

# Impact of Household Food Security on Maternal Nutritional Profile

Shilpa Jose<sup>1</sup>, Subhasree S<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Home Science, St. Teresa's College, Ernakulam

<sup>2</sup>Research Scholar, Department of Home Science, St. Teresa's College, Ernakulam

**Abstract:** *The present study was carried out to get an insight into the household food security status and to assess the nutritional status of pregnant and lactating women in coastal households in terms of anthropometry, biochemical, clinical parameters and nutrient intake. Also, analysis of the relationship between household food security with health and nutrition related indices of mothers were carried out. Food security core module (USDA, 2000) was used to classify households into different categories. Pregnancy weight gain was insufficient for one third of subjects. Anemia was found in 20% of women. Mean nutrient intake of pregnant mothers were significantly lower than RDA. Only 42% of families were food secure. On assessing the interrelation between BMI of lactating women and household food security levels, it was found that most of the women who were underweight were from food insecure households.*

**Keywords:** Food Security, Nutritional status, Weight gain, Pregnancy, Lactating mothers

## 1. Introduction

Reproductive age women form the most vulnerable segments of population from the nutritional point of view. Maternal undernutrition is associated with low birth weight and all its related adverse consequences. The factors associated with deterioration of maternal nutritional status as identified by Vir (2011) were reduction in habitual dietary intake especially during drought and pre-harvest season, increase in manual work, adolescent pregnancy, short inter-pregnancy interval and infections during pregnancy. There are many organisations set up to ensure food security at community level, local, household and individual levels. These include Public Distribution System (PDS), Integrated Child Development Services (ICDS) and Primary Health Centres (PHCs). The Public Distribution System (PDS) plays an important role in the provision of food security (Brij Pal, 2011). PDS continues to be a major instrument of Government's economic policy for ensuring food security to the poor.

The services under ICDS are interlinked with various sectors with the aim of providing a lasting benefit on the well being of children and their mothers. The classification of beneficiaries and their availing of the services as mentioned above are children (upto 6 years), expectant and nursing mothers, and girls and women. This program is implemented by the department of women and child development at the centre in coordination with the state governments with the aim of holistic development of the child. (Brinda, 2003). The present study 'Impact of household food security on maternal nutritional profile' was carried out with the following objectives: To get an insight into the household food security status in the selected area, to assess the nutritional status of pregnant and lactating women in coastal households in terms of anthropometry, biochemical, clinical parameters and nutrient intake and to analyse the relationship of household food security with health and nutrition related indices of mothers.

## 2. Literature Survey

Maternal undernutrition is associated with low birth weight and all its attendant adverse consequences. Chopra *et al.*, (2012) studied women of child bearing age living in the slums of Mumbai and found that their micronutrient intake was very low. According to Sharma (2012), in India, poverty is deeply embedded in social constructs that impact adversely on woman's economic status in society as well as her nutrition and health status, and food security caused from unequal distribution of food at home. Several studies on maternal nutritional profile conducted in India like Sahoo and Panda (2006) Gautam *et al* (2008) and Saini *et al.*, (2012) also have brought out that reproductive age women and children are at increased nutritional vulnerability.

## 3. Methodology

The area selected for the study was five coastal wards of Ernakulam district namely Fort Kochi, Puthuvype, Malippuram, Kannamaly and Chellanam. Stratified sampling was the method of sampling chosen for the study. In stratified random sampling, the population is divided into non overlapping subpopulations called strata. A probability sample is selected in each stratum. The first strata were the coastal wards of Kochi. 64 wards were classified as coastal wards out of which five wards were selected randomly. The PHCs of each ward were enlisted and permission sought for the conduct of the study. The PHCs which consented for the study were included. All pregnant and lactating women who attended the PHC were enrolled as subjects of the study. There were a few dropouts barring whom the subjects cooperated in every stage of the study. 45 lactating women and 30 pregnant women were interviewed for the present study.

