Effect of nutritional status of pregnant women on outcome of pregnancy

Farooqui Hafeez Farzana and Megha Kumbhar

A sample of 60 pregnant women was purposively selected in their IIIrd trimester from Parbhani city. All the selected pregnant women were personally interviewed by investigator with the help of pre- planned questionnaire, so as to elicit the information regarding socio-economic status, age, type of family and dietary pattern. Information about the associated factors with pregnancy like age at first delivery, parity, interval between two pregnancies, type of delivery, BMI and complications during pregnancy was also collected. Nutritional status was assessed by taking anthropometric measurements such as weight and height. Body mass index (BMI) was calculated from the recorded measurements of body weight (kg) and height (cm) of the subjects. Haemoglobin content of subjects was recorded from the pathological reports. The weight and length of the new born were recorded in clinic with the help of beam type of scale and length was recorded with the help of infantometer. The food intake of selected pregnant women was assessed by one day weighment method. The weight of the raw edible food stuffs used to prepare food for the family and the corresponding cooked weights of the prepared foods were recorded for each meal in a prepared schedule. The average food and nutrient intake of pregnant women per day was compared with recommended dietary allowances of ICMR (2010) and expressed in terms of per cent value of RDA. Simple arithmetic means of percentages were calculated with standard deviation to interpret the results. Nutrient intake of the pregnant women was compared with RDA by using 'Z' test. Correlation co-efficient was calculated for haemoglobin level, parity, body mass index, educational level, weight and length of newborn. The nutrient intake of selected pregnant women when statistically compared with RDA indicated that there was significant difference in the studied nutrients except for thiamine, riboflavin and vitamin C. The intake of energy, protein, calcium, iron, β carotene, niacin and folic acid were significantly less than RDAs while the intake of fat was significantly more than RDAs. Parity of the mother was not having correlation with the weight and length of the newborn. As the haemoglobin level was increasing the weight and length of the newborn was also increasing. Positive correlation was found with increasing haemoglobin level with the weight and length of newborn. There was no correlation with BMI, weight and length of newborn. As the education level was increasing the weight and length of newborn was also increasing but it was found that there is no significant difference.

Key Words : Pregnant women, Nutritional status , Outcome of pregnancy

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Author for correspondence :
Farooqui Hafeez Farzana, Department of Food Science and Nutrition, College of Community Science, Vasantrao Naik Marathwada Krishi Vidyapeeth, **Parbhani (M.S.) India** (Email: drfhfarzana@gmail.com)

Associate Authors' :
Megha Kumbhar, Department of Food Science and Nutrition, College of Community Science, Vasantrao Naik Marathwada Krishi Vidyapeeth, **Parbhani (M.S.) India** (Email: mkumbhar108@gmail.com)

Farooqui Hafeez Farzana and Megha Kumbhar

INTRODUCTION

Proper food and good nutrition are essential for survival, physical growth, mental development, performance, productivity, health and well being. Pregnancy is such a critical phase in a woman's life, when the expecting mother needs optimal superior quality of food to support the developing fetus. Human pregnancy is divided into three trimester periods of three months each. The first trimester carries the highest risk of miscarriage, natural death of embryo or fetus. During the second trimester, the development of the fetus can be more easily monitored and diagnosed. The third trimester is marked by further growth of the fetus.

A number of factors have the influence on pregnancy outcome such as economic and educational status of mother, age of the mother, parity, weight gain during pregnancy, duration of gestation, haemoglobin level of blood, maternal nutrition, weight and height of pregnant women. A relationship between low birth weight with maternal weight and height indices are reported by several workers (Ghosh *et al*., 1974 and Mameesh *et al*., 1985). The weight gain during pregnancy is an important test in determining maternal nutritional status. The desirable weight throughout the gestation period is about 20 to 25 lbs. The average total weight gain should be at the rate of five, eight and ten lbs for first, second and third trimesters, respectively.

Though there are documentary evidences stating the relationship between nutritional status of pregnant women and the outcome of pregnancy, there are very few studies from this region regarding the same. Hence, the present study was undertaken to know the effect of nutritional status of pregnant women on the outcome of pregnancy.

