

Diet Pattern and Nutritional Status of Women Working in Call Centers of India

Meenakshi Mathur, Monika Harsh, and Sumita Mathur

Dept. of Home Science, JNV University, Jodhpur, India

Email: mmathur26@yahoo.co.in, {monikasanjaypurohit, summi.gal}@gmail.com

Abstract—The present study was conducted with the objective to assess the present nutritional status and diet pattern of the women working at call centers and also to counsel them about balanced diet. The study was conducted only on those call centers which were identical in nature according to their working hours, type of calling (international) and size (big). For the study purposive sampling technique was used and total 200 women were selected from major 4 metropolitan cities of India i.e. Ahmedabad, Bangalore, Mumbai and Noida. From each city 50 women were selected. To assess the nutritional status of women working at call centers, anthropometry measurements were recorded including height and weight. From these measurements the Basal Metabolic Index (BMI) was calculated. To explore the diet pattern, 24 hours diet intake and food frequency intake were taken. Results indicated that most of the respondents were obese and overweight. When the diet of women working at call centre was analyzed on the basis of major food groups it was found that cereal group or carbohydrates consumption was very high and even diet had pulses consumption in moderation but, vegetable and fruits consumption was less. Even the intake of milk and milk products in their diet was low. The diet was majorly of junk food. Therefore it can be concluded that there is a great need of intervention for nutritional counselling at such work places.

Index Terms—women of call centers, nutritional status, BMI, 24 hour dietary recall

I. INTRODUCTION

The past few decades have witnessed a tremendous growth in the population of shift workers, especially in highly industrialized cities of India. Industrialization in India and in other countries has led to the widespread adoption of 24 hour continuous operations in a number of industries and engaged in shift work.

A. Women in the Trans-National Call Centers

“A woman’s health in her total well-being is not determined solely by her biological factors and reproduction, but also by effects of work load, nutrition, stress, war and migration, among others.” [1] The participation of women in the call center workforce is seen as a critical enabling factor for continued growth of the industry. Young women mainly fresh graduates, are the preferred workforce in the industry as a certain type

of dynamism, communication and IT skills are required to ‘care’ for the customers, who in some sectors are predominantly men. Participation of women in the BPO sector is constantly increasing from 25 percent of workforce in 2006 to 40 percent in 2008 and has reached around 45 percent by 2010 [2]. Call centers constitute around one-third of the total employment in the BPOs in India [3]. Call centers in India prefer hiring young, educated women as they are perceived to be hardworking, patient, attentive, loyal, and less aggressive and have better interpersonal and analytical skills than men. The call center employment requires “emotional labor”, for empathizing with the customers and women are stereotyped as best suited for this job [4], [5].

B. Nutritional Status of Women’s Working in Call Centers

The major challenge today before women working in call centers is to overcome the resource limitation that deliver them to low levels of productivity and wellbeing. While women’s role in the food chain is essential to produce most important resource, food, which paradoxically does not guarantee women even minimum levels of nutrition.

Malnutrition adversely affects women’s participation in the economic system and their productivity. To break this fierce paradox it is important to focus simultaneously on women’s nutrition-related roles and their nutritional status.

Fig. 1 depicts biological and other productive roles of women that may be influenced by their nutritional status. While women’s nutrition status is an integral part of their household’s nutrition profile, it is also a cause of the household’s nutritional status, since performance of nutrition-related roles depends, for example, on women’s energy level. Socioeconomic and socio-cultural factors (e.g., income, literacy, traditional beliefs) simultaneously influence both women’s nutritional status and their nutrition-related roles. On the Indian subcontinent, the apparent contradiction between women’s primary responsibility for household nutrition (e.g. food preparation, health care) and their own serious malnutrition renders a simultaneous examination of these two aspects particularly interesting. The immediate determinants of nutritional status (dietary intake, health, and care) do not differ in urban and rural contexts. But urban households may have a more difficult time than rural ones in maintaining adequate nutritional levels.

