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Assessment of Dietary Pattern of Pre Obese Employees of UAS, Bengaluru

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ABSTRACT

One hundred and twenty pre-obese employees of UAS, GKVK, Bangaluru were purposively selected and collected the Information about food consumption and dietary intake by "24 hour recall method" for 3 days on different weeks and average intake was computed accordingly. Sedentary lifestyle, physical inactivity, high intake of calorie rich foods, processed and snack foods, genetic predisposition of non-communicable diseases was more prevalent among subjects. Lacto vegetarian type or mixed type of dietary pattern and lack of physical exercise was predominant in all subjects. The intake of cereals, pulses, roots & tubers, sugar and fat and also mean nutrient intake of all subjects for energy, protein, fat, carbohydrates and calcium were found to be above the RDA, except for iron and fibre.

Key words: *Dietary pattern, Pre obese, Employees*

INTRODUCTION

Change in life style and dietary pattern along with improved socio-economic status stemming from rapid modernization has resulted in occurrence of chronic and degenerative diet related diseases in India[3]. Many factors can contribute to obesity and overweight, including lifestyle choices (e.g., lack of exercise, little sleep), medical conditions (e.g., hypothyroidism) and genetics (i.e., heredity). Over weight and obesity results when a person takes more calories than it is required[4].

These excess calories are stored in the body as fat, leads to gained weight. Over weight and obesity are especially observed in educationally and economically back word group of people and also medical concern of the people[2]. Obesity leads to risk of some chronic diseases. It can be controlled by doing proper exercise, healthy life style and intake of low caloric foods.

MATERIAL AND METHODS

Dietary intake: Average daily food and nutrient intake

The dietary survey of 120 subjects was done and collected the information on the dietary practices, food frequencies and average daily food and nutrients intake by "24 hour recall method" for 3 days on different weeks. The average intake was computed accordingly, to record the amount of food and beverages consumed, standardized katoris and glasses were used.

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The different food items were converted into their raw equivalents and the daily nutrients intake were calculated using food composition tables given by Gopalan *et al*.[5]. The average daily food and nutrients intake were compared with Suggested Dietary Intakes (SDIs) for balanced diet and recommended dietary allowances (RDAs) for nutrients[7].

Per cent adequacy of foods

The per cent adequacy of food was calculated using the formula

$$\text{Per cent Adequacy of food (\%)} = \frac{\text{Average food intake/day}}{\text{SDI}} \times 100$$

Percent Adequacy of Nutrients (PAN)

Diet quality can be assessed by taking into account the single nutrient intake, RDA differentiated by age, sex, physical activity, etc. This is calculated by dividing the actual nutrient intake by the respondent by the RDA(Recommended Dietary Allowance) of that nutrient. PAN is defined as the ratio of intake of particular nutrient to its recommended dietary intake or RDA, with multiple of hundred.

$$\text{PAN (\%)} = \frac{\text{Subject's daily nutrient intake}}{\text{RDA of that nutrient}} \times 100$$

RESLTS AND DISCUSSION

Type of diet

The type of diet and dietary pattern of the subjects are observed that 50 per cent male subjects had lactovegetarian type of diet was more among male subjects followed by mixed type diet/ non vegetarian (33.33%). Mixed type of diet refers to the diet combined with vegetarian and non-vegetarian with meat based products twice/thrice a week. 16.66 per cent males were ovo- lacto vegetarian. Maximum number of females were lacto vegetarians (66.66%), followed by ovo-lacto-vegetarians (16.66%) and mixed diet (16.66%) was observed (Table: 1).

It was observed that type of diet and dietary pattern seemed to influence the incidence of disease. Findings suggested that lacto vegetarians and mixed type of diet pattern was prominent among all male and female subjects. Newby *et al*.[8], reported the prevalence of obesity among 40 per cent non vegetarians,29 per cent ova vegetarians and 25 per cent lacto vegetarians in the study group of 40-45 years of age group. Muller[10] also observed the higher BMI and waist circumference among adult males in Calcutta, India among sample of age group 40-45 years who had food pattern of rich, high fat dairy products and also opined that a large shift of food consumption in developing countries from whole cereals to high calorie and high fat diets among urban population and higher income groups has resulted in prevalence of obesity and related non-communicable disease.