METHODOLOGY

A sample of 60 pregnant women was purposively selected in their IIIrd trimester from Parbhani city. All the selected pregnant women were personally interviewed by investigator with the help of pre- planned questionnaire, so as to elicit the information regarding socio-economic status, age, type of family and dietary pattern. Information about the associated factors with pregnancy like age at first delivery, parity, interval between two pregnancies, type of delivery, BMI and complications during pregnancy was also collected. Nutritional status was assessed by taking anthropometric measurements such as weight and height. Body mass

index (BMI) was calculated from the recorded measurements of body weight (kg) and height (cm) of the subjects. Haemoglobin content of subjects was recorded from the pathological reports. The weight and length of the new born were recorded in clinic with the help of beam type of scale and length was recorded with the help of infantometer.

The food intake of selected pregnant women was assessed by one day weighment method. The weight of the raw edible food stuffs used to prepare food for the family and the corresponding cooked weights of the prepared foods were recorded for each meal in a prepared schedule. The average food and nutrient intake of pregnant women per day was compared with recommended dietary allowances of ICMR (2010) and expressed in terms of per cent value of RDA. Simple arithmetic means of percentages were calculated with standard deviation to interpret the results. Nutrient intake of the pregnant women was compared with RDA by using 'Z' test. Correlation co-efficient was calculated for haemoglobin level, parity, body mass index, educational level, weight and length of newborn.

OBSERVATIONS AND ASSESSMENT

General information of the selected pregnant women is depicted in Table 1. Among the selected pregnant women 55 per cent belonged to age group 20 to 24 years, 40 per cent belonged to 25 to 29 years, 3.33 per cent belonged to 35 to 39 years and only 1.66 per cent was of age group of 30 to 34 years. Majority (81.66%) of the pregnant women were college educated while 18.33 per cent were school educated. No one was illiterate in this group (Fig. 1). Maximum (76.66%) had only two members in their family, while 18.33 per cent had 2-4 family
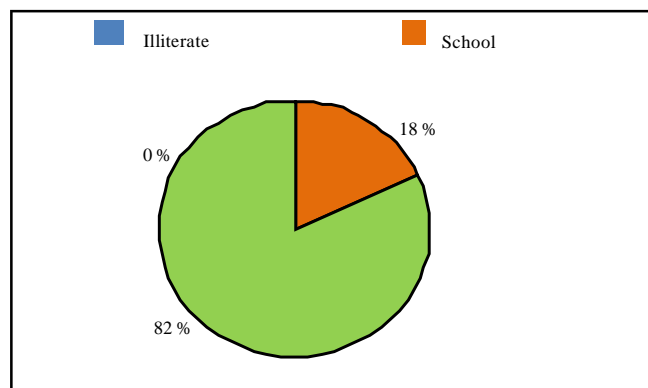

Fig. 1 : Educational status

members and 5 per cent had more than 4-6 members in their family. Among the selected pregnant women 73.33 per cent belonged to nuclear family, 11.66 per cent belonged to joint family and 15 per cent belonged to extended family (Fig. 2). Family income of the pregnant women was ranging from less than Rs. 10,000 to more than Rs. 20,000 per month. Maximum (78.33%) were having more than Rs. 15,000 to > 20,000 per month, while 20 per cent had more than Rs. 10,000 to ≤15,000 and only 1.66 per cent had Rs. less than or equal to 10,000 per month family income (Fig. 3).

The information about obstetrical history of pregnant women is shown in Table 2. It was found that 100 per cent of selected pregnant women were in their III trimester. Among the selected pregnant women 75 per cent were of the age group of 20 to 30 years at first
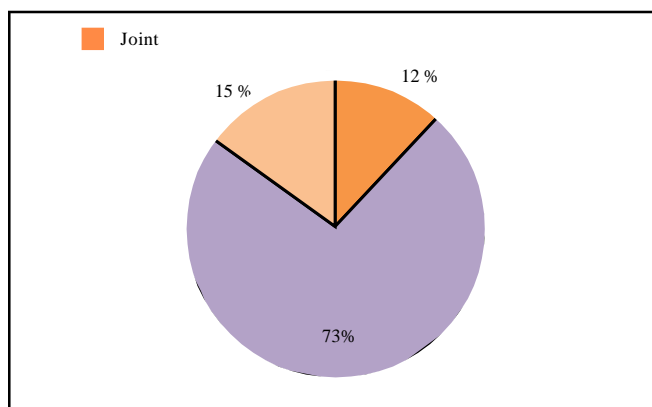