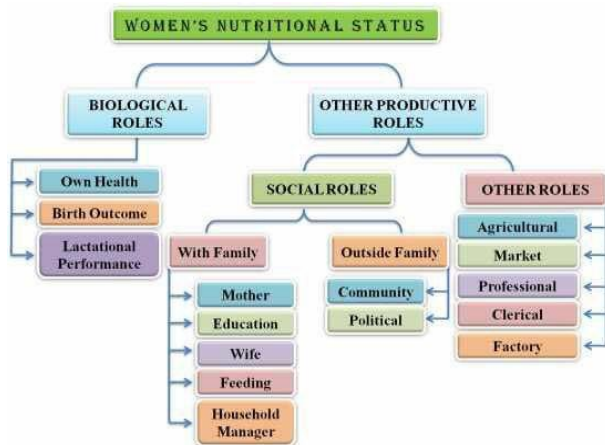


Figure 1. Biological and other productive roles of women that may be influenced by their nutritional status

Although the effect of shift work on health has been studied extensively in other countries but in India, very few studies have been carried out. As people work for irregular hours, their regular eating habits are difficult to maintain. Many of them consume more fast foods; therefore they did not meet the recommended daily intakes for major nutrients.

So according to the factors mentioned in Fig. 2, the shift workers have a higher prevalence of being overweight. Changed eating habits and other life style changes (including reduced exercise), among shift workers may lead to increase in their BMI, which in turn leads to poor nutritional status. Hence, the present study was conducted with the objective to assess the nutritional status of women working at call center.

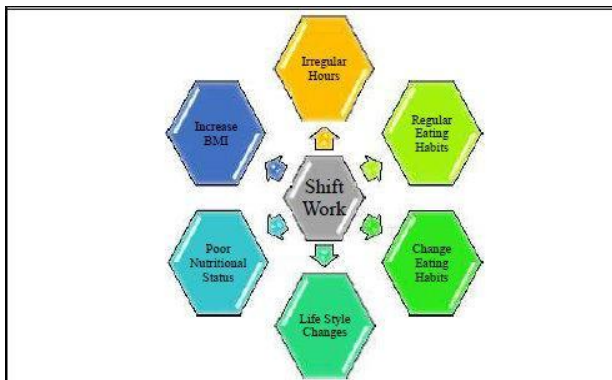


Figure 2. Effect of shift work on nutritional status of woman working in call center

C. Justification of Study

A comprehensive study has not been done till date on call centers. Most women who work in night shifts at call centers feel mentally tired. There is no study on the effect of working hours on the stress level. There is dearth of literature available on women position in call centers in India therefore this study is undertaken to know whether the job at call centers is same or different for women to work at other places. The study also focuses on the impact of shift and night duties on the life of women working at these centers. There are many unfolded aspects about woman position in call centers. To conduct

an in depth study and prepare a database on nutritional status of women in call centers, this study is undertaken entitled "Diet Pattern and Nutritional Status of Women Working in Call Centers of India".

D. Objectives of Study

- To study the diet pattern of women working in call centers.
- To assess the nutrition status of women working in call centers.

II. REVIEW OF LITERATURE

S. Reeves studied on the effect of shift-work on food intake and eating habits [6]. The aim of this study was to investigate the effect of shift work on food intake and eating patterns in order to assess the impact of this on health. The results revealed night workers did not eat more, but ate smaller meals and snacks over a greater time frame. Because shift work is a factor in the timing of food consumption, and typically there was a lack of good food facilities at night, it was suggested that this had the potential to cause difficulties in the establishment of healthy eating patterns.

C. Devadarshini analyzed the impact of shift work on nutritional status, lifestyle and health status of shift workers [7]. The study assesses the nutritional status and life style in shift workers to document their health problems. The software professionals were considered for the study. Information on nutritional status, food habits, lifestyle, and health status were collected by a structured and pre-tested questionnaire. Researcher analyzed that, majority of the day workers (41.7%) were having ideal BMI, whereas, 55.9 per cent shift workers were in obese grade I group. Analysis of diet survey revealed no significant difference in the intake of food as well as nutrients between the day and shift workers. Tobacco consumption and alcohol consumption was significantly higher in shift workers. Higher consumption of sweet drinks, sweets, baked products, fried items, fast foods and higher frequency of missing meals was found in shift workers than day workers.

