ROLE OF LOW DIETARY INTAKE OF IRON AND ENERGY IN DEVELOPMENT OF ANEMIA IN SUBJECTS (30 – 40 YRS.) BELONGING TO THE REGION OF ALWAR, RAJASTHAN

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Abstract

Anemia is a global public health problem, with major consequence for human health and socio-economic development. Anemia is a condition in which the number of red blood cells (and consequently their oxygen – carrying capacity) is insufficient to meet the body's physiological needs.According to a review of nationally representative survey data from 1993 to 2005, the World Health Organization (WHO) estimates that more than 1.62 billion people are affected by Anemia.

As the major cause of Anemia is Iron deficiency, so, the need was felt to do a Dietary survey and Anemic subjects so that the Iron supplementation can be completely provided through daily diet. In the survey forty subjects suffering from Anemia were selected from region of Alwar, Rajasthan. The Demographic details were collected through interview cum questionnaire method. The hemoglobin of the subjects was tested by Haemoglobinometer. The subjects were having very less Hb than prescribed normal range as given by WHO.The mean nutrient intake viz.calories, protein, fat ,carbohydrate, Iron was calculated by seven day dietary recall method. It was resulted that anemic subjects were taking less than half of the RDA's. Poor status of Iron intake was found among the subjects. The nutrition education was imparted to the subjects.

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1. Introduction

Nutritional Anemia is defined as a condition in which the hemoglobin content of the blood is lower than normal (Krause.et.al, 2011).Specific physiological needs vary with a person's, age gender, residential elevation above sea level (altitude), smoking behavior, and different stages of pregnancy (WHO, 2000). Iron deficiency Anemia implies that the hemoglobin concentration is below the 95th percentile of the distribution of hemoglobin concentration in apopulation (disregarding effects of altitude, age and sex etc. on hemoglobin concentration).Iron deficiencybeing defined as absence of iron stores combined with science of an iron deficient erythropoietin (Vitamin and Mineral Requirement Human Nutrition.et.al, 1998).

Anemia is blood disorder. Blood is a vital liquid that your heart constantly pumps through your veins and arteries and all throughout your body. Anemia can affect people of all ages, races and ethnicities. Anemia occurs if your body makes too few red blood cells (RBCs), destroys too many RBCs, or loses too many RBC's. RBCs contain hemoglobin, a protein that carries oxygen throughout the body. When you don't have enough RBCs or the amount of hemoglobin in your blood is low, your body doesn't get all the oxygen it needs.Signs and symptoms of Anemia are Tiredness or weakness, pale or yellowish skin, Faintness or dizziness, increased thirst, sweating, weak and rapid pulse, shortness of breath, lower leg cramps, Heart- related symptoms:- abnormal heart rhythms, heart murmur, enlarged heart, heart failure. (U.S.D.H.HS et.al 2011).

It is equally common in women in the reproductive period of their life since there is loss of iron during menstruation and increased demands during pregnancy and lactation. The causes for poor intakes of iron aredue to poor economics, malignancy GI tract, and anorexia nervosa, chronic blood loss. Piles, hookworm infestation, excessive menstrual loss (menorrhagia), repeated pregnancies absorptions, bleeding peptic ulcer and decreased absorption of iron. Dietary sources of iron include eggs, dry fruits, liver meat, green vegetables and fresh fruits and there is deficient intake of these in the diet of most of people. (Essentials of Medicine, et.al 2008).

2. Review of Literature

The review of literature of the topic of research is not confined to India only as Anemia is an epidemic that has spread all over the world (WHO, 2000). Anemia is a serious public health problem in India, affecting all segments of the population (50-70%), especially infants and young children, adolescent boys and girls, women of childbearing age and pregnant women.

(ICMR, et.al 2011). Iron deficiency is seen to coexist with other cause of Anemia in India. In the urban slum, 75% of children suffering from anemia were seen to respond to iron administration and 22% of anemic children also had biochemical vitamin B12 deficiency. (Kuwait, et.al 2015).