Fig. 2: Type of family
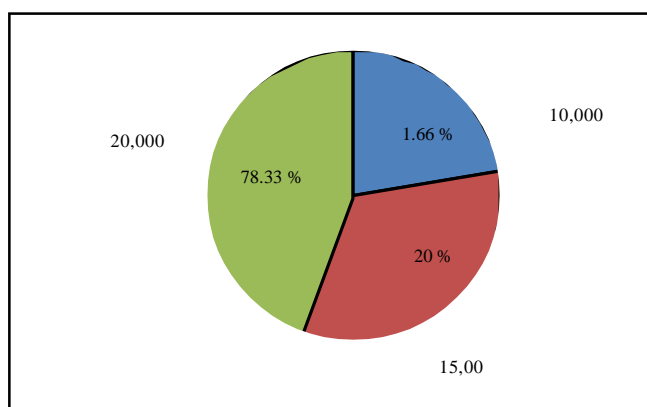
Fig. 3: Income

Sr. No.	Particulars	Pregnant women	
		Number	Percentage
1.	**Age of respondents**		
	20-24 years	33	55
	25-29 years	24	40
	30-34 years	1	1.66
	35-39 years	2	3.33
2.	**Educational status**		
	Illiterate	0	0
	School education	11	18.33
	College education	49	81.66
3.	**Number of family members**		
	≤2	46	76.66
	>2-4	11	18.33
	≥4-6	3	5
4.	**Type of family**		
	Joint	7	11.66
	Nuclear	44	73.33
	Extended	9	15
5.	**Monthly family income**		
	Rs. ≤ 10,000	1	1.66
	Rs. >10,000 ≤ 15,000	12	20
	Rs. >15,000 to > 20,000	47	78.33

Table 1 : General information of the selected pregnant women (n=60)

pregnancy, 21.66 per cent were less than 20 years and only 3.33 per cent were above 30 years of age at first pregnancy. In this study 41 (68.33 %) were primipara and 16 (26.66%) were second gravida and only three (5 %) were multi gravida. In this study 31.66 per cent pregnant women were having children, 15 per cent had the spacing of more than 3 years between two pregnancies whereas, 8.33 per cent had 2 years and 8.33 per cent had three years spacing between two pregnancies. Among the selected 60 pregnant women 46 (76.66%) had normal delivery while 14 (23.33%) had caesarean section.

The information regarding complications during pregnancy is presented in Fig. 4. It is evident that 78.33 per cent pregnant women were suffering from oedema, 61.66 per cent had loss of appetite, 35 per cent had hypertension, 21.66 per cent had body aches, 6.66 per cent had burning feet and 6.66 per cent were suffering from pallor. The other complications were eye problems

in 5 per cent, pain in calf muscles in 5 per cent and sore mouth in 3.33 per cent.

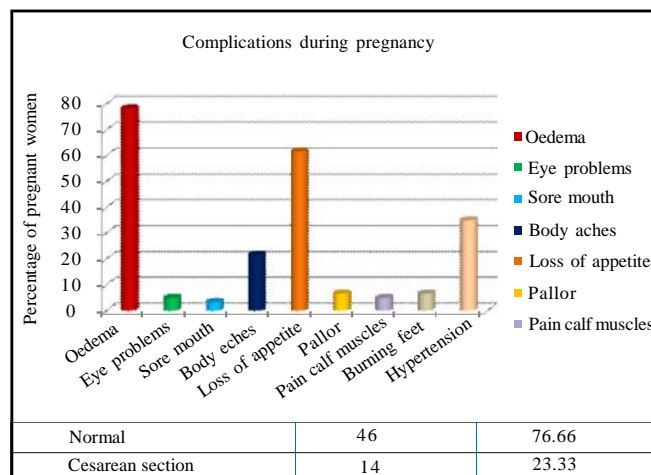The anthropometric measurements of the pregnant women are presented in Table 3. It is revealed from the

