

A Study of Nutritional Status of Pregnant Women of Some Villages in Balasore District, Orissa

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ABSTRACT Pregnant women have been widely recognized as a vulnerable group from health point of view. They need more food than normal person for the proper nourishment of the growing fetus. The field of nutrition of the pregnant women, particularly in rural area, has been sadly neglected. Against this backdrop, the study was carried out among 105 pregnant women from 20 different villages of Balasore district. A pre-tested structured interview schedule was used for the collection of general information. 24 hour recall method of diet survey was applied for the collection of dietary information. Hemoglobin level was collected from doctor's report for observing the anaemic condition. It was found that the mean iron, calcium, carotene and folic acid was much lower than the RDA volumes. Percent incidence of common nutritional deficiencies among the pregnant women was much higher in the third trimester than the 1st and 2nd trimester. In spite of better education and high-income, nutrition intake was lower than RDA in case of many sample women. Based upon the analysis, the study finally emphasizes the need for popularizing cultivation of low cost nutrition greens and vegetables in each household and imparting nutrition education to the village women.

INTRODUCTION

Maternal nutrition and health is considered as the most important regulator of human fetal growth. A healthy mother can produce a healthy child. If women are not well nourished, they are more likely to give birth to weak babies resulting in high infant mortality rate.

Pregnancy is the period of dynamic change for a mother requiring a lot of care. During this period the fetus is nourished directly by the mother through placenta. Since the baby totally relies upon its mother for nourishment, the pregnant woman is to be provided with an adequate and well-balanced diet (Mudambi, 1992). A woman's normal nutritional requirement increases during pregnancy in order to meet the needs of the growing fetus and of maternal tissues associated with pregnancy. Proper dietary balance is necessary to ensure sufficient energy intake for adequate growth of fetus without drawing on mother's own tissues to maintain her pregnancy (Mridula et al., 2003).

In pregnancy anaemia has a significant impact on the health of the fetus as well as that of the mother. It is the most wide spread nutritional disorder in the world effecting 30 per cent of the worlds population. It is more common among the expectant mother (Thangaleela and Vijayalaxmi, 1994).

According to Agarwal (1991) maternal anaemia resulted in 12 to 28 per cent of fetal loss, 30 per cent of perinatal and 7 to 10 per cent of neonatal deaths. The remaining births have about 50 per cent chance resulting in a low birth weight (LBW) baby. Anaemia in pregnancy is also associated with increased maternal morbidity and mortality.

Pregnant women have been widely recognized as a vulnerable group from the health point of view. It has been universally accepted that they need more food for the growing fetus. They constitute the important segments of the population with higher nutrient requirements. Considerable amount of attention has to be paid to for the dietary intake and nutritional status of pregnant women.

The field of nutrition of pregnant women in rural area is sadly a much-neglected area of research. There is a dearth of literature on health and nutrition of pregnant women in rural area. Hence, the present study is undertaken to know the health and nutrition status of pregnant women in the rural area.

Objectives

The study has the following objectives:

1. Know the socio-demographic features of sample respondents.

2. Record the food and nutrient intake of the respondents and compare the same with the available recommended dietary allowances (RDA).
3. Observe the impact of socio-demographic features on food and nutrient intake of the respondents.
4. Analyze the prevalence of nutritional anaemia among the respondents.

MATERIALS AND METHODS

The study was carried out amongst pregnant women in different trimesters of pregnancy belonging to rural areas of Balasore district of Orissa. 105 pregnant women from 20 villages constitute the sample respondents. Purposive sampling method was adopted for surveying the sample. The list of pregnant women was collected from Anganwadi workers and ANM (Auxiliary Nurse Midwife) working in those villages. A pre-tested structured interview schedule was used for collection of general information. Twenty-four hours recall method of diet survey was applied for the collection of dietary information. The intake of nutrients by the respondents was calculated by using Nutritive Value of Indian Foods (Gopalan, 1991). Recommended dietary allowances suggested by the ICMR for pregnant women was utilized to assess the adequacy of nutrient intake by the respondents. Information on Hemoglobin level was collected from their doctor's prescriptions. The study followed the WHO (1989) standard of hemoglobin below 11 gm/dl during pregnancy is an indication of anaemia.

