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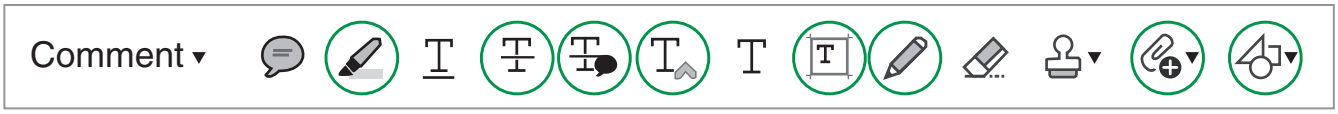

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Letter to the editor

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Moderate walking speed predicts hospitalisation in hypertensive patients with cardiovascular disease

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Hypertension (HTN) is a leading risk factor for developing cardiovascular disease (CVD), and carries a major global burden of disease.[1] Blood pressure (BP) and CVD are strongly associated, with even small increments in BP leading to an increased risk of CVD.[1] The prevalence of HTN is influenced by several lifestyle factors, including smoking, diet, body mass and insufficient physical activity.[2] On the other hand, it is well known that healthy lifestyle changes, including increased physical activity, contribute significantly to better BP control.[3,4] Epidemiological studies have demonstrated an inverse relationship between physical activity, cardiorespiratory fitness (CRF) and HTN.[4] In addition, a considerable number of studies have shown significant lowering of BP through regular aerobic exercise of moderate intensity in patients with HTN.

Even though higher CRF has been associated with lower risk of future events among people with HTN,[5–7] hypertensive patients are less physically active than normotensive people.[5,8] The gold standard for the assessment of CRF is the direct determination of the peak oxygen uptake (VO_2peak) by measuring gas exchange during incremental and maximal exercise testing.[9]

The assessment of VO_2peak is recommended for assessing CVD severity, predicting prognosis and evaluating the efficacy of cardiac rehabilitation/secondary prevention programmes.[10] When added to common risk factors, including systolic blood pressure, VO_2peak significantly improves the estimation of both short- and long-term risk for CVD mortality.[11–13] However, practical, financial and time constraints limit the direct determination of VO_2peak in many clinical settings.

VO_2peak has been demonstrated to be strongly associated with walking capacity in well-functioning older adults and among heart failure patients.[14,15] Walking is the most common physical activity among adults, and is the preferred mode of exercise testing. A simple, submaximal 1-km treadmill walking test (1 k-TWT) has been validated for the estimation of VO_2peak among stable outpatients with CVD,[16,17] with and without preserved left ventricular ejection fraction.[18] In addition, walking speed is a well-known indicator of health and function in aging and disease. Whether higher walking speed attenuates the risk of hospitalisation in adults with HTN is less known. Thus, we aimed to examine the association between walking sped and long-term all-cause hospitalisation in patients with HTN and CVD.

Hospitalisation was assessed in 1078 patients (male/female 867/211, age 64 ± 10 years) with HTN and CVD ($\approx$85% with coronary heart disease) three years after enrolment in an exercise-based secondary prevention programme. All patients completed a baseline health examination and a 1-km treadmill walk at a moderate intensity, perceptually regulated at 11–13/20 on the Borg Scale. All-cause hospitalisation was assessed as function of the walking speed during the 1 k-TWT.

At baseline subjects were subdivided into three groups based on walking speed as follows: SLOW (2.6 ± 0.5 km/h, $n = 359$), INTERMEDIATE (3.9 ± 0.3 km/h, $n = 362$) and FAST (5.1 ± 0.5 km/h, $n = 357$). During the following three years all-cause

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hospitalisations were 182 for SLOW (50% of the sample), 160 for INTERMEDIATE (44% of the sample) and 110 for FAST (31% of the sample).

Slow walkers compared with fast walkers were significantly older (69 ± 9 *vs.* 59 ± 9 years), had a higher body mass index (28.0 *vs.* 27.2), a lower prevalence of family history for CVD (37% *vs.* 53%), higher serum fasting glucose (111 ± 34 *vs.* 106 ± 27 mg/dL), higher total cholesterol (197 ± 40 *vs.* 184 ± 35 mg/dL) and higher creatinine (1.19 ± 0.6 *vs.* 1.10 ± 0.5 mg/dL). In addition, slow walkers had significantly lower use of β-blockers and statins, and a higher use of diuretics.

Compared with the SLOW group, the fully adjusted hazard ratios for hospitalisation were 0.97 (95% confidence interval (CI) 0.75 to 1.24, $p = 0.78$) for the INTERMEDIATE, and 0.63 (95% CI 0.45 to 0.88, $p < 0.001$) for the FAST groups (p for trend < 0.01). Each additional 1 km/h in walking speed resulted in a 19% reduction in overall hospitalisation (hazard ratio 0.81, 95% CI 0.71 to 0.91, $p < 0.001$). Length of hospital stay was 4186 days for SLOW (23 days per person); 2240 for INTERMEDIATE (14 days per person) and 990 days for FAST (nine days per person).

In conclusion, the walking speed maintained during a moderate 1-km walk was inversely related to all-cause hospitalisation in patients with HTN and CVD. The higher the baseline walking speed, the lower the relative risk of hospitalisation, and the shorter the length of hospital stay. These findings provide further support to the prognostic relevance of walking speed in outpatients with CVD.[19,20]

Declaration of Conflicting Interests

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