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A Longitudinal Study on the Food and Nutrient Intake of Pregnant Women

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Introduction

The extensive changes that occur in women during pregnancy influence the need for different nutrients and the efficiency with which the body uses them. Brown[1]has indicated that the diet of a pregnant women should provide the vast majority of her nutrient need in required amounts. Unfortunately findings of the research reports of several groups of workers have indicated that the diet of pregnant women is inadequate both in quality and quantity[2,3]

Inadequate diets have been related to clinical problems during the course of pregnancy as well in the outcome of pregnancy.

Considerable data is available regarding the food and nutrient intake of women during pregnancy from cross-sectional studies conducted in different parts of India, whereas such data from longitudinal studies are meagre. But data from cross-sectional studies may not give reliable and exact information because of the multifactorial interplay and their influence on the nutritional status. Hence, the longitudinal study which is superior to cross-sectional studies in assessing the food intake of women during pregnancy was chosen for the present investigation.

Materials and Methods

The pregnant women who were visiting either a private nursing home or a primary health centre for antenatal checkup during first trimester were randomly selected in 20

number for the study. The selected pregnant women comprised of four equal groups, based on income and area of living.

The food intake of the selected pregnant women per day in each trimester was collected by one day weighment method[4]. The weights of edible foods in raw state used for preparing different cooked foods. The corresponding weights of the cooked items of foods in a day's, and the weights of actual intake of the cooked items of a diet in different meals of a day for each of the selected pregnant women were recorded.

The weights of cooked food consumed by each pregnant women were converted into the corresponding weights of raw foods.

The intake of different nutrients per day by each selected pregnant women was then calculated from the food intake values using nutritive value of indian foods[5]

Results and Discussion

Intake of different foods per day by the selected pregnant women in first, second and third trimesters is given in Table I. Consumption of cereals, pulses. leafy vegetables, fats and oils, sugar and jaggery and milk and milk products by the pregnant women in first, second and third trimesters were less than the values of recommended dietary allowances (RDA) of ICMR [5]. But the intake of only roots and tubers and fruits were found to be satisfactory in first, second and third trimesters as compared to the RDA values. Thus the results indicated that the diet was not able to meet the requirements of different foods for the pregnant women in adequate amounts. Even Gupta and Sharma [6] reported that the consumption of different foods during pregnancy was unsatisfactory in a day's diet.

Table I.: Average food intake (gm) of the selected pregnant women in 1, 2 and 3 trimesters

Food stuffs (g)	**Recommended dietary allowances**	**Mean values of food intake (gm) by the pregnant women in different trimesters**			**SE**	**CD**
		I	**II**	**III**		

Cereals	475	229	267	255	8.5	23.5
Pulses	60	24	34	32	2.4	6.8
Fruits and Tubers	50	58	80	82	7.0	19.5
Leafy Vegetables	100	39	43	58	7.9	N.S
Other Vegetables	40	26	44	40	6.3	N.S
Fats and Oils	25	15	17	16	0.6	N.S
Sugar and Jaggery	30	20	20	20	1.3	N.S
Milk and Milk Products	250	132	170	169	11.9	33.1
Fruits	30	46	110	132	9.1	25.3

The differences in the mean values of intake of cereals, pulses and fruits by the pregnant women in first and second trimesters were found to be significant ($P < 0.05$). Though variation in the mean values of intake of different foods by the pregnant women in second and third trimesters was noticed. The difference was not significant ($P > 0.05$).

Intake of different foods per day by the pregnant women from families of more than Rs.10,000 per year (high income group) and from families of less than Rs.10.000 per year (low group) is presented in Table II. The intake of pulses, other vegetables, fats and oils, milk and milk products and fruits by the pregnant women of high income group was significantly more than that by the pregnant women of low income group ($P < 0.05$). Whereas, the intake of cereals between the two groups did not differ significantly. The results of this study are in line witth the results of Rawtani and Verma[7] who reported that consumption of cereals was inversely related, while that of pules, milk, oil and sugar was directly related to per capita expenditure.

The difference in the intake of only fats and oils by the urban and rural pregnant women was significant but not that of other foods.

Table II.: Average food intake (gm) of the selected pregnant women in high income and low income groups

Food stuffs (g)	Mean values of food intake (gm) by the pregnant women of different income groups		SE	CD
	High income group	Low income group		
Cereals	242	259	6.9	N.S
Pulses	40	20	2.0	N.S
Fruits and Tubers	81	66	5.8	N.S
Leafy Vegetables	52	42	6.5	N.S
Other Vegetables	49	25	5.2	14.4
Fats and Oils	20	12	0.5	1.4
Sugar and Jaggery	20	20	1.1	N.S
Milk and Milk Products	226	88	9.8	27.0
Fruits	130	63	7.4	20.6

The affects of interactions of trimesters of pregnancy, family income and area (urban or rural) of the pregnant women, on the intake of different foods was found to be non-significant.