Table 1. Type of Diet of pre obese subjects

Dietary pattern	Pre obese (n = 120)					
	Male(n=60)	%	Female(n=60)	%	Total (n = 120)	%
Lacto vegetarian	30	50	40	66.66	70	58.33
Ovolacto vegetarian	10	16.66	10	16.66	20	16.66
Mixed diet	20	33.33	10	16.66	30	25
Total	60		60		120	

Mean food intake of subjects

The mean intake of male subjects was milk and milk products 95.48g, green leafy vegetables (GLV) 40.86g, other vegetables 65.75g, fruits 75.39g and which were below the RDA, except for cereal was 410.26g, pulses 88.85g, roots and tubers 200.48g sugar 31.08g and fat 55.45g which were above the RDA.

The mean food intake of female subjects indicated that daily intake of milk and milk products was 120.96 g, roots and tubers 145.16 g, green leafy vegetables 45.83 g, other vegetables 70.28 g and fruits 85.37g which were below the RDA. The mean intake of cereals, pulses, sugar, and fat was 292.54g, 68.85g 30.79g and 39.76g respectively. This is clearly indicated by the higher per cent adequacy of cereals (108.34%), pulses (114.75%) roots and tubers (100%) sugar (150.12%) and fat (181.8%) and lower per cent adequacy of other vegetables (32.5%), milk and milk products (40%) and green leafy vegetables (40%) (Table: 2).

It was observed that higher food intake than the recommended dietary allowances for cereals and fat was observed among female employees of pre obese subjects. This indicates the domination of calorie rich foods is prevailing among the subjects. That is clearly denoted in the lower mean intake and percent adequacy of green leafy vegetables, other vegetables, milk and milk products and fruits among female group. Among males also mean intake of cereals, pulses, roots and tubers, sugar and fat was more than other food groups which has reflected in higher percent adequacy also. Burton[11] and Hu[12] reported the similar results.

Table 2. Mean food intake (g/day) of the pre obese subjects

Food groups	Pre obese (n = 120)					
	Male (n=60)			Female (n=60)		
	RDA	Actual intake (Mean ± SD)	% Adequacy	RDA	Actual intake (Mean ± SD)	% Adequacy
Cereals	375	410.26± 27.2	109.40	270	292.54± 42.17	108.34
Pulses	75	88.85± 6.94	118.46	60	68.85± 6.84	114.75
Milk and milk products	300	95.48± 29.22	31.66	300	120.96± 28.61	40
Roots and tubers	200	200.48± 13.1	100	200	145.16± 11.62	72.5
Green leafy vegetables	100	40.86± 6.27	40	100	45.83± 5.46	45
Other vegetables	200	65.75± 10.42	32.5	200	70.28±20.06	35
Fruits	100	75.79± 10.42	75	100	85.37± 3.40	85
Sugar	20	31.08 ± 6.77	155.4	20	30.79± 7.81	150.12
Fat	25	45.45± 9.91	181.8	20	39.76± 7.06	198.8

Mean nutrient intake of pre obese subjects

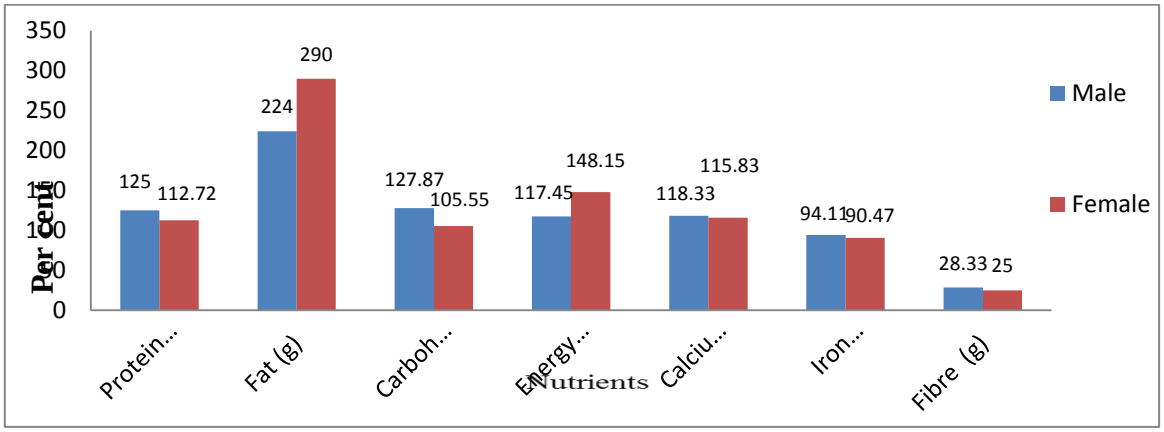
The mean per cent adequacy of nutrients of the male subjects for energy, protein, fat, carbohydrates, and calcium (117.5%, 125%, 224%, 127.77% and 118.33% respectively) which were found to be above the RDA. The same of iron and fibre was 94.11 per cent and 28.33 per cent respectively, which were found to be below the RDA (Figure 1).

