Role of physical activity and diet in incidence of hypertension: a population-based study in Portuguese adults

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Background/Objectives: To evaluate longitudinally the role of physical activity (PA) (type and intensity) and diet (measured using DASH score, nutrients and food intake) in hypertension incidence.

Subjects/Methods: As part of the EPIPorto study, 549 participants (≥40 years), resident in Porto, Portugal, at risk of developing hypertension, were evaluated. Blood pressure (BP) measurements were obtained twice (1999–2003 and 2005–2008), with a median interval of 3.8 years. Hypertension was defined as systolic BP ≥ 140 mm Hg and/or diastolic BP ≥ 90 mm Hg, and/or if the subjects were under anti-hypertensive therapy. Validated questionnaires were used to assess usual PA and dietary intake during the previous year. Poisson regression was used to calculate the incident rate ratios (IRRs) and respective 95% confidence intervals (95% CIs).

Results: In our population, the crude incidence rate (95% confidence interval (CI)) per 100 person-years of hypertension was 6.23 (5.26–7.20). After adjustment for several confounders, an inverse, though not significant, association was found across increasing tertiles of leisure-time PA and IRR (95% CI): 1 (reference); 0.77 (0.51–1.16); and 0.74 (0.48–1.11). No significant associations between the DASH score and hypertension incidence were observed. However, potassium intake (mg/1000 kcal) was shown to be inversely associated with hypertension development (upper tertile: 41863.0 for women and 41657.2 for men) vs first tertile (IRR = 0.65 (0.44–0.96), P for trend = 0.025). Additionally, in multivariate analysis, a significantly inverse association between the consumption of fruits/vegetables/pulses and hypertension incidence was found (upper vs first tertile: IRR = 0.61 (0.40–0.93), P for trend = 0.024).

Conclusions: In Portuguese adults, after adjustment for several confounders, the development of hypertension was inversely associated with potassium and fruits/vegetables/pulses intake. A dose–response is inherent to these inverse associations.

Keywords: hypertension; leisure-time physical activity; fruits; vegetables; pulses; potassium

Introduction

Hypertension is a major risk factor for cardiovascular diseases (CVDs), representing the leading attributable risk factor for death worldwide (WHO, 2009). Physical activity (PA) and a ‘healthy’ diet are believed to have a beneficial role in both prevention and treatment of high blood pressure (BP) (Forman et al., 2009; Kokkinos et al., 2009).

An overwhelming number of epidemiological studies support that increased PA of adequate duration, intensity and volume significantly lowers BP (Gu et al., 2007; Parker et al., 2007; Kokkinos et al., 2009). However, the concept of dose–response is still controversial and the intensity and type of activity that must be involved in primary prevention of hypertension needs further clarification. Additionally, different dietary patterns have already been shown to be protective against high BP (Dauchet et al., 2007; McNaughton et al., 2007), namely the Mediterranean (Panagiotakos et al., 2003) and the DASH (Appel et al., 1997; Champagne, 2006) diets. However, the magnitude of the relationship of PA and dietary patterns with hypertension incidence remains to be clarified, especially in European populations with high prevalence of CVD (WHO, 2004).