This study conducted at Bangladesh aimed at investigating the prevalence of Anemia among males and females. Distribution of hemoglobin concentration <90g/L, <120 g/L, and < 130g/L.According to WHO about 69% of males and 70% females of females were found to be Anemic. World Health Organization (WHO), 2000 statistics indicate a worldwide Anemia prevalence of about 30% with higher rates in developing countries. Young children and pregnant women are the most affected group with an estimated global prevalence of about 40 percent and 50 percentrespectively. Severe Anemia (with hemoglobin levels < 8g/dl) is more frequently seen in severely undernourished children who also exhibit signs associated with deficiencies of calories, proteins , vitamins and minerals.(B.Srilaxmi).

3. Material and Methods

3.1 Locale of Study:-The study was conducted at Solanki Hospital in Alwar, Rajasthan. The purpose of this study was to see the association of dietary pattern with the disease.

3.2 Selection of the subjects:-

a) Forty adults including twenty males & twenty females between 30 -40 years of age were randomly selected.
b) The height and weight of all the subjects were measured to find the undernutrition among them.
c) The objective and experimental protocol of the study was explained to the subject, and their prior content was taken.

3.3 Experimental Plan:-

The study was constituted of phases and the classification of subjects is elaborated as under:

3.3.1 Phase 1:- The phase one included 40 adults for the study. For this purpose field studies medical history and Biochemical assessment was performed as under:

3.3.1.1Field Studies: -These studies consist of collection of data regarding general information, physical activity pattern, and health record and anthropometry measurement. The general information of subjects related to age, education, occupation, marital status , family type and size, history of blood loss, medical history were recorded by using the questionnaire.

3.3.2.Phase 2:-

3.3.2.1 Dietary history: - The data related to the past one week of the dietary intake of the subjects by seven day recall method. The information about the food likes and dislikes and dietary pattern of subjects was also obtained.

3.3.3 Phase3:-

3.3.3.1 Biochemical Assessment: - The hemoglobin was determined by haematocrit method. The blood sample was taken by pricking the finger of the subject by Lancet. The hemotocirt tube was placed near the incision site and the blood flowed into the tube via capillary action until it reached the predesignated mark on the tube. To maintain the consistency of the results the amount of blood was equally divided into three samples of 0.3ml each. Seal the tube with a sea lent. The packed cell volume (PCV) can be determined by placing the tubes in a micro hematocrit centrifuge for five minutes. The centrifugation was not done at high speed as it could break the syringe holding the blood sample. This separates the blood sample into layers. Then the measurement of the length of the blood samples including the red blood cells was taken and divided by the length of whole column. The value of hematocrit was calculated by multiplying this value of 100%. The hemotocrit was divided by three and it resulted in the value of hemoglobin levels in grams per deciliter. (g/dl).

3.4 Dietary Counseling:-

After collecting the initial information regarding the subjects of who volunteered to be part of the study, the guidance through consumption of iron rich diet was provided with dietary counseling and behavioral guidance. For Anemia this booklet included information on calorific value of commonly consumed foods, lists of food to be eaten, limited and avoided, food exchange lists and calorie content of some common dishes/snacks. For Anemia the emphasis was primarily laid

on increasing the amount of energy (kcal) in the diet and on the increase of consumption of Iron, in the form of whole cereals, fruits and vegetables, nuts and oil seed the green leafy variety. We advised the anemic patients to take brown rice, oatmeal, broccoli, tofu, fish, nuts and mainly green leafy vegetables which contain lots of Iron.

3.5 Statistical Analysis of the data:-

The collected data were decoded, tabulated and statistically analyzed using standard techniques such as arithmetic mean, standard deviation and average.