Food security core module (USDA, 2000) was also used along with the interview schedule to classify households into food secure, food insecure without hunger, food insecure with moderate hunger and food insecure with severe hunger. Food Security Core Questionnaire module (USDA, 2000) is

the most authoritative and accessible resource to measure household food security (Nord *et al.*, 2012)

Nutritional Assessment is the first step in developing nutritional goals for a population. Anthropometric measures included Height, Weight, BMI for lactating mothers. Weight gain during pregnancy was compared to recommendations of Institute of Medicine of the National Academies. (IOM, 2009)

**Table 1:** Recommended Weight gain in pregnancy (IOM, 2009)

Pre Pregnancy Weight	BMI	Recommended Total Weight (kg)	Recommended Weight Gain in II and III Trimesters (kg) per week
Underweight	<18.5	12.6-18	0.45
Normal	18.5-24.9	11.25-15.75	0.45
Overweight	25-29.9	6.75-11.25	0.27
Obese (All grades)	>30	4.95-9	0.25

Biochemical assessment was carried out for 30 pregnant women of coastal areas by assessing the secondary data from the PHC records regarding serum haemoglobin estimation, blood pressure and random blood sugar. A dietary assessment using 24 hour recall method and food frequency questionnaire method was carried out on the entire sample to evaluate the food habits, food frequency and food preferences.

#### 4. Results and Discussion

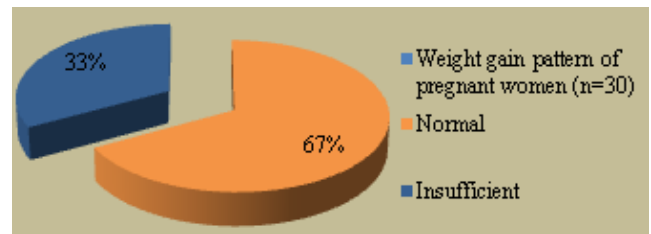
Nutritional status of the subjects was assessed using anthropometric assessment like weight gain pattern of pregnant women and height, weight and BMI of lactating women; biochemical assessment using the secondary data obtained from the PHCs and also by dietary assessment.

**Table 2:** Anthropometric assessment of mothers

Anthropometric Parameters	Frequency	Percentage (%)
<b>Weight gain pattern of pregnant women (n=30)</b>		
Normal	20	67.7
Insufficient	10	33.3
<b>BMI of lactating mothers (n=45)</b>		
Underweight	5	11.1
Normal	36	80
Overweight	4	8.9
Obese	0	0

Weight gain of pregnant women was assessed using current weight of women with their stage of pregnancy (Institute of Medicine of the National Academies, 2009).

It was found that the weight gain of majority (67.7%) of the women were normal. Weight gain was insufficient for many (33.3%) of the subjects. From the BMI assessment of the lactating women, it was found that only majority (80%) of women had a normal BMI; However quite a few (11.1%) were underweight. A few (8.9%) were classified as overweight. (Figure 1)



**Figure 1:** Weight gain pattern of pregnant women

It was found that majority (80%) of pregnant women had normal haemoglobin levels. A few (13.3%) had mild anaemia and very few (6.7%) had moderate anaemia. Through the study conducted to find the prevalence of anaemia among pregnant women in Raichur among 185 patients, Vijayanath *et al.*, 2008 concluded that prevalence of anaemia was high (88.64%) and severe degree anaemia was also seen in high incidence. Mild degree of anaemia was seen among half (49.18%) of the pregnant women. In the present study, it was found that only nearly quarter (20%) of the subjects had anaemia. This shows that the prevalence of the anemia among reproductive women is slightly lower in Kerala, probably due to better ICDS and PHC functioning.

**Table 3:** Biochemical and clinical assessment of pregnant women

Biochemical Parameters	Frequency (n=30)	Percentage (%)
<b>Haemoglobin</b>		
Normal (11g/dL and above)	24	80
Mild (10-10.9g/dL)	4	13.3
Moderate (7-7.9g/dL)	2	6.7
<b>Blood Pressure</b>		
Hypertension	4	13.3
Normal	7	23.3
Borderline (110/70mmHg)	19	63.3
<b>Blood Glucose</b>		
GDM	1	3.3
Normal	29	96.7

The assessment of blood pressure in the study indicated that majority (63.3%) of the pregnant women were in the borderline with 110/70 mmHg whereas some (23.3%) of the subjects had normal blood pressure. A few (13.3%) were hypertensive also. Borderline cases of hypertension is considered normal as women's circulatory system expands rapidly during pregnancy; the systolic blood pressure is likely to drop by 5-10 mm Hg and diastolic pressure by as much as 10 to 15 mm Hg during the first 24 weeks.

A study conducted by Kolble *et al.* (2004) on Caucasians, Asians and Blacks revealed that the mean blood pressure decreased from early to mid pregnancy before increasing to levels 4 mmHg higher at term than in early pregnancy. Values > 130/80 and <90/50 mmHg were observed. Blood pressure was slightly lower in Asians and Blacks. It was also found that the random blood sugar level of majority (96.7%) of the pregnant women were normal.