Normal	46	76.66
Cesarean section	14	23.33

Fig. 4: Information regarding complications during pregnancy

Table 2 : Obstetrical history of selected pregnant women			(n=60)
Sr. No.	Obstetrical history	Pregnant women	
		Number	Percentage
1.	**Trimester of pregnancy**		
	III	60	100
2.	**Age at first pregnancy**		
	Less than 20 years	13	21.66
	20-30 years	45	75
	Above 30 years	2	3.33
3.	**Parity**		
	Primipara	41	68.33
	Second gravida	16	26.66
	Multi gravida	3	5
4.	**Interval between pregnancies**		
	2 years	5	8.33
	3 years	5	8.33
	More than 3 years	9	15
5.	**Type of delivery**		
	Normal	46	76.66
	Cesarean section	14	23.33

Table 3 : Anthropometric measurements of pregnant women				(n= 60)
Sr. No.	Anthropometric measurements	Number	Range	Mean ± SD
1.	Height (cm)	60	150-162	154.0 ± 2.83
2.	Body weight (kg)	60	50- 83	57.83± 6.21
3.	Body mass index	60	18.5> 30	24.27± 2.62

Table that height of the all pregnant women was ranging from 150-162 cm and the mean of the height was 154.0±2.83cm whereas, the weight of the pregnant women was ranging from 50-83 kg with the mean weight 57.83± 6.21 kg. The range of BMI of all the pregnant women was 18.5 to > 30 with mean of BMI 24.27± 2.62.

Biochemical examination of pregnant women is given in Table 4. The Table 4 shows that 40 per cent of pregnant women had AB+ blood group, 26.66 per cent pregnant women had A+ blood group, 15 per cent had O+, 11.66 per cent had B+ blood group. Only 6.66 per cent of pregnant women belonged to O- blood group.

Average intake of different foods per day by the pregnant women is shown in Table 5. The mean intake of cereals, pulses, green leafy vegetables, other vegetables, roots and tubers, fruits, oils and fats, sugar and jaggery and milk and milk products was 186.6±63.52g, 31±23.92g, 62.1±30.80g, 21.2±43.51g, 34.2±38.57g, 250.6±95.00g, 24.2±8.43g, 19.4±7.85g and 322.9±78.22 g, respectively.

The average nutrient intake of selected pregnant women is given in Table 6. The mean intake of energy (kcal), protein (g), fat (g), calcium (mg), iron (mg), β carotene (µg), thiamine (mg), riboflavin (mg), niacin (mg), vitamin C (mg), folic acid (µg) was 2084.3±120.40, 58.24±11.92, 39.9±5.92, 1004.6±175.87, 33.26±3.89, 3423.3±1879.13, 1.18±0.32, 1.33±0.44, 10.59±5.99, 52.51±15.00, 45.26±32.53, respectively. Mean values of nutrient intake were less compared to RDA for all the nutrients except fat.

The nutrient intake of selected pregnant women when statistically compared with RDA indicated that there was significant difference in the studied nutrients except for thiamine, riboflavin and vitamin C. The intake of energy, protein, calcium, iron, β carotene, niacin and folic acid were significantly less than RDAs while the

Table 4 : Biochemical examination of pregnant women			(n=60)
Sr. No.	Particulars	Pregnant women	
		Number	Percentage
1.	**Blood group**		
	A+	16	26.66
	B+	7	11.66
	AB+	24	40
	O+	9	15
	O-	4	6.66
2.	**Haemoglobin (g/dl)**		
	8-9	5	8.33
	9-10	8	13.33
	10-11	34	56.66
	11-12	13	21.66

Table 5 : Average food intake of the selected pregnant women			(n=60)
Foods stuffs (g)	*Balanced diet (g)	Mean values of food intake (g)	Food intake as per cent of balanced diet
Cereals	300	186.6 ± 63.52	62.2
Pulses	60	31 ± 23.92	51.6
Green leafy vegetables	150	62.1 ±30.80	41.4
Other vegetables	100	21.2 ±43.51	21.2
Roots and tubers	100	34.2 ± 38.57	34.2
Fruits	200	250.6 ± 95.00	125.3
Oil and fats	30	24.2 ± 8.43	80.6
Sugar and jaggery	20	19.4 ± 7.85	97
Milk and milk product	500	322.9 ± 78.22	64.58

*NIN manual (1998), Page No 16.

