

# Nutritional Status of Women Employees of Public Sector Electronics Industry Consuming Home and Canteen Food

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## INTRODUCTION

Rapid industrialisation has resulted in the increased number of women seeking gainful employment in the production activities particularly in electronics industry. It is estimated that women's employment in the organised sector is about 12% of the total employment in industry, mainly as a labour force involved in production activities (Barbara, 1988; Papola, 1993). In electronics industry, the opportunities for employment of women seems to be encouraging as nearly 18.8% of women are employed in this sector (Vittal, 1995). The gainful employment of women outside home has improved the standard of living, greater financial independence and access to material resources (Barbara, 1988), which may influence their health and nutritional status. It is generally believed that women's employment lead to better nutrition for themselves and for their families (Gulati, 1978; D'souza, 1982; Ghosh, 1987; Joanne et al., 1988; Chatterjee, 1988; Chatterjee and Julian, 1989). Further, organised feeding programme for industrial workers in public sector undertakings is gaining importance to promote better nutritional status since well fed labour force and productivity are closely related (Swaminathan, 1967). In addition, it is also to be noted that the impact of the consequence of increase in income on nutrition appear to be more complex when other environmental aspects and food behaviour characteristics including the type of food service provided, activity pattern, hours of work, time available for meals, meal frequency and break time etc other than economic status and education appear to play a vital role. Therefore, in the present study, the nutritional status of employed women in an electronic industry belonging to both executive and non-executive cadres are determined, their food behaviour characteristics with reference to their consumption of food provided by the industrial canteen and home food consumption were studied.

## METHODOLOGY

*Profile of the Industry:* The study was carried out in Bharat Electronics Ltd. (BE) located in urban Bangalore district. BE is a premier professional public sector, Govt. of India enterprise set up under the ministry of defence. It is a mother unit, started in 1954 with a production assets worth Rs. 2773 crores and now has a turnover of 9 billion. BE produces communication equipment, radar system for the defence forces in addition to components and equipments for radios, television, telecommunications, satellite communications, meteorology, space electronics etc in about 12 divisions.

*Employee Status and Selection of the Subjects:* BE has a total of 10,528 employees on its roll including executives (Ex-I) and Non-executives (Nex-II), out of which 2335 (22.17%) were women. Among its women employees, Ex-I constituted only 200 (8.5%), the rest being Nex-II 2135 (91.5%). Majority of women employees particularly Nex-II were involved in assembling, testing, soldering, fixing the printed circuit boards, milling, wiring, electroplating, etc. Ex-I women were involved in design development, research fabrication and personnel management.

The probable random sampling method was employed to assure a representative no. of women from all the 12 divisions. The study adopted a two stage sampling to select the women. In the I stage, 93 Ex-I and 460 Nex-II women were selected for nutritional anthropometry. In the II stage, 66 Ex-I and 144 Nex-II women were selected for dietary assessment. The selected women were found to avail the canteen food services which included one breakfast, lunch and two times either tea / coffee/milk by the industry. There were also women who consumed food brought from home.

*Assessment of Nutritional Status:* For evaluating the nutritional status of the selected women, pre-formed questionnaire was used which consisted of recording socio-economic status, menu and meal pattern and anthropometric

measurements- height (cm) and weight using the standard procedure (Jeliffe, 1966) were recorded for all the 553 women. BMI and body fat % was estimated (Paul Deurenberg, 1991).

The food intake of selected sub sample of 66 Ex-I and 144 Nex-II was assessed by interviewing the women with the help of household measures relevant to Indian cuisine models to construct the individual women's 24 hour food intake for home food (HF) consumers and canteen food (CF) consumers.

Energy expended in different physical activities for two different days was computed using the data on time use recalls of the selected women (FAO/WHO 1985). Energy balance was determined by factorial method. Resting metabolic rate (RMR) predictable of women was computed factorially using the formula (ICMR 1990). Food intake data was converted into raw ingredients in terms of food groups and intern was translated into energy by calculation using food composition tables (Gopalan, 1993).

