Dietary patterns are associated with arterial stiffness and carotid atherosclerosis in postmenopausal women

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Introduction

The sharp increase of cardiovascular risk after the menopausal transition implies the need for further research. The identification of modifiable cardiovascular risk factors, in terms of dietary habits, could be a potential primary prevention practice among postmenopausal women.

Objectives

To investigate possible associations between dietary patterns and indices of vascular structure and function among healthy postmenopausal women.

Materials & Methods

A cross-sectional evaluation of 310 healthy postmenopausal women without clinically overt CVD or diabetes recruited consecutively from Menopause Clinic of Aretaieio Hospital of Athens was conducted over a three-year period. Demographic characteristics, medical and menstrual history and physical activity patterns were recorded. Anthropometric, laboratory and clinical assessments were also conducted. Dietary intake was assessed by a validated food frequency questionnaire. Adherence to Mediterranean diet was evaluated through a relevant score. Pulse wave velocity (PWV) was measured as an index of aortic stiffness. Intima-media thickness (IMT) of both right and left common carotid artery (CCA), carotid bulb (CB) and internal carotid artery (ICA) and combined carotid IMT (CCIMT) were also assessed by non-invasive and easily accessible methods

Results & Discussion

Demographic, anthropometric and dietary-lifestyle characteristics are presented in Table 1. The mean age of all participants was 58.7 years old (± 6.9 years old) and the mean menopause age was 49.2 years old (± 5 years old). The majority of women had increased body weight (36.8% overweight and 28.7% obese) and was characterized by high adherence to Mediterranean-style diet (44.5%). Indices of vascular structure and function did not differ statistically significant among participants with different level of Mediterranean-style diet adherence. However, women with high adherence to Mediterranean diet had lower mean CCIMT by 1.2%, compared to those with low adherence (0.82mm±0.19 vs. 0.83mm±0.23).

Table 1. Demographic, anthropometric & lifestyle characteristics of study sample

Characteristics	Mean	Standard Deviation	Frequency
Age (years old)	58.7	6.9	-
Years of menopause	9.6	6.6	-
Body Mass Index (BMI) (kg/m²)	28.2	11.4	-
BMI categories			
Normal weight (%)	-	-	34.5
Overweight (%)	-	-	36.8
Obese (%)	-	-	28.7
Waist circumference (cm)	90.4	12.2	-
MedDietScore (0-55)	36.6	5.1	-
Physical activity (Total MET-min/week)	683.5	782.7	-

Higher red meat consumption was related to greater TyG-index (b-coefficient=1.358; p=0.01).

Concerning the body fat distribution, higher consumption of tea, alcohol, nuts, as well as, the higher adherence to MedDietScore associated inversely with mid-upper arm circumference (MUAC) and Triceps skinfold thickness (TSF), respectively (Figure 2,3).

Figure 2. MUAC by tertiles of food groups' consumption frequency

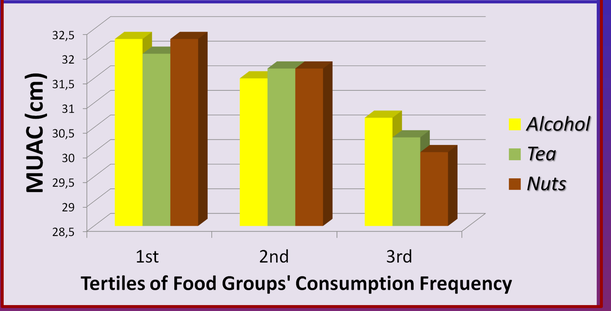
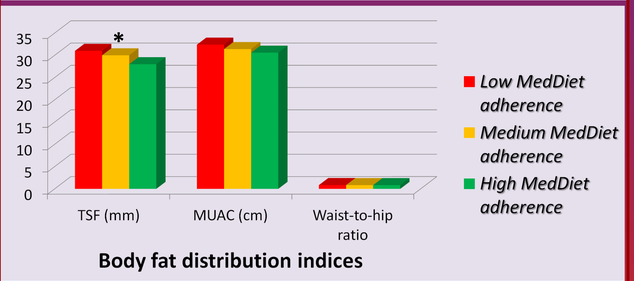
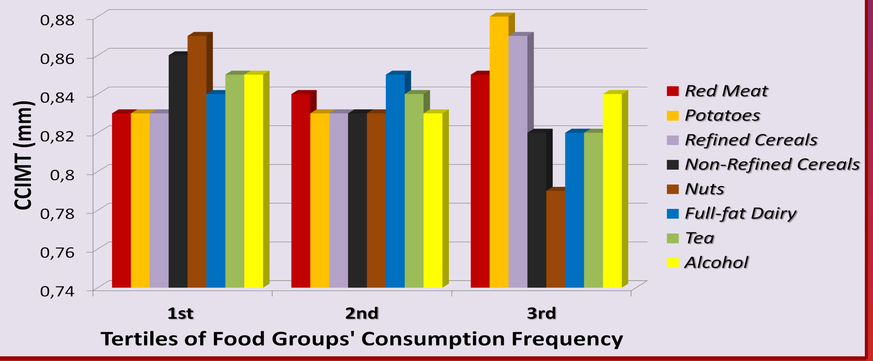


Figure 3. Body fat distribution indices according to MedDiet adherence



After controlling for potential confounders and further adjustment for daily energy intake, linear regression showed that consumption of nuts and non-refined cereals were associated negatively with CCIMT (b-coefficient=-0.026; p=0.01) and CCB-IMT (b-coefficient=-0.105; p=0.02), respectively. Consumption of potatoes (b-coefficient=0.644; p<0.001) and refined cereals (b-coefficient=0.081; p=0.04) was positively associated with CCIMT. Regarding arterial stiffness, higher intake of tea (b-coefficient=-0.371;p=0.03) and total dairy products (b-coefficient=-0.943; p=0.02) was associated negatively with PWV. Given that a large number of studies modelled dietary patterns continuously and/or categorically in tertiles, in Figure 1 mean CCIMT of study sample is presented according to different tertiles of specific food groups' consumption frequency. The lower tertile (1st) is indicative of lower food consumption frequency and the highest tertile (3rd) represents high food frequency consumption. Regarding the consumption of nuts, full-fat dairy products, tea and non-refined cereals, the participants in the 3rd tertile had lower mean CCIMT, compared to the participants in the 1st tertile.

Figure 1. Carotid IMT by tertiles of food groups' consumption frequency



Conclusions

Dietary patterns are associated with metabolic indices and subclinical atherosclerosis in postmenopausal women independently of total energy intake and physical activity.