The average intake of different nutrients per day, by the selected pregnant women in first, second and third trimesters are given in Table III. Consumption of calories, protein, calcium, iron and riboflavin by the pregnant women in first trimester was less than the recommended dietary allowances. But the vitamins like beta carotene, thiamine. niacin and vitamin C were consumed in more amount than the recommended dietary allowances. Though the intake of all nutrients by the pregnant women in either second or third trimester was more than that in the first trimester, most of the nutrients were found to be inadequate to meet the needs. However, the intake of beta carotene, thiamine, niacin and vitamin C by the pregnant women was found to be satisfactory. In second and third trimesters when compared with the recommended dietary allowances. This indicates that the diet of pregnant women was not adequate to meet the requirements of nutrients during the course of pregnancy. Similar results were reported by Nath and Geervani[2]. Vijaya Lakshmi and Lakshmi[8]. Devdas and Eswaran [9]. Rao [10]

The nutrient intake of pregnant women in first trimester was markedly less than that in second and third trimesters. However there was no significant difference in the intake of different nutrients by the pregnant women in second and third trimesters. These results are in agreement with the findings of Kuizon et al[11]

Table III.: Average nutrient intake of the selected pregnant women in I, II and III trimesters

Nutrients	**Recommended dietary allowances**	**Mean values of food intake (gm) by the pregnant women in different trimesters**			**SE**	**CD**
		I	**II**	**III**		
Calories (K.cal)	2100	1438	1788	1672	33.2	92.1
Protein (gm)	85	43	53	51	1.0	2.0
Calcium (mg)	1000	511	636	622	25.9	71.7
Iron (mg)	38	17.3	21.1	19.9	1.0	2.0
B.carotene (mg)	2400	3882	4426	4034	104.3	289.1
Thiamine (mg)	1.1	1.12	1.43	1.31	0.05	0.1
Riboflavin (mg)	1.3	0.71	0.95	0.82	0.05	0.1
Niacin (mg)	14	14.37	15.32	15.09	0.8	NS
Vitamin C (mg)	40	60	82	63	14.1	NS

Table IV.: Average nutrient intake of selected pregnant women of high income and low income groups

Nutrients	**SE**		**CD**	
	Mean values of nutrients intake by the pregnant women of different income groups			
	High income group	**Low income group**		
Calories (K.cal)	1929	1337	27.1	75.2

Protein (gm)	56	42	0.8	2.3
Calcium (mg)	797	382	21.2	58.8
Iron (mg)	21.1	17.8	0.8	2.4
B.carotene (mg)	4409	3819	85.2	236.0
Thiamine (mg)	1.35	1.23	0.04	0.1
Riboflavin (mg)	0.87	0.78	0.04	NS
Niacin (mg)	16.83	13.02	0.70	1.8
Vitamin C (mg)	83	55	11.5	31.90

Intake of different nutrients per day by the selected pregnant women in the families of high income groups is presented in Table IV. The intake of the nutrients, except Reboflavin, was significantly more in the pregnant women of high income group than that of the low income group. These findings are in line with the results reported by Vijayalakshmi and Devaki A[12]who reported a positive correlation between income level and diet chosen by the expectant mothers.

The intake of all nutrients except vitamin C by the pregnant women was more in urban areas than in rural areas. However, the difference in the intake of nutrients by the urban and rural pregnant women was not significant statistically.

Interactions of trimesters of pregnancy, family income and area, on the intake of different nutrients by the pregnant women were found to be non significant statistically.

Summary and Conclusion

A longitudinal study was carried out in the present investigation to evaluate the nutritional status of pregnant women.

The intake of different foods by the pregnant women, in each trimester. was deficient in meeting the recommended dietary allowances. However the food intake of pregnant women in the first trimester was significantly less than that in the second and third

trimester ($P < 0.05$). The factors which exerted a significant effect on the food intake were family income and trimesters of pregnancy($P < 0.05$).

Intake of calories, protein, calcium and iron by the pregnant women in all the trimesters was far below the recommended dietary allowances. It was also found that the intake of all nutrients by the pregnant women was significantly more in the second and third trimesters than that in the first trimester. As noticed with food intake, the effects of the trimester of pregnancy and family income on the intake of nutrients were quite significant($P < 0.05$).

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