N. Sudo investigated on nutrient intake among female shift workers [8]. Based on a questionnaire survey for all meals and snacks consumed by female workers, the study aimed to clarify the effects of shift work on their nutrient intakes in association with food consumption patterns. The shift workers, particularly the late-shift workers, took smaller amounts of energy and nutrients than the daytime workers. Their inadequate nutrient intake was due to lower meal frequency and poor meal quality, both of which were conditioned by shift work.

A. Lowden *et al.* investigated on eating and shift work - effects on habits, metabolism and performance [9]. They investigated that, shift workers were at higher risk of a range of metabolic disorders and diseases (e.g., obesity, cardiovascular disease, peptic ulcers, gastrointestinal problems, failure to control blood sugar levels, and metabolic syndrome). At least some of these complaints may be linked to the quality of diet and irregular timing of eating.

S. Lee and S. Kim studied Health-Related Factors and Nutritional Status in Shift-Workers [10]. Study examined the health-related factors and nutritional status of single women workers in their 20's who work night and day shift. The results of the study were summarized as follows: The shift-workers showed lower rate of office tenure, income, job satisfaction, weight and higher rate of weight change than the non-shift- workers. The shift-workers showed lower rate of exercise, sleeping hours, good health condition and higher rates of presence of disease, gastric and intestinal illnesses than the non-shift-workers.

III. METHODOLOGY

A. Locale of Study

The data was gathered from Ahmedabad, Bangalore, Mumbai and Noida call centers. The study was conducted only on those call centers, which were identical in its nature, their working hours, type of calling (international), and size (big).

B. Sample

As per Fig. 3, total 200 women working at call center were included in the study out of them 50 women each were from Noida, Ahmedabad, Bangalore and Mumbai.

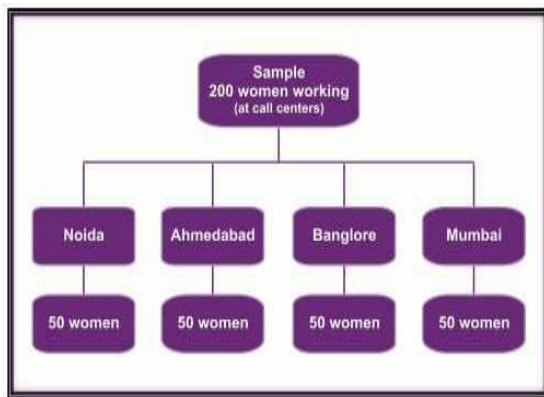


Figure 3. Sample of the study

C. Procedure

- Permission from center head was taken and then women working in call centers were selected from each city Mumbai, Bangalore, Noida, and Ahmedabad.
- Rapport was established and permission was sought from the subject after explaining the purpose of study.
- Each respondent signed the information consent form individually and gave their consent to act as a respondent in the study.
- They were explained the relevance and importance of such a personalized study.
- The forms were personally filled in front of the researcher to avoid non-return and partial answering of questions.
- The subjects were stimulated for thinking and elicit proper answers.

- Sufficient time was provided for filling up the questionnaires.
- Each participant was individually thanked for their cooperation.

D. Sample Selection

For the study purposive sampling was done. Some restrictions were followed in the sample selection. Women working in call centers were selected on following basis:

- Unmarried
- Age between 18-30 years
- Working in shift duty
- Completed at least one year of working at call center

E. Tools

To assess nutritional status, anthropometric measurements including height & weight were recorded and from that body mass index was calculated (BMI).

To know the pattern of dietary intake a 24 Hour Diet intake or recall method was used. A 24 hour diet intake, also known as a 24 hour recall, is a dietary tool in which an individual is asked to recount all food, beverages and nutritional supplements consumed during a 24 hour period. Depending on who is conducting the recall, other specifics may also be required such as time of day, preparation methods, ingredients, measures and brand names. The 24 hour period being recalled is usually from midnight to midnight from the previous day or over the past 24 hours.

