anaemia in women and children. Other risk factors in women included having >3 children and having a child <24 months old.[8] All these risk factors are influenced by social factors and the more important factors are poverty and illiteracy. There are multiple pathways through which social factors influence health, and pathophysiological mechanisms involve homeostatic and allostatic changes in response to stress, neuroendocrine changes and altered autonomic functions, and abnormal inflammatory and immune responses.[9] Asian diets appeared to differ in containing meat less often as a source of iron, while pulses and chapattis provided more phytate and fiber. It is suggested that dietary intakes of phytate and fiber are important in causing lower ferritin levels by reducing iron absorption.[10] Iron-deficiency anaemia has particular negative consequences on women in their childbearing years, and its prevention is a high priority in most health systems Nutritional education can improve knowledge of healthy nutrition and lifestyle choices. Focused

nutritional education using available resources and correcting current dietary habits in a vulnerable group of young women may result in dietary changes that can ultimately improve iron intake.[11]

Aim of our study was to determine the frequency of iron deficiency anaemia in women of child bearing age and to also gather knowledge about the food habits of these patients.

PATIENTS AND METHODS

Two hundred non-pregnant females of child bearing age (between 15–45 years) were included in the study. Non probability, purposive sampling technique was used. One hundred females had no history of pregnancy while the remaining hundred had prior history of at least one pregnancy. A questionnaire was used to collect the demographic and socioeconomic information including age, place of residence, education, levels of crowding, type and duration of employment, and approximate monthly income. Information of dietary habits (quantity of meat consumed each week, use of tea, vegetables, bread and bean), maternal and menstruation history (menarche, age at first conception, parity, inter-pregnant interval, history of any blood loss).

Poverty was defined by internationally accepted level of USD 1 per day (i.e., Rs. 1,800 per month) and patients with haemoglobin less than 11.5 mg/dl were included in the study. Patients already taking iron supplement were excluded from the study. This was followed by thorough clinical examination to record any abnormal finding.

Laboratory work done in pathological laboratory of JPMC and included haemoglobin (Hb), TLC, DLC, RBC count, absolute value. Diagnosis of iron deficiency anaemia was done on red cell morphology and peripheral blood smear, and by serum ferritin level. Stool examination for occult blood, ova and cyst was carried out in all patients. Serum iron and TIBC in few patients. Bone marrow examination was not done because it was not practicable for most of the patients.

Data was entered in SPSS 11.0. Discrete variables such as age groups, history of pregnancy, education level, risk factors for IDA, and food habits were presented as frequency or percentages. Chi-square test was used to analyse the significant difference between IDA and non IDA women in relation with history and no history of pregnancy, and $p<0.05$ was considered as statistically significant value.

RESULTS

A total of 200 patients with sign and symptoms of anaemia were recruited. 100 patients had no previous history of pregnancy while the other 100 had had at least one prior pregnancy. Out of these, 89 (44.5%) patients were found to be having iron deficiency anaemia (IDA) (Table-1). Amongst the patients with IDA, 39 (43.82%)

females belonged to age group 15–25 years while 20 (22.47%) were between the age of 25–35 years, and the rest of the 30 (33.70%) patients were above the age of 35 years. Forty nine (55.05%) patients had primary education, while 26 (29.21%) patients had had secondary school education, 8 (8.93%) patients had attended college, while only 6 (6.74%) patients were graduates.

Table-1: Table shows that there is a statistically significant difference b/w pregnant and non pregnant woman with iron deficiency

	IDA	No IDA	*p-value*
History of Pregnancy	58 (65.2%)	42 (37.8%)	<0.001
No Pregnancy	31 (34.8%)	69 (62.2%)	
Total	89	111	

In these 89 patients, 58 (65.2%) patients were had a history of pregnancy. 22 (24.71%) females had their first pregnancy before the age of 20 years, 40 (68.96%) females were multipara and in 32 (62.06%) of these patients the inter-pregnancy interval was less than one year (Figure-1). Thirty-one (34.8%) patients had IDA with no history of pregnancy. Dietary history revealed that 75 (84.26%) patients were having more than 4 cups of tea per day. All of them were using rice, vegetables and bread and other very low iron containing diet (Table-2).

