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Nutrient Intake of Pre and Post Menopausal Obese Women of A Metropolitan City

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Seema Charde*[1], Rekha Sharma[2]

[1] **Research Scholar Post Graduate Teaching Department of Home Science*

[2] *Associate Professor, UGC-Human Resource Development Centre, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra, India*

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ABSTRACT

The present investigation was undertaken to assess the nutrient intake of pre and postmenopausal obese women of a metropolitan city. About 279 obese women, comprising of 141 pre-menopausal and 138 post-menopausal women of age group between 35- to 60 years, were selected from Gokuldham Medical Center, Goenka And Associates Medical And Research Centre, Goregaon, (East), and Mumbai through judgmental sampling. A structured questionnaire was formulated to assess the demographic profile and anthropometric measurements. Twenty-four hour recall method was followed for diet survey. Results of the study showed that the mean age of premenopausal women was 41.18 ± 3.83 years and postmenopausal women was 54.72 ± 3.58 years. The mean monthly income of premenopausal and postmenopausal women was Rs 22.81 ± 0.60 lakhs and Rs 29.33 ± 0.62 lakhs respectively. The mean Body Mass Index of premenopausal women was 31.36 ± 4.15 kg/m^2 and of postmenopausal was 31.98 ± 3.90 kg/m^2. The percent adequacy of calories and proteins were 122 to 125% higher than the Recommended Dietary Allowances (RDA) whereas the fat adequacy was about 300% above the RDA. The percent adequacy for vitamin, calcium and iron intake ranged between 59.8 % to 99.56 %. The macronutrient intake viz., carbohydrates (p= 0.929), protein (p= 0.323), fat intake (p= 0.652) of pre and postmenopausal women did not show any significant difference. Similarly, the Saturated fats (p = 0.549), MUFA (p = 0.265) and PUFA (p = 0.236) did not show any significant difference between the intake of pre and postmenopausal women. However, calcium, iron and vitamin C intake showed significantly higher intakes among the postmenopausal women (p=0.000).

INTRODUCTION

Obesity has been recognized as a worldwide epidemic of the 21st century. Almost 65% of the world population lives in countries where excess body weight is the reason for higher mortality than underweight. In the period from 1980 to 2008, the number of obese people (body mass index, BMI ≥ 30 kg/m^2) increased two-fold globally (www.who.in).

The problem of obesity affects all age groups. It is also observed among menopausal women. Menopause is the time in a woman's life when, as a consequence of hormonal changes occurring in the body, the risk of overweight and obesity increases significantly and, therefore, so does the risk of metabolic and cardiovascular diseases. Excess body weight in menopausal women may also be of social and psychological importance since the occurring symptoms may considerably decrease the quality of life and sexual activity of these women. Reduction of body weight in obese menopausal women should play a vital role in the treatment of this group of patients. Therefore, adequate management seems to be essential, and it should involve dietary, pharmacological and/or surgical treatment, depending on the patient's needs (Brończyk et al.2015). Schoppen *et al.(*2005) studied the food, energy and macronutrient intake of postmenopausal women from a menopause program. They found the diet of the group of postmenopausal women attending a prevention program closely conforms to current nutritional guidelines. Physical activity, body weight and intake of vegetable foods are adequate and may be very useful to counterbalance the increased risk of several pathologies after menopause. However, consumption of carbohydrate-rich foods is lower than recommended. Participation in the menopause health care-program is useful for weight control and dietary advice.

Energy (calorie) needs generally decline with age; however, micronutrient needs do not, and, in some cases, the intake of micronutrients should increase. For example, women over 50 years of age need to increase the intake of calcium. Encourage women to consume nutrient-dense foods and avoid empty calories or energy-dense foods in order to meet their micronutrient needs and maintain a healthy body weight. Nutrient-dense foods provide necessary micronutrients in addition to calories, whereas energy-dense foods provide excess calories in small volumes of food without providing many micronutrients (Abdulaziz,2010).

In view of the above discussion, it was postulated to study the nutrient intake of pre and post-menopausal obese women of a metropolitan city. The objectives were to assess the

demographic profile, Body Mass Index, diet intake, and nutrient intake of pre and post-menopausal obese women.

