ASSESSMENT OF DIETARY INTAKE OF MODERATELY ANAEMIC PREGNANT WOMEN VISITING A PRIMARY HEALTH CENTRE IN DELHI

***Anshu Sharma[1], Salila Thomas[2] and Pushpa Sundararaj[3]**

[1]Assistant Professor, Institute of Home Economics, University of Delhi, New Delhi

[2]Associate Professor, [3]Associate Professor, Lady Irwin College, University of Delhi, New Delhi

anshusharma2006@gmail.com

ABSTRACT

Background: *Even today, seven decades after independence, pregnancy anaemia remains one of the major public health problems in India; associated with increased risks like maternal mortality and low birth weight deliveries. Studies show that over 80% of all pregnant women in India are anaemic; and almost 20% of these have moderate anaemia (Hb 5.0 - 8.0 g/dl). Diet is one of the major factors that determine the nutritional status and haemoglobin levels of pregnant women. Though, over decades, there has been an improvement in the dietary intake of pregnant women, but their micronutrient intake is still much below their required allowances.* **Objective:** *To assess the dietary intake of moderately anaemic pregnant women (second trimester) in a primary health centre.* **Methodology:** *Diet survey was performed, 24 hour dietary recall was carried out on 141 moderately anaemic pregnant women who were in their second trimester of pregnancy and were visiting a primary health centre in Delhi for their antenatal checkup.* **Results:** *The data showed that majority (80%) of pregnant women had a two meal pattern in a day. Most of the meals comprised of cereals with pulse/vegetable; intake of fruits and green leafy vegetables was very low; hence their micronutrient intake, especially, iron and folic acid was below 50% of the RDA and this was one of the reasons for their low haemoglobin levels (5.0-7.9 g/dl).* **Conclusion:** *Data showed that intake of micronutrients, especially, iron and folic acid was low; this appears to be one of the major reasons for their moderate anaemia condition. The prevailing condition cannot be corrected with dietary changes alone and requires a more direct intervention too (giving intramuscular iron). Thus, all pregnant women coming for ante-natal checkup for the first time must be screened for their degree of anaemia and treated accordingly along with dietary modifications.*

Key Words: *Anaemia, Pregnancy, Diet.*

INTRODUCTION

Anaemia is a global public health problem affecting both developing and developed countries with major consequences on human health as well as social and economic development. It is a condition in which body does not have enough dietary iron available to form Haemoglobin which gives red colour to our body cells and also helps in carrying oxygen from the lungs to various parts of the body. When the level of haemoglobin is below the normal, an individual is said to be anaemic. The cut-off points for determining the presence of anaemia in different groups is given in Table 1 (WHO/UNU/UNICEF, 2001). Some of the adverse health consequences of anaemia include diminished concentration leading to impairment of maximal work capacity and reduced work output, decreased muscle function and increased susceptibility to infections.

Table 1: Cut-off points for determining presence of anaemia for different age groups

Group	Age (years)	Haemoglobin (g/dl)
Children	0.5 – 4.99	< 11.0
Children	5.0 – 11.99	< 11.5
Children	12.0 – 14.99	< 12.0
Adult Male	≥ 18.00	< 13.0
Adult Female	≥ 18.00	< 12.0
Pregnant Female	≥ 18.00	< 11.0

Though anaemia affects both the genders but it is found to be more prevalent in physiological stages of life (adolescence, pregnancy and lactation). In India, studies carried out way back in 1950's and 1960's showed that almost 80% of pregnant women had anaemia (haemoglobin levels < 11.0 g%, Table 2) and of these, about 20% had moderate anaemia (Haemoglobin levels 5.0 – 7.9 g%). In general, anaemia in pregnancy is associated with an increased risk of low birth weight deliveries, maternal mobidity and mortality. Data from nationwide surveys, carried out almost six decades hence, indicate that there is no change in the incidence of pregnancy anaemia inspite of the government programs being run at the national level.