4. Results and discussion

The subjects were conscious about their blood loss.A total of 40 samples from the study area were included in the analysis. Various criteria like background profile, anthropometry, food consumption, medical history, physical history and general awareness were studied and analyzed. The present study shows (20%) of anemic female subjects.Further (30%) of anemic males and females suffering from Intestinal Reflux Diseases or Peptic Ulcer Disease respectively.

Table 4.1 Total mean hemoglobin of all subjects. (N=40)

Age group of Subjects	Total no. of Subjects*N=40	
	Mean Hb of Male Subjects (**n=20)	Male Hb of Female Subjects (**n=20)
30 – 32 yrs	8±1 (n=3)	7±1.41 (n=6)
33 – 35 yrs	9±2.64 (n=3)	7.3±0.836 (n=5)
36 – 37 yrs	9±4	7.5±1.290

	(n=2)	(n= 4)
38 – 40 yrs	13.5±2.121 (n=2)	6±1.224 (n=5)

*N= Total no. of subjects

**n=Total no. of male and female subjects.

Total mean hemoglobin level of male subjects of age group from 30 – 32 yrs is 8±1, 33 – 35 yrs is 9±2.64, 36 – 37 yrs is 9±4 and 38 – 40 yrs is 13.5±2.121 whereas female subjects of age group from 30 – 32 yrs is 7 ± 1.4, 33 – 35 yrs is 7.3±0.836, 36 – 37 yrs is7.5±1.290 and 38 – 40 yrs is 6±1.224.

Table No. 4.2 Food habits of the subjects suffering from Anemia (N = 40) in Alwar.

Population Characteristics	Response	Percentage of subjects # (N=40)	
		Male **(n=20)	Female **(n=20)
Fruits Prefer	Apple	40	50
	Mango	10	15
	Banana	30	20
	Guava	20	15
Leafy Vegetable	once a week	30	35
	Twice/week	-	40
	Thrice /week	40	15

	None of the above	30	10
5 Meals a day	Yes	30	-
	No	70	100
Jaggery	Yes	30	45
	No	70	55
Food Supplement	Vitamin	10	25
	Protein	-	15
	Iron	40	40
	Folic acid	30	20
Allergic food product	Yes	10	95
	NO	-	5

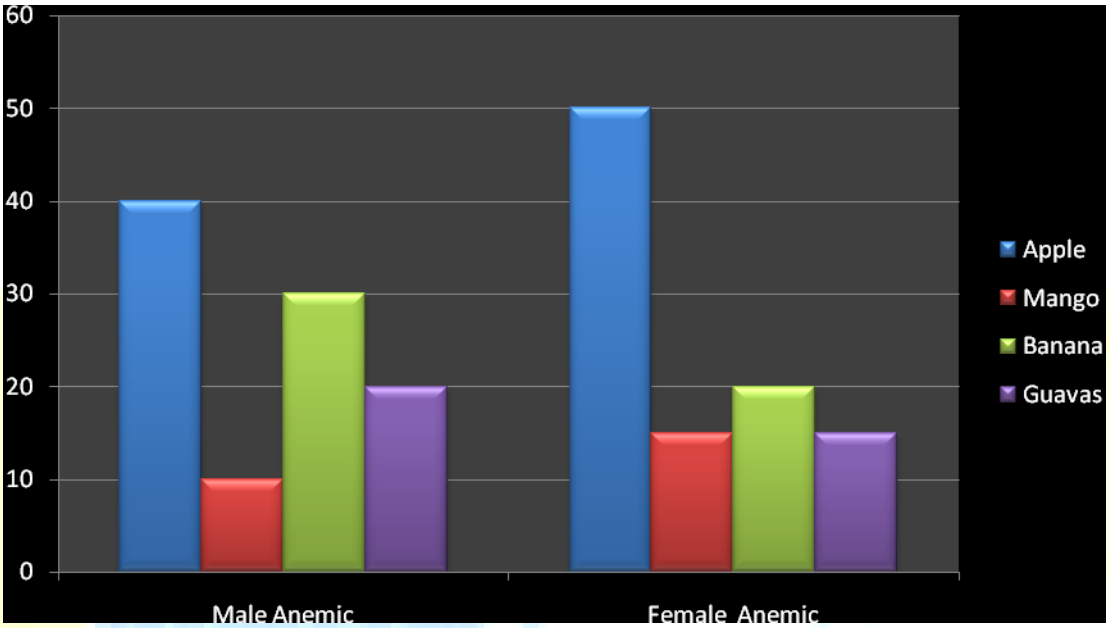
*N = total number of the subjects of all age groups