F. Statistical Analysis

The data was tabulated and further analyzed in terms of:

- Percentage distribution
- Mean and standard deviation

IV. RESULTS AND DISCUSSIONS

The results obtained were put through statistical analysis and interpreted as under. For better understanding results were divided in two major sections:

1. Nutritional status of women working in call centers
2. Food intake/Diet pattern of women working in call centers

Under the nutritional status of women head following points were considered:

- Body Mass Index (BMI) of women working at call centers
- Intake of fast food per day by women working at call centers
- Intake of milk per day by women working at call centers
- Intake of salad per day by women working at call centers
- Intake of fruit per day by women working at call centers
- Intake of tea/coffee per day by women working at call centers

Under the head, diet pattern of women working in call center following items were looked for:

- Number of meals taken per day by women working at call centers
- Type of food/food group taken by women working at call centers
- Is variety in meals preferred by women working at call centers
- Do you think because of unusual office schedule you are unable to eat properly
- Do you think the meal given to you at office is proper meal which fulfills body requirement

A. Body Mass Index

This Fig. 4 shows the nutritional status in terms of BMI of women working in call center of different cities. At Bangalore call center, maximum women were obese, i.e. 14% as compared to other cities and at the same time at Mumbai call center, maximum women were overweight (50%). Most of the participants eat fast food because the life at these cities is very fast and most of the women were from other cities. 68% of women working at Noida and 60% of women working in Ahmedabad were of normal weight. This was because lifestyle of these cities is not very fast most of the women working there were local residents and stay with their families, as a result they doesn't eat fast food much and were conscious towards their health. The finding of the study was supported by Boyee who determined BMI, weight gain, ergonomics and exercise variables in 395 united states call center employees. Results demonstrated a substantial weight gain over a period of 8 months in the participants.

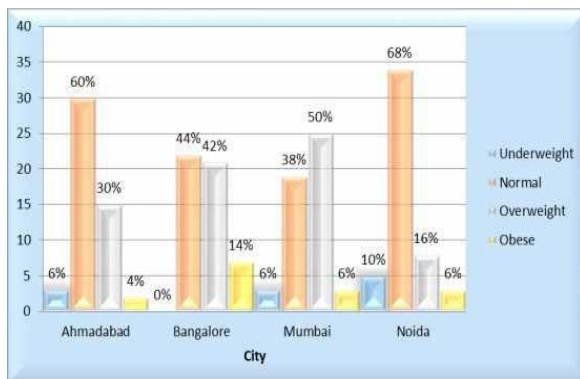


Figure 4. Nutritional status (BMI) of women working in call centers

B. Intake of Fast Food

Table I reflects the number and percentage of intake of fast food /day by women working in call. In Bangalore it is the highest reaching 80%. In Mumbai and Noida it was noted that 60% of women working at call center were taking fast food. In Bangalore the percentage is higher because most of the women were from other cities and living alone where as in Ahmedabad it was lowest because most of the women working there were localities and living with family. The finding of the present study is supported by Danielle Suarez [11]. The study also found out that there is a high consumption of chips, burgers,

fries, and fried chicken among the workers, but there was a fewer number of them who consume instant noodles and street food regularly. Fried chicken was the most popular food choice among the BPO workers, with 78% saying that they consume it regularly, followed by chips (54%), fries (53%), and burger (49%). The intake of fast food is not a good practice and as a result individuals step into many lifestyle diseases such as obesity, diabetes, gastric disturbances and many more.

TABLE I. NUMBER AND PERCENTAGE INTAKE OF FAST FOOD PER DAY OF WOMEN WORKING IN CALL CENTERS

S. No.	Ahmedabad	Bangalore	Mumbai	Noida	Total
Yes	23 46%	40 80%	30 60%	30 60%	123 61.5%
No	27 54%	10 20%	20 40%	20 40%	77 38.5%
Total	50	50	50	50	200