RESULTS AND DISCUSSION

Socio-demographic Profile: It was observed that 50.5 per cent respondents belong to 21-25 years age group, followed by respondents of 26-30 years of age (27.6%). The mean age was ascertained to be 24.2 years (Table 1). The educational status revealed that only 9.5 per cent of mothers were illiterate, 31.4 per cent had college education or above whereas the remaining had either middle or high school level education. The mean age at marriage of the respondents was 20.8 years. 53.3 per cent respondents got married within 20 years of age, 42.9 per cent respondents got married between 21 to 25 years of age and only 3.8 per cent

Table 1: Distribution of respondents on the basis of demographic characteristics.

<i>Respondents</i>	<i>N</i>	<i>%</i>
<i>Age</i>		
Up to 20 years	19	18.1
21-25 years	53	50.5
26-30 years	29	27.6
31 and above	04	3.8
<i>Occupation</i>		
Housewife	98	93.3
Self independent	07	6.7
<i>Month of Pregnancy</i>		
1 st Trimester	06	5.7
2 nd Trimester	38	36.2
3 rd Trimester	61	58.1
<i>Sex of Living Children</i>		
Male	27	33.3
Female	54	66.7
<i>Per capita Income</i>		
i. Up to Rs.300/-	30	28.6
ii. Rs.301 – 600/-	27	25.7
iii. Rs.601 – 900/-	38	36.2
iv. Rs.901 & above	10	9.5
<i>Caste</i>		
High	21	20.0
Middle	48	45.7
Low	36	34.3
<i>Age of Marriage</i>		
Up to 20	56	53.3
21-25	45	42.9
26-30	04	3.3
<i>Number of Children</i>		
0	57	54.3
1	29	27.6
2	11	10.5
3+	08	7.6
<i>Survival of Children</i>		
Living	81	80.2
Dead	20	19.8
<i>Respondent's Education</i>		
Illiterate	10	9.5
Up to middle school	23	21.9
Up to high school	39	37.1
Up to intermediate	13	12.4

respondents were in the first trimester, 36.2 per cent were in the second trimesters and 61 per cent respondents were in the third trimester of pregnancy during the course of the field work.

On the basis of size of family, 41 per cent had a family size up to four, 51.4 per cent had a family size between 5 and 6 and the rest were from large sized family having members 7 or above. As many as 73.3 per cent of the subjects belonged to joint families whereas only 26.7 per cent of the subjects were members of nuclear families.

Out of the total, 28.6 per cent respondent's husbands were in service, 25.7 per cent respondent's husbands were engaged in business, 36.2 per cent were engaged as labourers and daily

wages while the rest were engaged in agriculture sector or as skilled laborers. Respondents were divided into four groups according to per capita income per month. Group-I (up to Rs.300/- per month), group-II (Rs.301 – 600/- per month), group-III (Rs.601 to 900/- per month) and group-IV (Rs.901 and above). It was observed that 28.6 per cent earned up to Rs.300/- whereas 25.7 per cent earned between Rs.301 and 600, 36.2 per cent had earning in the average of Rs.601 – Rs.900 and only 9.5 per cent earned Rs.901 and above per month.

Obstetrical Pattern of the Pregnant Women:

Table 2 represents the obstetrical pattern of the pregnant women in different trimesters. Out of 105 pregnant women, little more than half of the women (50.4%) were in their first pregnancy. The remaining 49.6% women had in all 153 pregnancies including the instant ones. This is not surprising, since today family planning is not well practiced to any significant degree.

Nutrient Intake of the Respondents: Table 3 indicates the average intake of different nutrients in comparison to the RDA. Recommended Daily Allowance (RDA) is the intake of nutrients derived from the diet that keeps nearly all people in good health. It takes into account the individual variation in nutrient needs and also availability of nutrients, which may vary from diet to diet (Gopalan, et al., 2002). As per RDA, the energy consumption should have been 2525 kcal/day. The average energy consumption of pregnant women was considerably low (13.58%) as compared to RDA. The less intake of calories leads to various problems. Even though the pregnant women took more cereal foods, still a deficit intake was observed.