Similarly that was reflecting in the higher mean per cent adequacy of nutrients such as energy, protein, fat, carbohydrates, and calcium i.e. (148.15%, 112.72%, 290%, 105.55% and 695.41%, respectively) which were found to be above the RDA. The adequacy of iron and fibre was lower than RDA (i.e. 90.47% and 25%, respectively) among females.

The mean nutrient intake of all the nutrients except for iron and fibre was higher among both male and female groups of pre obese subjects. This is might be due to the higher intake of mean food intake of energy dense foods and higher frequency of consumption pattern of processed foods/snack items on daily or weekly basis among most of

the subjects. The data is reflecting on the higher per cent adequacy of nutrients of fat, energy, protein and carbohydrates among pre obese subjects and also lower percent adequacy of iron and fibre. Similar findings were observed by Muller[10], Hill and Rolls and Monga *et al.*[14],

Figure 1: Per cent adequacy of nutrients of pre obese subjects



Correlation coefficient between anthropometric measurements with nutrients intake of the pre obese employees

The energy intake exerted a positive correlation with weight (0.321) and BMI exerted a positive significant relationship with energy intake (0.788**) in male subjects. Energy intake exerted a positive correlation with height (0.23), weight (0.18) and hip circumference (0.058) among female subjects. Fat intake showed a positive significant relationship with weight (0.61*) and positive relationship with waist circumference (0.013) and waist to hip ratio (0.17). Whereas in female subjects fat exerted as a positive relationship with BMI (0.39). More amount of fat intake shows positive significant correlation with the weight (0.689*). Fibre intake exerted a positive correlation with height (0.47), weight (0.51), waist circumference (0.39) and hip circumference (0.25) in male subjects whereas in female subjects a negative significant correlation with the hip circumference (-0.684*) was observed with fibre intake (Table: 3).

Increase in energy intake increases the BMI of the subjects indicating significant positive correlation with the energy intake ($p<0.01\%$). Several studies have indicated that fat, energy, and carbohydrate intake influence the higher anthropometric measurement (weight and waist circumference) which reflects the positive correlation with BMI and WHR. Protein showed a significant positive association with hip circumference in female subjects ($p<0.05\%$)

Table 3. Correlation coefficient between anthropometric measurements and nutrients intake of pre obese subjects.

Nutrients	Male (n=60)						Female (n=60)					
	Height	Weight	BMI	WC	HC	WHR	Height	Weight	BMI	WC	HC	WHR
Energy	-0.25	0.321	**0.788****	0.209	-0.423	0.483	0.23	0.18	-0.031	-0.309	0.058	-0.606
Protein	-0.21	-0.22	-0.24	0.33	-0.092	0.403	0.38	-0.310	0.243	0.56	**0.724***	0.045
CHO	-0.36	-0.226	-0.12	**0.68***	-0.292	-0.104	0.25	0.091	-0.155	0.204	0.075	0.23
Fat	-0.17	**0.61***	-0.29	0.013	-0.293	0.17	-0.35	**0.689***	0.39	-0.109	-0.13	-0.062
Calcium	-0.004	-0.014	-0.012	0.22	0.40	0.27	-0.39	-0.13	0.013	-0.396	-0.27	-0.34
Iron	-0.450	-0.380	- .019	0.25	-0.017	0.047	-0.174	0.12	0.057	-0.318	-0.084	-0.396
Fibre	0.47	0.51	-0.14	0.39	0.25	-0.025	-0.216	0.099	-0.315	-0.56	**-0.684***	-0.106

CONCLUSION

Lacto vegetarian type of diet was predominantly observed in both groups followed by mixed type / non vegetarian diet. Among all subjects the mean food intake of milk and milk products, fruits, green leafy vegetables, and other vegetables was below the RDA. But intake of cereals, pulses, roots & tubers, sugar and fat was more than RDA. This has reflected in the higher per cent adequacy of roots and tubers and fat whereas lower per cent adequacy of other vegetables, milk and milk products and green leafy vegetables. The mean nutrient intake of all subjects for energy, protein, fat, carbohydrates and calcium were found to be above the RDA except for iron and fibre. This has reflected in the higher mean per cent adequacy of nutrients of the male as well as female subjects.

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