**Table 4:** Mean nutrient intake of pregnant mothers

Nutrients	RDA	Mean Intake	% Met	p - value
Energy (Kcal)	2250	1490 ± 311	66.2	<0.001
Protein (g)	78	49.3 ± 13.23	63.2	<0.001
Iron (mg)	35	6.3 ± 2.29	18.0	<0.001
Calcium (mg)	1200	387 ± 128	32.3	<0.001
Vitamin C (mg)	60	11.3 ± 4.89	18.8	<0.001

\*\*\* <0.001

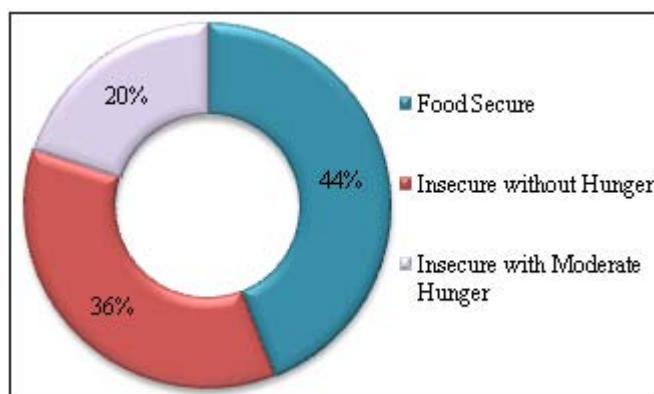
The mean nutrient intake was found to be low. Only 66.2% of the energy requirements and 63.2% of the protein requirements were met. The iron and Vitamin C intake was found to be very low, i.e. only 18% and 18.8% of the Recommended Dietary Allowance (RDA). Only 32.3% of the calcium requirements were met by the subjects. There was highly significant difference in intake levels when compared to RDA.

The food security levels of households were assessed using USDA questionnaire survey module, (USDA, 2000). According to the responses of the subjects, the households were grouped as food secure, food insecure without hunger, food insecure with moderate hunger and food insecure with severe hunger.

**Table 5:** Household Food Security Status of selected families (USDA, 2000)

Household food security level	Frequency (n=75)	Percentage (%)
Food Secure	33	44
Insecure without Hunger	27	36
Insecure with Moderate Hunger	15	20
Total	75	100

Only 42% of families were food secure while some 36 percent were food insecure without hunger. Many households (20%) were food insecure with moderate hunger. Figure 8 illustrates the results.



**Figure 4:** Level of food security of coastal households

According to the study on integrated management of coastal zone for food security carried out in Bangladesh by Bala and Hossain in 2010, the overall status of food security at district levels was good but food security at household level was reported to be poor. Another study conducted by Agarwal *et al.*, (2009) showed that one third of India's urban population resided in extreme poverty and 51% of the households were food insecure.

Thus on comparison with the above studies, the present study signifies that the level of food security in Kerala is better when compared to the other states. 44% of the 75 households selected for studies in the coastal areas of the Kochi were food secure. It was found that none of the household's food security level was classified as extremely food insecure or food insecurity with severe hunger.

The household food security status was cross tabulated and tested to bring out the significance with health parameters like nutrient intake, weight gain in pregnancy, haemoglobin levels in pregnancy, BMI of lactating women, and sanitation and hygiene levels of households. The tabulations and discussions are presented below.

**Table 6:** Interrelation between food insecurity and other health parameters

Parameters	Food Insecurity		Fisher's Exact Value	p - value
	Secure	Insecure		
<b>Weight gain pattern in pregnancy</b>				
Normal	8 (40.0%)	12 (60.0%)	1.071	0.442 <sup>ns</sup>
Insufficient	6 (60.0%)	4 (40.0%)		
<b>Haemoglobin levels in Pregnancy</b>				
Normal	11 (45.8%)	13 (54.2%)	0.409	0.999 <sup>ns</sup>
Mild Anaemia	2 (50.0%)	2 (50.0%)		
Moderate Anaemia	1 (50.0%)	1 (50.0%)		
<b>BMI of lactating women</b>				
Under Weight	1 (20.0%)	4 (80.0%)	6.084	0.029**
Normal	14 (38.9%)	22 (61.1%)		
Over Weight	4 (100%)	0 (0.0%)		
<b>Food Variety of Diet</b>				
Poor	25 (43.1%)	33 (56.9%)	0.083	0.788 <sup>ns</sup>
Good	8 (47.1%)	9 (52.9%)		
<b>Phytochemical Density of Diet</b>				
Low	1 (100%)	0 (0.0%)	1.290	0.440 <sup>ns</sup>
High	32 (43.2%)	42 (56.8%)		
Good	31 (44.9%)	38 (55.1%)		
Poor	0 (0.0%)	0 (0.0%)		