Table 2: Cut-off points for screening various degrees of pregnancy anaemia

Category	Haemoglobin (g/dl)
No anaemia	≥11.0
Mild anaemia	8.0 – 10.99
Moderate anaemia	5.0 – 7.99
Severe anaemia	< 5.0

Inadequate dietary intake is one of the major factors responsible for anaemia in pregnancy (Kramer, 1987). A majority of the women living in the developing countries undergo pregnancy in existing adverse conditions of poverty and overwork. Infact, anaemia is a stressful period as the expectant woman has to meet not only her own nutritional requirements but also the nutrient needs of the growing foetus, especially, in the second and third trimesters (WHO, 1968). Although the nutrient requirements during the first trimester are quantitatively small, nutritional deprivations during this period can adversely affect placental structure, and indirectly, the ultimate weight of the baby (Luke, 1994). However, in late gestation, maternal undernutrition can have profound effects. Several nation-wide surveys have been carried out over the past few decades which indicate that though there has been an increase in the dietary intake of the pregnant women but still it is below the recommended dietary allowances (NNMB, 2002; NNMB 2006; INP 1998). The possible reasons for this could be low dietary intake of nutrients, low frequency of consumption of food groups rich in micronutrients; increased reproductive cycles with short inter-pregnancy-intervals; poor bioavailability of iron in phytate rich Indian diet, poor nutritional status of the mother, parity, early marriage leading to adolescent pregnancies and gender discrimination in intra-household food allocation.

In India alone, almost 60% of adolescent girls are anaemic. It is these girls, who enter the marriage institution with anaemia and in due course, pregnancy only serves to aggravate their pre-existing anaemia. Several studies have been carried out to find prevalence of pregnancy anaemia and the dietary intake of these women; but ample data have not been collected specifically for moderately anaemic pregnant women who form a substantial percentage (20%) of the anaemic pregnant women group. Moderate anaema in pregnant women may lead to intra-uterine growth retardation, premature and / or low birth weight (weight < 2.5 Kg) deliveries, maternal mortality, anaemia in infancy leading to low foetal iron stores thus causing increase in perinatal mortality. Studies have also shown that prevalence of morbidity due to infections almost doubled in pregnant women with moderate anaemia. In the lower socio-economic group in India, continued low dietary intake among the already chronically undernourished and overworked women, poses a serious threat to both the mother and the feotus (Ramachandran, 1989). The demand for all the nutrients (Energy, Protein, Calcium, Iron, Folic Acid, B-complex vitamins etc.) are increased during pregnancy. In the present study an effort has been made to find out the diet and nutrient intake of moderately anaemic pregnant women with the following objectives:

- To assess the dietary intake (using 24-hour dietary recall) of moderately anaemic pregnant women (second trimester) belonging to low socio-economic group and coming to a Primary Health Centre in Delhi for their ante-natal check-up.
- To compare the dietary intake of moderately anaemic pregnant women (second trimester) with the recommended dietary allowances 2010 (RDA, 2010).

METHODOLOGY

The study was carried out in a primary health centre in Delhi where pregnant women came for their regular ante-natal check-up. All these pregnant women were screened for anaemia using the gold standard cyanmethaemoglobin method. Based on their haemoglobin levels, these women were classified into four categories – normal (Hb > 11.0 g/dl); mildly anaemic (Hb 8.0-10.9 g/dl); moderately anaemic (5.0-7.9g/dl) and severely anaemic (Hb < 5.0 g/dl).

In a sub-sample of moderately anaemic women, dietary intake data was collected using 24-hour dietary recall method. The inclusion criterion for the same was the group of moderately anaemic pregnant women who

- Had no obstetric problems
- Had singleton pregnancy
- Were their second trimester
- were keeping well (no cold / fever etc)
- cooked food at home
- were willing to participate in the diet survey.

Tools and Technique: All the pregnant women coming to the antenatal OPD were registered for their check-up. Their socio-demographic profile and clinical details (Obstetric History, Blood Pressure, Height, Weight) were recorded. Then she was screened for anaemia and other parameters (Blood Sugar, VDRL). After their check-up, moderately anaemic pregnant women who fulfilled the above mentioned criterion were selected for diet survey which was carried out using a set of standardized utensils. A proforma was developed and pretested before collecting the data for the dietary intake of the selected expectant mothers. The data were collected for all the food items and the amounts consumed by them throughout the previous day. These women were enquired about the total measures of the raw ingredients used in cooking dishes, total amount cooked and of that the amount eaten by them using household measures like katories, glasses and spoons of different sizes with known volumes.

