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Nutritional status and dietary pattern of female students from North East states India residing in Chennai

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Abstract

Nutritional status of young women plays an important role in human life. This study was undertaken to assess the nutritional status and dietary pattern of female students from North East states India residing in Chennai. A questionnaire was used to elicit information on the socio-demographic profile, physical activity pattern, family medical history, food habits, dietary intake and present nutritional status. Anthropometric measurements such as height, body weight, body mass index, waist circumference, hip circumference and waist to hip ratio were recorded for all the subjects. Further biochemical test including hemoglobin levels and blood pressure were recorded. Clinical assessment was conducted to record the clinical symptoms of nutritional deficiencies. Dietary assessment consisted of a food frequency questionnaire and twenty four hour dietary recall and a usual dietary intake to assess the general dietary pattern were recorded. Results of the study indicate that there was no population based difference in mean height, body weight, and Body Mass Index (BMI) of the subjects. Hemoglobin level and blood pressure of the subjects were found to be normal. There were no major clinical symptoms present to the subjects. It was found that the mean intake of nutrients such as energy, protein, and carbohydrate, calcium, iron and folic intake of subjects was found to be below the RDA (Recommended Dietary Allowances).

Keywords: Nutritional status, dietary pattern, young women, north east states, recommended dietary allowances

1. Introduction

Women, by nature have a special role to play in all fields of life-society, family, education, administration and politics. Family is the first institution, which is encountered by women. She begins, as a daughter and sister, then she develops into wife and mother, later she becomes elder of the family and heads a clan. All these roles are complicated and difficult to perform. The consequences of women's unfavorable status in India include discrimination in the allocation of household resources such as food and in access to health and education, as well as marriage at young ages. Women tend to have a difficult time caring for themselves because they care so much for others (Sharma, 2007) [6].

Women are naturally endowed to play a key role in spearheading and sustaining movements for upliftment of health, well being and socio-economic status of families and communities (Gopalan, 2004) [3]. Women's health matters not only to women themselves. It is also crucial to the health of the children they will bear. This underlines an important point: paying due attention to the health of girls and women today is an investment not just for the present but also for future generations (WHO, 2009) [8]. Smaller scale studies conducted on Indian Women indicate heavy toll of micronutrient deficiencies and confirm the high prevalence of anemia among adolescent girls and young women because of poor nutrition, poor quality of food intake they suffer not only macronutrient deficiency but also micronutrient deficiency (Bains and Mann, 2000) [1].

Adequate nutrients are consumed to support the body's daily needs and any increased metabolic demands, the person develops an optimal nutritional status. This status promotes growth and development, maintains general health, supports activities of daily living and helps protect the body from disease and illness (Mahan *et al.*, 2004) [5]. Preventive interventions need to be targeted at younger women as much as, if not more than, at older women.

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2. Objectives of the Study

The study was planned with the following objectives:

1. To assess the nutritional status of female students from North East States India residing in Chennai.
2. To assess the dietary intake of female student from North East States India residing in Chennai.

3. Materials and Methods

Sample

Purposive sampling technique was used for the selection of 100 female students from North-East States India residing in Chennai.

Criteria for sample selection

- Young unmarried women in the age group of 18-28 years.
- Women living in Chennai.
- Willingness of the subjects to participate in the study

Tools used for the study

The various tools used for data collection for the study were as follows.

1. **Questionnaire:** was used to elicit information on the socio-demographic profile, physical activity pattern, family medical history, food habits, dietary pattern and life style of the subjects. Dietary intake was assessed by a 24 hour recall method for all the subjects.
2. **Anthropometric measurements:** Anthropometric such as height, body weight, body mass index, waist circumference, hip circumference and waist to hip ratio were recorded for all the subjects.

Height: Standing height was measured with the help of a measuring tape fixed to the wall. The subjects were asked to remove the foot wear and stand with heels together and looking straight. A glass scale was brought down to the topmost point on the head. The height was measured to the nearest centimeter.

Body weight: Body weight was assessed using a portable weighing scale. It was calibrated against known weights.

Body Mass Index: The body mass index (BMI) also called quetelet's index does not measure the fat compartment directly but does correlate weight and height in order to estimate overall fat stores. This is calculated as

$$\text{BMI} = \frac{\text{Body weight in kg}}{\text{Height in meter}^2}$$

Waist circumference: The measurement of waist circumference in centimetres recorded for all subjects using a non-flexible measuring tape placed around the waist at the point of the umbilicus.

Hip circumference: The hip circumference of the subjects was also measured by the measuring.

Waist to Hip Ratio: The waist to hip ratio was calculated using the formula:

$$\text{Waist to hip ratio} = \frac{\text{Waist circumference}}{\text{Hip circumference}}$$

3. **Biochemical test:** Biochemical test of hemoglobin levels was done using hemotocrit method (willingness of the subjects) and subjects were asked to rest for 5-10 minutes and then their blood pressure was recorded.
4. **Clinical assessment:** was conducted to identify clinical symptoms of nutritional deficiencies.
5. **Dietary assessment:** component consisted of a food

frequency questionnaire and twenty four hour dietary recall to assess the general dietary pattern and nutritional status of the subjects.

