

## **Study of nutritional composition of traditional supplementary foods consumed by lactating mothers**

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### **ABSTRACT**

**Background:** The lactation period is a major source of concern in developing countries because of its positive impact on the health and nutrition of children. Adequate nutrition for the mothers is therefore important for their good health as well as for that of their offspring. **Aim:** The aim of this study was to assess nutritional status of lactating women in City of Muzaffarnager, Uttar Pradesh of India. **Materials and methods:** This cross sectional study was conducted on 200 randomly selected women attending post natal clinics with their infants (0-6 months) in five health facilitates / hospitals in Muzaffarnager Dist. A structured, validated and pre-tested questionnaire was used to obtain information on socioeconomic characteristics. Body Mass Index (BMI) was used to assess nutritional status by taking height and weight measurements using standard procedures. Dietary intake was assessed using 24 hour recall and a validated food frequency questionnaire. Mean nutrient intake was calculated and expressed as percentages of WHO recommended values. Data was analyzed using descriptive statistics and Pearson correlation coefficient was used to determine association between BMI and nutrient intake. **Results:** Majority of the women (94%) were in the age range of 20-35 yrs and had a total family monthly income > INR 3500. The prevalence of underweight 19%, normal 43.5%, overweight 26% and obesity were 11.5%, respectively. Cereals/cereal based dishes and leafy/non leafy vegetables were consumed more frequently while meat were less frequently consumed on a daily basis. Energy, protein, calcium and vitamin A intake were lower than recommendations. No significant correlation was found between BMI and energy intake. **Conclusion:** Intake of some essential nutrients was lower than recommendations. Intervention programs such as nutrition education and dietary diversity should be emphasized during antenatal and lactation period to improve better health and nutrition outcomes.

**Key Words :** Food consumption, Lactating women, Nutrient intake, Nutritional status

### **INTRODUCTION**

The diet of mothers during pregnancy and lactation has a direct influence on her infant's health status. It is a crucial period during which mother continue to protect her young infant

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in the same way as she was feeding when the baby was in placenta. The lactation period is a major source of concern in developing countries because of its positive impact on the health and nutrition of infants. Lactating women from developing countries are considered nutritionally vulnerable groups because this period places a high nutritional demand on the mother. Inadequate maternal diet during this period will lead to poor secretion of nutrients in breast milk and this can have long term impact on the child's health. It is reported that a lactating woman should produce about 700 to 800 ml of milk per day and this requires an extra energy need of about 500 calories per day. Women who are severely malnourished have reduced lactation performance, thus, the quantity of milk produced depends a lot on the mother's diet. The diet consumed by the mother will not only fulfill her own nutritional needs but will also enable her to produce enough milk for her infant. Nutritional status is an indication of the overall well being of a population. It has been reported that lactation has different effects on maternal nutritional status depending on its duration, intensity, as well as cultural diversity. However, the high energy cost of lactation as well as the nutritional and health risk it could pose for the woman emphasizes the need for continuous monitoring of their nutritional status and dietary intake in poor resource countries. The objective of this study was therefore to provide information about the nutritional status of lactating women as well as dietary pattern of the lactating women and to assess the nutritional composition of traditional supplementary food consumed by lactating women residing in this area.

## METHODOLOGY

### **Study area :**

The study was conducted in 2006. Muzaffarnagar city is an urban area and one of the big city of the state with a landmass of 4,008 square kilometers. The population of this area according to the 2006 census was 30 lakh. All state ministries, departments and the secretariat are centrally located in this Local Government Area. The inhabitants of the town are involved in business, civil service, trading as well as artisan work. All 5 hospitals in this area are designated as "Baby Friendly Hospitals". These health institutions operate antenatal, postnatal and child welfare clinics which cater for pregnant/lactating women and their babies residing within and outside the local government.

### **Study design :**

This was a cross sectional study carried out between April to July, 2006.

### **Sampling procedure :**

This study was conducted in India's Muzaffarnagar region in 5 hospitals *viz.*, one dist hospital and four maternity hospitals. For present study lactating women belonging to urban counterpart were selected from each hospitals using purposive random sampling technique. 40 mothers of each hospitals were selected, thus total 200 samples were selected for study. Clinical examination, anthropometrics measurement and B.M.I. was used and diet survey was conducted by using repeated 24 hrs recall method was used and statistical tools used to determine percentage, mean, S.D. students t-test etc.