MATERIALS AND METHODOLOGY:

About 279 obese women, comprising of 141 pre-menopausal and 138 post-menopausal women of age group between 35- to 60 years, were selected from Gokuldham Medical Center, Goenka & Associates Medical & Research Centre, Goregaon, (East), and Mumbai through judgmental sampling. The data were collected using interview cum questionnaire methods. A structured questionnaire was formulated to assess the demographic profile and anthropometric measurements. The anthropometric measurements viz., height and weights were taken as per the standards given by Jelliffe (1968). The Body Mass Index of women were calculated and classified according to WHO (2004). The quantitative information on consumption of foods of pre and post-menopausal women was obtained by 24 hours' recall method of dietary survey. In this recall method of oral questionnaire diet survey, questions were asked about the types of food preparations made at breakfast, lunch, afternoon, tea time and dinner. An account of the raw ingredients used for each of the preparations was obtained. The nutrient intake was calculated using the Indian Food Composition Tables (Longvah *et.al* 2017). The nutrient intake was compared with Recommended Dietary Allowances, (RDA) for adult sedentary female Indians as suggested by the Expert Committee of ICMR (2010) and the percent adequacy of nutrients was calculated. The nutrient intake of pre and post-menopausal obese women was compared by Student t test using SPSS version 20. The confidence interval was set at 95 %.

RESULTS AND DISCUSSION

The demographic profile of pre and post-menopausal women has been presented in Table 1.

Table 1: The demographic profile of pre and post-menopausal women

SN	Demographic profile	Pre Menopausal Women (N= 141)	Post menopausal Women (N=138)
1	**Age in years (Mean ± SD)**	41.18 ± 3.83	54.72 ± 3.58
2	**Education**		
	Illiterate	0 (0.0%)	7 (5.07%)
	Up to 12th	36 (25.53 %)	56 (40.58 %)
	Graduate	79 (56.0 %)	65 (47.10 %)
	Post Graduate	26 (18.44 %)	10 (7.25 %)
3	**Occupation**		
	Housewife	78 (55.32 %)	102 (73.91 %)
	Working	63 (44.68 %)	36 (26.09 %)
4	**Monthly Income (Rupees in Lakhs)** Mean ± SD	22.81 ± 0.60	29.33 ± 0.62
5	**Number of Children**		
	Zero	3 (2.13 %)	1 (0.72 %)
	1 child	78 (55.32 %)	35 (25.36 %)
	2 children	56 (39.72 %)	80 (57.97 %)
	3 children	4 (2.84 %)	22 (15.94 %)
6	**Number of family members**		
	4	61 (43.26 %)	73 (52.90 %)
	5	8 (5.67 %)	40 (28.99 %)
	6	0 (0.00 %)	2 (1.45 %)

The data presented in Table 1 show that the age of pre-menopausal women ranged between 34 to 49 years and the mean age was 41.18 ± 3.83 years. About 25.53% pre-menopausal women had education up to 12th standard and 56 % were graduate. About 55.32 % women were housewives and 44.68 % were working. The mean monthly income of pre-menopausal women was Rs 22.81 ± 0.60 lakhs. Except for 2.13 % pre-menopausal women, all were married. The majority women had one child (55.23 %) and about 39.72 % had two children. About 43.26 % women had four members in the family.

The age of post-menopausal women ranged between 48 to 60 years and the mean age was 54.72 ± 3.58years. About 40.58 % post-menopausal women had education up to 12th standard and 47.10 % were graduate. All post-menopausal women were housewives. The mean monthly income of women was Rs 29.33 ± 0.62 lakhs. All post-menopausal experimental women were married. The majority women had two children (57.97 %) and about 25.36 % had one child. About 52.90 % women had up to four members and 28.99 % had five members in the family.

Body Mass Index

The distribution of menopausal women, according to the classification of Body Mass Index (BMI) WHO (2004) has been presented in Table 2.

Table 2: Distribution of women according to Body Mass Index.

SN	BMI (kg/m^2)	Pre Menopausal Women (N= 141)	Post menopausal Women (N=138)
1	Mean BMI (kg/m^2)	31.36 ± 4.15	31.98 ± 3.90
2	Grade I - Pre obese (24.9 to 30)	57 (40.43 %)	37 (26.81 %)
3	Grade II - Obese (30 to 39.9)	80 (56.74%)	94 (68.12 %)
4	Grade III - Morbid Obese (Above 40)	04 (2.84 %)	07 (5.07 %)

The mean Body Mass Index of premenopausal women was 31.36 ± 4.15 kg/m^2 and of postmenopausal was 31.98 ± 3.90 kg/m^2. The majority pre-menopausal (56.74 %) and postmenopausal women (68.12 %) had a Grade II obesity. About 2.84% and 5.07 % pre and postmenopausal women were morbidly obese.

