

Relationship between socioeconomic status and asymptomatic peripheral arterial disease: a retrospective study

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Letter to the editor

Little information is available on the influence of socioeconomic status (SES) on the development of atherosclerosis. SES may provide important clues into the accumulation of risk that occurs from childhood, particularly health habits that may predispose individuals to unhealthy diets and low physical activity.^{1–4} We retrospectively evaluated the influence of SES on ankle-brachial index (ABI), a reliably symptom-independent tool of asymptomatic peripheral arterial disease.

Methods

Four hundred and twenty-five healthy women, mean age 48 ± 9 years, mean BMI 26.1 ± 5.6 (Table 1), were referred from general practitioners for screening and prevention of cardiovascular disease (CVD). Participants were free of symptoms, had ABI evaluation and completed the International Physical Activity Questionnaire (IPAQ) developed by the WHO, validated for the Italian population.^{5–7} Participants with a history of CVD and diabetes were excluded. SES was assessed by a self-administered questionnaire that investigated education (elementary; some high school; completed high school; university) and income (<30 000 euro/year; between 30 000 and 60 000 and >60 000 euro/year). The ABI of each leg is calculated by dividing the higher of the dorsalis pedis or posterior tibial pressure by the highest of the right or left arm pressure.^{5,6}

Local Ethical Review Board approved the study and participants signed an informed consent.

Statistical analysis: SPSS, V.21.0.1 (SPSS Inc, Chicago, Illinois, USA) was used. Results are presented as mean \pm SD or frequency expressed as a percentage. To study the association of SES with ABI, we used Cox proportional hazards regression analysis adjusted for age, BMI, smoking and adherence to Mediterranean diet (model 1); and for total cholesterol, HDL cholesterol, SBP and high sensitivity C-reactive protein (model 2). *P* less than 0.05 was considered significant.

Results

The mean Mediterranean Score was 32.6 ± 3.3 (median score was 30.9). The associations between socioeconomic groups and Mediterranean Score were consistent. Women with a low social and economic status were more obese (beta coefficient 0.20 $P < 0.05$) and smokers (beta coefficient 0.1; $P < 0.05$).

Table 2 illustrates the association of SES with ABI as a marker of asymptomatic atherosclerosis in the two models. A low SES is an independent factor for asymptomatic atherosclerosis. Women with high SES are more active according to IPAQ and had a greater adherence to Mediterranean diet.

Comment

For women in high-income countries, the estimated population attributable risk for mortality was 14% for smoking, 8% for overweight, 5% for physical inactivity, 4% for low fruit and vegetable intake.⁸ The effect of healthy lifestyle is multifactorial and is mediated by several factors, namely antioxidant intake and release of cytokines induced by physical activity.^{9–12} The SES strongly influenced lifestyle. Healthy lifestyle, based on adequate diet, regular physical activity and weight management, is both costly and time consuming and is a tough challenge.¹³ Fruit and vegetables are usually more expensive compared with fast food and healthy food required more home working.¹⁴ In addition, free gyms and sports facilities are scarce and sometimes difficult to access. Our hypothesis is that women with high economic status are more aware of the importance of lifestyle in the prevention of disease so they are more likely to find time to eat well and to perform regular physical activity. We confirm this observation; women with higher income had

Table 1 Clinical characteristics of patients

Clinical characteristics	
Mean age (years)	48.5 ± 9.2
Weight (kg)	81.2 ± 4.3
BMI (mean)	26.1 ± 5.6
Waist circumference (cm)	87.3 ± 5.4
SBP (mmHg)	124.2 ± 5.1
DBP (mmHg)	88.8 ± 3.1
Smoking (cigarettes/day)	10 ± 7
Alcohol (abstainer) number of pts	32
hs-CRP (mg/l) (available in 275 pts)	2.8 ± 1.3
Elementary nr (%)	115 (27%)
Some high school	85 (20%)
Completed high school	98 (23%)
University	127 (30%)

Table 2 Association of economic status with asymptomatic peripheral arterial disease (measured using ankle-brachial index) in adjusted models

ABI	<30 000 euro/ year references	Between 30 000 and	>60 000 euro/year
		60 000 euro/year HR (95% CI)	HR (95% CI)
Model 1	1	0.98 (0.37–1.24)	0.78 (0.55–0.90)*
Model 2	1	0.97 (0.44–1.23)	0.83 (0.41–0.93)*

ABI, ankle-brachial index; CI, confidence interval, PAD, peripheral arterial disease.
* $P < 0.05$; ** $P < 0.01$.

a healthier lifestyle and are less likely to developed asymptomatic atherosclerosis.

Limitations of the study are: first the retrospective design and the use of self-administered questionnaire to investigate nutritional habits, education, income and physical activity; second the lack of stratification according to emerging new risk factors in women (i.e. gestational hypertension and diabetes, premature menopause, polycystic ovary syndrome). Due to these biases this study provides preliminary data suggesting an influence of SES on atherosclerosis.

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coordinated and assembled the article. M.N., A.V.M., F.C., R.G. and A.F. performed the final supervision. All authors contributed to and approved the final article.

Conflicts of interest

There are no conflicts of interest.

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