Statistical Analysis: The mean nutrient intake of these women was computed using the nutritive value of Indian foods (ICMR, 1989). A comparison of the nutrient intake has been made with standard recommended dietary allowances and National data collected under India Nutrition Profile data collected for Delhi state.

RESULTS AND DISCUSSION

In the present study, a total of 3772 pregnant women, who had come for the antenatal check-up were enrolled. From the collected socio-demographic data, the standard of living index of the pregnant women who came there was calculated. According to this, the pregnant women belong to low socio-economic group and were categorized as 29.4% belonging to low, 45.5% to middle and 25.1% to high

low socio-economic group. Majority of the women were between 21-29 years of age. Of these, 44.6% were expecting their first child in current pregnancy. The mean height of these women was 151.2 cm. The mean weight of the expectant mother was 48.6 kg, 49.4 kg and 52.0 kg in the first, second and third trimesters, respectively.

The mean haemoglobin level of the pregnant women in the current study was 9.5 g/dl. Overall, 88% of these women were anaemic, of which 66.7% were mildly anaemic, 21% were moderately anaemic and 0.3% had severe anaemia.

Taking the inclusion criterion into consideration, dietary recall method was carried out in 141 pregnant women with moderate anaemia. Majority of them (80%) had a two-meal pattern. A large number of these women had tea with biscuits/rusks/bread in the morning followed by lunch and dinner. Their meals comprised of cereals with pulses / vegetables and very little intake of fruits and green leafy vegetables. Most of them consumed milk or milk products daily; fat and sugar consumption was moderately high. Among pulses, whole pulses were absent from their diets and though some of them were non-vegetarians but their non-vegetarian food consumption was limited to certain occasions.

The nutrient intake analysis (Table 3 and Figure 1) revealed suboptimal intake when compared to the recommended dietary allowances for all nutrients, except, Thiamine.

Table 3: Mean daily intake of nutrients (Mean+SD) among moderately anaemic pregnant women (in second trimester) as compared to the RDA (ICMR, 2010)

Nutrients	Mean+SD (n=141)	RDA
Energy (Kcal)	1590.6+477.63	2580
Protein (g)	51.0+22.36	74
Calcium (mg)	543.9+323.34	1200
Iron (mg)	14.0+6.79	35
Folate (ug)	57.6+32.18	500
Riboflavin (mg)	1.0+0.47	1.33
Vitamin A (mcg)	275.2+235.66	800
Thiamin (mg)	1.27+0.61	1.12
Niacin (mg)	12.7+5.85	16
Vitamin C (mg)	27.4+11.94	60

The low mean energy intake could be attributed to anorexia as stated by majority of the pregnant women. They consumed two meals a day with no in-between snacks. On an average, only 58% of RDA energy requirements were met with. The overall low intake of protein could be due to the high cost of protein rich foods (milk, pulses, egg and non-vegetarian food). The protein in their diet was mainly from cereals and dehusked pulses as the consumption of meat and meat products was quite low. The data indicates that not even 50% of the calcium requirements are met with. The main sources of

calcium for these women were cereals, pulses, banana, milk in tea and curds. Iron and folic acid intake was exceptionally low and hence contributed to high prevalence of iron deficiency anaemia among these women.

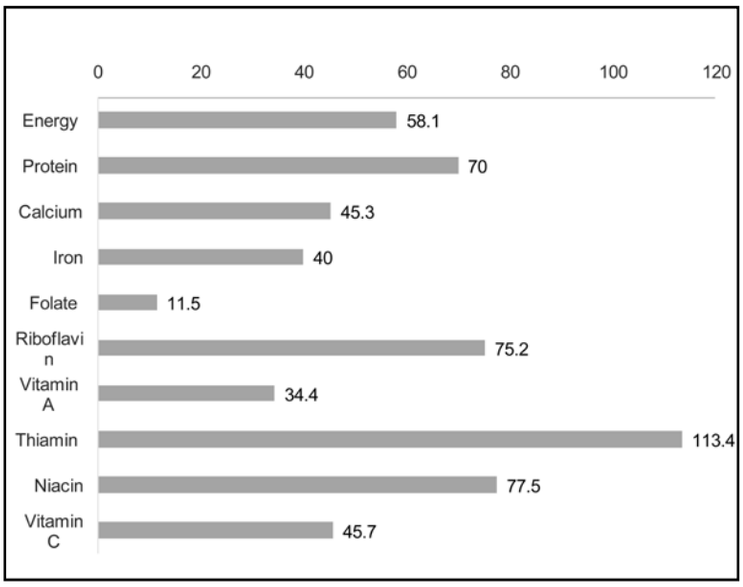

Figure 1: Percent RDA met (for various nutrients) by moderately anaemic pregnant women (in second trimester)