C. Intake of Milk

Table II reflects the percentage of intake of milk/day by women working in call centers. In Ahmedabad this percentage is highest 62% of women drinks milk every day out of which 46% once a day and 16% twice a day where as 38% said they don't drink milk at all. Similarly, in Mumbai and Bangalore this percentage was lowest that is only 48% of women working in call centers drink milk per day once or twice a day. For Noida this is 58%, i.e. 44% took milk once/day and 14% twice/day. Overall percentage of taking milk is very low only 58%. Milk contains carbohydrates, protein and various essential vitamins and minerals. Milk is considered to be complete food as it contains all the essential amino acid (proteins) and most of the subjects of the study were vegetarian. Milk can supply all the essential nutrients which are lacking in vegetarian food sources if the intake of milk and milk products is enough. So it is advised to take milk at least twice a day.

TABLE II. NUMBER AND PERCENTAGE INTAKE OF MILK / DAY BY WOMEN WORKING AT CALL CENTERS

S. No	Ahmedabad	Bangalore	Mumbai	Noida	Total
Yes (1 time)	23 46%	20 40%	16 32%	22 44%	81 40.5%
Yes (2 time)	8 16%	4 8%	8 16%	7 14%	27 13.5%
No	19 38%	26 52%	26 52%	21 42%	92 46%
Total	50	50	50	50	200

D. Intake of Salad

Table III reflects the percentage of consumption of salad/day by women working in call centers. Where Noida has highest 52% and Ahmedabad has lowest 22%, Bangalore and Mumbai has equal 26% which is in fact, very low. Salads composed from even few ingredients make a nutrition rich meal. Deficiency of these can incur many health problems. Salad provides dietary fiber to the meal which should be an important component of each meal.

TABLE III. NUMBER AND PERCENTAGE INTAKE OF SALAD PER DAY BY WOMEN WORKING AT CALL CENTERS

S. No.	Ahmedabad	Bangalore	Mumbai	Noida	Total
Yes	11 22%	13 26%	13 26%	26 52%	63 31.5%
No	39 78%	37 74%	37 74%	24 48%	137 68.5%
Total	50	50	50	50	200

E. Intake of Fruit

In Table IV the higher percentage is at Bangalore i.e. 44% whereas the lowest is at Noida and Ahmedabad which is i.e. 26%, percentage of Mumbai is 38%, this percentage is comparatively very low as fruit supplies fructose with the most of beneficial nutrients including vitamins, minerals and fibers. If fruit consumption is not in the recommended amount, it can result in nutrient deficiency and poor health.

TABLE IV. NUMBER AND PERCENTAGE INTAKE OF FRUIT / DAY TAKEN BY WOMEN WORKING AT CALL CENTERS

S. No.	Ahmedabad	Bangalore	Mumbai	Noida	Total
Yes	13 26%	22 44%	19 38%	13 26%	67 33.5%
No	37 74%	28 56%	31 62%	37 74%	133 66.5%
Total	50	50	50	50	200

F. Intake of Tea/Coffee per Day by Women Working at Call Centers

In Table V, we can see that 49% of the women working in call center drink 1-2 times tea or coffee/day, out of which Bangalore is at the highest with 58% and Mumbai at the lowest with 42%. From the study it was resulted that 30% of the women working in call center drink 3-4 times tea or coffee/day, out of which highest intake is at Mumbai and Noida with 32% and lowest at Bangalore with 26%. It was also noted that 8.5% of the women working in call center drink 5-6 times tea or coffee/day out of which Ahmedabad is highest with 14% and Bangalore is at the lowest with 4%, remaining 12.5% of women working in call centers doesn't drink tea or coffee at all. The finding of the present study is supported by Danielle Suarez [11] who reported that highly-caffeinated drinks are a staple of BPO workers' diets.