During pregnancy, protein rich diet promotes optimum fetal growth. RDA for protein for pregnant women is 65 gm/day. In this study the mean protein intake was only 8.38% as compared to RDA. RDA for iron for pregnant

women is 38mg/day. In this study the mean daily iron intake obtained by the mothers was 33.86% deficit than RDA. The recommended calcium intake during pregnancy is 1000mg/day. But mean calcium intake of the mothers was lesser by 20.66% than RDA. The percentage of iron deficit was high (33.86%) when compared to the calcium deficit (20.66%) among the pregnant women. RDA for carotene (Vitamin A) for pregnant women is 2400mg/day. The average daily intake of carotene was also deficit by 72.8%.

The low intake of calcium, iron and carotene noted among pregnant women might have been due to the inadequate intake of green leafy vegetables and vegetables.

The average intake of thiamine was 21.53% excess than RDA. But the mean intake of riboflavin was 46% less than the RDA. This might be due to the occasional inclusion of animal protein like egg, mutton, chicken, etc. in their diet. The consumption of milk and milk products was also found to be less than RDA. The intake of niacin was excess by 27% than RDA and the mean intake of vitamin C was excess by 248% than RDA. Excess intake of vitamin was the reflection of adequate intake of fruits like ripe tomato, orange, lemon, etc.

RDA for folic acid for pregnant women was

Table 3: Average nutrient intake by pregnant women in comparison with RDA.

Nutrients	RDA	Actual intake (Mean±SD)	% Excess/ deficit
Protein (g)	65	59.55 ± 17.97	-8.37
Energy (kcal)	2525	2181.92 ± 311.21	-13.58
Calcium (mg)	1000	799.44 ± 682.62	-20.06
Iron (mg)	38	25.13 ± 17.07	-33.86
Carotene (mg)	2400	652.65 ± 539.17	-72.80
Thiamine (mg)	1.3	1.58 ± 0.37	21.53
Riboflavin (mg)	1.5	0.81 ± 0.48	-46.00
Niacin (mg)	16	20.32 ± 4.56	27.00
Vitamin C (mg)	40	139.24 ± 119.15	248.10
Folic acid (mg)	400	161.19 ± 94.66	-59.70

Table 2: Obstetrical pattern of pregnant women in different trimesters.

Trimester	Gravida										Total no. of children born	
	1 st		2 nd		3 rd		4 th		5 th and above			
	N	%	N	%	N	%	N	%	N	%	N	%
1 st N=6	03	50.00	01	16.7	01	16.7	1	16.7	-	-	06	100.0
2 nd N=38	16	42.10	15	39.5	05	13.2	2	5.3	-	-	33	86.8
3 rd N=61	34	55.47	14	23.0	06	9.8	5	8.2	2	3.3	62	101.6
Total N=105	53	50.40	30	28.6	12	11.4	8	7.6	2	1.9	101	96.2

400mg/day. The mean intake of folic acid was deficit by 59.7% than RDA. This might be due to the inclusion of inadequate amounts of green leafy vegetables and dairy foods. Similar observations have also been reported in other studies for protein and iron diet (Mohapatra et al., 1990 and Mridula et al., 2003).

Trimester and Nutrient Intake: The average intake of different nutrients per day by pregnant women in first, second and third trimesters are presented in Table 4. Consumption of protein, calories, calcium, iron, carotene, riboflavin, folic acid by pregnant women in first trimester was less than RDA. But the vitamins like thiamine, niacin and vitamin C were consumed in more quantity than the RDA. The intake of all nutrients by the pregnant women in first trimesters was more than that in the second trimester and third trimester except vitamin C and iron. The vitamin C consumption was found to be more by pregnant women of second trimester and intake of iron was more among women during their 3rd trimester. However, in both the cases, it was less than the RDA. So most of the nutrients were found to be inadequate to meet the needs. Only the intake of vitamins like vitamin C, niacin, thiamine was satisfactory in all trimesters of pregnancy. This indicates that the diet of pregnant women was not adequate to meet the requirements of nutrients during the course of pregnancy.

Correlation indicates that the difference in the mean values of intake of energy, protein and calcium by the pregnant women in different trimesters was found to be insignificant ($p < 0.05$) and iron intake was found to be significant ($p > 0.05$).