**n = number of subjects of each age group

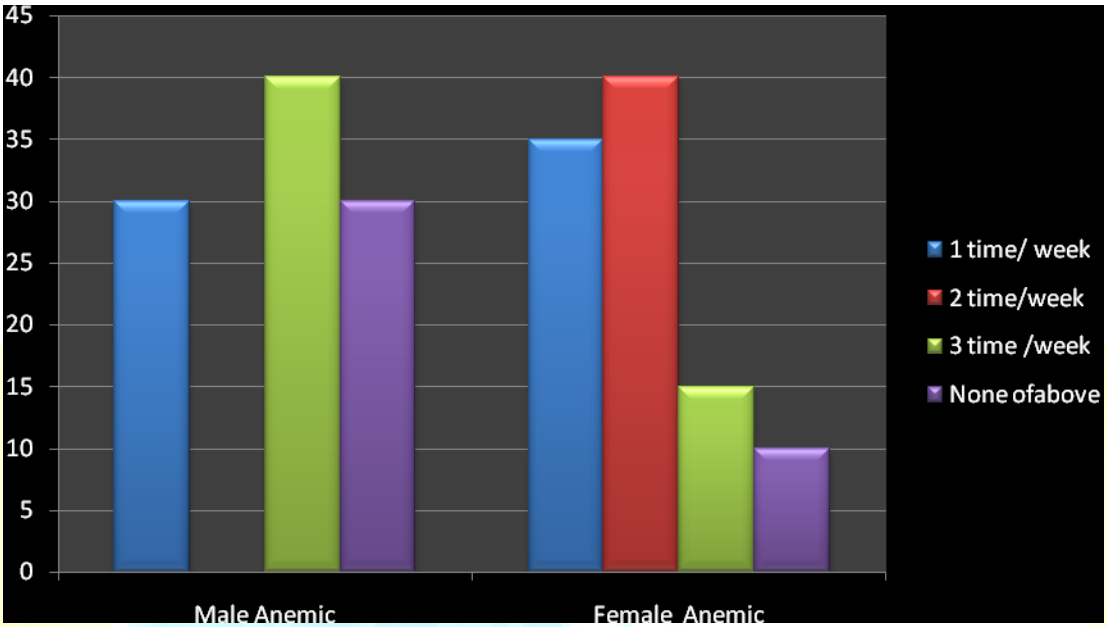
#= Multiple responses

Fruits: - The percentage of Anemic male's subjects from Alwar were 40, 10, and 30 and, 20 per day. While the percentage of female anemic adults of Alwar were 50, 15, 20 and

respectively.



Leafy Vegetable:-The percentage of anemic males adults of Alwar who were eating out daily, 1-time per week, 2- time per week, 3-times per week, and none of the above rarely were 30,0 ,40, and 30 per cent in anemic males and the percentage in anemic females adults of Alwar who were eating out daily,1-time per week, 2- time per week, 3- times per week, and none of above rarely were 35,40,15, and 10 respectively.



Age, body mass index, and smoking were associated with Anemia. Women with Anemia reported lower intakes of energy, protein, foliate vitamin B-12, iron, vitamin C, and red meat. Multiple dietary deficiencies were associated with 215 greater risk of persistent Anemia. (Diet Assoc, et.al 2011).