TABLE V. NUMBER AND PERCENTAGE INTAKE OF TEA/COFFEE PER DAY BY WOMEN WORKING AT CALL CENTERS

S. No.	Ahmedabad	Bangalore	Mumbai	Noida	Total
Yes (1-2 times)	26 52%	29 58%	21 42%	22 44%	98 49%
Yes (3-4 times)	15 30%	13 26%	16 32%	16 32%	60 30%
Yes (5-6 times)	7 14%	2 4%	5 10%	3 6%	17 8.5%
No	2 4%	6 12%	8 16%	9 18%	25 12.5%
Total	50	50	50	50	200

G. Number of Meals

In Table VI, we can see that out of 200 women only 7 women were consuming meals around 6-7 times in a day and they were from Ahmedabad and Bangalore. It was

very surprising to note that maximum women were only having meal either twice or thrice in a day. This is very bad sign as food should be taken regularly to meet the nutrient requirements essential for good health. Deficiency can cause several health problems. The finding of the present study is supported by Danielle Suarez, abs-cbnNEWS.com [11]. The study revealed that less than half of call center workers (47%) regularly eat 3 meals a day. The study also revealed that compared to other workers, more female call center workers skip meals 40% skip breakfast, 20% skip lunch, and 16% skip dinner.

TABLE VI. NUMBER AND PERCENTAGE OF INTAKE OF MEALS PER DAY BY WOMEN WORKING AT CALL CENTERS

S. No.	Ahmedabad	Bangalore	Mumbai	Noida	Total
2-3	37 74%	30 60%	38 76%	39 78%	144 72%
4-5	8 16%	18 36%	12 24%	11 22%	49 24.5%
6-7	5 10%	2 4%	-	-	7 3.5%
Total	50	50	50	50	200

H. Type of Food/Food Group

Table VII shows the percentage of consumption of various food groups among women working at call centers. It was noted that 100% of participants in the study consumed cereal group above the Recommended Dietary Allowances (RDA for cereal). The overall conclusion was that 54.5% eat pulses, 31.5% take leafy vegetables, 42.5% take fruits, 52% have milk and milk products and 20% eat fast food regularly. On the contrary, the study also concluded that few participants around 17.5%, never ate fruits, 13% never consume milk and milk products and 14% never ate fast food.

TABLE VII. TYPE OF FOOD/FOOD GROUP CONSUMED BY WOMEN WORKING AT CALL CENTERS

	Always	Sometimes	Rarely	Never	Total
a) Pulses	109 54.5%	55 27.5%	20 10%	16 8%	200
b) Leafy Vegetables	62 31.5%	75 37.5%	40 20%	23 11.5%	200
c) Fruits	84 42%	53 26.5%	24 12%	39 17.5%	200
d) Milk & Milk products	104 52%	48 24%	22 11%	26 13%	200
e) Fast food	40 20%	50 25%	82 41%	28 14%	200

I. Variety in Meals

From the Fig. 5, it can be interpreted that out of 200 women 39% 'Sometimes' preferred variety in their meal pattern and it is interesting to know that 36.5% women 'Always' added variety in their meals. This shows that they were not stick to a particular diet pattern and added different food groups in the diet which is a healthy habit. On the contrary there were also women who 'never' added any variety to their meal and are mostly stuck on same diet every day, they were only 6%.

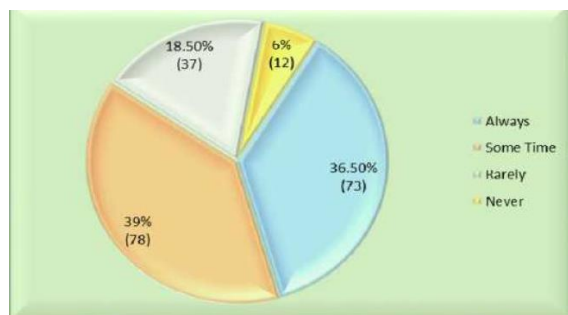


Figure 5. Is variety in meals preferred by women working at call centers

J. Unusual Office Schedule

According to Fig. 6, overall 16% of the women working at call center were unable to eat properly due to unusual work schedule whereas more than 67.5% of working women sometimes or are rarely unable to eat properly but just 16.5% of working women were able to eat properly in the unusual shift schedule.

