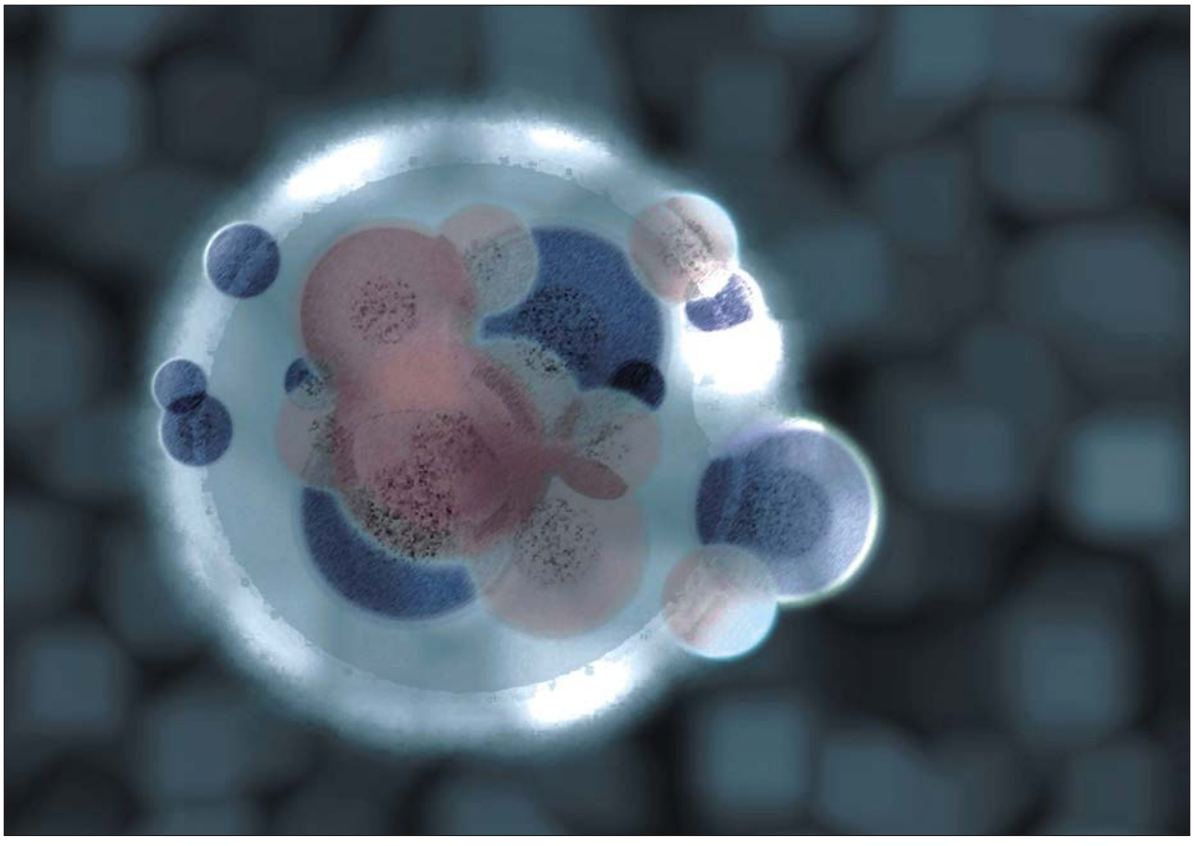

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Assessment of Nutritional Status in Post Menopausal Women of Ardebil, Iran

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Abstract: The aim of the present study is to describe socio-demographic and anthropometric factors, energy, nutrient intake and food habit of menopause women. In the descriptive cross-sectional study, 924 females (386 urban and 538 rural) aged more than 50 years from different areas of Ardebil province were selected by a multi stage sampling method. Variables including age, anthropometric factors, calorie and nutrients intake as well as the food habit were recorded for each case. In order to determine dietary intake, information of 24 h dietary food recall was recorded for three successive days. The educational levels and some socio-demographic variables were evaluated using an appropriate questionnaire. Statistical comparison of means among different groups was performed using ANOVA and t-test. The general proportions of overweight for rural and urban women were 37.9 and 44.6%, respectively. There was significant differences in anthropometric factors including height, weight and BMI among literacy levels ($p<0.05$). No statistically differences were between job levels and anthropometric indicators. The mean of daily iron and vitamins (B_1, B_3 and C) intakes of post menopausal women were adequate. However the mean of folate, vitamins B_2 and B_6, calcium, zinc, selenium and calorie intake were less than dietary reference intakes. We concluded that percentage of overweight, obesity among post menopausal women in urban area were more than rural area.

