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## Food Service Facility and Adequacy of Food Served at the Work Site in an Electronics Industry

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### INTRODUCTION

In recent years, there appears to be a large scale employment of women in industries (Rungta, 1995; Rajnarayan, 1995) due to economic liberalisation particularly in the electronics industry (India Year Book, 1996). Hence, suitable organised mass feeding programme for these industrial workers attains greater importance and moreover, there observed to be a direct relationship between well fed labour force and productivity. It is also an unique opportunity for promoting better nutritional status for workers and their families. It is also made obligatory to provide food to workers on subsidy basis, since commutation between the work place and habitation absorbs considerable time and energy (Govt. of India, 1947). It is important that the meals served are nutritionally adequate, hygienically prepared and served and the diet served is considered to be a basic and vital factor in the upkeep of workers, since they spend major part of their time at work place. But very little information is available on the adequacy of meals served to employees in terms of both quality and quantity and organisation and management of industrial food service establishments. Hence, the present study was undertaken.

### MATERIALS AND METHODS

The present investigation was carried out in a mega public sector industrial canteen i.e. Bharat Electronics Ltd., (BEL) located in Bangalore urban district. The industry has about 10,528 employees both in executive and non-executive cadres, worked both in first (7.00am to 3.00pm) and second shift (8.30 am to 4.30pm), working for a total of 8 hours per day with half an hour lunch break. Majority of employees were involved in carrying out sedentary jobs like assembling, testing, inspection, soldering, etc. including research and development activities. Initially, BEL personnel manager and canteen manager were contacted to whom the purpose of the study was explained. Questionnaire was used to obtain the general

information of the canteen followed by repeated visits to study the food service facility and to evaluate the food production and service and its related aspects. Format of the schedule contained questions in addition to observations relating to the general information of the canteen organisation, personnel, selection and training of employees, finance, purchase, selection and procurement of food items, storage issues, food production and service and a check list for evaluation of food characteristics, cleanliness, sanitation, and kitchen hygiene. These are expected to have a direct impact on the health and nutrition of employees. Data were collected on the daily inventory of foods consumed, meal and menu pattern of the food service. Per capita consumption of different foods estimated was compared with the desirable dietary pattern calculated for sedentary employee. Per capita nutrient availability per employee in the two meals provided i. e. one break fast and one lunch were computed and compared with the recommended dietary intake for the whole day to obtain the adequacy of food consumption.

### RESULTS

Food service at BEL was functioning since 1956. It had altogether five canteens spread over an area of seven acres in a two kilometer of radius of actual working area of the industry, with a total sitting capacity of 6000 employees at one time. Out of which three canteens are exclusively for non-executive employees, one for executives, and one for the employees of Centre for Training and Development. First shift employees were provided lunch at 11 am and second shift at 12.30pm. Break fast with coffee /milk and evening tea were served at the work spot itself. Canteen was operated round the clock on all the working days. All the canteens were equipped well to provide convenient hygienic food services to the employees.

Organisational setup of BEL canteen had a strength of 147 personnel working in four shifts with a scheduled duty of eight and a half hours

per day.

As per the Karnataka Factory Rules (1969), BEL had constituted a canteen management committee which is an advisory body for day to day operations particularly regarding the menu planning, maintenance of quantity and quality food standards.

Canteen management committee had ten members of which five members were nominated by the management from different divisions with a chairman for two year term and canteen manager as an invitee. Minutes of the meeting were submitted to the general manager [personnel] for remarks and submitted to the Executive Director [ED] for final approval and implementation.

*Physical Facilities:* Facilities provided in all the five canteens were similar. Each unit constituted of a dining hall, production area inclusive of space for pre-preparation and cleaning, storerooms-cold and dry. Storerooms were organised as per the standard procedures with shelves and containers. These rooms were provided with sufficient racks, bins for non-perishables, Cold storage facility was provided for storing vegetables, fruits, left over foods and bakery items. Milk and curds in large quantity were observed to be stored in four fibre remoulded plastic tanks[RP] having a capacity of 400 litres of milk with a receiving area for checking and inspection of the purchased items. The dining hall was found to be spacious with sufficient tables and chairs

Facilities included weighing machines for weighing both large (500kg) and small quantities (10 kg). A flour mill facility included for the preparations of cereal flour and spices [masala] mix. The food plants were provided with poori and chapati dough makers, processing machines, steam insulated vessels for the preparation of rice, sambhar, rasam etc. It was observed that nearly 90 percent of cooking fuel was derived from solar water heating system. The system was provided with motors, temperature controllers, sensors and insulated water tanks to generate 7500 litres of hot water (70°C). In addition, diesel generator and cooking gas were also being used as fuel. All the canteens were found to have a plate washing machine fabricated at BEL.

*Personnel:* A total of 147 personnel working in all the five canteens were under the supervision

of a single canteen manager.

Each employee was assigned to a specific job and responsibility considering the economic and socio-psychologic dimensions. It was observed that the management was aware of the fact that low wages and cheap labour were uneconomical, hence, a take home salary of the personnel was found to be satisfactory which was also endorsed by the personnel.

