

MATERNAL DIET AND BIRTH WEIGHT

By

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SUMMARY

A clinical study of dietary pattern and birth weight of 125 primigravid women are presented. Out of 125 cases, 45 cases were found to have taken balanced diet as recommended by I.C.M.R. (1968). The study shows that all nutrients are important for ideal birth weight. Birth weight change is not significant among well nourished and mildly undernourished group. Birth weight is lowered by a mean of 181.6 gms in the moderate and severely undernourished group taken together. The critical level of protein below which birth weight is significantly lowered is 40 gms per day. Interestingly, excess protein intake above this level has no beneficial effect on birth weight. Incidence of low birth weight babies among severely undernourished group is 44 per cent.

Introduction

Expectant mothers constitutes the most vulnerable segment of a population from the nutritional standpoint. Pregnancy is a state of physiological stress characterised by profound metabolic and hormonal changes to preserve the maternal health and to provide for the development and growth of the foetus. These changes impose additional nutritional demand during pregnancy.

The influence of maternal nutrition on the course and outcome of pregnancy is a subject of considerable interest to the workers in the field of maternal and child health, specially in developing countries. There is now growing evidence that the nutritional status of the mother during pregnancy could affect not only her health but also the condition of her off-

spring. One such effect is the birth weight of the neonate. Birth weight may therefore be a useful yardstick in assessing the maternal nutritional status of a population. The dietary pattern and the magnitude of the problem of under-nutrition may vary in different parts of the same country. So, an attempt has been made in this study, to find out the dietary pattern, problem of under nutrition and its relation with birth weight, for the population of North Eastern Region of our country.

Material and Methods

This study was carried out in the Department of Obstetrics and Gynaecology, Assam Medical College Hospital, Dibrugarh, starting from 1st January, 1985 to 1st January, 1986. In this study 125 primigravid women were studied. All the factors which affect the birth weight (multigravida, diabetes, hypertension,

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systemic disease, multiple pregnancies, elderly primi etc.) were excluded from the study.

The dietary pattern was studied by oral questionnaire method and weightment of raw food stuffs. The nutritive value of the food were found out from food table 'Nutritive value of Indian Foods' as reported by Gopalan (1984).

After processing the data, four different nutritional groups were sorted out: Group 'A' (45 women) took balanced diet and formed a control group; Group 'B' (27 women), mildly undernourished took 2000-2500 K cal/day; Group 'C' (28 women) moderately undernourished took 1500-2000 K cal/day and the Group 'D' (25 women), grossly undernourished and received less than 1500 K cal/day.

Results and Observations

The dietary pattern of 125 women were determined and compared with that recommended by I.C.M.R. for pregnant women and with that of Iyengar (1969) vide Table I.

The dietary pattern of different nutritional groups and its relationship with birth weight are shown in Table II. It reveals that all the nutrients are important for an ideal birth weight. Birth weight difference is not significant between well nourished (Group 'A') and mildly undernourished (Group 'B') group. Birth weight is lowered by mean of 181.6 gm in the moderate (Group 'C') and severely (Group 'D') undernourished group taken together. In contrast to protein, marked increase of fat intake among Group 'A' than Group 'B', results in no increase of birth weight which signify that protein is mainly responsible for increase in birth weight.

Protein intake pattern and birth weight of 125 women as a whole are analysed in Table III.

The above Table shows that the optimum amount of protein below which birth weight is significantly lowered is 40 gms/day. Intake of protein in excess of these does not beneficially increase the birth weight.

TABLE I

Name of food stuffs	Present study (gm/day)		I.C.M.R. (1968)	Iyengar (1969)
	Range	Mean		
Cereal	200-500	367.2	400	276
Pulses	10-80.6	38.5	55 (non veg) 70 (veg)	21
Green leafy vegetables	20-200	73.3	150	8
Other vegetables	25-100	71.7	75	12
Roots and tubers	25-100	67.2	75	8
Fruits	5-100	16.8	30	26
Milk	5-350	97.8	225 (non veg) 325 (veg)	41
Fats and oils	5-50	24.4	35 (non veg) 40 (veg)	20
Eggs	5-40	13.9	30	22
Flesh food	3-60	18.2	30	
Sugar and Jaggery	10-50	25.9	40	14
Nutrients:				
Calories (K cal/day)	1081.2—3057.4	1976.5		
Protein (gms/day)	24.4— 83.7	46.2		

TABLE II
Nutrient Pattern and Birth Weight Distribution of different Nutritional Groups are Shown in Table—II

Group	Protein (gms/ day)	Fat (gms/ day)	Carbohydrate (gms/day)	Calories (K cal/day)	Birth weight (Gms)
Gr. 'A'					
Range	54.3-83.7	44.8-89.4	407.0-526.9	2506.6-3057.4	1900-3600
Mean	65.8	65.4	461.4	2705.5	2790
Gr. 'B'					
Range	39.7-75.2	15.7-59.3	354.8-453.8	2008.1-2493.0	2100-3150
Mean	49.4	36.6	409.1	2173.4	2709.2
Gr. 'C'					
Range	32.7-55.6	7.2-52.9	278.2-429.0	1500.4-1959.8	2100-2800
Mean	41.5	24.2	336.4	1731.0	2532.1
Gr. 'D'					
Range	24.6-35.3	7.1-27.7	229.8-374.3	1081.2-1488.8	1750-2800
Mean	28.4	13.4	263.5	1296.4	2346

TABLE III

Mean protein (gms/day)	Number of cases	Birth weight (Gms)	
		Range	Mean
Below 30	18	1750-2650	2336.1
30-40	20	2000-2800	2390.0
40-50	26	2100-2950	2630.7
50-60	19	2000-3150	2660.5
Above 60	42	2250-3600	2844.0

There were 25 low birth weight babies (L.B.W. babies) out of 125 cases. The distribution of L.B.W. babies among different nutritional groups are shown in Table IV.

The dietary pattern of the mothers of L.B.W. babies are shown in Table V. It shows that all the nutrient intake are much below the recommended allowances.

TABLE IV

Group	Total number of cases	Number of L.B.W. babies	Percentage
A	45	5	11.1
B	27	3	11.1
C	28	6	21.4
D	25	11	44.0

TABLE V

Nutrients	Range	Mean
Protein	25.5- 60.1 gm	37.33 gm
Fat	7.5- 66.07 gm	26.9 gm
Carbohydrate	212.4- 487.2 gm	328.75 gm
Calories	1081.2-2766.4 Kcal	1723.44 Kcal

Discussion

In this present study, out of 125 cases 45 (36%) women found to have taken balanced diet as recommended by I.C.M.R. This study also showed a significant higher consumption of almost all food stuffs except fruits as compared with South Indian series of Iyengar (1969).

Gopalan found that average diets of pregnant Indian women provide only about 1500 to 1800 cal and about 40 gms protein daily.

Present study showed that with increase of protein, fat, carbohydrates and total calories in the maternal diet, birth

weight increases. Dietary intake of protein is the most important out of all. The critical level below which there is a mean lowering of 181.6 gm birth weight is 40 gms protein per day. This value is lower by 15 gms than that recommended by I.C.M.R. (I.C.M.R. recommendation 1 gm/kg body weight + 10 gms; average Indian women weight 45 kg).

References

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