Table 6 : Average daily nutrient intake of the selected pregnant women (n=60)

Nutrients	RDA	Mean values of nutrient intake	Excess/deficit (%)	Z value
Energy (kcal)	2250	2084.3 ± 120.40	-7.36	10.65 **
Protein (g)	78	58.24 ± 11.92	-25.33	12.82**
Fat (g)	30	39.9 ± 5.92	33	12.96**
Calcium (mg)	1200	1004.6± 175.87	-16.28	8.60**
Iron (mg)	35	33.26 ± 3.89	- 4.97	3.71**
carotene (µg)	6400	3423.3± 1879.13	- 46.51	12.26**
Thiamin(mg)	1.2	1.18± 0.32	- 1.66	0.32 NS
Riboflavin (mg)	1.4	1.33± 0.44	-5	1.09 NS
Niacin (mg)	14	10.59± 5.99	- 24.35	4.43**
Vitamin C (mg)	60	52.51 ± 15.00	-12.48	3.86 NS
Folic acid (µg)	500	45.26± 32.53	-90.94	117. 7 **

** indicate significance of value at P=0.1   NS= Non-significant

Table 7: Effect of parity of mother on weight and length of newborn

Sr. No.	Parity of mother	Pregnant women		Weight of newborn Mean ± SD	Length of newborn Mean ± SD
		Number	Percentage		
1.	Primipara	41	68.33	2.65± 0.12	42.08± 1.34
2.	Secondgravida	16	26.66	2.70± 0.10	41.25± 1.52
3.	Multigravida	3	5	2.6 ± 0.12	42.6 ± 1.24
	'r' value			-0.07 NS	-0.19NS

NS= Non- significant

Table 8 : Effect of haemoglobin level of mother on weight and length of newborn

Sr. No.	Haemoglobin (g/dl) of mother	Pregnant women		Weight of newborn Mean ± SD	Length of newborn Mean ± SD
		Number	Percentage		
1.	8-9	5	8.33	2.54 ± 0.04	39.4 ± 1.2
2.	9 -10	8	13.33	2.71 ± 0.11	41.5 ±0.86
3.	10- 11	34	56.66	2.65 ± 0.13	42.02 ±1.48
4.	11-12	13	21.66	2.76 ± 0.12	42.46± 1.15
	'r' value			0.41**	0.58**

** indicate significance of value at P=0.1

Table 9: Effect of body mass index of mother on weight and length of newborn

Sr. No.	Body mass index of mother	Pregnant women		Body mass index of mother Mean ± SD	Weight of newborn Mean± SD	Length of newborn Mean± SD
		Number	Percentage			
1.	18.5-24.99	41	68.33	22.99± 1.26	2.69 ±0.14	41.73 ± 1.48
2.	25.0-29.99	16	26.66	26.09 ±1.10	2.61 ± 0.10	41.68 ± 1.68
3.	>30	3	5	32.56 ±1.36	2.63 ± 0.12	42.6 ± 0.94
	'r' value				-0.16 NS	0.12 NS

NS= Non-significant

Table 10 : Effect of education of mother on weight and length of newborn

Sr. No.	Education of mother	Pregnant women		Weight of newborn Mean ± SD	Length of newborn Mean ± SD
		Number	Percentage		
1.	School	11	18.33	2.65 ± 0.10	41.18± 1.58
2.	College	49	81.66	2.69± 0.14	42.0± 1.42
	'r' value			0.18NS	0.20 NS

NS= Non-significant

intake of fat was significantly more than RDAs.