**Socio-demographic characteristics :**

A structured questionnaire was used to obtain information on socio-demographic characteristics of the subjects such as age, occupation, education, income, number of children. Mostly young women age between 20-35 are in more numbers than middle aged women between 35-50 years. We found backward class people are more in numbers than other general and scheduled caste. As regard education only 29% women were graduated and approx 15% has completed upto high school. Rest is having basic or no education. We also found percentage of joint family people are more in numbers than nuclear family. It is in the ratio of 66:34. Family income group is most important factor. Generally their family head was earning above Rs. 3500 and these kind of percentage was 37 and rest are in between Rs. 500 to Rs. 3500 in a month. As regard occupation of women, there are two category one is housewife who is 88% and other is working women of 12%. Working women belongs to further two categories *i.e.* business and service and few of them also belongs to farmer.

**Anthropometric measurements :**

Weight measurement was taken using a portable bathroom scale. The subjects were asked to remove any clothing which might change body weight and remove their shoes while standing erect on the weighing scale. Readings were taken to the nearest 0.1 kg. Height was measured using a portable heightometer with a movable head piece while subjects stood erect on bare foot. Measurement was taken to the nearest 0.1 cm. BMI was calculated as weight (kg) divided by height (m<sup>2</sup>) for each subject. All measurements were taken and recorded in duplicates using standard procedures.

The study shows average weight of women in between age 20-35 is 52.10 kg and age between 35-50 years is 50.24 kg. The increased weight is good indication for better milk secretion whereas the underweight lactating mothers cannot nourish their baby well. Also studied height of age group 20-35 yrs the height is 152.11 cm and 35-50 years are found 151.76 cms. Observation of BMI is also we found 22.29. 19% women are under nourished, 43.5% are normal, 25% overweight and 11.5% are obese. Clinical symptoms of lactating women are also observed as healthy 66%, unwell 26% and 8% ill.

**Dietary intake assessment :**

Dietary intake was assessed using a previously validated 24 hour recall and qualitative food frequency questionnaire: A Study of the Nutritional Status and Dietary Intake of Lactating Women in Muzaffarnagar. For the 24 hour recall, the subjects were asked to recall all foods and beverages consumed during the past 24 hours. The use of common household utensils and models of portion sizes were used to aid the women estimate the amount of food they consumed and these were converted to grams using household measures. For commercially prepared foods such as biscuits, an equivalent was bought and weighed to minimize the amount of weighing the women had to do. In the case of packaged foods, information was obtained from the nutrition facts on the package. The average nutrient intake was calculated for each individual using Food composition table. The food frequency questionnaire was used to ascertain the frequency of consumption of certain foods in the list on daily, weekly or monthly basis.

<b>Table 1 : Average food intake of lactating mothers having child (0-6 months)</b>				
Sr. No.	Nutrients	Average intake / unit	Standard value RDA	% increase or decrease
1.	Energy	2458 Kcal	2525	+1.36
2.	Protein	94 GR/Day	75	+25.33
3.	Fat	76 GR/Day	65	+16.92
4.	Calcium	1473 mg/Day	1400	+5.14
5.	Iron	61 mg/Day	60	+1.67
6.	Vitamin A	1540	1550	-0.65
7.	Thiamin	mg/Day	1.2	-8.33
8.	Vitamin B12	2.4µg/Day	2.5	-4.00

<b>Table 2 : Consumption frequency of food among lactating women</b>						
Sr. No.	Food	Once a day	Twice a day	Thrice a day	Once a week	Occasionally
1.	Cereals	44.5%	29.0%	12.0%	14.5%	-
2.	Pulses	34.5%	39.0%	-	26.5%	-
3.	Sugar and jaggery	36.0%	56.0%	6.0%	2.0%	-
4.	Oil and fat	55.5%	10.5%	-	21.0%	13.0%
5.	Milk products	35.5%	63.0%	1.5%	-	-
6.	Meat, poultry	-	-	-	12.0%	15.0%
7.	Fruits	60.5%	23.5%	3.0%	8.5%	4.5%
8.	<b>Vegetables</b>					
	(A) Green leaves	42.0%	11.0%	8.5%	38.5%	-
	(B) Roots and tubers	34.0%	5.0%	-	46.0%	15.0%
	(C) Others	71.0%	16.0%	-	13.0%	-

<b>Table 3 : Traditional supplementary food consumed by lactating women</b>			
Sr. No.	Category	Frequency	Percentage
1.	Traditional food	188	94.00%
2.	Consuming group	-	-
3.	Normal diet	12	6.00%
4.	Consuming group	-	-