Employment of personnel was through the employment exchange based on their job experience. Freshly selected personnel were being given orientation and on the job training by the trained senior personnel. Except for the manager who had a Diploma in Catering Management all the others did not have any certificate in catering. Work done assessment of the employees was based on their performance and responses elicited from the consumers over a period of time.

Regular medical check up of employees including blood and urine analysis, x-ray, ECG was being carried out regularly at the BEL hospital free of cost. Employees who were found medically unfit, were being transferred to other field/ area in the industry.

*Finance and Food Subsidy:* Under the welfare measures, the company provided a budget of Rs. 4.3 crores during the period of study i.e. 1995-96, expecting an increase of 10% rise in expenditure, Rs. 4.5 crores was allotted during 1996-97. Out of which as high as Rs. 4 crore was towards the food subsidy. It was observed that out of total expenditure of Rs.540/ month/employee, an amount of Rs. 352/ month/employee was subsidised. A policy of higher subsidy on food was provided with an anticipated higher productivity and returns.

*Purchasing:* For the purchase of food items, purchase department of the industry was responsible for the procurement of items from the Government recognised firms based on the indent placed by the canteen manager and store keeper. Non perishable items were purchased from Karnataka Consumer Co-operative Federation (KCCF), National Consumer Co-operative Federation (NCCF), Karnataka Oil Federation (KOF) on monthly basis. Perishable items like vegetables, milk and bakery products were procured through Horticulture Producers and Consumers Marketing Society (HOPCOMS),

Karnataka Milk Federation (KMF) and Modern Bakery respectively on fortnightly credit basis. Tea or Coffee powders were being purchased from Brooke Bond or Nestle Companies. Pickles and papads were supplied by 'Akshaya'-a women's welfare association- an employment of destitute women run by BEL. There was a Perpetual Inventory for issue of items each day (Table 1).

*Food Production and Service:* The continuous supply of desirable, nutritious and

**Table 1: Inventory of daily consumption of foods**

Name of the food stuffs	Quantity/day
Rice	1400kg
Redgram dal	275kg
Ragi	400kg
Refined oil	210kg
Sugar	300kg
Groundnut	15Kg
Rusk	500nos.
Bread	1900 loaves
Bun	15,000 nos.
Milk	3200 lit.
Vegetable	2530 kg
Roots and tubers	340Kg
Green leafy vegetables	115 kg

acceptable food is considered important in food service. It was noted that majority of workers regarded their meal at the work site as their major meal, because of long hours (8) being spent at the industry. Hence, menu and meal planning served as a centre of all activities taking into account the type of work and general environment.

Menu was being planned by the canteen manager in consultation with the canteen management committee on the basis of seasonal availability of food with due attention to nutritive value. For instance, large quantity of milk was included in tea or coffee in addition to providing milk during breakfast to improve the quality of vegetarian diet. Canteen also provided curd and butter milk and adlibitum service. In addition, ragi being a rich source of calcium and fibre, ragi dumplings were included in the daily menu. A typical menu is shown in table 2. It can be pointed out from the menu, that it is devoid of fruits and sufficient green leafy vegetables. The per capita food consumption provided in the two meals of canteen food as compared to a desirable dietary pattern (DDP) to meet the recommended

**Table 2: Meal and menu pattern of the canteen food service**

I Shift	II Shift(Time) (General)	Meal	Preparation
8.00- 8.15 am	9.30- 9.45am	Breakfast	Bread or bun and cake,Coffee/milk
11.00- 11.30 am	12 noon- 12.30 am	Lunch	Ragi dumplings, rice,sambhar, rasam, palya, curd, buttermilk, papad and pickle
1.00- 1.15 pm	2.30- 2.45 pm	After noon	Tea

*Note:* - Special rice items like pulao/bisibelebath/puliogre are provided for lunch along with other items on every Wednesday.  
- Store bought sweets are provided once a month.  
- Ad lib-i-tum self service.

allowance is shown in table 3 and per capita nutrient availability of the diet is shown in Table-4 It is seen that the per capita consumption exceeded the desirable amounts particularly in case of calorie rich cereals, milk, sugar, oils and fats. Surprisingly, these amounts were consumed in two meals itself at the work site other than the food consumed at home. Hence, the consumption of energy dense foods may be detrimental to the health of sedentary employees.

Acceptability of foods by the workers was given top priority while planning the menu, determined on popularity index- plate waste basis and criticism made in the complaint register.

Method of cooking was essentially that of a

**Table 3: Per capita food consumption**

Food stuffs	Canteen food (gm/ ml) per capita	Desirable Dietary Pattern (DDP)
Cereals & millets	225	285-398
Pulses	25	51-72
Green leafy vegetables	10	100
Roots & Tubers	30	50
Other vegetables	200	100
Milk & Milk Products	280	150
Sugar	45	35
Fruits	-	100
Fats & Oils	35	30-40

- DDP was computed to provide 1900-2400 calories and 48-60 gm of protein for sedentary employees.  
- Canteen food pattern included one breakfast and one lunch only.

