

Nutritional status and physical activity among post-graduate hostel girls, University of Rajasthan, Jaipur

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In the present study, an attempt has been made to report the Nutritional status and physical activity pattern in female students (n=104) living in P.G. Hostel of University of Rajasthan, Jaipur. Assessment of nutritional status was done through 24 hr dietary recall and anthropometric measurements (height, weight and BMI). Energy expenditure was calculated using two days 24 hr recall and time spent in various activities. The physical activity pattern was assessed by using validated and standardized questionnaire. The prevalence of overweight and obesity was calculated by the critical limits of body mass index (BMI). The study indicated that 10 per cent P.G. Hostel girls were found pre obese and 10.5 per cent were in obese category. Their nutrient intake was also inadequate energy, iron and calcium were significantly lower while fat intake was significantly higher. They were falling in negative energy balance.

Key Words : Body mass index, Energy expenditure, Obesity, Overweight, Physical activity

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INTRODUCTION

Obesity and overweight are serious health problems. Strictly speaking, obesity connotes an excessive fat accumulation in adipose tissue whereas overweight indicates an excessive body weight in relation to height. Nationally representative surveys have shown rising trend of overweight and obesity in developing countries (Balarajan and Villamor, 2009). Economic development, increased availability and consumption of food, changes in lifestyle and increased urbanization are contributing further to increase the burden of obesity in India. The burden of obesity is more in urban areas and affecting young adults and children (Yajnik, 2004). Especially college students are highly vulnerable to obesity as living

away from home, transitioning to independent living and are thus making their own food choices, irregular routines and attracted to new lifestyle, which often results in imbalanced diet (Brunt *et al.*, 2008). Physical activity (PA) levels have also declined globally in recent decades (Ng and Popkin, 2012). Regular PA decreases many of the health risks associated with obesity or being overweight (Blair and Brodney, 1999). Since there is paucity of evidences on burden of obesity and prevailing lifestyle patterns among young adults in India, the present small scale study was carried out to find out the burden of overweight and obesity among postgraduate female student living in hostel of University of Rajasthan, India.

METHODOLOGY

Sample size comprised of 104 girls aged between 20-26 years living in various girl's hostel of University of Rajasthan, Jaipur. Any students with chronic illnesses like hypertension and acute illnesses like hepatitis, fever were excluded. During data collection, personal interviews were

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held with each subject. All the information about socio-demographic variables and two-day 24 hr recall other than festive day's intake was collected from each subject. The physical activity pattern was assessed by using validated and standardized questionnaire given by Bharathi *et al.* (2000). The type of activity of subject was judged by asking the subject to report the time spent in various activities. Two day 24 hr recall of time spent in activities was recorded for this, the subjects were asked to record minute by minute bureau of their activity under various heads like sleeping, bathing, watching T.V., studying, walking, ironing and washing clothes. For the assessment of obesity, height and weight measurements were taken from each subject using standard protocol given by Weiner and Lourie (1981). The practical and clinical definition of overweight and obesity is based on body mass index (BMI). Therefore, the value of BMI was

calculated for each subject by the following method:

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

OBSERVATIONS AND ASSESSMENT

Out of 104 P.G. hostel girls, majority of the girls were found in the age group of 21 years (32%) then 22 years (31%) followed by 20 years (22%). The average reference height reported by ICMR (2010) was 160.7 cm, which is lower than the values (161.3 cm) reported in the present study. The mean weight of girls was 55.4±6.13 in kg which was comparable to the ICMR reference (54.8 kg) value. The mean BMI of girls was 21.4±2.4 which again was found to be normal according to WHO standard (20.5) for normal BMI category (www.who.int). Most of the P.G. girls had normal BMI due to routine walk to their departments and evening

Table 1 : Comparison of BMI among P.G. hostel girls with WHO standard

	WHO cut off	% of subjects
ED III severe	<16	0.96 (1)
ED II moderate	16-17	0 (0)
ED I Mild	17-18.5	2.88 (3)
Under wt low but normal	18.5-20	11.54 (12)
Normal	20-24.9	64.42 (67)
Pre obese	25-25.9	9.62 (10)
Grade I	26-29.9	10.5 (11)

Notes: BMI analysis of P.G. hostel girls; Total sample size n=104; Values are percentages Parenthesis depicts numbers; Reference source: adapted from www.who.int.

Table 2 : Mean nutrient intake of P.G. hostel girls

Nutrient	RDA	Mean ±SD	% of RDA	P value
Energy (kcal)	1900	1648±236.8 X ↑	86.70	0.00*
Protein (g)	55	53.32±7.4 √ =	96.90	0.49
Fat (g)	20	61.86±13.7 √ ↓	309.30	0.00**
Iron (mg)	21	14.68±4 X ↑	69.90	0.00**
Calcium (mg)	600	85.65±168.9 X ↑	14.20	0.00**

Notes: Assessment of mean nutrient intake through two day 24 hour dietary recall and comparison b/w nutrient intake, and RDA; Total sample size of P.G. hostel girls (female n=104; Statistical inferential test=Mean, standard deviation and Student's or Welch's t test ; Values are means ± SD; SD, standard deviation; *Significant, **Highly Significant; X, values do not achieve; Recommended dietary allowances(RDA) for reference sedentary women , Dietary guidelines for Indians; √, values do achieve recommended dietary allowances(RDA) for reference sedentary women; ↑ it is suggested an intake increase; ↓ it is suggested an intake reduction; = it is suggested an equivalent as per recommended dietary allowances (RDA) for reference sedentary women, Dietary Guidelines for Indians-A manual, ICMR, 2011.