On assessing the interrelation between BMI of lactating women and food insecurity, it was found that most of the women who were underweight were from food insecure households. This association between Food security and BMI was statistically significant also. Chapparo (2012) in the technical report on household food insecurity and nutritional status of women of reproductive age and children under 5 years of age stated that the height and weight of women of reproductive age were lower if they came from household with food insecurity though there was not any significant difference in the weight of women from moderately and severely insecure households. It was also known that there was not a significant difference in the BMI of women from moderately and severely insecure households. Both were significantly lower than the BMI of women in food secure households. The present study also indicates comparable results.

All other selected parameters including weight gain of pregnant mothers were not found to have a significant association with household food security status. This may be due to the additional care taken by pregnant women of even food insecure households. Supplement use of iron and folic

acid by the pregnant women and access to health care by most of the selected subjects have ensured better health status to them irrespective of household food security status. However regarding nutritional profile, there is still a long way to go as very few women were found to have satisfactory nutrient intake.

## References

- [1] Agarwal S., Vani Sethi, Palak Gupta et al(2009)Experiential Household Food Insecurity in an urban, underserved slum of North India, Food Sec.vol.1:pp:239-250
- [2] Bala BK and Hossain MA (2010) Modeling of Food Security and ecological Footprint of coastal Zone of Bangladesh, Environ Dev Sustain, vol.12, pp:511-529
- [3] Brij Pal (2011) Organisation and working of Public Distribution System in India: A critical analysis, Research on Humanities and Social Sciences, Vol.1(1).pp:26-32
- [4] Brinda V., (2003) Household Food Security and Integrated Child Development in India, Centre for Economic and Social Studies and International Food Policy Research Institute (IFPRI), Washington DCpp:39-46
- [5] Chapparo Camila (2012) Household Food Insecurity and Nutritional Status of Women of Reproductive Age and Children Under 5 years of Age in Five Departments of Western Highlands of Guatemala- An Analysis of Data from the National Maternal and Infant health Survey 2008-2009 of Guatemala; FANTA 2 Bridge, Washington.
- [6] GautamVirender P, K. Taneja Devender, Nandini Sharma, K. Gupta Vimal, Ingle Gopal K, (2008), Dietary Aspects of Pregnant Women in Rural Areas of Northern India, Maternal and Child Nutrition, Vol.4(2), Pp: 86-94.
- [7] Institute of Medicine of the National Academies(2009)Weight gain during Pregnancy:Re examining the guidelines.WashingtonDC, The National Academies Press. Last accessed from iom.nationalacademies.org on 8-9-2015
- [8] Kolble N. O, Roos M, Gasser T, Huch. R, Huch. A, Zimmermann. R, (2004), Cross sectional study of automated blood pressure measurements throughout pregnancy, British Journal of Obstetrics and Gynaecology, Vol.111, Pp 319-325.
- [9] Kuppuswamy scale (2007).Kuppuswamy B, (2007), Manual of Socioeconomic Status (urban), Indian Journal of Paediatrics, Vol.74(12), Pp:1131-1132.
- [10] Nord.M, R.PerezEschamilla and A.M. SegallKorrea, (2012), Modified US Household Food Security Survey Module in Campinas, Brazil, European journal of Clinical Nutrition (2008), Vol.62, Pp:665-673.
- [11] SahooSubarnalata and Panda Basumati, (2006), A Study of Nutritional Status of Pregnant Women of Some Villages in Balasore District, Journal of Human Ecology, Vol.20(3), Pp: 227-232.
- [12] Saini S, Singh J, Ahluwalia S K, Mittal A, Singh M.M, Qadri S, (2012), A Cross Sectional Study of the Association of Maternal Socio Demographic Factors and Low Birth Weight in Tertiary Care centre in Northern India, Indian Journal of Maternal and Child Nutrition, Vol.14(1).
- [13] USDA (2000) US Household Food Security Survey Module, Economic Research Service, USDA.
- [14] Vijaynath, Patil Ramesh S, Jitendra, Patel Abhishek. (2010) Prevalence of anemia in pregnancy. Indian Journal of Applied Basic Medical Sciences; 12B:15.
- [15] VirChander Sheila (2011) Public Health Nutrition in Developing Countries- Part II, Woodhead publishing India Pvt Ltd, Pp: 67