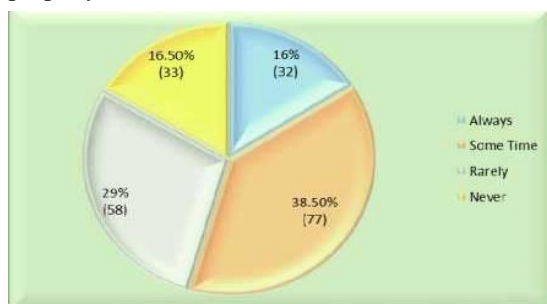


Figure 6. Do you think because of unusual office schedule you are unable to eat properly?

K. Meals at Office

As per Table VIII, almost 35.5% working women were satisfied with the meal supplied in the office. 38.5% reported that sometime the meal given to them at office was proper meal which fulfills their body requirements on the other hand 26% were not satisfied with the meals given to them in office irrespective to the city they work in.

TABLE VIII. DO YOU THINK THE MEAL GIVEN TO YOU AT THE OFFICE IS A PROPER MEAL WHICH FULFILLS YOUR BODY REQUIREMENT

Always	Sometimes	Rarely	Never	Total
71	77	22	30	200
35.5%	38.5%	11%	15%	

V. CONCLUSIONS

Results indicated that few women (14%) of Bangalore call centre were obese and 50 % women working at Mumbai call centre were overweight. 60-68% women of Ahmedabad and Noida had normal weight, thus had normal nutritional status. Most of the respondents, irrespective of the city where they live 72% consume only 2-3 serving of meals per day. One fourth of them consume 4-5 serving of meals per day. Overall milk consumption was also low as per the recommended allowances. 46% did not consume milk in the whole day.

Consumption of salad and fruits was also very low. Only 30% and 33% consumed salads and fruits in a day. When the diet of women working at call center was analyzed on the basis of food groups it was found that cereal group or carbohydrates consumption was very high, pulses was also more, vegetable and fruits consumption was less, milk and milk products was also low and junk food consumption was high. Tea/Coffee was highly consumed by almost all women. Therefore, it can be concluded that there is a great need of intervention for nutritional counseling and if possible a canteen should be attached to all call centers which provide food which is hygienic and nutritionally rich and balanced.

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Meenakshi Mathur (M.Sc. Ph.D.) is Professor and Head of Dept. of Home Science, Jai Narayan Vyas University, Jodhpur, India. She has a teaching experience for more than 30 years and research experience of around 20 years. Her areas of research include nutrition for all ages, reproductive health education, e-content preparation. She has guided more than 15 Ph.D. students. She has represented India in International conferences in USA, UK, Bhutan, etc. Having published over 35 papers in national & International journals, she is author of over 4 educational books. She has also prepared 15 educational films on reproductive health in association with UGC, India, which are regularly broadcasted on national education channels and also used by various universities and colleges as content for e-education. She is a senior member of many eminent organizations as UNICEF, APCBEES, Ministry of Women & child development, State Education Ministry. She is also a member in expert panel at numerous universities in India.



Monika Harsh (M.Sc.) is a Research Scholar at Jai Narain Vyas University, Jodhpur, India and pursuing Ph.D. in Home Science with specialization in Women and gender Studies. She has participated in many national and international conference related to health and human development in the country.



Sumita Mathur (M.Sc.) is a technically competent Nutrition and Healthcare professional. Presently she is a Research Scholar at Jai Narain Vyas University, Jodhpur and pursuing Ph.D. in Home Science with specialization in Nutrition and Infertility. She did her masters in science (M.Sc.) in Services for Child Care and Education from the same university. She is graduated in Human Nutrition and Dietetics from Manav

Rachna Educational Institutes, New Delhi. After completing MBA in Hospital and Health Management from Institute of Health Management Research (IIHMR) Jaipur, she worked for an year with IIHMR as a Research Officer the Food Fortification Project Rajasthan funded by Global Alliance for Improved Nutrition (GAIN), Geneva. She has good technical experience in project planning, implementation, monitoring & evaluation. Coordination and Liaising with key stakeholders was one of her major task. She contributed in developing communication strategy and IEC material for disintegration of information regarding food fortification at various levels. Ms. Mathur has one book publication and two international paper publication to her credit. She has participated in many national and international conference related to health, nutrition and management. She has good analytical skills and eye for details which helps to produce high quality outputs.