Per Capita Income and Nutrient Intake: The average intake of nutrients by pregnant women in relation to per capita income is presented in Table 5. The protein intake was found to be more among pregnant women of group-III. The mean

protein consumption of group-I was found to be 52.65 ± 19.9 gm/day while their RDA was 65gm/day. But in case of group-III pregnant women, the mean intake of protein was more, i.e. 67.97 ± 19.43 gm, while their RDA was 65gm/day. Except group-III, the mean protein intake was less than the RDA in all income group. The mean energy intake was found to be more among group-III pregnant women as compared to other income groups, i.e. 2288.81 ± 355.89 kcal/day but less than the RDA. The mean consumption of calcium was higher among group-III pregnant women, but it was less than the RDA. The mean consumption of iron, carotene, thiamine, riboflavin and folic acid was higher among group-IV pregnant women, but it was again less than the RDA except intake of thiamine. The mean consumption of niacin and vitamin C was higher among group-III pregnant women and it was even more than the RDA. The consumption of some of the food items was not affected by economic status of the family as some families grow those food items for their own consumption irrespective of their income. Average nutrient intake of pregnant women according to per capita income indicated that no significant difference was observed in the intake values of protein, energy, calcium and iron ($p < 0.05$).

Nutritional Anaemia: Table 6 represents the mean daily dietary intake of iron, folic acid and protein of the non-anaemic and anemic pregnant women. The mean daily protein intake was higher among moderate anemic respondents i.e. 66.99 ± 23.43 g and lower i.e. 61.54 ± 16.43 g among mild anemic respondents. The mean iron intake was higher among non-anemic respondents while it was lower in case of moderate anemic respondents. The mean folic acid intake was higher among non-anemic respondents and it was lower in case of moderate

Table 4: Average daily nutrient intake by pregnant women in relation to different trimesters.

Nutrients/ trimesters	I trimester Mean $\pm$ SD	II trimester Mean $\pm$ SD	III trimester Mean $\pm$ SD	Total Mean $\pm$ SD	r
Protein (g)	63.89 $\pm$ 24.64	59.63 $\pm$ 18.87	59.07 $\pm$ 16.95	59.55 $\pm$ 17.97	-0.948
Energy (kcal)	2286.12 $\pm$ 495.39	2137.61 $\pm$ 350.07	2199.27 $\pm$ 263.09	2181.92 $\pm$ 311.21	-0.655
Calcium (mg)	833.19 $\pm$ 595.06	758.43 $\pm$ 507.12	821.67 $\pm$ 786.07	799.44 $\pm$ 682.62	-0.235
Iron (mg)	22.77 $\pm$ 10.33	23.43 $\pm$ 14.02	26.43 $\pm$ 19.25	25.13 $\pm$ 17.07	0.901
Carotene (mg)	831.98 $\pm$ 482.26	604.16 $\pm$ 518.45	665.21 $\pm$ 560.27	652.65 $\pm$ 539.17	
Thiamine (mg)	1.69 $\pm$ 0.35	1.55 $\pm$ 0.45	1.59 $\pm$ 0.32	1.58 $\pm$ 0.3	
Riboflavin (mg)	1.02 $\pm$ 0.77	0.75 $\pm$ 0.46	0.82 $\pm$ 0.47	0.81 $\pm$ 0.48	
Niacin (mg)	27.08 $\pm$ 9.72	19.33 $\pm$ 3.89	20.27 $\pm$ 3.69	20.32 $\pm$ 4.56	
Vitamin C (mg)	140.90 $\pm$ 75.01	148.17 $\pm$ 125.01	133.51 $\pm$ 99.02	139.24 $\pm$ 119.15	
Folic acid (mg)	213.84 $\pm$ 113.10	151.04 $\pm$ 90.25	162.33 $\pm$ 95.40	161.19 $\pm$ 94.66	

Table 5: Average daily nutrient intake of pregnant women in relation to per capita income.