Key words: Anthropometric factors, nutrients, overweight, menopause, Ardebil

INTRODUCTION

Anthropometric values are closely related to nutrition, genetic makeup, environmental characteristics, social and cultural conditions, lifestyle, functional status and health. Anthropometric evaluation is an essential feature of geriatric nutritional evaluation for determining malnutrition, being overweight, obesity, muscular mass loss, fat mass gain and adipose tissue redistribution. Anthropometric indicators are used to evaluate the prognosis of chronic and acute diseases and to guide medical intervention in the elderly (Villareal *et al*., 2005; Grinker *et al*., 2000; Forster and Gariballa, 2005). The Women's Health Initiative, a multifaceted research program examining factors associated with disease risk in postmenopausal women, presents an opportunity to examine differences between caloric intake estimated by an food frequency questionnaires and reasonable estimates of metabolic need based on height, weight and age, in a large sample of post-menopausal women. In addition to differences in age, regional and racial/ethnic representation, the trial has a unique characteristic related to diet. Women experience a panoply of physiological changes during menopausal transition and afterwards. Hormonal changes that characterize menopause are likely to influence the nutritional needs and habits of women. A number of observational epidemiological studies have dealt with risk factors of chronic diseases, namely cardiovascular disease (CVD) and osteoporosis, in postmenopausal women. However, the nutritional components were not precisely assessed because frequency questionnaires were used in most of these studies. Studies aimed principally at assessing the nutritional adequacy of food intakes during menopause are scarce. This gap in the literature concerning women as this stage of life is surprising as nutrition is paramount in health maintenance and care, especially at a time when the population is ageing and considerable efforts must be deployed to prevent and treat chronic diseases (Massé *et al*., 2004). In Iranian women, the median age of menopause is 49.2 years in rural areas and 49.9 years in urban areas (Mohammad *et al*., 2004). Thus, the aim of the present study is to describe socio-demographic and anthropometric factors, energy, nutrient intake and food habit of menopause women in Ardebil province of Iran. Special focus is given to age and to the question whether the prevalence of low intake and thus the risk of nutritional deficiencies, is increasing with menopause.

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MATERIALS AND METHODS

In a descriptive cross-sectional study, 924 females from Ardebil province (386 urban and 538 rural) aged more than 50 years were selected by multi stage sampling method. Variable including age, anthropometric factors (height, weight), calorie and nutrients intake as well as the food habit were measured for each case in 2005. The educational levels and some socio-demographic variables including marital status and job levels were evaluated using appropriate questionnaire. Participants were classified into non, low (primary school), moderate (secondary school) and high (college or university) education levels. All subjects signed an informed consent statement before participating in the study. Height and weight were obtained using a portable digital scale and a portable digital Stadiometer following standard technique. Height and weight were measured without shoes and in a light summer uniform in a private room by trained interviewers. Height was measured to the nearest 0.5 cm using a portable Stadiometer. Weight was measured to the nearest 0.1 kg using portable Soenle digital scales with a range of 0-200 kg. Body Mass Index (BMI, in kg m^{-2}) was calculated from the women height and weight. BMI the most widely accepted indicator was used to assess obesity among women (WHO, 1995). BMI ≥30 and 25 ≤BMI<30 considered to be obesity and overweight, respectively (WHO, 1995). In order to determine dietary intake, information of 24 h dietary food recall was recorded for three successive days. Mean daily dietary intake and food composition were estimated using Iranian Food Composition Tables (Iranian Food Processor Software) (Mafiei *et al*., 2002). The prevalence of food frequency among women was evaluated using specific questionnaire. For determination of food habit each participant were reported consumption of specified food bases of daily, weekly, monthly and yearly. The selected frequency choice, given by the subjects for each food item from the food groups, was then converted to a weekly intake. Statistical analyses were performed using SPSS version 13 for windows. Results are expressed as means±SD. Statistical comparison of means among groups was performed with ANOVA and t-test. Differences were considered statistically significant at $p<0.05$.