<b>Table 4 : Sub category of traditional food consuming group of lactating mothers</b>				
Sr. No.	Special foods	Frequency	%	Reason
1.	Chungani	124	62.00	Hot food for strength
2.	Paga, Doodh, Mewa Laddu Badam	48	24.00	Increases milk secretion
3.	Huluwa, Ajwan Pani, Panjiri	16	8.00	Energetic given strength
4.	Gond Laddu	12	6.00	Gives strength of waist

#### **Data/Statistical analysis :**

Statistical analysis was carried out. Results were expressed as means and standard deviations, frequencies and percentages, while Pearson correlation was used to determine relationship between BMI and nutrient intake. Average nutrient intakes were compared to

WHO reference values for lactating women and the percentages of recommended intake met by the mothers was estimated.

A food consumption survey revealed that 6 different supplementary food items—ajwain ka laddu, gond ka laddu, battia ka laddu, haldi laddu, lidh ka laddu, and soth ka laddu were widely consumed by lactating women in ball form.

A nutritional analysis of these supplementary foods indicated that a 250-gram serving is sufficient for meeting a third of the protein and carbohydrate requirements of a lactating woman. All foods analyzed were rich sources of iron, calcium, phosphorus, and magnesium. Of all the forms of laddu, ajwain contained the maximum amount of protein, calcium, phosphorus, and moisture while battia provided the most iron. The fat content was generally high in all cases to enable the ingredients to be formed into balls. It appears that the diet of lactating women is given greater attention in the immediate postpartum period than in later stages of lactation.

## RESULTS AND DISCUSSION

The socio-demographic characteristics of lactating women shows majority of mothers (94%) were in the age range of 20-35 years. Most of them (29% and 15%) had either primary or secondary education. About one third were housewives, few were working had total family monthly income more than INR 3500, more than two-thirds (95%) had between 1-3 children.

It can be concluded for the present study that intake of all nutrients except fat was unsatisfactory due to lack of knowledge about balance diet. Despite their poor dietary intake their weight and height were not below to standard. Traditional supplementary food was rich

**Table 5 : Daily nutrients intake of lactating women according to family size**

Sr. No.	Nutrient	Upto 3 members			3 to 5 members			Above 5 members		
		Mean	S.D	R	Mean	S.D	R	Mean	S.D	R
1.	Protein	56.48	12.42	0.2146	55.16	11.42	0.3124	53.68	11.81	-0.2842
2.	Fat	59.37	20.13	-0.0286	57.38	15.62	-0.2216	56.78	14.18	0.0514
3.	Calorie	1976.79	431.16	0.1451	1872.13	368.41	0.0357	1781.45	348.71	0.2857
4.	Iron	21.01	8.21	-0.0154	20.00	9.02	-0.0421	21.84	10.36	0.0248
5.	Vitamin B12	0.55	0.26	0.1024	0.53	0.21	0.0211	0.58	0.23	0.0468

**Table 6 : Daily nutrients intake of lactating women according to family income**

Sr. No.	Nutrient	Income											
		Rs. 500 – Rs. 1500			Rs. 1501 – Rs. 2500			Rs. 2501 – Rs. 3500			Rs. 3501 and above		
		Mean	SD	R	Mean	SD	R	Mean	SD	R	Mean	SD	R
1.	Calorie	1812.14	419.26	0.2101	1846.23	403.16	0.4232	1967.63	411.21	0.2145	2089.82	161.2	0.1561
2.	Protein	51.75	13.38	0.3121	52.97	10.36	0.2145	54.86	8.12	0.312	61.89	7.92	0.3894
3.	Fat	56.62	17.85	0.1121	57.26	13.72	0.1653	59.32	14.43	0.2151	68.79	8.82	0.4281
4.	Iron	24.16	11.02	0.1282	24.93	8.54	0.2162	25.21	9.36	0.2234	27.36	8.94	0.0451
	Vitamin B12	0.55	0.48	0.0753	0.57	0.51	0.2870	0.58	0.21	0.612	0.67	0.60	0.0321

<b>Table 7: Daily nutrients intake of lactating women according to education</b>										
Sr. No.	Nutrient	Illiterate			Can Read only			Primary		
		Mean	S.D.	R	Mean	S.D.	R	Mean	S.D.	R
1.	Protein	40.88	48.82	0.2134	42.75	14.26	0.0113	46.13	11.67	0.2141
2.	Fat	50.40	17.31	-0.1151	38.76	11.97	0.3246	56.18	11.68	0.2871
3.	Calorie	1761.21	231.78	0.2137	1671.24	202.48	0.2215	1684.19	212.81	0.1335
4.	Iron	20.97	6.69	0.1366	20.12	4.26	0.1216	21.51	9.39	-0.1042
5.	Vitamin B12	0.44	0.22	-0.214	0.35	0.16	-0.1104	0.54	0.41	0.2123

Table 7 contd...