## RESULTS

*General Information:* The mean age of the study group was found to be  $33 \pm 9.7$  (Ex-I) and  $44.7 \pm 6.6$ yr (Nex-II). Women in executive cadre were found to be younger to those who were in non-executive position. Majority of the families in both the groups belonged to nuclear type of families. Mean family size of the study group was found to be similar i.e. 3.9 and 4.1 in Ex-I and Nex-II respectively. However, in terms of individuals, 52% of Ex-I and 63% of Nex-II were found to be medium size families. Educational status of Ex-I women was found to be higher than the Nex-II. The estimated mean monthly income from different sources was higher in Ex-I at  $17,405 \pm 685$  compared to  $11,182 \pm 4612$  in Nex-II women.

*Nutritional Status:* Mean anthropometric measurements and BMI of women both home and canteen food consuming groups is presented in Table 1. At the time of study most of them appeared to be on 'heavier side' of the body build. Results showed that weight and BMI of women consuming canteen food in both the groups were found to be higher compared to home food consumers and significantly higher particularly in Nex-II group. Mean body weight and BMI of canteen food consumers were found to range

from  $56.3 \pm 5.4$  to  $57.8 \pm 11.9$  and  $22.9 \pm 5.3$  to  $27.3 \pm 6.8$  respectively and these values were found to be significantly higher than the reported values for urban women belonging to higher income group (Rao K.V. et al., 1986).

**Table 1: Mean  $\pm$  SD anthropometric measurements and Body Mass Index (BMI) of women**

Measurements/ Index	Ex-I		Nex-II	
	HF(n=29)	CF(n=64)	HF(n=145)	CF(n=315)
Height (cm)	154.2 <sup>a</sup> $\pm$ 5.8	155.2 <sup>a</sup> $\pm$ 4.8	155 <sup>a</sup> $\pm$ 5.2	154 <sup>a</sup> $\pm$ 5.3
Weight (kg)	52.3 <sup>a</sup> $\pm$ 7.2	56.3 <sup>a</sup> $\pm$ 5.4	57.8 <sup>a</sup> $\pm$ 11.9	64.9 <sup>b</sup> $\pm$ 9.6
BMI	22.3 <sup>a</sup> $\pm$ 4.6	22.9 <sup>a</sup> $\pm$ 5.3	24 <sup>a</sup> $\pm$ 6.3	27.3 <sup>b</sup> $\pm$ 6.8

Any two means in rows carrying different superscripts a b.... differ significantly ( $P \leq 0.05$ )

HF = Home Food, CF = Canteen Food+Home food.

Similarly, percentile distribution of women by BMI and body fat % presented in Table 2 point out that majority of women consuming canteen food was found to be overweight and obese compared to home food consumers in both the groups. It is to be noted that 47 and 64% of Nex-II women consuming food provided by the industry at the work site were found to be overweight/ obese by BMI and body fat % criteria respectively.

**Table 2: Percentile classification of women by BMI and body fat %**

Classification	Ex-I		Nex-II	
	HF	CF	HF	CF
<b>BMI</b>				
15-18.5 (under nourished)	8(9)	8(9)	2(0.4)	4(0.8)
18.5-25 (normal)	17(18)	40(43)	72(16)	93(20)
25-30 (obese grade-I)	4(4)	16(17)	49(11)	162(35)
>30 (obese grade -II)	-	-	22(5)	56(12)
<b>Body Fat %</b>				
19-23	5(5)	7(8)	-	4(0.8)
24-29	11(12)	27(29)	35(8)	12(3)
>30 (obese)	13(14)	30(32)	11(24)	294(64)

Figures in paranthesis indicate percentage

The mean food intake (Table 3) indicate that cereals and millets including refined food products formed sizeable portion in the dietaries of women availing food from the canteen and these were found to be significantly higher compared to HF consumers. Consumption of milk and milk products was also found to be

**Table 3: Mean  $\pm$  S.D dietary food intake of women consuming home and canteen food vis-à-vis Desirable Dietary Pattern (DDP)**