RESULTS

Height, weight and BMI of urban women were more than rural ($p<0.05$). Anthropometric factors of married women were more than single ($p<0.05$) (Table 1). Based on BMI percent higher proportion of women were overweight and normal weight in two areas. The general proportions of overweight among rural and urban women were 37.9 and 44.6%, respectively. There was a prevalence greater proportion of overweight and obesity among women in two areas (Table 2). There was significant different in anthropometric factors including height, weight and BMI among literacy levels ($p<0.05$). There was significant differences in protein, carbohydrates and calorie intake among BMI levels ($p<0.03$) and this differences between all of groups were significant ($p<0.05$). There were a greater proportion of non educated post menopausal women among literacy levels in two areas and in the rural women were more than urban women (Table 3) and was not found secondary and college literacy levels in rural women. No statistically differences were between job levels and anthropometric indicators. The mean of calorie and some nutrients (such as, protein, carbohydrate, fiber, total fat, saturated fat, folic acid, vitamins C and B_1 and calcium) intakes of rural women were more than urban, significantly ($p<0.05$). The mean of daily iron and vitamins (B_1, B_3 and C) intakes of post menopausal women were adequate. However the mean of folate, vitamins B_2 and B_6, calcium, zinc, selenium and calorie intake were less than Dietary Reference Intakes (DRIs) in two areas (Table 4). Food frequency showed that bread was the main food source in post menopausal women. The frequency intake of rice, vegetables and red meat per week in urban women were more than rural women,

Table 1: The mean of height, weight and BMI between two different groups

Anthropometric factors	Area Rural (N = 538) Urban (N = 386)	Marriage Single (N = 152) Married (N = 772)
Height (cm)*	152.1±07.9	152.6±06.7
	155.1±07.6	153.5±08.1
Weight (kg)*	61.5±12.7	61.0±11.1
	66.1±12.7	64.0±13.2
BMI (kg m^{-2})*	26.6±05.2	26.1±04.2
	27.5±04.9	27.1±05.1

*: Different is significant at the 0.05 level (2-tailed); All values are mean±SD

Table 2: The level of body mass index in two areas

	BMI level						
Area	Low (<18.5)	Normal (18.5-24.9)	Over weight (25-29.9)	Obesity I (30-34.9)	Obesity II (35-39.9)	Obesity III (>40)	Total
Rural	8 (1.5)	216 (40.1)	204 (37.9)	72 (13.4)	30 (5.6)	8 (1.5)	538 (100)
Urban	8 (2.1)	114 (29.5)	172 (44.6)	64 (16.6)	16 (4.1)	12 (3.1)	386 (100)

Value in parenthesis are in percentage

Table 3: The frequency of variables in different literacy

	Literacy				
Area	Non	Primary	Secondary	College	Total
Rural	476 (88.5)	62 (11.5)	-	-	538 (100)
Urban	318 (82.4)	48 (12.4)	8 (2.1)	12 (3.1)	386 (100)

Value in parenthesis are in percentage

Table 4: The mean of daily calorie and nutrients intake of Ardebilian women in different areas

Variables	Area rural urban	Variables	Area rural urban
Calorie (kcal day^{-1})*♦	1693.00±552	Vitamin B_6(mg)♦	0.9±0.6
	1521.00±879		0.8±0.4
Protein (g)*	61.00±22.0	Folic acid (µg)*♦	67.5±57.3
	58.00±30		53.8±44.2
CHO (g)*	260.00±82	Vitamin C (mg)*	51.4±40.4
	221.00±168		45.0±44.0
Fiber (g) *	10.20±5.2	Calcium (mg)*♦	506.0±363
	7.80±4.3		364.0±216
Total fat (g)*	36.80±25.9	Iron (mg)*	19.0±9.2
	34.60±14.4		14.9±6.4
Saturated fat (g)*	14.60±9.7	Zinc (mg)	3.8±2.1
	13.10±7.0		3.2±1.8
Mono unsaturated fat (g)	16.30±11.4	Selenium (µg)♦	25.5±17.3
	15.60±6.8		22.7±16.9
Poly unsaturated fat (g)	5.90±6.1	Calpr	15.2±11.3
	5.90±2.9		15.7±5.4
Vitamin B_1 (mg)*	1.40±0.6	Calcarbo*	59.7±9.1
	1.10±0.5		55.6±9.4
Vitamin B_2 (mg)♦	0.90±0.4	Calfat*	26.0±7.9
	0.82±0.4		28.9±10.5
Vitamin B_3 (mg)	19.70±8.7		
	18.60±8.8		

