

Physical activity is associated with lower arterial stiffness in normal-weight postmenopausal women

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Introduction

Regular physical activity is the most widely-adopted strategy for reducing CVD risk with aging, more likely due to its vascular health-enhancing influence. Moreover, obesity epidemics, that is even more pronounced in older populations, contribute in the development of various CVD risk factors, such as type 2 diabetes mellitus (T2DM), dyslipidemia and hypertension, that further increase the global burden of the CVD disease.

Results

Mean values of PWV decreased linearly with increasing intensity of physical activity (classes of physical activity: sedentary vs walking vs moderate vs vigorous activity: 9.07±1.22m/s vs 9.12±1.72m/s vs 8.47±1.31m/s vs 7.94±0.40m/s, ANOVA p for linear trend 0.003) (Figure 1). In non-obese postmenopausal women, PWV values associated with: i) the total number of METs (b-coefficient = -0.261, p=0.002), as well as, with SBP; ii) or with the number of moderate METs (b-coefficient = -0.192, p=0.025), as well as, with age and SBP. In our study sample (N=625), participants were classified in two categories; women exhibiting only mild physical activity (i.e. walking) and women presenting with moderate/vigorous activity. Subgroups included lean (BMI < 25kg/m²; N=194) and overweight – obese women (BMI ≥ 25kg/m²; N=431) (Table 1).

No significant associations were observed between the intensity of physical exercise and arterial stiffness in the overweight - obese group.

Objectives

The aim of this study was to investigate the association of low-intensity, moderate-intensity and vigorous-intensity physical activity with cardio metabolic parameters, carotid intima media thickness and arterial stiffness in postmenopausal women.

Materials & Methods

Our study sample included 625 women who visited the clinic, for the first time, between September 2015 and July 2019. The energy expenditure was estimated in metabolic equivalent of energy (MET) hours per week according to the IPAQ short form. All women were subjected, before their recruitment, to a routine evaluation program which included breast mammography, gynecological examination and Papanicolaou smear, as well as, evaluation of renal/thyroid/liver function.

Table 1. Descriptive analysis of the biochemical, hormonal and anthropometric parameters, as well as, indices of subclinical atherosclerosis in the study sample

	Walking		ANOVA p-value	Moderate/Vigorous Activity		ANOVA p-value
	Lean	Overweight/Obese		Lean	Overweight/Obese	
Age (years)	56.5±8.1	58.4±7.3	0.064	56.2±7.7	58.4±7.5	0.016
YSM (years)	7.6±6.2	9.5±7.2	0.043	7.9±6.1	9.2±7.6	0.126
BMI (kg/m ²)	23.1±1.4	30.7±4.7	<0.001	22.6±1.5	29.4±3.9	<0.001
Waist (cm)	80.9±7.7	95.7±12.7	<0.001	79.3±7.5	94.8±10.0	<0.001
Hip (cm)	100.6±6.0	112.3±11.0	<0.001	97.6±9.2	110.8±7.9	<0.001
SBP (mmHg)	110.3±19.6	116.8±24.9	0.058	111.5±19.4	118.8±25.2	0.015
DBP (mmHg)	67.9±12.0	70.1±15.5	0.289	68.5±10.5	70.5±14.3	0.223
Glucose (mg/dL)	90.3±7.5	96.8±19.1	0.010	89.1±8.9	93.4±11.8	0.003
Insulin (μIU/L)	6.5±2.0	12.5±12.4	0.115	5.6±2.1	9.1±4.9	0.004
HOMA-IR	1.5±0.5	2.5±1.3	0.021	1.2±0.5	2.1±1.4	0.007
Cholesterol (mg/dL)	218.3±36.7	211.1±37.1	0.196	209.8±26.5	213.9±38.8	0.365
Triglycerides (mg/dL)	81.9±30.6	103.9±41.7	<0.001	74.4±27.6	104.1±47.1	<0.001
HDL-cholesterol (mg/dL)	70.6±15.3	60.3±13.7	<0.001	70.9±15.5	63.5±14.9	<0.001
LDL-cholesterol (mg/dL)	137.0±35.2	135.0±34.4	0.704	125.9±26.3	133.8±34.5	0.056
CCA-IMT (mm)	13.1±1.4	13.6±1.1	0.076	13.4±1.4	14.0±1.1	0.048
CB-IMT (mm)	13.2±2.2	13.3±1.4	0.870	12.2±2.4	12.8±1.6	0.517
ICA-IMT (mm)	12.5±2.2	12.4±1.9	0.873	11.5±2.1	12.6±1.9	0.025
Combined IMT (mm)	12.9±1.4	12.8±1.0	0.802	12.2±0.9	13.3±0.8	0.020
PWV (m/s)	8.7±1.7	8.9±1.6	0.561	8.3±1.4	9.4±1.5	<0.001

YSM=years since menopause; BMI=body mass index; SBP=systolic blood pressure; DBP=diastolic blood pressure; HOMA-IR=homeostasis model assessment of insulin resistance; HDL-cholesterol=high density lipoprotein cholesterol; LDL-cholesterol=low density lipoprotein cholesterol; CCA-IMT=common carotid artery intima media thickness; CB-IMT=carotid bulb intima media thickness; ICA-IMT=internal carotid artery intima media thickness; PWV=pulse wave velocity *Bold indicates statistical significance, p-value<0.05.