In many cases more than one cause of IDA was found so results are not simple fraction of total 89 patients.
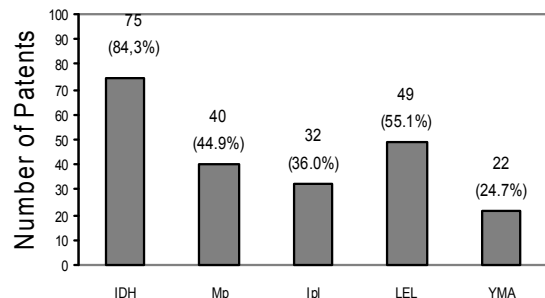
Key: IDH=Improper Dietary Habit, Mp=Multipara, IpI=Inter-pregnancy Interval < one year, LEL=Low Education Level, YMA=Young Maternal Age

Figure-1: Risk factors for iron deficiency anaemia

Table-2: Food Habits of study population

Type of Menu		Number	%
Breakfast	Chapatti, tea	60	67.40
	Rusk/bread, Tea	16	17.97
	Bread, Tea, egg	11	12.35
	Others	2	2.24
Lunch	Chapatti, Pulses, tea	54	60.67
	Chapatti, Vegetables	13	14.60
	Rice, Meat curie	12	13.48
	Chapatti, yogurt, vegetables	8	8.98
	Others	2	2.25
Dinner	Chapatti, vegetables	57	64.04
	Chapatti, Cooked meat	20	22.47
	Rice, Pulses	9	10.11
	Others	3	3.37

DISCUSSION

Despite global recognition, iron deficiency anaemia is still a major health problem especially in developing countries like Pakistan. The prevalence seems to be increasing. Study conducted in 1987 shows the prevalence of anaemia was 30% in young women[12], while a recent study indicates the prevalence of iron deficiency anaemia at 43.36% in the population. This study shows similar prevalence figures for IDA and therefore reinforces the view that IDA is big problem and needs to be dealt with on priority basis.

Socio-economical problems, lack of reproductive health education, dietary habits and life-style are the major causes of iron deficiency anaemia. Because of extended families and large number of dependents the nutritional requirement and caloric needs are difficult to meet. According to the National Economic Survey, 2000 and 2001, poverty at a percentage of population went up from 32.60% in 1998–91 to 33.50% in 1999–2000.[13] Most of the patients belonged to low socio-economic class with lack of proper education, employment and a low quality lifestyle and diet. In such conditions it was very difficult for them to fulfil their daily iron/nutritional requirements.

Patients suffering from IDA were young and had history of one or more pregnancy. In previous study it has been shown that prevalence of iron deficiency anaemia has increased in early lower teen girls, was the highest in high-teen girls and young women and there was highest prevalence for those who got pregnant at an earlier age especially during teenage years.[14]

The patients with IDA were from the low socio-economic group, it was revealed during research that most of them could not afford to buy high quality food that is rich in iron and other proteins and that most of them were having mostly vegetables, tea and bread which are relatively economical. Pakistan falls in the category where use of simple bread (*chapaati*) and tea is very common. These food servings contain phytase and tenin which inhibit absorption of iron. Iron deficiency anaemia is frequently observed in women from south-Asia region because of vegetative diet.[15] Another local study has also revealed that food rich in proteins like beef, chicken and fish are very expensive in our country and due to low income the daily wages labourers in Pakistan are unable to purchase it. The study reveals that animal proteins, leafy un-cooked vegetable and yellow fruits are not present in the food of the poverty-stricken population. Therefore the people are prone to malnutrition and iron deficiency anemia.[16]

The preventive weekly iron-folate supplementation of women during their reproductive life, whose efficacy is recognised, and offers a promising alternative; its impact in terms of public health is under current evaluation.[17] Iron fortification has many advantages over iron supplementation. Fortification of salt with iron has been accepted by the govt. of India as a public health approach to reduce prevalence of anemia.[18] Due to poverty, most of the patients with IDA cannot afford quality food let alone supplementary medications. Therefore only a government effort through availability of subsidised medications may solve the problem.

CONCLUSION

Asian diet differ from the western diet in that they containing meat less often as a source of iron, while pulses and chapattis provide more phytate and fiber. We speculate that the main reasons for IDA are a combination of a higher parity and a less common use of iron supplementation in pregnancy in the Pakistani group and a higher content of phytate in the Pakistani diet.

Culturally sensitive intervention research, which addresses application of Iron deficiency anaemia education principles, temporary supplementation, and adequate income for dietary modification and long-term iron supplementation to prevent Iron deficiency anaemia, is warranted.

The implementation of national nutrition plans including the control of iron deficiency as one of the priorities and the participation of the public health and education sectors, food industries, the community and the media should contribute to the success of the interventions and to the control of iron deficiency. There is now need for the development of clear policy guidelines based on these simple and integrated interventions.

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