All values are mean±Standard deviation; CHO = Carbohydrate, Calpr = Calorie from protein; Calcarbo = Calorie from carbohydrate, Calfat = Calorie from fat; *: Different is significant at the 0.05 between two groups; ♦: Different is significant at the 0.05 compared with DRIs

Table 5: The mean of food frequency per week of Ardebilian women in different areas

Food groups (servings)	Area rural urban	Food groups (servings)	Area rural urban
Milk	3.7±3.1	Egg	4.3±4.2
	3.6±3.2		4.0±3.2
Yogurt	5.0±4.2	Cheese	6.2±4.8
	5.2±3.8		6.3±2.8
Bread	14.1±9.3	Fruits	0.3±0.2
	13.0±6.7		0.6±0.3
Rice*	3.7±3.2	Vegetables*	1.2±1.0
	5.0±3.7		2.0±1.5
Potato	4.6±3.5	Fish	0.9±0.5
	4.4±3.6		1.0±0.8
Pulse*	3.1±2.9	Poultry	2.2±2.6
	2.6±2.1		2.8±2.9
Red meat*	2.2±2.0		
	2.9±2.8		

All Values are mean±Standard deviation; *: Different is significant at the 0.05 level (2-tailed)

significantly ($p<0.05$), but frequency intake of pulse per week in rural women was more than urban, significantly ($p<0.05$) (Table 5).

DISCUSSION

Present results suggest that the height, weight and BMI in urban post menopausal women were higher than those in rural area which is similar to the study of Kamadjeu *et al.* (2006) about obesity of urban women in Cameron. Overweight and obesity in urban women were more than rural women that may be contribute to the increase in weight, height and BMI associated with urbanization. Although BMI has some limitations, most studies investigating the overweight associated factors used this index as sole indicator of overweight (dos Santos and Sichieri, 2005; Villarino-Rodríguez *et al.*, 2002). Present results showed that general proportions of overweight among rural and urban women are 37.9 and 44.6%, respectively. Underweight as determined using the BMI (<18.5) was on average 1.8%. This figure was higher urban than in rural women, which similar to the study of Sánchez-García *et al.* (2007). Thr BMI was normal in 29.5 and 40.1% in urban and rural women, respectively.

In both clinical practice and epidemiology BMI, is the most used indicator to determine both the individual and collective general nutritional status. This index is considered to positively correlate with certain health and longevity indicators (Keller and Ostbye, 2005). In the present study, women with higher levels of education are more likely to be overweight in all three models which is inconsistent with study of Nguyen *et al.* (2007).

Frequent eating was found to associate with increased body fat in postmenopausal women (Yannakoulia *et al.*, 2007). Although consumption of a low variety of energy-dense foods may contribute to reduced energy intake and body weight at any age, the variety of micronutrient-dense foods consumed needs to be increased in old age people to prevent micronutrient deficiencies. In order to maintain health all adults need advice on the changing needs for dietary variety with aging and that older persons with low BMI are particularly vulnerable to dietary shortfalls (Roberts *et al.*, 2005). Mean micronutrient intakes compared well with DRIs, all of menopausal women consumed less than recommended levels for folate, vitamins B2 and B6, calcium, zinc and selenium or daily food servings of vegetables or fruits. Foote *et al.* (2000) showed since the beneficial aspects of foods are not limited to essential nutrients, nutrition recommendations to older adults may be improved by emphasizing daily servings of nutrient-dense choices within the Food Pyramid. The present study expands our knowledge about dietary patterns in women at an early stage of menopause and highlights some compatibilities and incompatibilities with current health advice