Infact, the average intake of iron was only 14 mg which was less than that observed in India Nutrition Profile (INP, Table 4) and could meet only 40% of the RDA. The mean intake of all B-complex group vitamins (except thiamine) and vitamin A was low as compared to the RDAs. A comparison of mean intakes of nutrients by the moderately anaemic pregnant women with the dietary intakes in INP survey for Delhi women showed marked difference (Table 4).

Table 4: Comparison of average intake of nutrients (Mean+SD) among the moderately anaemic pregnant women (in second trimester) with INP (1998) survey – Delhi state

Nutrients	Present study (moderately anaemic pregnant women)	INP 1998 (Delhi women)
Energy (Kcal)	1499.6+477.63	2048
Protein (g)	51.0+22.36	65.32
Calcium (mg)	543.9+323.34	654
Iron (mg)	14.0+6.79	20.17
Folate (ug)	57.6+32.18	Not available
Riboflavin (mg)	1.0+0.47	0.88
Vitamin A (mcg)	275.2+235.66	348.25
Thiamin (mg)	1.3+0.61	1.80
Niacin (mg)	12.5+5.85	15.94
Vitamin C (mg)	27.4+11.94	53.49

The mean intake of all the nutrients in the latter were better than those in the present study. This could be due to:

i) A large number of women reported poor appetite during pregnancy leading to less intake of food,
ii) Non-availability of iron rich food items throughout the year,
iii) Low intake of vitamin C rich foods which helps in iron absorption.

The percentage of the RDA of different nutrients as consumed by the moderately anaemic pregnant women is indicated in Table 5. Almost 40% of the moderately anaemic expectant women in their second trimester consumed less than 50% of the RDA for energy, 29% consumed 50-70% and only 31.2% consumed more than 70%. The protein intake was more than 70% in 58.9% of the expectant women. More than 50% of these women were not able to meet even half of the calcium requirements and only about one-fourth of them consumed more than 70% of the requirements. More than 70% of iron intake was found in only 5% of the moderately anaemic pregnant women whereas 100% of them had less than 50% of folic acid requirements fulfilled.

Table 5: Distribution of moderately anaemic pregnant women by percent RDA consumption of different nutrients in the second trimester

Nutrients	Percent RDA		
	< 50%	**50 – 70%**	**>70%**
Energy	39.7	29.1	31.2
Protein	17.7	23.4	58.9
Calcium	51.8	20.6	27.7
Iron	77.3	17.7	5.0
Folate	100	0	0
Vitamin A	63.8	6.4	29.8
Riboflavin	41.8	17.1	41.1
Thiamine	14.2	16.3	69.5
Niacin	23.4	24.1	52.5
Vitamin C	27.0	34.8	38.3

CONCLUSION

Thus, the data show that for all macro and micronutrients (except thiamine), the mean dietary intake of the moderately anaemic pregnant women in their second trimester in the present study was below the RDA. Infact, the nutrient intake was lower than even the corresponding INP survey values. The data indicate that the diets of these women were grossly inadequate for almost all nutrients contributing to their low levels of haemoglobin. No special efforts were made by them to improve their diets. The possible reasons for this could be ignorance about importance of diet during pregnancy, anorexia during this time period, habitual aversion towards certain food groups, high cost of food items which made

them beyond the reach of women belonging to low-socio-economic group. The prevailing condition of moderate anaemia in pregnancy cannot be corrected with dietary changes alone and requires a combination of interventions like balanced diet, nutrition education, family planning counselling, giving intramuscular iron. Thus, all pregnant women coming for ante-natal checkup for the first time must be screened for their degree of anaemia and imparted nutrition education about importance of balanced diet in pregnancy. Infact, emphasis on the improvement in the nutritional status of would be mothers should start during adolescence itself. As a result, these girls will enter marriage with a good nutritional status and will usher in a healthy generation.

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