Food item	Ex-I		Nex-II		DDP
	HF	CF	HF	CF	
Cereals & millets	260 <sup>a</sup> $\pm$ 40	350 <sup>b</sup> $\pm$ 70	305 <sup>a</sup> $\pm$ 35	395 <sup>b</sup> $\pm$ 85	240
Pulses	45 <sup>a</sup> $\pm$ 10	55 <sup>a</sup> $\pm$ 15	55 <sup>a</sup> $\pm$ 20	78 <sup>b</sup> $\pm$ 16	60
Green leafy vegetables	15 <sup>a</sup> $\pm$ 5	10 <sup>a</sup> $\pm$ 5	15 <sup>a</sup> $\pm$ 10	20 <sup>a</sup> $\pm$ 15	100
Other vegetables	65 <sup>a</sup> $\pm$ 15	75 <sup>a</sup> $\pm$ 25	75 <sup>a</sup> $\pm$ 20	85 <sup>a</sup> $\pm$ 25	50
Roots & tubers	85 <sup>a</sup> $\pm$ 30	125 <sup>b</sup> $\pm$ 45	115 <sup>a</sup> $\pm$ 25	175 <sup>b</sup> $\pm$ 45	50
Fruits	80 <sup>a</sup> $\pm$ 15	80 <sup>a</sup> $\pm$ 20	100 <sup>a</sup> $\pm$ 15	120 <sup>a</sup> $\pm$ 45	100
Milk & milk products	300 <sup>a</sup> $\pm$ 60	450 <sup>b</sup> $\pm$ 85	305 <sup>a</sup> $\pm$ 50	380 <sup>b</sup> $\pm$ 45	150
Fats & oils	40 <sup>a</sup> $\pm$ 10	40 <sup>a</sup> $\pm$ 15	35 <sup>a</sup> $\pm$ 15	45 <sup>a</sup> $\pm$ 15	30
Sugar & jaggery	45 <sup>a</sup> $\pm$ 15	55 <sup>a</sup> $\pm$ 20	50 <sup>a</sup> $\pm$ 15	65 <sup>a</sup> $\pm$ 20	30
Fleshy foods	20 <sup>a</sup> $\pm$ 15	20 <sup>a</sup> $\pm$ 15	20 <sup>a</sup> $\pm$ 15	25 <sup>a</sup> $\pm$ 10	-

Any two means in rows carrying different superscripts a b.... differ significantly (P = 0.05)

significantly higher in CF. The mean intake of all food items except pulses in Ex-I and green leafy vegetables in both the groups was found to be higher when compared to the desirable dietary pattern (DDP).

Energy intake of CF consumers was found to be significantly higher compared to HF consumers (Table 4). Similarly, positive energy balance of CF women ranged from 189  $\pm$  56 to 211  $\pm$  20 Kcal, energy expenditure being low.

It was noted that the meal frequency (4-5) was found to be higher in those women who consumed food at work site (CF). Breakfast items provided by the canteen consisted only of bakery products like bread, bun, cake / biscuit etc. along with rich coffee with good quantity of milk and / or milk alone for drinking. This is in addition to tea / coffee intake at home sometimes with light snacks. More importantly, lunch provided by the canteen was *adlibitum* service consisting of rice, ragi dumplings, sambhar, rasam, vegetable, curd, papad, pickle with special rice items once a week and a store bought sweet item once a month. In contrast, meal frequency of HF women was found to be less at 3-4 who brought lunch limited to rice, sambhar and curd. Breakfast items included upama, idli, dosa, chapathi etc and most of these preparations were made from whole grain cereals.

Another main difference was found to be with regard to 30 minutes of lunch-break available. In

CF women, major part of 30 minutes spent on walking up and down to the canteen from work place and standing in the queue, as a result very less time (10-15 minutes) was available for eating the full course of lunch, resulting in gobbling up excess food hurriedly compared to HF women who ate their limited lunch items more leisurely.