Sr. No.	Nutrient	Secondary			High School			Graduate and above		
		Mean	S.D.	R	Mean	S.D.	R	Mean	S.D.	R
1.	Protein	51.26	12.08	0.0214	53.97	12.10	-.1214	57.71	10.21	0.2042
2.	Fat	55.51	17.15	0.1121	56.67	18.07	0.3121	61.44	14.41	0.1716
3.	Calorie	1799.26	245.11	0.2181	1897.21	291.22	0.0261	2018.11	298.52	0.3142
4.	Iron	24.13	10.68	0.0812	27.09	12.54	0.0021	27.92	7.42	0.0562
5.	Vitamin B12	0.58	0.31	0.0012	0.61	0.21	0.1151	0.52	1.63	0.1104

<b>Table 8 : Nutrition composition of traditional supplementary foods</b>									
Sr. No.	Food Items	Protein (g)	Fat (g)	Ash (g)	Fiber (g)	Carbo-hydrate (g)	Energy (KC)	Ca (mg)	Iron (mg)
1.	Badam Haluwa	9.60	25.22	1.48	0.68	25.75	348.18	150.15	2.12
2.	Paga Doodh	9.31	19.61	2.58	1.35	27.71	309.73	348.00	3.98
3.	Ajwain Pani	15.50	19.26	5.60	18.50	37.21	388.12	1630.00	30.21
4.	Mewa Laddu	8.96	24.28	2.18	1.41	55.12	474.12	189.85	4.18
5.	Panjiri	8.51	28.42	1.86	1.01	53.067	501.19	53.00	3.92
6.	Harira	6.21	29.32	2.36	1.08	57.19	503.50	260.18	6.21
7.	Gond Laddu	4.97	47.72	1.61	1.09	71.46	614.52	150.88	5.52
8.	Sothura	7.42	27.62	2.25	1.64	47.78	455.30	215.65	5.58

in all nutritive but excess amount of fat in the form of ghee was used in its preparation because of tradition belief that edible oil cause cough and ghee provided strength to the body.

Data on food consumption showed that the women consumed a variety of foods from cereals, roots/tubers, legumes and fruits/vegetables. However, their diets were mainly starch based and low in fruits and vegetables. Their mean energy intake was slightly lower than recommendation. This is consistent with findings from other developing countries among lactating women. It was however lower when compared to reports from developed countries. Despite the fact that the mean energy intake in this study was lower than standards, more than 37.5% had high BMI. The high BMI could be due to the weight gained during pregnancy. Again, the BMI recommendation for normal adults was used in classifying the lactating women since there is no recommended standard for them.

### Conclusion :

Majority of the lactating women were either normal or overweight. Intake of some

essential macro and micro nutrients was lower than recommendation in this study. Dietary intake consisted mainly of plant based foods (cereals, roots and tubers) with low bioavailability and which may not be adequate to support increased nutrient requirements during the lactation period. Intervention programs such as nutrition education, food supplementation and dietary diversity should be emphasized during antenatal and lactation period to improve better health and nutrition outcomes. Due to the cross sectional nature of the study, it is suggested that longitudinal assessment be carried out in the study area in order to ascertain nutritional status of lactating women over a longer period of time. Limitations of the study Caution should be observed in the interpretation of the results as this may have been affected by the cross sectional nature of the study. Again, interpretation of the BMI should be done with caution as there is no specific classification for lactating women. The values used are for normal adult women.

#### **Limitations of the study :**

Caution should be observed in the interpretation of the results as this may have been affected by the cross sectional nature of the study. Again, interpretation of the BMI should be done with caution as there is no specific classification for lactating women. The values used are for normal adult women.

#### **Suggestions :**

It is observed that nutrition is very important factor. Inadequate nutrition develops the many diseases so both deficiency and excess of food leads to health disorders. Therefore healthy nutrition programme should be developed to prevent non communicable disease and promote good health. Govt should take initiative to launch educational campaign those contemplating a pregnancy and breast feeding mothers to increase the intake of iodine supplements by 100 to 200 µg per day.

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