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Anthropometric Profile and Nutrient Intake of Overweight/ Obese Women

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KEYWORDS Body Mass Index. Waist Hip Ratio. Obesity. Adult Women, Nutrients

ABSTRACT The study included 77 household adult women from Mecheri, Salem District, Tamil Nadu. Women with risk of obesity and obese women were recruited for conducting the study. Data on General information, socio economic status, anthropometric measurements and nutritional profile were collected using interview schedule. The results revealed that overall, 65 % of the adult women identified as overweight and obesity. Age, small family and income status were found to be risk factors of Obesity. Positive significant correlation was observed between the Body Mass Index and Waist Hip Ratio of the selected obese subjects. Data on assessment of the nutrient intake against the Recommended Dietary Allowance (RDA) indicated that the nutrient intake was significantly ($P < 0.01$) higher than RDA. A low degree (less than 0.5) and non significant correlation was observed between nutrient intake and anthropometric measurements like weight, waist and hip circumference and waist/hip ratio except body mass index.

INTRODUCTION

Obesity has now become an important health problem in developing countries particularly in India which is currently experiencing a rapid epidemiological transition. Available data on prevalence of obesity from different published studies suggest that the prevalence ranged from 10 to 50 percent. The prevalence of obesity in Chennai urban population indicates that 22.8% males and 31.8% females were obese respectively. Measures commonly used for assessing obesity are Body Mass Index and Waist circumference. Several reports suggested that for any given Body Mass Index, Indians tend to have increased waist circumference. Further, Indians also tend to have excess body fat, abdominal and truncal adiposity, for many given waist circumference, they have excess body fat accumulation and for any given body fat, they have increased insulin resistance. (Ramachandran et al. 1997). Abdominal obesity is more common among Chennai urban population in the age group of above 20 years. Obesity is considered to be the link between insulin resistance and metabolic abnormalities inclusive of diabetes, hypertension and dyslipidaemia, all of which are risk factor for coronary artery disease (Mohan et al. 2001).

Many developing countries including India today face the dual burden of diseases of poverty

as diseases of affluence. Some of the reasons for this change among many are urbanization and adaptation of westernized life style (Popkin 1994; Drewnowski and Popkin 1997;). India is passing through a transitional phase of socioeconomic development. There is an increase in women's employment due to economic pressure. The gainful employment of women, which ensures increase in income, may lead to better nutrition for themselves (D'souza and Bhujza 1982; Gulati 1982). Improved health facilities, increase the income, availability of food and decrease in physical activity have contributed to this epidemic form of Overweight and Obesity especially in the urban areas of the developed and developing countries (Vijayalakshmi et al. 2005). According to the published data, during the last 30 years, along with the increase in consumption of fast foods, the incidence of obesity, diabetes and circulatory system diseases has rose up rapidly (Bowman 2004; Cheng 2003; Ebbeling et al 2004; Isganaitis and Lustig 2005; Zwierzyk 2005). With rapid urbanization in recent years, there is a boom in fast foods in India, majority of fast foods contain high amounts of saturated and transfatty acids and less dietary fiber cause obesity (Kumar et al. 2007). The purpose of the study was to describe anthropometric profile and nutrients intake in the overweight and obese women.

MATERIALS AND METHODS

The cross sectional study was conducted all (N=77) the households of Kandhasamy Nagar at Mecheri in Salem District, Tamil Nadu. In each household the women head (N=77) was contacted and nature of the study was explained to them. Various anthropometric measurements viz height and weight were measured by using standard methods (Jeliffie et al. 1989). Body Mass Index was calculated with height and weight measurements. The selected women were classified into different levels of degree of obesity (IOTF 2002). Women with risk of obesity and obese women included for conducting the present study. Data on general information, socio-economics status, food intake by 24 hours recall method for three consecutive days and frequency of junk foods intake were collected. An interview schedule was used as a tool to collect the data. Waist and Hip circumferences were measured to find Waist Hip Ratio (WHR). Nutrient composition of the diets was calculated using Nutritive Value of Indian foods and it was compared with Recommended Dietary Allowances of Indian Council of Medical Research. Statistical measures like a mean, standard deviation, t-test and correlation were used to analyze the collected data.