Nutrients/ trimesters	Group-I Rs. £ 300/- Mean±SD	Group-II Rs.301-600/- Mean±SD	Group-III Rs.601-900/- Mean±SD	Group-IV Rs. > 900/- Mean±SD	Total Mean±SD	r
Protein (g)	52.65±19.90	56.60±18.09	67.97±19.43	63.39±14.57	59.55±17.97	-0.158
Energy (kcal)	2059.52±354.87	2150.59±298.40	2288.81±355.89	2231.48±287.52	2181.92±311.21	-0.012
Calcium (mg)	551.63±466.69	755.92±677.61	976.25±581.24	881.92±470.26	799.44±682.62	0.078
Iron (mg)	26.03±21.79	23.30±16.66	28.06±23.95	26.83±11.77	25.13±17.07	-0.820
Carotene (mg)	366.62±280.14	479.50±305.16	579.45±226.17	119.14±106.32	652.65±539.17	
Thiamine (mg)	1.24±0.31	1.55±0.30	1.48±0.26	1.80±0.44	1.58±0.37	
Riboflavin (mg)	0.47±0.21	0.75±0.48	0.80±0.38	1.05±0.52	0.81±0.48	
Niacin (mg)	19.97±2.85	19.90±4.27	22.20±7.22	20.30±3.84	20.32±4.56	
Vitamin C (mg)	108.45±77.48	119.09±92.94	179.33±137.20	168.32±102.34	139.24±119.15	
Folic acid (mg)	99.91±45.80	145.43±73.82	175.41±111.53	205.79±115.27	161.19±94.66	

Table 6: Mean daily dietary intake of anaemia related nutrients among non-anemic and anemic group of pregnant women.

Anaemia Mean±SD	Protein Mean±SD	Iron Mean±SD	Folic acid
Normal (N = 20)	62.23±15.32	31.79±23.62	211.15±119.85
Mild (N = 10)	61.54±16.43	27.84±17.38	205.34±117.41
Moderate (N = 11)	66.99±22.34	21.41±12.34	158.21±84.52
Total (N = 41)	63.37±17.71	28.04±19.75	194.11±109.80

Table 7: Haemoglobin content of the pregnant women of different trimesters.

Timesters	Haemoglobin content (g/dl) range	N	Mean±SD
1 st	9.0–10.9	03	9.7±1.04
2 nd	8.8–12.7	13	10.4±1.39
3 rd	8.6–12.4	25	11.1±1.00
Total	8.6–12.7	41	10.7±1.10

anemic respondents. It was observed from the table that mean daily dietary intake of iron, folic acid of the anemic pregnant women were significantly lower than those of the non-anemic pregnant women.

Haemoglobin Content: The haemoglobin content of the pregnant women in different trimester is given in Table 7. The haemoglobin content (g/dl) of the pregnant women in 1st trimester ranged from 9 to 10.9 with mean value of 9.7±1.04. In 2nd trimester it was 8.8 to 12.7 with mean value of 10.4±1.39 and in 3rd trimester of pregnancy the haemoglobin content in the blood ranged from 8.6 to 12.4 with the mean value of 11.1±1.00. The mean haemoglobin content in the blood of all pregnant women in 1st and 2nd trimesters of pregnancy was below normal (<11g/dl) but in 3rd trimester it was normal.

It was observed from the table that, as trimester increases the haemoglobin level also increases perhaps because of substantial proportion of pregnant women consumed iron and folic tablets or syrups regularly.

SUMMARY AND CONCLUSION

It was found that the nutrient intake of the respondents was significantly less as compared to RDA. Only thiamine, niacin and vitamin C intake was found to be satisfactory. The diet of pregnant women was found to be deficient in protein, calcium, iron, carotene, riboflavin and folic acid. Only in few cases, protein, iron and calcium requirements were fulfilled. The mean iron, calcium and carotene intake was much lower than the RDA values.

The malnutrition problems among pregnant women are very complex. The percentage incidence of the common nutritional deficiencies in these pregnant women was much higher in the third trimester than first and second trimesters of pregnancy. A judicious combination of various food groups is required to ensure that nutrient demands of individuals are fully met. It was also found that the mean daily dietary intake of iron and folic acid of the anemic pregnant women was significantly lower than those of the non-anemic pregnant women.

In spite of better education and high monthly income, nutrition intake was lower than RDA. This might have been due to poor knowledge on nutrition and ignorance about health by these women. Therefore, apart from supplementary nutrition to pregnant women of poor socio-economic status, emphasis should be given towards nutrition and health education adopting multi-media approach. The agriculture extension home science extension officials should encourage the rural women to cultivate low cost nutritious fruits, vegetables, etc. and popularize the same for consumption in the rural families. For supplementary nutrition, iron and folic acid tablets should be supplied to the pregnant women. For the maintenance of healthy and active life, access to safe and nutritious food is essential. For the food security of the household, purchasing power of the family should be

increased through various income generating schemes.

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