Table 3 : Mean energy intake and total energy expenditure in P.G. hostel girls

Variables	Average energy expenditure
Total energy expenditure	1804±260.74
Energy intake	1648.9±236.80
Energy balance	-155.1±23.94

Notes: Total energy expenditure (TEE) yielded using Physical activity pattern assessed by standardized questionnaire given by Bharathi *et al.* (2000) two day 24 hr recall of time spent in activities was recorded; Two-day 24 hr dietary recall other than festive day's intake was used for energy intake calculation; (Energy balance = Energy intake -TEE); Values shows Mean ±S.D. (standard deviation).

walks. Various activities have been followed by P.G. hostel girls like sweeping, washing clothes and exercises other than daily routine work.

Table 1 depicts the percent distribution of girls as underweight, normal and pre obese and obese according to classification given by WHO (2004). Majority of the P.G. hostel girls had normal BMI (64%), around 12 per cent fell in underweight but normal category, 10 per cent were overweight and 10.5 per cent belonged to obesity grade I category. In a similar study by Premlal *et al.* (2016), prevalence of overweight and obesity among the study population was 11.7 per cent and 21.5 per cent, respectively.

A mixed thinking persists in adults today either they reduce and strive to attain zero size figure or they indulge in binge eating. In adults, the practice of maintaining weight compels them to restrict their daily necessary diet to stay slim. But sometimes unintentionally they consume energy dense fast foods which are easily available almost all the time. Contrastingly in the present study, the P.G. hostel girls were consuming 88 per cent of RDA (Recommended dietary allowance) only which was found to be significantly lower than RDA (at $p < 0.05$). This could be due to conscious dieting pattern and eating lesser amount of cereals. The mean protein intake of subject was non-significantly higher as compared to RDA (at $p < 0.05$). The average fat intake of subjects was 61 g which was significantly higher than RDA (at $p < 0.05$). The major reason which contributed to adult's obesity was intake of more amount of fat in diet. This can be related to the fondness of subjects towards fast food and desi ghee on chapattis. They were consuming significantly lower iron and calcium intake (at $p < 0.05$). The dietary sources of iron and calcium were found to be fewer or lacking in P.G. hostel girl's diet (Table 2). A study from Chennai city (2016) on college going female students revealed much lower mean energy intake than the recommended allowances. However, fat intake of the sample was found to be higher than the recommended allowances (Kalaivani and Karunanidhi, 2016).

Energy balance is achieved when the energy from the intake of food and drinks equals the energy expended for metabolic processes and during physical activity. The amount of food eaten and the amount of physical activity undertaken determine the state of energy balance (Isaac and Chandrasekar, 2014). Table 3 showed the mean total energy expenditure (TEE) by the P.G. hostel girls

was higher (1804 kcal) than total energy intake (1648.9 kcal). Therefore negative energy balance was observed. P.G. hostel girls were involved in different heavy work activities like sports, various exercises and were also engaged in sedentary work like mopping, washing etc. Lower energy intake and more TEE could be attributed to unbalanced diet, poor consumption of cereals, pulses, roots and tubers, sugars and fruits, less frequent meals due to lack of time and non-availability of variety and tasty food. Data was collected at the beginning of sessions in various courses. P.G. hostel girls enrolled in study also included new admissions and due to this their routine activities increased in hostels compared to their house life. A study by Jonville *et al.* (2009) on energy expenditure and dietary intake in overweight versus non-overweight adults in Caribea showed that both energy expenditure and intake were higher in the overweight men and women as compared with their normal-weight counterparts. It should also be noted that a higher body mass requires a higher energy consumption in the order of 15 to 25 kcal/kg.

Conclusion :

The mean energy intake was inadequate among all subjects; however, their diets were high in fat. Intake of iron and calcium was lower. Negative energy balance was also seen. Major reasons were unbalanced diet, irregular meal pattern and extraneous activities in daily routine. Counseling sessions for healthy and nutritious diet (including iron and calcium rich foods) should be organized. The diet in hostel campuses should also be checked and monitored for wholesomeness and quality maintenance. The role of family members is found to have a significant influence on the intake of healthy food groups such as green leafy vegetables and fruits. Hostel warden and Parents need to be educated to encourage adolescents to have breakfast and meals on a regular basis to ensure nutrient adequacy and curb the problem of underweight, overweight and obesity.

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