Nutrient Intake of Women

The mean nutrient intake of women, according to menopausal status in comparison with the Recommended Dietary Allowances (2010) has been presented in Table 3.

Table 3: Mean nutrient intake of menopausal women in comparison with RDA (2010)

Nutrients	Pre and Post-Menopausal Women	N	Mean	Std. Deviation	RDA (2010)	Percent Adequacy
Calorie (Kcal)	Pre Menopausal Women	141	2331.12	221.08	1900	122.69
	Postmenopausal Women	138	2318.83	238.92	1900	122.04
Carbohydrates (gm)	Pre Menopausal Women	141	375.25	69.19		
	Postmenopausal Women	138	375.99	71.14		
Protein (gm)	Pre Menopausal Women	141	69.30	14.06	55	125.98
	Postmenopausal Women	138	67.62	14.34	55	122.92
Fat (gm)	Pre Menopausal Women	141	60.06	12.96	20	300.3
	Postmenopausal Women	138	59.38	12.44	20	296.85
Saturated Fats (mg)	Pre Menopausal Women	141	5.51	1.82		
	Postmenopausal Women	138	5.64	1.76		
MUFA (mg)	Pre Menopausal Women	141	21.50	14.78		
	Postmenopausal Women	138	19.58	13.81		
PUFA (mg)	Pre Menopausal Women	141	33.37	14.05		
	Postmenopausal Women	137	35.34	13.53		
Calcium (mg)	Pre Menopausal Women	141	526.10	87.04	600	87.68
	Post menopausal Women	138	597.38	101.29	600	99.56
Vitamin C (mg)	Pre Menopausal Women	141	23.92	5.73	40	59.8
	Post menopausal Women	138	27.43	5.93	40	68.57
Iron (mg)	Pre Menopausal Women	141	13.83	3.76	21	65.85
	Post menopausal Women	138	16.25	4.51	21	77.38

The data reveal that the mean calorie intake (2331.12 and 2318 Kcal/day) and protein intake (69.29 and 67.61 gm/day,) and fat intake (60.06 and 59.37 gm/day respectively) of premenopausal women were slightly higher than postmenopausal women. The mean intake of saturated fats and PUFA were higher in postmenopausal women than premenopausal women. Similarly, the mean calcium, vitamin C and iron intake of postmenopausal women were higher than premenopausal women.

The percent adequacy of calories and proteins were 122 to 125% higher than the Recommended Dietary Allowances (RDA) whereas the fat adequacy was about 300% above

the RDA. Schoppen *et.al (*2005) studied the food, energy and macronutrient intake of postmenopausal women from a menopause program. They found the diet of the group of postmenopausal women attending a prevention program closely conforms to current nutritional guidelines. Physical activity, body weight and intake of vegetable foods are adequate and may be very useful to counterbalance the increased risk of several pathologies after menopause. However, consumption of carbohydrate-rich foods is lower than recommended.

The percent adequacy for vitamin C and iron intake of menopausal women in the present study ranged between 59.8 % to 77.38 %. However, the calcium intake of pre and postmenopausal obese women were 87.68 and 99.56 % of RDA respectively. The recommended daily requirement of calcium has been the focus of much discussion recently, especially for prevention of osteoporosis of menopausal women. There is evidence that calcium requirement, which is recognized as the intake required to maintain calcium balance and therefore bone health, varies depending on culture, dietary, genetic, and geographical factors. Calcium balance is determined by the relationship of calcium intake, absorption, and excretion. Percentage net absorption depends on the intake, presence of phosphates, phytates in the food, and serum concentration of 1,25-dihydroxyvitamin D (25(OH) D) which controls intestinal absorption. Menopausal status through lowered estrogen concentration has a major influence on calcium absorption. Estrogen deficiency lowers intestinal absorption of calcium.[Aloia *et. al*, 2010] Urinary excretion of calcium is affected by menopausal status, protein, and sodium intake. Dietary protein, especially animal protein has a positive effect on urinary calcium excretion.[Kerstetter and Allen 1990]

Protein intake of most south Asian countries is 34-38 g of protein per capita, [The Global Food Security Index-2012] that is much lower than the western countries. On the contrary, in the present investigation, the protein intake of menopausal women was found to be 67 to 69 gm /day. The metabolism slows down as one gets older, and women in their mid-forties tend to become more sedentary. This all adds up to weight gain, one of the most dreaded menopause symptoms. By filling up on low-calorie fruits and vegetables, one can help minimize weight gain while getting the nutrients you need to stay healthy [Radhika *et. al* 2007].