## DISCUSSION

Results of the study indicate that the desirable socio-economic features of employed women satisfy the objective of improving the quality of life (Barbara, 1988). Since, women's gainful employment would lead to higher level of income with increased food consumption and nutritional status (Priyani Soysa, 1987).

Although higher mean weight of Nex-II women in both HF and CF group appeared inversely proportional to socio-economic status and may perhaps be assigned to their higher age gradient. However, the mean weight of women in both the groups are higher than the other urban women (NNMB, 1984; Rao et al., 1986), but comparable to NCHS standards and women in Bombay (Dhurandhar and Kulkarni, 1992) while the weights and BMI of Nex-II women found to be higher compared to women in Iran and Jordan (Hosseini and Ghassein, 1990) dispelling the general observation that women in Asia are

**Table 4: Energy balance of women**

	Ex-I		Nex-II	
	HF	CF	HF	CF
Energy intake	2210 <sup>a</sup> $\pm$ 155	2490 <sup>b</sup> $\pm$ 221	2657 <sup>a</sup> $\pm$ 118	2988 <sup>a</sup> $\pm$ 148
Energy expenditure	2231 <sup>a</sup> $\pm$ 134	2301 <sup>a</sup> $\pm$ 175	2567 <sup>a</sup> $\pm$ 150	2777 <sup>b</sup> $\pm$ 156
Energy balance	21 <sup>a</sup> $\pm$ 9	189 <sup>b</sup> $\pm$ 56	90 $\pm$ 24 <sup>a</sup>	211 <sup>b</sup> $\pm$ 20

Any two means in rows carrying different superscripts a b... differ significantly (P  $\leq$  0.05).

underweight (Hossein and Ghassein, 1990).

Further, the majority of women in both the groups of CF category were overweight / obese both by BMI and body fat % criteria found to be associated with increased food intake of these women might have been influenced greatly by the environmental factors like increased meal frequency, adlibitum food service, inadequate meal time forcing women to gulp down food indiscriminately, monotonous nature of work, inclusion of energy dense bakery products made out of refined flours and sugars for breakfast might have all contributed to their positive energy balance with lowered energy expenditure resulting in overweight / obesity in CF women compared to HF group. It appears to be further compounded by their minimum physical activity. The results are indicative of the fact that environmental factors particularly of food service facility at the work site without proper perspective on energy requirements of sedentary activity may expose women to the risk of malnutrition of excess energy.

Hence, women's employment in an electronic public sector industry with sedentary nature of work and the type of food service provided at the work site need to be modified with special emphasis on creating nutritional awareness and the risk of malnutrition of excess energy intake.

**KEY WORDS** Women's Employment. BMI. Body Fat %. Home and Canteen Food. Energy Balance. Overweight. Obesity.

**ABSTRACT** Nutritional status of women employed in an electronic industry of both executive Ex-I (n-93) and non-executive Nex-II (n-360) was determined. The sample was drawn from a total of 200 Ex-I and 2135 Nex-II women working in all the 12 divisions. The study was conducted in two stages on women consuming canteen and home food. Nutritional status was assessed by anthropometric measurements, food intake and energy balance. The results indicated that mean body weight and BMI of canteen food consumers ranged from  $56.3 \pm 5.3$  to  $57.8 \pm 11.9$  and  $22.9 \pm 5.3$  to  $27.3 \pm 6.8$  respectively for Ex-I and Nex-II gps. Majority of canteen food consumers (CF) were found to be overweight and obese by BMI and body fat %. Criteria. Dietary intake of cereals and millets, milk and milk products, fats and oils, sugar and jaggery were found to be higher particularly in Nex – II CF group compared to the desirable dietary pattern (DDP). Positive energy balance of CF women in both the groups found to range from  $189 \pm 56$  to  $211 \pm 20$  kcal as energy expenditure was low due to their nature of

work combined with the type of food service provided by the industry and other environmental factors. The results indicate that these women are at greater risk of malnutrition of excess energy.

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