concerning the prevention of disease common at this stage of life. The study of Villarino-Rodríguez *et al*. (2002) was showed regarding the vitamin intake, the mean dietetic content of thiamine, niacin and vitamin C supplies the 100% of the recommended intake of the population in study women similarly is our study. Several minerals other than calcium and phosphorus play essential roles in bone health (Bunker, 1994). The food frequency questioinnaire correctly identified subjects with calcium intakes below the Malaysian recommended daily allowance (450 mg day^{-1}) with 60% specificity and with 92% specificity for women consuming less than 800 mg calcium day^{-1} (Chee *et al*., 2002). Postmenopausal women in this study, having dietary calcium intakes far below the recommendations for their age, may be at increased risk of osteoporotic hip fracture later in life. A calcium supplementation of 1000 mg day^{-1} attenuates bone loss in postmenopausal women (Celotti and Bignamini, 1999). In present study zinc intake was all insufficient in both groups of women, that is good agreement with the finding of Berner *et al*. (2002). The diet of postmenopausal women in our study contained 65.3 and 77.5% of zinc DRI for urban and rural women, respectively. The amount and type of dietary protein is of great importance after menopause for both bone metabolism and the cardiovascular system. Much lower calcium intake observed in this study might cause difficulties adapting to the acid load resulting from a high-protein diet (Draper *et al*., 1991). Dietary folate, which was newly established DRI of 400 μg day^{-1} (Food and Nutrition Board, Institute of Medicine, 1998) in this study folate intakes of menopausal women were 13.4 and 16.9% of the DRI for urban and rural women, respectively.

Fruits and vegetable intake of post menopausal women were less than recommended Food Pyramid, that may affect some nutrients intakes (e.g., folate). In summary, the diets of postmenopausal women in this study seemed to be inconsistent with national recommendations for a healthy diet. It seems, nutritional inadequacy to be a reality among this group of the population as revealed by other studies with the similar or larger sample size (Berner *et al*., 2002; Volkert *et al*., 2004; Barger-Lux *et al*., 1992; Rimm *et al*., 1998). We concluded that percentage of overweight, obesity and literacy among post menopausal women in urban area were more than rural area, which may be cause urbanization. The present results suggest that post menopausal women living in Ardebil have low intake of serving some food groups which may effect on some nutrients deficiency in their consumption dietary.

REFERENCES

Barger-Lux, M.J., R.P. Heaney, P.T. Packard, J.M. Lappe and R.R. Recker, 1992. Nutritional correlates of low calcium intake. Clin. Applied Nutr., 2 (4): 39-44.

Berner, Y.N., F. Stern, Z. Polyak and Y. Dror, 2002. Dietary intake analysis in institutionalized elderly: A focus on nutrient density. J. Nutr. Health Aging., 6 (4): 237-342.

Bunker, V.W., 1994. The role of nutrition in osteoporosis. Br. J. Biomed. Sci., 51 (3): 228-240.

Celotti, F. and A. Bignamini, 1999. Dietary calcium and mineral/vitamin supplementation: A controversial problem. J. Int. Med. Res., 27 (1): 1-14.

Chee, W.S.S., A.R. Suriah, Y. Zaitun, S.P. Chan, S.L. Yap and Y.M. Chan, 2002. Dietary calcium intake in postmenopausal Malaysian women: Comparison between the food frequency questionnaire and three-day food records. Asia Pacific J. Clin. Nutr., 11 (2): 142-146.

dos Santos, D.M. and R. Sichieri, 2005. Body mass index and measures of adiposity among elderly adults. Rev. Saude Publica, 39 (2): 163-168.

Draper, H.H., L.A. Piché and R.S. Gibson, 1991. Effects of a high protein intake from common foods on calcium metabolism in a cohort of postmenopausal women. Nutr. Res., 11 (4): 273-281.

Food and Nutrition Board, Institute of Medicine, 1998. Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B_6, Folate, Vitamin B_{12}, Pantothenic Acid, Biotin and Choline. National Academy Press, Washington, DC.