RESULTS AND DISCUSSION

The level of degree of obesity of the subjects indicated that just one percent and 34% of the women were categorized as underweight and normal respectively Eighteen percent of the women was classified as at risk of obesity, 31% and 16% of the women were classified as obese-I and obese – II categories respectively (Table I). Vijayalakshmi et al. (2005) reported that, among the middle adulthood women, 12% were found to be under weight and 35% had normal weight ,

Table 1: Identification of obesity using Body Mass Index (N=77)

BMI*	Parameters	Percent
<18.5	Under weight	1
18.5-22.9	Normal	34
23.0-24.9	At risk of obesity	18
25-29.9	Obese-I	31
>30.0	Obese-II	16

*=International Obesity Task Force (2002) proposed classification of Body Mass Index.

whereas 14%, 28% and 11% were found to be at risk of obesity, Obese-I and Obese –II categories, respectively.

The mean waist and hip circumferences and WHR of the obese women were found to be quite high compared to other studies in India (Beegom et al 1995; Singh et al 1995). Abdominal adiposity assessed using waist circumference is considered to be more appropriate to predict metabolic disorders than generalized adiposity assessed by BMI. (Mohan and Deepa 2006). The risk of developing type-II diabetes and heart disease, was higher if the risk generally above a BMI of 25Kg/m², with a sharper increase above a BMI of 30Kg/m² (National Institute of Health 1998). The mean BMI of obese II women was higher when compared with obese I women and it was also higher when compared with at risk obese women. Body Mass Index was increased along with the increment of Waist, Hip Circumference and Waist Hip Ratio (Table 2).

Table 3 shows that Waist, Hip circumference and Waist Hip Ratio were positively and significantly (P<0.01) correlated with the Body Mass Index of the selected obese subjects. Variable like Waist, Hip and Waist Hip Ratio had high degree correlation with BMI. The correlation between Waist circumference and Body Mass Index was 0.82, hip circumference and Body Mass Index Was 0.83, Waist Hip Ratio and Body Mass Index was 0.70. This indicates that selected samples had excess adiposity with intra abdominal or visceral fat and reduced muscle mass. So there was an increased risk for diabetes hypertension, dyslipidaemia and ischemic heart disease. The most commonly used measure of fat distribution is Waist Hip Ratio. Studies have revealed that a high degree of correlation between WHR and the proportion of fat situated intra-abdominally at the umbilical level (Sunanda 2006).

Majority of the subjects (90%) were in the age group of above 30years where as 10% of the obese subjects belonged to 20-30 years of age group. Among the selected obese subjects 12% were illiterates, One to five years of education was obtained by 34% of the selected subjects, 34% of the obese subjects had 6 – 10 years education and remaining 20% of the obese subjects got above 10 years education. Business was the primary occupation of 50% of the selected obese women and 40% of them were housewives. Data indicated that majority of the subjects (96%) belonged to nuclear family

Table 2: Mean anthropometric measurements of the selected adult women (N=50)

Parameters	Mean ± S.D					
	Height in cm	Weight in kg	BMI	Waist circum-ferance (cm)	Hip circum-ferance (cm)	Waist Hip Ratio
At risk	155.43 ±5.9	57.86 ±4.4	23.9 ±0.6	89.14 ±2.7	99.2 ±2.0	0.89 ±0.01
Obese-I	158 ±6.85	67.7 ±7.7	27.2 ±1.4	100.7 ±9	108 ±7.3	0.9 ±0.02
Obese-II	151.4 ±5.9	73 ±6.0	31.8 ±1.4	110 ±6.2	115.4 ±4.3	0.9 ±0.024

Table 3: Relationship between BMI and other factors (N=50)

Factors	'r' value
Age	0.04 ^{Ns}
Waist circumference	0.82*
Hip circumference	0.83*
Waist Hip Ratio	0.70*

*- significant at 1% level, Ns- Non significant

whereas 4% of them were lived in joint family. Majority of (84%) of the selected subjects had small family size. Regarding income 40% of the subjects belonged to Rs. ≤ 5000, followed by 42% to Rs. 5001-10,000 and 18% to Rs. ≥10,001. Adult obesity was associated with junk foods consumption, this was judged by taking the frequency of junk food intake (Table 4).

Table 5 revealed that nearly 32 to 36 % of the selected subjects consumed junk foods weekly twice. Since junk foods are high in energy, excessive consumption of junk foods coupled with lack of adequate physical activity may contribute to obesity (Sudershan and Subba Rao, 2008).