**Table 4: Per capita nutrient availability (in two meals)**

Nutrients		RD I for Sedentary women
Energy (Kcal)	1854	2045 ± 310
Fat (gm)	51	45 ± 16
Protein (gm)	45	50 ± 12
Calcium (mg)	849	400
Iron (mg)	12.2	30
Retinol (mg)	1127	600
Thiamine (mg)	1.4	1.3 ± 0.14
Riboflavin (mg)	1.02	1.5 ± 0.15
Niacin (mg)	4.2	17.5 ± 2.0
Vit. C (mg)	46.0	40

RDI- Recommended Dietary Intake- Values are means of RDI computed using ICMR recommendations for each women based on desirable body weight.

pattern followed in Bangalore area- steam cooking, boiling and frying. Undesirable practises of draining out 'rice ganjee' to maintain the quality of cooked rice was practised. This 'rice ganjee' could be reused in the preparation of ragi dumplings. Adlibitum self service was being followed in all canteen units.

*Hygiene and Sanitation:* Industrial catering needs enough emphasis on hygiene and safety food measures to avoid the contamination of food, since any outbreak of food borne disease/disorder affects several persons simultaneously, resulting in loss of productivity and increase in the cost of hospitalisation. It is reported that 60% of food borne illnesses are caused by poor handling techniques and serving the contaminated food (Jacob, 1989).

Facilities provided for cleaning and washing of vessels, food items and hand washing appeared to be 'good'. Cleaning of the premises was being carried out regularly. Personal hygiene of the food service employees with respect to uniform, appearance (hair, face, hands, feet, etc.), smoking and hand habits were observed to be good. Receiving area, store rooms, cooking and washing areas and dining halls were being scrubbed and kept clean along with good facility for waste disposal. Ventilation and lighting arrangements were found to be satisfactory.

## DISCUSSION

The concept of industrial food service refers to the ability and willingness of a industry to assure availability of quality food along with

sufficient quantity to sustain the health and nutrition of workers (Naila Kabeer,1990) along with desirable food service environment. Hence, food service provided by the BEL canteen in terms of infrastructural facilities- viz. – organisational type, physical layout and equipment were found to be 'excellent'. However, the limitation appeared in terms of the choice of personnel and menu planning and the provision of adlibitum self service facility particularly with regard to milk, curd, papad, etc although, it is a fact that adequate provision of meals improve the productivity and morale of workers as well as their welfare, health and nutritional status. In addition, the method of preparation of rice- draining off 'ganjee', pre preparation of vegetables (washing and cutting) and a prolonged cooking were undesirable from the nutritional stand point.

It is important that food service programme should aim at satisfying the nutritional needs and requirements of the working group to promote optimum health. However, the food service provided for the workers by the BEL management appears to ignore such needs. The actual per capita availability of food as compared to the desirable estimated dietary pattern for the whole day revealed increased amounts of cereals, milk, sugar, fats and oils in the two main meals itself (breakfast and lunch). Although provision of extra milk and milk products to the vegetarian diet help to improve the quality of protein, increased intake along with other energy dense foods particularly bakery products, sugar, fats and oils appears inappropriate to meet the nutritional needs of these sedentary workers. It is apparent that in the absence of trained personnel and nutrition advisor, certain unsuitable foods were being provided. Moreover, the employees (food service consumers) appear to lack nutrition knowledge and awareness as they were in the habit of consuming milk, curds, pickles, papads etc in excess. This type of food behaviour may prove detrimental to health of employees in the long term. In addition, the meal time allotted being just 30 minutes including walking to and fro canteen perhaps was insufficient for discriminatory eating. It may be that such hurried meal time induce 'gulping' resulting in consuming larger portion of food than that is necessary.

The findings indicated that the food service

management and organisation was satisfactory. The inappropriate food provided particularly for breakfast, the restricted mealtime, adlibitum food service may all have contributed towards increased per capita consumption of energy rich foods. The nature of work of employees being sedentary, the increased energy consumption by the workers may lead to development of overweight/ obesity and other chronic diseases.

**KEY WORDS:** Physical Facility. Organisation. Management. Finance. Purchasing. Food Production. Service. Hygiene. Sanitation. Adequacy.

**ABSTRACT** Canteen food service facility provided in an electronics industry was studied on different aspects-physical facilities in terms of provision of store rooms, food plant, canteen personnel, finance, food subsidy, purchasing, food production and service, hygiene and sanitation appeared quite satisfactory. Meal and menu planning studied was devoid of green leafy vegetables and fruits. Break fast items included were mainly refined bakery products – bread/bun, cake and biscuits supplying mainly calories. Per capita consumption of cereals, oils and fats, sugar, milk and milk products in the two meals itself was found to be in excess of their requirements. As a consequence per capita nutrient consumption exceeded

the desirable amounts particularly calories in the two meals provided other than the food consumption at home. In the absence of proper awareness of nutrition, adlibitum food service with 30 minutes break for lunch appeared to be inappropriate in the group of sedentary workers. The study indicates the need for proper menu and meal planning, type of food service and nutrition education.

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