Foote, J.A., A.R. Giuliano and R.B. Robin, 2000. Older adults need guidance to meet nutritional recommendations. J. Am. Coll. Nutr., 19 (5): 628-640.

Forster, S. and S. Gariballa, 2005. Age as a determinant of nutritional status: A cross sectional study. Nutr. J., 4 (1): 28.

Grinker, J.A., K.L. Tucker, P.S. Vokonas and D. Rush, 2000. Changes in patterns of fatness in adult men in relation to serum indices of cardiovascular risk: The normative aging study. Int. J. Obes. Relat. Metab. Disord., 24 (10): 1369-1378.

Kamadjeu, R.M., R. Edwards, J.S. Atanga, E.C. Kiawi, N. Unwin and J.C. Mbanya, 2006. Anthropometry measures and prevalence of obesity in the urban adult population of Cameroon: An update from the Cameroon Burden of Diabetes Baseline Survey. BMC Public Health, 6: 228.

Keller, H.H. and T. Ostbye, 2005. Body Mass Index (BMI), BMI change and mortality in community-dwelling seniors without dementia. J. Nutr. Health Aging, 9 (5): 316-320.

Mafiei, M., M. Bostam, A. Marandi, A. Jalali and R. Vakili, 2002. Iranian food consumption program. A unique nutritional software in Iran. Iranian J. Publ. Health, 31 (3-4): 105-107.

Massé, P.G., J. Dosy, C.C. Tranchant and R. Dallaire, 2004. Dietary macro and micronutrient intakes of nonsupplemented pre and postmenopausal women with a perspective on menopause-associated diseases. J. Hum. Nutr. Diet., 17 (2): 121-132.

Mohammad, K., S.M. Sadat Hashemi and F.K. Abadi Farahani, 2004. Age at natural menopause in Iran. Maturitas, 49 (4): 321-326.

Nguyen, M.D., S.A. Beresford and A. Drewnowski, 2007. Trends in overweight by socio-economic status in Vietnam: 1992 to 2002. Public Health Nutr., 10 (2): 115-121.

Rimm, E.B., W.C. Willett, F.B. Hu, L. Sampson, G.A. Colditz, J.E. Manson, C. Hennekens and M.J. Stampfer, 1998. Folate and vitamin B_6 from diet and supplements in relation to risk of coronary heart disease among women. J. Am. Med. Assoc., 279 (5): 359-364.

Roberts, S.B., C.L. Hajduk, N.C. Howarth, R. Russell and M.A. McCrory, 2005. Dietary variety predicts low body mass index and inadequate macronutrient and micronutrient intakes in community-dwelling older adults. J. Gerontol. A Biol. Sci. Med. Sci., 60 (5): 613-621c.

Sánchez-García, S., C. García-Peña, M. Ximena Duque-López, T. Juárez-Cedillo, A. Rosa Cortés-Núñez and S. Reyes-Beaman, 2007. Anthropometric measures and nutritional status in a healthy elderly population. BMC Public Health, 7 (10): 2.

Villareal, D.T., C.M. Apovian, R.F. Kushner and S. Klein, 2005. American society for nutrition; NAASO the obesity society. Obesity in older adults: Technical review and position statement of the American society for nutrition and NAASO, The Obesity Society. Am. J. Clin. Nutr., 82 (5): 923-934.

Villarino-Rodríguez, A., C. García-Linares Mdel, M.T. García-Arias, C. and García-Fernández Mdel, 2002. Anthropometric assessment and vitamin intake by a group of elderly institucionalized individuals in the province of Leon. (Spain). Nutr. Hosp., 17 (6): 290-295.

Volkert, D., K. Kreuel, H. Heseker and P.Stehle, 2004. Energy and nutrient intake of young-old, old-old and very old elderly in Germany. Eur. J. Clin. Nutr., 58 (8): 1190-1200.

WHO (World Health Organization), 1995. Physical status: The use and interpretation of anthropometry. Report of a WHO expert committee. WHO. Tech. Rep. Ser., pp: 854.

Yannakoulia, M., L. Melistas, E. Solomou and N. Yiannakouris, 2007. Association of eating frequency with body fatness in pre and postmenopausal women. Obesity (Silver Spring), 15 (1): 100-106.