6. **Statistical Analysis:** The data collected was subjected to the following statistical analysis:
 - Arithmetic mean
 - Standard deviation

4. Results and Discussion

I. Anthropometric Measurements

Height, Body Weight and BMI of the subjects

Anthropometric Measurements	N=100	
	Mean	± S.D.
Height	155.4	± 3.6
Body Weight	51.0	± 5.4
BMI	20.9	± 2.4

Table 1 shows the mean values and standard deviation of height, Body Weight, and Body Mass Index of the subjects. The mean body weight of the subjects was appropriate to the mean height. The Body Mass Index of the subjects was within the normal range of 18.5 to 24.9 kg/ m².

Waist circumference, Hip circumference and Waist Hip Ratio of the subjects

Anthropometric measurements	N=100	
	Mean	± S.D.
Waist Circumference	29.13	± 3.41
Hip Circumference	32.61	± 4.10
Waist Hip Ratio	0.9	± 0.041

Table 2 shows the mean values and standard deviation of waist circumference, hip circumference and waist hip ratio of subjects. Nutritional status is an indication of the overall well being of a population. Adequate nutritional status of women is important for good health and increased work capacity of women themselves as well as for the health of their offspring (Black *et al.*, 2008) [2].

II. Biochemical Test

Blood Hemoglobin levels and Blood pressure of the subjects

Blood Hemoglobin (mg/ dl) (N=26)	Mean ± S.D	
	Mean	± S.D.
Blood Pressure (Systolic) (N= 80)	114.5	± 6.454
Blood Pressure (Diastolic) (N=80)	79.9	± 5.165

(willingness of the subject)*

Biochemical test of hemoglobin levels was done using hemotocrit method (willingness of the subjects) and subjects were asked to rest for 5-10 minutes and then their blood pressure was recorded. Table 3 shows the subjects of biochemical test and it was found to be normal.

III. Dietary Pattern

Dietary pattern of the subjects

Dietary pattern	N=100	
	Number	%
Vegetarian	2	2
Non-vegetarian	98	98

From table 4, it can be seen that 98 percent of the subjects were found to be non-vegetarians. Only two percent of the subjects were found to be vegetarians. Vegetarian diets, particularly vegan diets are associated with low bone mineral density (BMD) (Ho-Pham *et al.*, 2009) [4].

Frequency of skipping meals of the subjects

Meals	N=100				
	Daily	Weekly once	Weekly twice	Weekly thrice	Rarely
	%	%	%	%	%
Breakfast	38	5	11	10	36
Lunch	34	7	5	5	3
Tea	16	3	5	14	19
Dinner	8	2	4	3	1

From table 5, it can observe that 38 percent of the subjects respectively to skipped breakfast on a daily basis. (34 %) of the subjects were found to skip lunch on a daily basis and 36% of the subjects rarely skip breakfast. Meal skipping is a common behavior among young adults. Eating a good breakfast sets the tone for the rest of the day. The foods you choose for breakfast can provide you with the energy you need and lots of vitamins and minerals to help keep you healthy. Eating breakfast also has long term health benefits. It can reduce the risk of obesity, high blood pressure, heart disease and diabetes (Warren, 2004) [7].

Comparison of mean nutrient intake of the subjects with the RDA

Nutrient	RDA*	N=100
		Mean ± S.D
Energy(Kcal)	1875**	1404± 416.5
Protein (g)	50	39.5± 11.7
Fat (g)	30	36± 11.9
Carbohydrate (g)	260	223± 80
Calcium (mg)	400	130.6± 43.1
Iron(g)	30	8.9± 3.37
Folic (mg)	0.1	0.12± 0.2

ICMR NIN (Recommended dietary allowance for Indians, 2004)

** Sedentary

The mean intake of nutrients of the subjects daily based on their 24 hour dietary recall was compared with recommended dietary allowance (RDA).

Table 6 indicates that, the mean nutrient intake of energy, protein, carbohydrate, calcium, iron and folic of the subjects was less than the RDA. This is probably because most of the subjects have habit of skipping meals or took three small meals. Thus the mean intake was lesser compared to RDA.

Frequency of food groups consumption of the subjects

Food Groups	Daily	Thrice per week	Once per week
	%	%	%
Cereals and cereal products	100	-	-
Pulses	21	-	79
Fruits and Vegetables	10	25	65
Meat, Milk and Milk products	25	25	50
Nuts and Oil seeds, Sugar	35	25	30

(N=100)

The distribution of the subjects, based on their frequency of food groups consumption is presented in table 7. It can be inferred that all the subjects consumed cereals and cereal products on a daily basis, indicating that rice is the staple food of the subjects. Twenty-one percent of the subjects consumed pulses on daily bases. Consumption of pulses like channa, red gram dhal, bengal gram, black gram dhal, rajma, soyabean and green gram dhal. Remaining 79% of the subjects consumed pulses once per week. Ten percent of the subjects consumed fruits and vegetables on daily bases. Remaining 25 percent of the subjects consumed thrice per week and 65% of the subjects consumed once per week. Green leafy vegetables are a rich source of iron, calcium, beta carotene, vitamin C, riboflavin and folic acid. Green leafy vegetables are inexpensive and it is advisable to include more frequently in our daily diet.

Food groups from meat, milk and milk products of the subjects 25 percent consumed on daily bases whereas 50 percent of the subjects consumed once per week and remaining 25 percent of the subjects consumed thrice per week.

Food groups from nuts, oils and sugar, 35 percent of the subjects consumed on daily bases and 25 percent consumed thrice per week. Remaining 30 percent of the subjects consumed once per week.

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