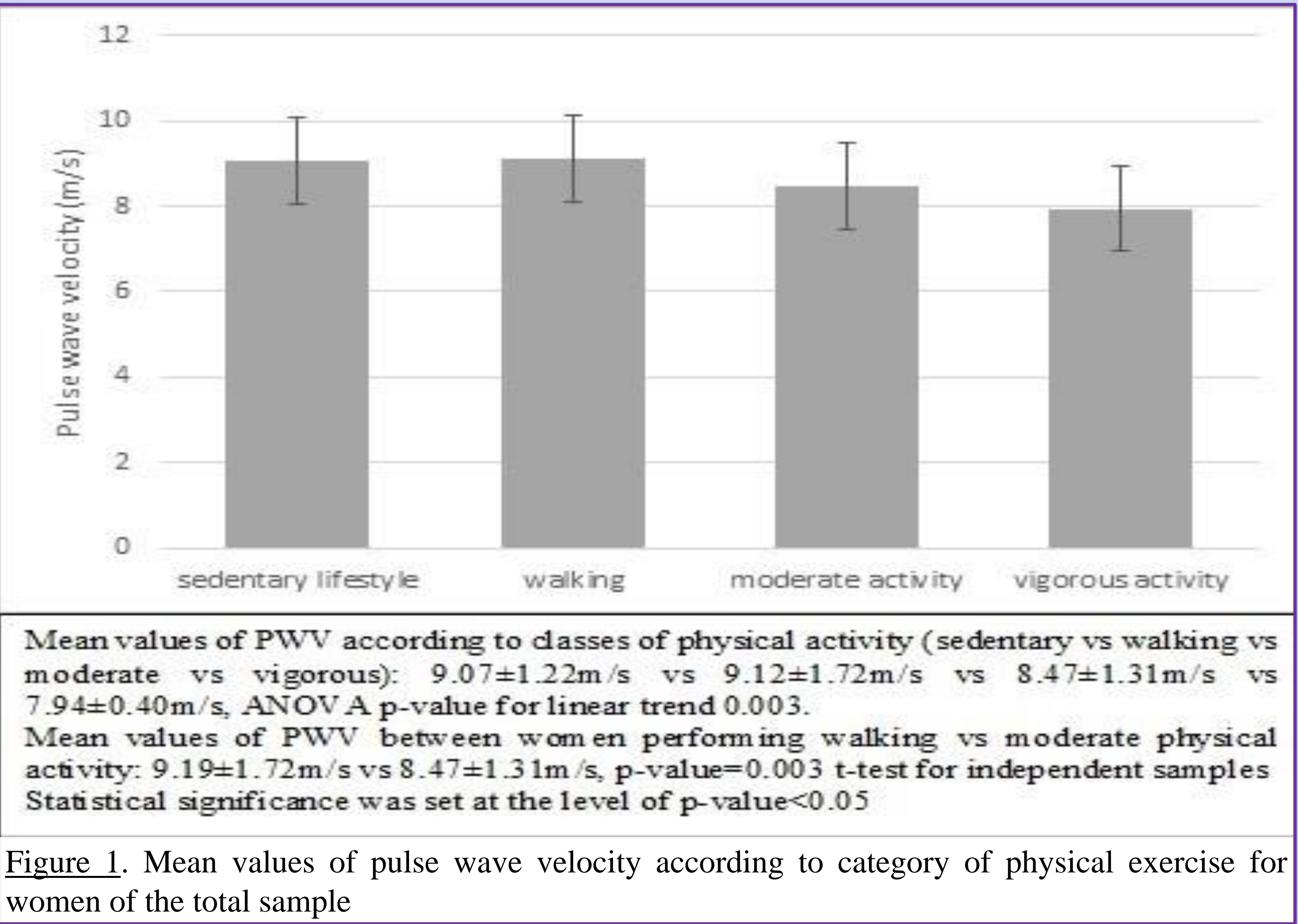


Figure 1. Mean values of pulse wave velocity according to category of physical exercise for women of the total sample

Conclusions

Evidence provided that physical activity is associated with a better cardio metabolic profile and lower arterial stiffness in postmenopausal women. This association was mainly evident in lean postmenopausal women