The effect of parity of mother on weight and length of newborn is depicted in Table 7. It is evident from the Table that 68.33 per cent of pregnant women were having only one child, 26.66 per cent had two children and only 5 per cent had more than 2 children. The mean weight of the newborn of primipara, second gravida and multi gravida was 2.65±0.12, 2.70±0.10 and 2.6±0.12kg while the length of newborn of primipara, second gravida and multi gravida was 42.08±1.34, 41.25±1.52 and 42.6±1.24 cm, respectively. From this it can be said that parity of the mother is not having correlation with the weight and length of the newborn.

The effect of haemoglobin level of the mother on the weight and length of newborn is presented in Table 8. It is seen from the Table 8 that 8.33 per cent of pregnant women had 8-9 g/dl of haemoglobin and the mean weight of their newborn was 2.54±0.04 kg and mean length was 39.4±1.2 cm. The women belonged to haemoglobin 9-10 g/dl were 13.33 per cent the mean weight of their newborn was 2.71± 0.11 kg and mean length was 41.5±0.86 cm, while the 56.66 per cent of pregnant women had the haemoglobin 10-11 g/dl and the mean weight of their the newborn was 2.65±0.13 and mean length was 42.02±1.48cm. In this study 21.66 per cent pregnant women had 11-12 g/dl of haemoglobin and the mean weight of their newborn was 2.76±0.12 kg and mean length was 42.46 ±1.15cm. The positive correlation was found with the increasing haemoglobin level with the weight and length of the newborn.

The effect of body mass index of the mother on the weight and length of the newborn is shown in Table 9. It is seen from the Table 9 that 68.33 per cent pregnant women belonged to the BMI range of 18.5 – 24.99, 26.66 per cent belonged to the range of 25.0-29.99. The women having more than 30 BMI were only 5 per cent. The mean weight of newborn of the mother belonging to BMI 18.5-24.99 was 2.69±0.14 kg and mean length was 41.73±1.48 cm. The mean weight of newborn of the mother belonging to BMI 25.0-29.99 was 2.61±0.10kg and mean length was 41.68±1.68 cm. The mean weight of the newborn of the mother having BMI more than 30 was 2.63±0.12 kg and mean length was 42.6±0.94 cm.

Effect of education of mother on weight and length of the newborn is presented in Table 10. It is seen from the Table 10 that 18.33 per cent of pregnant women had educated upto school level, 81.88 per cent were educated upto college level. The mean weight of the newborn of school educated mother was 2.65±0.10 kg and mean length was 41.18±1.58 cm while the mean weight of the newborn of college educated mother was 2.69±0.14 kg and mean length 42.0±1.42 cm. It is evident that as the education level of mother is increasing the weight and length of the newborn is also increasing.

Conclusion:

The mean intake of energy, protein, calcium, iron, β carotene, niacin and folic acid were significantly less than the RDAs while the intake of fat was significantly more than RDAs. Parity of the mother was not having correlation with the weight and length of the newborn. As the haemoglobin level was increasing the weight and length of the newborn was also increasing. Positive correlation was found with increasing haemoglobin level with the weight and length of newborn. There was no correlation with BMI, weight and length of newborn. As the education level was increasing the weight and length of newborn was also increasing but it was found that there is no significant difference.

LITERATURE CITED

Ghosh, S., Hooja, V., Ahmed, S.H., Acharyulu, R. and Bhargava, S.K. (1974). A longitudinal study of length, weight and head circumference from birth to 2 years among children of high socio-economic urban community in Delhi. *Indian Pediatr,* **11** (6): 395-398.

ICMR (2010). Nutrient requirement and recommend dietary allowances for Indians, A report of export group of ICMR. 2010.

Mameesh, M.S., Hathout, H., Safar, M.A.A.I., Mahfouz, A., Rebhi, M. and Hassan, J.M. (1985). Maternal anthropometric and socio-economic parameters associated with birth size in Kuwait, *Nutrition Reports International,* **31**: 35-40.

Singh, M. and Jain, S. (2012). Nutritional status of pregnant women of Rajasthan. *Asian J. Home Sci.*, **7** (2): 435-440.