The mean intake of nutrients by the obese subjects is presented in table 6. The mean daily energy intake of obese subjects was 2169 calories, protein- 57g, fat -34g, fiber-15g and Iron - 16g. Except fiber and iron, other nutrients intake were greater than the Recommended Dietary Allowances. The mean energy and protein was found to be significant at (p<0.01) one percent level and fat intake was found to be significant at (p<0.05) five percent level. High intake of energy dense foods promotes weight gain; these energy dense foods are not only highly processed but also micronutrient poor. Energy dense foods tend to be high in fat and sugars. (WHO Report 2003).

Table 4: General information and socio-economic status of the selected obese subjects (N=50)

General information & socio-economic status	Percent
<i>Age in Years</i>	
20-30	10
30-40	40
>40	50
<i>Education in Years</i>	
0	12
1-5	34
6-10	34
>10	20
<i>Occupation</i>	
Business	50
Office going	10
Homemaker	40
<i>Family Type</i>	
Nuclear	96
Join	4
<i>Family Size</i>	
Small (2-4)	84
Medium (5-7)	16
<i>Income in Rupees</i>	
<5000	40
5001-10,000	42
>10,001	18

Table 6: Mean Nutrient intake of the selected subjects (N=50)

Nutrient intake	RDA [§]	Mean ± S.D	't' value
Energy (k cal)	1875	2169 ± 195	10.65*
Protein (g)	50	57.18 ± 9.69	5.25*
Fat (g)	20	34.4 ± 8.45	12.05**
Fiber (g)	40 [#]	14.7 ± 6.71	26.6 ^{Ns}
Iron (mg)	30	15.58 ± 5.45	18.7 ^{Ns}
Carbohydrate(g)	-	402.6 ± 43.9	-

[§] Recommended Dietary Allowances by ICMR, (1992).

[#] Srilakshmi B (2005)

*significant at one percent level,

**significant at five percent level

Ns-Non significant.

Table 5: Frequency of junk food consumption of the obese subjects

Food items	Daily	Weekly twice	Weekly once	Rarely	Nil
Bakery products	8	32	12	48	0
Sweets	2	32	14	52	0
Oily foods	16	36	28	18	2
Carbonated beverages	4	22	4	70	0

Table 7: Relationship between Nutrients Intake and anthropometric measures of the Selected Obese Subjects (N=50)

Nutrients	'r' value				
	Weight (kg)	BMI	Waist circumference (cm)	Hip circumference (cm)	Waist / Hip ratio
Energy	0.4332**	0.3666**	0.4537**	0.4851**	0.2605 ^{Ns}
CHO	0.2419 ^{Ns}	0.3976**	0.4085**	0.4031**	0.3710**
Protein	0.2583 ^{Ns}	0.3042*	0.1992 ^{Ns}	0.2450 ^{Ns}	0.0904 ^{Ns}
Fat	-0.0193 ^{Ns}	0.2985*	0.2095 ^{Ns}	0.2420 ^{Ns}	0.1723 ^{Ns}
Fiber	-0.0568 ^{Ns}	0.1583 ^{Ns}	0.12246 ^{Ns}	0.1159 ^{Ns}	0.1291 ^{Ns}
Iron	0.01541 ^{Ns}	0.0398 ^{Ns}	0.0587 ^{Ns}	0.0502 ^{Ns}	0.0359 ^{Ns}

** - significant at 1% level, * - significant at 5% level, Ns - Non significant

The table 7 shows that there was significant relationship was observed between energy and anthropometric measures except Waist/Hip Ratio and low degree significant correlation was indicated between carbohydrate and anthropometric measures except weight. The coefficients for other nutrients were lower than 0.5. These findings confirmed that there was non significant association between nutrient intake and anthropometric measurements except energy.

SUMMARY AND CONCLUSION

It has been concluded that selected 65% of the adult women were at risk of obesity and had different grades of obesity I, II because of age and Socio-Economic status. The waist circumference, hip circumference and Waist Hip Ratio were highly correlated with BMI. The mean nutrients intake was significantly higher than Recommended Dietary Allowance. Energy intake of selected subjects had gone up with less intake of fiber. So energy dense foods and micronutrient poor foods promote weight gain.

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