Table 4.3:- Mean of daily nutrient intake of adults belonging to region of Alwar.

Nutrient	Alwar		RDA (g/day)	
	Male	Female	Male	Female
Energy (kcal)	881.82± 77.53	918.96± 65.96	2425	1875
Carbohydrate (g)	121.31± 14.09	120.39± 10.37	300	275
Protein (g)	33.13± 3.62	34.20± 3.87	60	50
Fat (g)	29.34± 5.34	33.40± 9.52	20	20
Iron (mg)	6.74± 0.67	6.94± 0.812	28(mg/d)	30(mg/d)

RDA – Recommended Dietary Allowances

Energy: - The mean daily intake of energy of anemic male subjects of Alwarwas 881.82± 77.53 respectively while the mean value of anemic female subjects of Alwar was 918.96± 65.96. The RDA values of male contain 2425 kcal and RDA value of female contains 1875 kcal energy.

Proteins: -The mean value of proteins of anemic males belonging to region of Alwar was 33.13± 3.62respectively. Similarly the mean value of anemic females from Alwar was 34.20± 3.87 respectively. According to ICMR, the RDA for Indian male is 60g/day and Indian female is 50g/day protein respectively.

Fats: -The mean value of fats of anemic males belonging to region of Alwar was 29.34± 5.34 g/day. Similarly the mean value of fats in anemic females from Alwar was 33.40± 9.52 g/day. The fat intake of both male and female subjects was average as compared to RDA of 20 g/day.

Carbohydrates: - The mean value of carbohydrates of Anemic males belonging to region of Alwar was 121.31± 14.09 g/day. Similarly the mean value of anemic females was 120.39± 10.37g/day. The intake of carbohydrate intake of both male and female subjects was just half the RDA. The RDA value of male contains 300 g and RDA value of female contains 275g carbohydrate.

Iron: - The mean value of iron of anemic males belonging to region of Alwar was6.74± 0.67g/day. Similarly the mean value of anemic females was 6.94± 0.812g/day. Disturbed and ignorant dietary habits and decreased intake of iron dense food is one of the major causes of Anemia among selected adults.The RDA values of male contain 28 mg and RDA value of female contains 30 kcal energy.

Conclusion

Iron deficiency is the most common known form of nutritional deficiency. Risk factors for Anemia include extremes of age, female's gender, lactation, heavy menstrual loss, peptic ulcer, shortness of breath, appetite or weight loss, tiredness, skin problem and pregnancy. (BMJ Publishing group 2015).Iron deficiency is more likely in women of reproductive age because of menstrual blood loss.

In this study there were 40 subjects, which were taken on the basis of random sampling and then divided into 20 males and 20 females. The subjects were ignorant about Dietary intake of iron and calories. They were not having sufficient amount of nutrients. The nutrition education and planned diets were imparted to the anemic subjects. In this particular study as mentioned above seven day dietary re-call of the subjects and food frequency questionnaire were collected on the basis of this survey. It was concluded that the subjects needed to know about Iron rich foods as well as factors affecting Iron absorption. The Iron rich foods were liver, lean meat, fish, legumes, dry fruits, whole grain cereal, jaggery, rice flakes, green leafy vegetable, soybeans, dried apricots, brown rice, oatmeal, and broccoli and so on. These foods were advised to the anemic patients. They were also guided about factors affecting Iron absorption.

1) Tea and coffee inhibit iron absorption when consumed with a meal or shortly after a meal. This hindrance Iron absorption.

2) Never combine green leafy vegetable with milk products e.g. Palak paneer. This leads to formation of insoluble salts oxalates and phylates in testis which does not allow Iron to be absorbed.

3) Add vitamin C to the daily diet as it helps to increase the absorption of Iron..

4) High fiber diet was also responsible for non-absorption of Iron.

5) Use of antacids was also prohibited in the selected anemic subjects. Antacids also hinder the absorption of Iron.

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