The comparison of mean intake of nutrient intake of pre and postmenopausal women has been presented in Table 4.

Table 4: The comparison of mean nutrient intake of pre and post-menopausal women

Nutrients	Pre and Post Menopausal women	N	Mean	Std. Deviation	Mean Difference	t	Sig. (2-tailed)
Calorie (Kcal)	Pre Menopausal Women	141	2331.12	221.08	12.287	.446	.656
	Postmenopausal Women	138	2318.83	238.92			
Carbohydrates (gm)	Pre Menopausal Women	141	375.25	69.19	-.7445	-.089	.929
	Postmenopausal Women	138	375.99	71.14			
Protein (gm)	Pre Menopausal Women	141	69.30	14.06	1.6819	.989	.323
	Postmenopausal Women	138	67.62	14.34			
Fat (gm)	Pre Menopausal Women	141	60.06	12.96	.6870	.452	.652
	Postmenopausal Women	138	59.38	12.44			
Saturated Fats (mg)	Pre Menopausal Women	141	5.51	1.82	-.12887	-.600	.549
	Postmenopausal Women	138	5.64	1.76			
MUFA (mg)	Pre Menopausal Women	141	21.50	14.78	1.91240	1.116	.265
	Postmenopausal Women	138	19.58	13.81			
PUFA (mg)	Pre Menopausal Women	141	33.37	14.05	-1.96755	-1.189	.236
	Postmenopausal Women	137	35.34	13.53			
Calcium (mg)	Pre Menopausal Women	141	526.10	87.04	-71.278	-6.308	.000
	Postmenopausal Women	138	597.38	101.29			
Vitamin C (mg)	Pre Menopausal Women	141	23.92	5.73	-3.513	-5.034	.000
	Postmenopausal Women	138	27.43	5.93			
Iron (mg)	Pre Menopausal Women	141	13.83	3.76	-2.424	-4.881	.000
	Postmenopausal Women	138	16.25	4.51			

The results presented in Table 4 shows that the macronutrient intake viz., carbohydrates (p= 0.929), protein (p= 0.323), fat intake (p= 0.652) of pre and postmenopausal women did not show any significant difference. Similarly, the Saturated fats (p = 0.549), MUFA (p = 0.265)

and PUFA (p = 0.236) intake also did not show any significant difference between pre and postmenopausal women. However, calcium, iron and vitamin C intake in the present study showed significantly higher intakes among the postmenopausal women (p=0.000).

The calorie intake of premenopausal women was insignificantly higher than postmenopausal women (p= 0.656). Energy (calorie) needs generally decline with age; however, micronutrient needs do not, and, in some cases, the intake of micronutrients should increase. For example, women over 50 years of age need to increase the intake of calcium. Encourage women to consume nutrient-dense foods and avoid empty calories or energy-dense foods in order to meet their micronutrient needs and maintain a healthy body weight. Nutrient-dense foods provide necessary micronutrients in addition to calories, whereas energy-dense foods provide excess calories in small volumes of food without providing many micronutrients (Abdulaziz,2010).

CONCLUSION:

It can be concluded from the study that the percent adequacy of calories and proteins of pre and postmenopausal were 122 to 125% higher than the Recommended Dietary Allowances (RDA) whereas the fat adequacy was about 300% above the RDA. The percent adequacy for vitamin, calcium and iron intake ranged between 59.8 % to 99.56 %. The macronutrient intake viz., carbohydrates (p= 0.929), protein (p= 0.323), fat intake (p= 0.652) of pre and postmenopausal women did not show any significant difference. Similarly, the Saturated fats (p = 0.549), MUFA (p = 0.265) and PUFA (p = 0.236) did not show any significant difference between the intake of pre and postmenopausal women. However, calcium, iron and vitamin C intake showed significantly higher intakes among the postmenopausal women (p=0.000).

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